



World Family Medicine Journal

incorporating the Middle East Journal of Family Medicine

ISSN 1839-0188

March 2018 - Volume 16, Issue 3



From the Editor

Chief Editor:

A. Abyad
MD, MPH, AGSF, AFCHSE
Email: aabyad@cyberia.net.lb

Ethics Editor and Publisher

Lesley Pocock
medi+WORLD International
AUSTRALIA

Email:

lesleypocock@mediworld.com.au

In this issue of the journal a number of papers dealt with research issues relevant to the community. In addition to a number of paper that addressed elderly issues, safety issues in medicine and alternative medicine.

Bader Alm Mustafa, B et al; undertaken a study to find out the prevalence of hypothyroid among the patients who attended the Qatif-3 primary health care (PHC) center, Qatif, Saudi Arabia. The prevalence of hypothyroid (TSH \geq 5.5 μ U/ml) was 0.7%. A higher prevalence of 2.5% and 1.5% was observed in the subjects who ages were 45-60 years and above 60 years, respectively with no significant difference (p .076). The authors concluded that hypothyroidism and subclinical hypothyroidism were common in Saudi primary care. PHC provider must be aware about its early detection and management.

Helvacı, M.R et al; tried to understand whether or not there is an atherosclerotic background of hepatosteatosis in sickle cell diseases (SCDs). The authors concluded that SCDs are chronic inflammatory processes on vascular endothelium at the capillary level, and terminate with accelerated atherosclerosis induced end-organ failures in early years of life. Hepatosteatosis may actually be one of the hepatic consequences of accelerated atherosclerotic process in the SCDs.

Ghanmi, L et al; assessed the level of burden and frequency of depression among caregivers in Alzheimer's disease, and identified the main factors associated with the burden and depression in these caregivers. The authors concluded that the level

of burden and depression in caregivers caring for a patient with Alzheimer's disease is high. This rate can be reduced by all members of the family sharing in the care of the patient, and by resorting to institutional care in the advanced stages of the disease. Mousavi, M et al; looked how do Iranian elderly people conceptualize social welfare. They examined the concept of social welfare from their perspective. The results of this study reveals multi-dimensional concepts which can be also used to develop welfare indicators for the Iranian elderly. Aghakhani, N et al; investigated the relationship between spiritual well-being and anxiety and depression in older adults who attended clinics in Shiraz. The results from the current study showed that we can address the function of spiritual well-being in enhancing old adults' quality of life during nursing care process.

Yaghoobi M.H et al; aimed to introduce the pattern of antibiotic resistance of common bacteria causing nosocomial infections in Besat Hospital, Hamedan. The authors concluded that the main problem in this hospital is MDR Gram-negative infections rather than the Staphylococcus aureus. Reihani, HR et al; performed a study to determine the status and pattern of antibiotic prescription in emergency department of Imam Reza hospital. The study indicates differences in antibiotic prescription patterns among physicians in emergency medicine department compared with those of other services. Pourahmad, M et al; looked at the use of the proper anti-pseudomonas antibiotic therapy is an expected challenge among health care providers.

RohamRad, M et al; attempt to determine the abundance of Escherichia coli producing ESBL, lactamase genes of blaSHV, blaTEM, blaCTX-M by Multiplex PCR and their relationships by creating antibiotic resistance in strains of E. Coli. Keshavarzi, S et al; evaluates the efficacy of aqueous extract of Prosopis farcta root on high cholesterol diet-induced NAFLD in rabbits as experimental model. Hemmatti, A.A et al; discussed the Preparation of the edible supplement product of calcium-D in form of tablet powder of sepia skeleton (cuttlebone) and investigation of its physicochemical properties.

Elhami, S et al; looked at The factors affecting effective clinical education from the viewpoint of students, Nursing Trainers, and nursing staff Based on the results of this research paying attention to the trainers and improving their personal characteristics. Abri, S et al; conducted a study to identify the current roles of social workers in Iranian hospitals. The indirect care roles include 4 categories that deal with research, cooperation with and membership on the treatment team and hospital committees, documentation, and fundraising. Abedini, S et al; elucidated the ethical challenges experienced by faculty members in Hormozgan University of Medical Sciences'.

Alyamani, A.S; report on a 75-year-old man who referred from Socotra Island to Al-Mukalla hospital. The final diagnosis was that of large biliary duct stone. Emergency classical cholecystectomy was carried out and biliary duct stone was extracted successfully. Ostovar, R et al; presented a case study on the burden of gastric cancer. Akbari, H et al; attempt to determine the barriers to implementation of the strategic plan from the standpoint of managers of educational hospitals of Jahrom University of Science.

A number of clinical research studies dealt with several issues. Ghorbani, S et al; investigated the effective factors and outcomes of renal transplantation in patients who received this therapy in Kermanshah University affiliated hospitals from 1989 to 2015. Ebtehaj, M et al; compared the effect of pethidine, ketamin and ondansetron on shivering after surgery in elective laparoscopic cholecystectomy under general anesthesia. Hamidi, M et al; compared safety and efficacy of LED and conventional phototherapy to treat hyperbilirubinemia.

Alternative medicine was alluded to by several authors. Saki K et al; reviewed the most important medicinal herbs effective on common psychiatric disorders such as anxiety, stress, fatigue, insomnia, seizures, epilepsy, and memory loss have been studied. Badelbuu, S.G et al; aimed in their study to use herbal products in the treatment of dermatitis.

Mazaheri M et al; looked at Influencing factors on the occurrence of road accidents with a special emphasis on motorcyclists in national and global research; a

review of the studies conducted in Iran and the world. Farzaneh, E et al; investigated the epidemiology of the brain damages without skull fracture.

A number of authors addressed woman issues. Giti, S et al; did a study to determine the mean Uterine Artery Doppler Pulsatility Index during pregnancy for Predicting Adverse Pregnancy Outcome. Bameri, F et al studies the effects of a hypothermia prevention program on the central body temperature and shivering in women undergoing a cesarean section. The study findings indicate that a hypothermia prevention program can greatly prevent the reduction in central body temperature and its complications, including shivering, in women undergoing a cesarean section. Rajabzadeh, F et al; reviewed the effect hot temperament herbs on primary Dysmenorrhea: a systematic review. They focused on herbal medicine to identify the efficacy and safety of herbals with hot temperament for primary dysmenorrhea which compared with placebo and other treatment. Hojat, M et al; investigated the Relationship between Serum Bilirubin Levels in the First Week of Life with Season of Birth. There was no significant relationship between season of birth and serum bilirubin levels in the first week of life.

A number of papers discussed the issue of safety in medicine as related to the Nursing field. Rezaei F et al; did a study to determine the effect of knowledge management dimensions on the level of performance of nurses working in Ayatollah Rouhani Hospital in Babol. The results of this study showed that most of the nurses of this center believe that the quad size of knowledge management on the level of performance among hospital nurses, in addition to improving the quality of nurses' services. Elhami, S et al; conducted a study for self-evaluation of nurses' clinical competency based on Benner theory. The results demonstrated that totally the level of clinical competency and use of nursing skills are desirable in the studied population. Goliroshan S, et al; evaluated the clinical competency of nurses working in Babol University of Medical Sciences hospitals. The authors recommended that nursing managers pay more attention to the quality of nursing services and, therefore, ways to improve them. Rezaei, F et al; investigated the Relationship between Intellectual Capital and Organizational Intelligence

among Nurses Working in Ayatollah Rouhani Hospital in Babol in 2017. Hosseini, M et al; looked at the relationship between the Family Functions and Health-Promoting Behaviors of Nursing Students in Tehran. Najafi, M et al; determine the compliance of the recorded nursing care with clinical care's classification system in the intensive care units of cardiac surgery. Due to the lack of nurses' familiarity with the nursing process and not using that in the documentation of the cares; using the CCC system for recording the nursing reports is suggested.

Community issues are always important for primary care and family physicians. Molkara, T et al; conducted a study with the aim of comparing the effects of different factors affecting marital instability between the women from general population and those with sexual dysfunction. There was no significant relationship between the mentioned factors and MII score in the control group ($P > 0.05$). Tavakolizadeh, J et al; looked at the effect of humor training on reducing hopelessness and increasing social adjustment in mothers of children with intellectual disability. Moghaddasfar, T et al; investigated the effectiveness of Commitment and acceptance therapy on psychological Well-being in Diabetes Patients..

Akbar, S et al; assessed factors affecting the chest compression cardiopulmonary resuscitation from the perspective of personnel pre-hospital emergency of central hub in Iran.

The authors concluded that it is possible that chest compression in CPR is more than 6 centimeters or less than 5 centimeters. Sani, MN et al; studied the performance of the resuscitation team by examining the extent of compliance with the standard principles of of CPR based on the latest scientific and specialized guideline. Ghotaslou, R et al; compared the number of different species of Lactobacillus and Bifidobacterium in Type 2 diabetic patients and healthy individuals. Namazi, M.H et al; evaluated the success rate, complications and follow up results of lower limb endovascular interventions.

Hajihashemi, M et al; examined the relationship between marital satisfaction and parenting Self-Efficacy among primary school students parent in Khomeini Shahr city. The findings of this study in-

dicade a direct and significant relationship between parenting Self-Efficacy and marital satisfaction. It is recommended that schools and other educational institute organize the educational intervention to increase marital satisfaction and successful parenting.

Copyright

While all efforts have been made to ensure the accuracy of the information in this journal, opinions expressed are those of the authors and do not necessarily reflect the views of The Publishers, Editor or the Editorial Board. The publishers, Editor and Editorial Board cannot be held responsible for errors or any consequences arising from the use of information contained in this journal; or the views and opinions expressed.
p-ISSN: 1839-0188; e-ISSN : 1839-0196

<http://www.mejfm.com>

<http://www.worldfamilymedicine.com>

Editorial Board

http://www.mejfm.com/editorial_board.htm

Author Information:

http://www.mejfm.com/author_info.htm

Publishers

Lesley Pocock
medi+WORLD International
Australia

Email:

lesleypocock@mediworld.com.au

2 Editorial**Original Contribution/Clinical Investigation**

- 8 Prevalence of Hypothyroid Disease in Saudi Primary Care
Bader Almustafa, Susan Almunif, Zahrah Aljidhr, Sakina Albusaeed, Ghadeer Aljishi
DOI: 10.5742/MEWFM.2018.93297
- 12 Atherosclerotic background of hepatosteatosi in sickle cell diseases
Mehmet Rami Helvacı, Mustafa Yaprak, Abdulrazak Abyad, Lesley Pocock
DOI: 10.5742/MEWFM.2018.93305
- 19 Studying the Extent of Compliance with the Standard Principles of Cardiopulmonary Resuscitation in the Selected Educational Centers of Mazandaran University of Medical Sciences 2016-2017
Narges Masoudi Sani, Hedayat Jafari, Mohammad Ali Heidari Gorji, Nouroddin Mousavi Nasab, Farzad Bozorgi, Vida Nesarhosseini
DOI: 10.5742/MEWFM.2018.93299
- 24 Antibiotic Prescription Patterns in an Academic Emergency Department in Iran
HamidReza Reihani, HamidReza Nader Neema John Mehramiz, Majid Khadem Rezaiyan, Mahdi Foroughian
DOI: 10.5742/MEWFM.2018.93300
- 30 Investigating the Relationship between Serum Bilirubin Levels in the First Week of Life with Season of Birth
Mohsen Hojat, Nabi Zarezadeh, Vahid Mogharab, Ehsan Rahmanian
DOI: 10.5742/MEWFM.2018.93301
- 34 The evaluation of the success rate, complications and mid-term follow up results of patients with peripheral arterial disease of lower limb treated using endovascular therapy: A single center study
Mohammad Hasan Namazi, Fatemeh Abedi, Morteza Safi, Hossein Vakili, Habibollah Saadat, Saeed Alipour Parsa, Isa Khaheshi, Soroush Veisi
DOI: 10.5742/MEWFM.2018.93302
- 39 Depression and burden level in the natural caregiver of the demented patient : A Tunisian experience
Latifa Ghanmi, Sonia Hammami, Salem Bouomrani, Amine Jabri, Mouna Abbes, Khalifa Zitoun, Lobna Zouari, Mohamed Maalej
DOI: 10.5742/MEWFM.2018.93298
- 47 Evaluation of the Effect of Aloe Vera Ointment with Chamomile Ointment on Severity of Children's Diaper Dermatitis: A randomized, double-blind clinical trial
Sima Ghanipour Badelbuu, Yousef Javadzadeh, Mahnaz Jabraeili, Shiva Heidari, Mohammad Arshadi Bostanabad
DOI: 10.5742/MEWFM.2018.93304

Population and Community Studies

- 52 Reviewing the barriers to the implementation of the strategic plans from the perspective of hospital managers in Jahrom
Hamideh Akbari, Navid Kalani, Abdolazim Jokar, Nabi Zarezadeh, Seyed Hamed Hojati, Esmail Rayat Dost
DOI: 10.5742/MEWFM.2018.93306

- 58 How do Iranian-Elderly People-Conceptualize Social Welfare?-A Content Analysis Study -----
Mirtahter Mousavi, Hassan Rafiey, Robab Sahaf, Mohammad Ali Mohammadi, Meroe Vameghi, Seyed Hossein Mohaqeqi Kamal, Faeze Joghataei, Arya Hamedanchi
DOI: 10.5742/MEWFM.2018.93312
- 64 The Relationship between Spiritual wellbeing, Anxiety and Depression in Old Adults: A cross sectional study of Shiraz Clinics, Iran
Nader Aghakhani, Davood Vahabzadeh, Soudabeh Niroomand, Zoleikha Asgarlii, Foroozandeh Zaravar
DOI: 10.5742/MEWFM.2018.93315
- 68 Investigate the Relationship between Marital Satisfaction and Parenting Self-Efficacy among Parents of Primary School Students
Mina Hajjhashemi, Maryam Amidi-Mazaheri
DOI: 10.5742/MEWFM.2018.93314
- 74 Effect of humour on reduction of hopelessness and increase of social adjustment in mothers of children with intellectual disability
Jahanshir Tavakolizadeh, Nasrin Jokar Ghochani
DOI: 10.5742/MEWFM.2018.93309
- 79 The Association of socio-demographic problems on Marital Instability between women with sexual dysfunction and general population in Mashhad, Iran 2017: A Case- Control Study
Tahereh Molkara, Malihe Motavasselian, Seyed Reza Moallem, Farideh Akhlaghi, Roshanak Salari, Reza Goldoozian, Veda Vakili
DOI: 10.5742/MEWFM.2018.93308
- 86 Barriers to effective advocacy for normal birth; Ethics in educational strategy of maternity care system: A qualitative study
Ali Ramezankhani, Tayebe Samieizadeh Toosi, Nahid Akbari
DOI: 10.5742/MEWFM.2018.93311
- 91 A study of influential factors on chest compression in cardio pulmonary resuscitation from the perspective of personnel of pre-hospital emergency of central hub in Iran in the first half year, 2016
Shahbazi Akbar, Shahin Faramarz, Sharifi Abolghasem, Molavi Choobini Z
DOI: 10.5742/MEWFM.2018.93313

Clinical Research and Methods

- 95 The Effects of a Hypothermia Prevention Program on the Body Temperature and Shivering in Women Undergoing Cesarean Section
Fatemeh Bameri, Ali Navidian, Asadollah Shakeri, Zahra Pishkarmofrad
DOI: 10.5742/MEWFM.2018.93322
- 102 Comparison of Bifidobacterium spp. and Lactobacillus spp. Count in Faeces of Patients with Type 2 Diabetes Mellitus and healthy people
Reza Ghotaslou, Shahram Arbabi, Akbar Aliasgharzadeh Abdullah Aliloo
DOI: 10.5742/MEWFM.2018.93316
- 107 Epidemiologic characteristics and outcomes of renal transplantation in hospitals affiliated to Kermanshah University of Medical Sciences, Kermanshah, Iran: 1989-2015
Sakineh Ghorbani, Afshin Goodarzi, Afshin Almasi, Ali Soroush, Bahram Samadzadeh, Mehrdad payandeh, Azadeh Foroughinia
DOI: 10.5742/MEWFM.2018.93317
- 113 Comparison of the effect of pethidine, ketamin and ondansetron on shivering after surgery in elective laparoscopic cholecystectomy under general anesthesia
Mehdi Ebtahaj, Nasim Zarin, Mahmood Aghaziyarati
DOI: 10.5742/MEWFM.2018.93318

- 118 Comparison of Phototherapy with light-editing diodes (LED) and Conventional Phototherapy (fluorescent lamps) in Reducing Jaundice in Term and Preterm Newborns
Majid Hamidi, Fatemeh Aliakbari
DOI: 10.5742/MEWFM.2018.93319
- 124 Ethical Challenges Experiences by Faculty Members: A Qualitative Research with a Phenomenological Approach
Samireh Abedini, Elham Imani, Abbas Fazli
DOI: 10.5742/MEWFM.2018.93320
- 132 Prevalence of Structural Brain Damage Without Skull Fracture in Autopsy of Head Trauma Victims
Esmaeil Farzaneh, Babak Mostafazadeh, Fatemeh Tarjoman, Aziz Kamran
DOI: 10.5742/MEWFM.2018.93321
- 139 An introduction to determination of mean Uterine Artery Doppler Pulsatility Index during pregnancy for Predicting Adverse Pregnancy Outcome
Sima Gitia, Vajihah Marsoosi, Maryam Moshfeghi
DOI: 10.5742/MEWFM.2018.93323

Basic Research

- 145 Syrian Mesquite Extract Improves Serum Lipids and Liver Tissue in NFALD modelled Rabbits
Samira Keshavarzi, Gholamreza Bahrami, Bahareh Mohammadi, Razieh Hatami, Shahram Miraghaee
DOI: 10.5742/MEWFM.2018.93324
- 153 Preparation of the edible supplement product of calcium-D in form of tablet from powder of sepia skeleton (cuttlebone) and investigation of its physico-chemical properties
Ali Asghar Hemmati, Azar Mostoufi, Nader Shakiba, Zahra Nazari Khrosgani, Shahrzad Memarzade
DOI: 10.5742/MEWFM.2018.93325
- 161 Determination of the frequency of blaCTX-M, blaSHV and blaTEM genes in Esherichia coli isolated from Burns patients in Tehran Shahid Motahari Hospital
Mona RohamRad, Nahid Rahimifard, GholamReza Javadi, Babak PourAkbari
DOI: 10.5742/MEWFM.2018.93326
- 165 A clinical debate concerning Aminoglycoside resistance genes among Pseudomonas aeruginosa strains
Morteza Pourahmad, Abassali Javadi, Asghar Kamran, Behrooz Ataei, Majid Yaran, Abdolreza Sotoodeh Jharomi
DOI: 10.5742/MEWFM.2018.93327

Health and safety issues in the Community

- 172 The pattern of antibiotic resistance of common bacteria causing nosocomial infections
Mojtaba Hedayat Yaghoobi, Mohammad Reza Arabestani, Pezhman Karami, Azad Khaleidi, Mohamad Ali Seifrabie, Omid Khiabanchian, Farshid Rahimi-Bashar
DOI: 10.5742/MEWFM.2018.93342
- 179 The Evaluation of Compliance of The Records of Nursing Care after Surgery in the Intensive Care Unit of Cardiac Surgery with Clinical Care Classification system
Masoomah Najafi, Nasrin Rassoulzadeh, Maryam Rassouli
DOI: 10.5742/MEWFM.2018.93328
- 186 Self-Evaluation of Nurses Clinical Competency based on Benner Theory
Saeedeh Elhami, Maryam Ban, Sajedeh Mousaviasl, Atefeh Zahedi
DOI: 10.5742/MEWFM.2018.93329
- 193 Influencing factors on the occurrence of road accidents with a special emphasis on motorcyclists in national and global research; a review of the studies conducted in Iran and the world
Mazaheri M, Keshavarz mohammadi N, Soori H, Ramezankhani A, Sohrabi vafa M, Sohrabi vafa F, Moradi A
DOI: 10.5742/MEWFM.2018.93330

- 216 Investigating the Relationship between Intellectual Capital and Organizational Intelligence among Nurses Working in Ayatollah Rouhani Hospital in Babol in 2017
Fatemeh Rezaei , Nasibeh Ramazannezhad, Fataneh Sabz Alipour Shiadeh
DOI: 10.5742/MEWFM.2018.93332
- 223 The Relationship between the Family Functions and Health-Promoting Behaviors of Nursing Students in Tehran, Iran
Meimanat Hosseini, Parvin Sarbakhsh, Soliman Mollaei
DOI: 10.5742/MEWFM.2018.93333
- Rehabilitation medicine**
- 227 Investigation of Serum Levels of Vitamin D in Patients with intractable Carpal Tunnel Syndrome Referred to Physical Medicine and Rehabilitation Clinics of Shiraz University of Medical Sciences in 2015
Seyed Mohammad Saghanezhad, Sharareh Roshanzamir, Marzieh Mohtashamkia
DOI: 10.5742/MEWFM.2018.93343
- Education and Training**
- 231 Investigating the Effect of Knowledge Management Dimensions on the Level of Performance of Nurses Working in Ayatollah Rouhani Hospital in Babol
Fatemeh Rezaei, Mohsen Hosseinzadeh Savadi, Maedeh Faraji Douki
DOI: 10.5742/MEWFM.2018.93336
- 237 Medical Social Workers in Iran: Professionals or Employees?
Sareh Abri, Mohammad Zahedi asl
DOI: 10.5742/MEWFM.2018.93334
- 244 The factors affecting effective clinical education from the viewpoint of students, Nursing Trainers, and nursing staff
Saeedeh Elhami, Maryam Heidari, Maryam Ban, Sajedeh Mosaviasl, Mohammad Khavasi
DOI: 10.5742/MEWFM.2018.93335
- Review papers**
- 252 Effects of hot temperament herbs on primary Dysmenorrhea: a systematic review
Farrin Rajabzadeh, Seyyed Mohammadbagher Fazljou, Laleh Khodaie, Shamsi Abbasalizadeh, Leila Sahebi
DOI: 10.5742/MEWFM.2018.93338
- 259 Natural Therapeutics for Common Psychiatric Disorders
Koroush Saki, Mahmoud Rafeian-Kopaei
DOI: 10.5742/MEWFM.2018.93337
- Original article**
- 266 Burden of Gastric Cancer: A Case Study of Iran
Rahim Ostovar, Abed Eghdami, Abdosaleh Jafari, Ramin Ravangard
DOI: 10.5742/MEWFM.2018.93341
- Case report**
- 271 Biliary Duct Large Stone
Abdulla Saleh Alyamani
DOI: 10.5742/MEWFM.2018.93340
- Nursing Research**
- 274 Investigating the Self-assessment of Clinical Competency of Nurses Working in Babol University of Medical Sciences Hospitals
Goliroshan S, Babanataj R, Aziznejadroshan P
DOI: 10.5742/MEWFM.2018.93331

Prevalence of Hypothyroid Disease in Saudi Primary Care

Bader Almustafa (1)
Susan Almunif (2)
Zahrah Aljidhr (2)
Sakina Albusaeed (2)
Ghadeer Aljishi (1)

(1) Qatif Primary Health Care, Qatif, Saudi Arabia
 (2) University of Dammam, Dammam, Saudi Arabia

Corresponding author:

Almustafa B
 Qatif Primary Health Care, Qatif, Saudi Arabia
Email: bader@alqatif.org

Received: February 5, 2018. Accepted: February, 10, 2018; Published: March 1, 2018

Citation: Almustafa B. et al. Prevalence of Hypothyroid Disease in Saudi Primary Care. *World Family Medicine*. 2018; 16(3):8-11. DOI: 10.5742/MEWFM.2018.93297

Abstract

Background: Thyroid dysfunction is a major public health problem. However, its burden in Saudi primary care has not been studied.

Objectives: To find out the prevalence of hypothyroid among the patients who attended the Qatif-3 primary health care (PHC) center, Qatif, Saudi Arabia.

Materials and Methods: A primary-care based study was undertaken by using the data which was retrieved from the thyroid function tests, which included T4 and TSH, of individuals ≥ 15 years old from the laboratory registers maintained in Qatif-3 PHC Center, from 1st September, 2014 to 30th August, 2016. Descriptive statistics and analysis were done using SPSS version 20 software.

Results: The total number of adult cases was 75, which included 13 males (17.3%). The prevalence of hypothyroid (TSH ≥ 5.5 $\mu\text{U/ml}$) was 0.7%. A higher prevalence of 2.5% and 1.5% was observed in the subjects whose ages were 45-60 years and above 60 years, respectively with no significant difference ($p = .076$). The incidence was 18 (17 per thousand of adult population) per year. The mean age of first presentation was 44.9 (SD 13.6) years. The median TSH level at presentation was 7.3 $\mu\text{U/ml}$.

Conclusion: Females and people of mid ages were more vulnerable to hypothyroid in this population. Hypothyroidism and subclinical hypothyroidism were common in Saudi primary care. PHC providers must be aware about its early detection and management.

Key words: TSH, Hypothyroidism, Saudi Arabia, Primary Care, Epidemiology, Burden

Introduction

Hypothyroidism is one of the most common endocrine disorders seen worldwide (1). Hypothyroidism presents in different stages of dysfunction, subclinical (SCHypo) and overt status (OvHypo). They usually present, in primary care, with nonspecific symptoms. Hashimoto's thyroiditis is the commonest cause whereas hypopituitarism and developmental abnormalities are much less common (3).

The prevalence of OvHypo in Europe is about 4-5% (2), while the prevalence of SCHypo is about 4-15% (1). In the United States, studies showed 0.4% prevalence of OvHypo, while 4.3-8.5% prevalence of SCHypo (3,4).

Studies of elderly persons above age of 60 years have shown a higher prevalence of raised serum TSH in this age group, above 10% of the subjects (1,5),

The most common cause of thyroid disorders is iodine deficiency and literature shows that almost one-third of the world's population lives in an area of iodine deficiency (Zimmermann, 2009). In 2004, however, a WHO assessment of global iodine status classified Saudi Arabia as having 'optimal' iodine nutrition. (6)

Regionally, a recent systematic review showed the prevalence of subclinical hypothyroid as 2.3% - 6.18%, while overt hypothyroid varied from 1.12% up to 47.34% (7).

In Saudi Arabia, studies in primary care are very limited, while none are found in the general population. In Albaha region, south-west, high-altitude area, Ahmed reported 40.8% prevalence of high TSH $>4 \mu\text{U/mL}$ (8). In Riyadh, a study in a tertiary hospital showed a prevalence of 15.5% of hypothyroidism among non-endocrine females above age of 20 years (9). Bahammam studied TSH in patients referred to a sleep disorder center. He found a prevalence of high TSH in 11.5% of obstructive sleep apnea (OSA) patients, while in 5.4% of non-OSA patients (10).

Qatif-3 Primary Health Care (PHC) Center is located in Qatif, at the eastern shore of Saudi Arabia. It is a very rich town of marine products, agriculture, oil and gas. It is not in an endemic region for goiter (4). The center is serving patients free of charge for all inhabitants.

The purpose of this study was to estimate the prevalence of hypothyroid cases, identified among Qatif-3 PHC center's attendants.

Knowledge of the prevalence will help in planning for appropriate training for care providers, in addition to better estimation of the need for logistics, laboratory tests and medications. It may stimulate further etiological and epidemiological studies.

Methodology

This was a cross-sectional epidemiological study conducted in Qatif-3 PHC Center, Saudi Arabia. Primary outcome measure of the study was the prevalence of hypothyroidism assessed by measurement of thyroid hormones.

Subjects were identified from the laboratory registers maintained in Qatif-3 PHC Center, from 1st Nov, 2012 to 30th Aug, 2016. Patients having thyroid function tests (T4 and TSH) done were selected. Medical records of all selected patients were reviewed. Inclusion criteria included individuals ≥ 15 years old with no prior history of hypothyroid, TSH $\geq 3.5 \mu\text{U/mL}$ and no missing demographics.

Based on previous thyroid history and current thyroid stimulation hormone test results, participants were classified using the following definitions: Hypothyroid: Serum-free thyroxine (FT4) $<0.90 \text{ ng/dL}$ and thyroid stimulation hormone (TSH) $>5.0 \mu\text{U/mL}$, Subclinical hypothyroidism: Normal serum FT4 and TSH $>5.50 \mu\text{U/mL}$, and Prior hypothyroidism.

The population of the catchment areas among years of the study was traced from the official census reports of the Ministry of Health in Qatif.

Descriptive statistics and analysis were done using the SPSS version 23 software. The prevalence of hypothyroidism was estimated as counts and percentages. A Chi-square test was used to assess difference in the prevalence of hypothyroidism, among different age groups and gender categories. ANOVA test was used to compare mean of TSH among different age and gender groups.

Results

The total number of adult cases enrolled was 145, from 1st September, 2014 to 30th August, 2016. It included 23 males (15.9%). Fourteen were excluded being not inhabitant of the catchment area or prior history of hypothyroid.

Out of the enrolled 145 subjects 122 (84.1%) were females. The mean age of the subjects, at their first presentation, was 45.5 (± 14.0 SD), ranging from 15 to 83 years, as shown in Table 1 (next page).

The prevalence of hypothyroid (TSH $\geq 5.5 \mu\text{U/ml}$) was 1.43% among the whole population, as shown in Table 2. However, a higher prevalence of 4.5% and 4.6% was observed in the subjects who were 45-60 years old and above 60 years old, respectively with no significant difference ($p = 0.12$). The incidence was 36 cases per year (4 per thousand of adult population per year).

The median TSH level at presentation was 6.89 $\mu\text{U/ml}$, as shown in Table 3. TSH $\geq 10 \mu\text{U/ml}$ was found in 38 (26.8%) individuals.

The mean level of presenting TSH among different age groups is shown in Table 4, while that among patients younger and older than 45 years is shown in Table 5.

Table 1: Age of presentation among sex

Sex	Mean	N	Std. Deviation	Median	Minimum	Maximum
male	49.09	23	14.56931	52.0	21.00	67.00
female	44.85	122	13.85224	45.0	15.00	83.00
Total	45.52	145	14.00303	45.0	15.00	83.00

No significant difference in age presentation between male and female patients, ANOVA Test = 0.184.

Table 2: Individuals presented with high TSH > 5.0 in Qatif-3 PHCC Sept 2014-Aug 2016

Age Group	15-<45 *			45-<60			>60			Total		
	Pop	N	%	Pop	N	%	Pop	N	%	Pop	N	%
Total Adult M	4263	9	0.2%	512	6	1.2%	340	8	2.4%	5115	23	0.4%
Total Adult F	4182	59	1.4%	578	43	7.4%	275	20	7.3%	5035	122	2.4%
Total Adult	8445	68	0.8%	1090	49	4.5%	615	28	4.6%	10150	145	1.4%

* Significant difference is noted between different age groups, Chi X2 p<0.001.

Table 3: Mean Level of presenting TSH among sex.

Sex	Mean	N	Std. Deviation	Median	Minimum	Maximum
Male	11.78	21	20.44	6.17	5.05	100.00
Female	19.42	121	58.58	7.02	5.12	486.00
Total	18.29	142	54.65	6.89	5.05	486.00

No significant difference in level of presenting TSH between male and female patients, ANOVA Test p=0.556.

Table 4: Mean Level of presenting TSH among age groups.

Age Group	Mean	N	Std. Deviation	Median	Minimum	Maximum
15 -< 24.99	56.35	10	150.99	8.95	5.88	486.00
25 -< 34.99	9.40	30	4.24	7.96	5.38	24.91
35 -< 44.99	16.50	27	23.00	7.70	5.23	100.00
45 -< 54.99	17.03	35	37.84	6.65	5.05	226.80
55 -< 64.99	21.74	29	69.26	6.41	5.20	377.60
>65	7.24	11	2.69	6.64	5.12	15.00
Total	18.29	142	54.65	6.89	5.05	486.00

No significant difference in level of presenting TSH among age groups, ANOVA Test p=0.284.

Table 5: Mean Level of presenting TSH among patients younger and older than 45 years

Age Group	Mean	N	Std. Deviation	Median	Minimum	Maximum
15 -< 44.99	19.27	67	59.84	8.21	5.23	486.00
> 45	17.41	75	49.97	6.57	5.05	377.60
Total	18.29	142	54.65	6.89	5.05	486.00

No significant difference in level of presenting TSH among those younger and older than 45 years, ANOVA Test $p=0.841$.

Discussion

The prevalence of hypothyroid spectrum noted in this study was 1.43%, which is less than the international figures. This may be due to the wider age group, the denominator used being whole catchment area population at age ≥ 15 years, the geographic location of Qatif near the seashore and the characteristics of the studied patients being symptomatic patients who presented in a general clinic.

The true prevalence may be much higher, due to the nature of the disease and its non specific presentation.

The prevalence of hypothyroid in females (2.4%) was six times that in males (0.4%). This difference between both genders is well expected and agreed with other studies.

A statistically significant difference is noted between those below 15 years of age and older groups. However, the difference is not significant between those at age group 45-60 years (4.5%), on one hand, and those older than 60 (4.6%), on the other hand. This calls for further study. It may reflect younger presentation of the disease, patient's behavior or doctor's inertia and disparity among older age groups.

Though no statistically significant difference was noted in level of TSH at presentation between different age groups, a decreasing trend in median level is noted, as the patient get older.

The TSH level $>10 \mu\text{U/ml}$ was found in 26.8% of this study, in comparison to 43% by Akbar et al (11).

This study showed the expected burden of hypothyroid in primary care, based on the catchment population. This will greatly help the planners to estimate the expected load and prepare for logistics. In addition, it helps the medical educators, clinicians and auditors in evaluating their findings.

Conclusion

Females and people of mid ages were more vulnerable to hypothyroid in this population. Hypothyroidism is common in Saudi primary care. PHC providers must be aware about its early detection and management.

Acknowledgment

The authors acknowledge the valuable contribution of Ms. Elham Albannai, Ms. Zahra', Ms. Clerk, Dr. Ghadeer Aljishi, Mr. Radwan Almatwa'a and Dr. Majdi Altufaif.

References

- Vanderpump MP. The epidemiology of thyroid disease. *British medical bulletin*. 2011 Sep 1;99(1).
- Garmendia Madariaga A, Santos Palacios S, Guillén-Grima F, Galofré JC. The incidence and prevalence of thyroid dysfunction in Europe: a meta-analysis. *The Journal of Clinical Endocrinology & Metabolism*. 2014 Mar 1;99(3):923-31.
- Garber JR, Cobin RH, Gharib H, Hennessey JV, Klein I, Mechanick JI, Pessah-Pollack R, Singer PA, Woeber for the American Association of Clinical Endocrinologists and American Thyroid Association Taskforce on Hypothyroidism in Adults KA. Clinical practice guidelines for hypothyroidism in adults: cosponsored by the American Association of Clinical Endocrinologists and the American Thyroid Association. *Thyroid*. 2012 Dec 1;22(12):1200-35.
- Hollowell JG, Staehling NW, Flanders WD, Hannon WH, Gunter EW, Spencer CA, Braverman LE. Serum TSH, T4, and thyroid antibodies in the United States population (1988 to 1994): National Health and Nutrition Examination Survey (NHANES III). *The Journal of Clinical Endocrinology & Metabolism*. 2002 Feb 1;87(2):489-99.
- Somwaru LL, Rariy CM, Arnold AM, Cappola AR. The natural history of subclinical hypothyroidism in the elderly: the cardiovascular health study. *The Journal of Clinical Endocrinology & Metabolism*. 2012 Jun 1;97(6):1962-9.
- Andersson M, Takkouche B, Egli I, Allen HE, Benoist BD. Current global iodine status and progress over the last decade towards the elimination of iodine deficiency. *Bulletin of the World Health Organization*. 2005;83:518-25.
- Al Shahrani AS, El-Metwally A, Al-Surimi K, Salih SB, Saleh Y, Al-Shehri A, Ali A. The epidemiology of thyroid diseases in the Arab world: A systematic review. *Journal of Public Health and Epidemiology*. 2016 Feb 29;8(2):17-26.
- Gaffer Ali AA, Altahir SA. Prevalence of Thyroids Dysfunction among Saudi Adult Males and Females. *J Endocrinol Diab*. 3(4): 1-3.
- Rana H, Mirah JA, Al-Shahrani N, Nouf A, Afrah A, Basma O, Sumbul F. Incidence of thyroid diseases in female Saudi adults visiting a tertiary care hospital in Riyadh. *Epidemiology: Open Access*. 2017;7(1).
- Bahammam SA, Sharif MM, Jammah AA, BaHammam AS. Prevalence of thyroid disease in patients with obstructive sleep apnea. *Respiratory medicine*. 2011 Nov 1;105(11):1755-60.
- Akbar DH, Ahmed MM, Hijazi NA. Subclinical hypothyroidism in elderly women attending an outpatient clinic. *Medical Science Monitor*. 2004 May 1;10(5):CR229-32.

Atherosclerotic background of hepatosteatosi s in sickle cell diseases

Mehmet Rami Helvaci (1)
Mustafa Yaprak (1)
Abdulrazak Abyad (2)
Lesley Pocock (3)

(1) Specialist of Internal Medicine, MD
(2) Middle-East Academy for Medicine of Aging, MD
(3) medi+WORLD International

Corresponding authr:

Mehmet Rami Helvaci, MD
07400, ALANYA,
Turkey
Phone: 00-90-506-4708759
Email: mramihelvaci@hotmail.com

Received: January 30, 2018; **Accepted:** February 10, 2018; **Published:** March 1, 2018

Citation: Helvaci M. et al. Atherosclerotic background of hepatosteatosi s in sickle cell diseases. *World Family Medicine*. 2018; 16(3):12-18. DOI: 10.5742/MEWFM.2018.93305

Abstract

Background: We tried to understand whether or not there is an atherosclerotic background of hepatosteatosi s in sickle cell diseases (SCDs).

Methods: All male and female patients with the SCDs were studied.

Results: The study included 428 patients (208 females). The mean ages of patients were similar in males and females (30.6 versus 30.1 years, respectively, $P>0.05$). Smoking (24.0% versus 6.2%) and alcohol consumption (5.0% versus 0.4%) were significantly higher in males ($P<0.001$ for both). Although the inflammatory nature induced severe weight loss of the SCDs and relatively younger mean ages of the patients, there were nine (4.0%) hepatosteatosi s cases in males and six (2.8%) in females ($P>0.05$). Their mean ages were 37.5 years in males and 31.8 years in females ($P>0.05$). Their mean body mass indexes were 25.8 kg/m² in males and 23.2 kg/m² in females ($P>0.05$). On the other hand, transfused red blood cell units in their lives (47.6 versus 28.4, $P=0.000$), chronic obstructive pulmonary disease (25.4% versus 7.2%, $P<0.001$), ileus (7.2% versus 1.4%, $P<0.001$), cirrhosis (7.2% versus 1.9%, $P<0.001$), leg ulcers (20.0% versus 7.2%, $P<0.001$), digital clubbing (14.0% versus 6.2%, $P<0.001$), coronary artery disease (18.1% versus 12.9%, $P<0.05$), chronic renal disease (10.4% versus 6.2%, $P<0.05$), and stroke (12.2% versus 7.6%, $P<0.05$) were all higher in males.

Conclusion: SCDs are chronic inflammatory processes on vascular endothelium at the capillary level, and terminate with accelerated atherosclerosis induced end-organ failures in early years of life. Hepatosteatosi s may actually be one of the hepatic consequences of accelerated atherosclerotic process in the SCDs.

Key words: Sickle cell diseases, chronic endothelial damage, atherosclerosis, hepatosteatosi s

Introduction

Chronic endothelial damage may be the major cause of aging, morbidity, and mortality by causing disseminated tissue hypoxia all over the body. Much higher blood pressure (BP) of the afferent vasculature may be the major underlying cause, and probably whole afferent vasculature including capillaries are involved in the process. Some of the well-known accelerators of the inflammatory process are physical inactivity induced weight excess, smoking, and alcohol consumption for the development of irreversible consequences including obesity, hypertension (HT), diabetes mellitus (DM), cirrhosis, peripheral artery disease (PAD), chronic obstructive pulmonary disease (COPD), chronic renal disease (CRD), coronary artery disease (CAD), mesenteric ischemia, osteoporosis, and stroke, all of which terminate with early aging and death. They were researched under the title of metabolic syndrome in the literature, extensively (1, 2). Similarly, sickle cell diseases (SCDs) are chronic inflammatory processes on vascular endothelium at the capillary level, and terminate with accelerated atherosclerosis induced end-organ failures in early years of life. Hemoglobin S (HbS) causes loss of elastic and biconcave disc shaped structures of red blood cells (RBCs). Probably loss of elasticity instead of shape is the main problem because sickling is very rare in peripheral blood samples of cases with associated thalassemia minors, and human survival is not so affected in hereditary spherocytosis or elliptocytosis. Loss of elasticity is present during whole life, but exaggerated with increased metabolic rate of the body. The hard RBCs induced chronic endothelial inflammation, edema, and fibrosis at the capillary level terminate with cellular hypoxia in all over the body (3, 4). Capillary vessels are mainly involved in the process due to their distribution function for the hard bodies. We tried to understand whether or not there is an atherosclerotic background of hepatosteatosi s in the SCDs in the present study.

Material and methods

The study was performed in the Medical Faculty of the Mustafa Kemal University between March 2007 and April 2016. All patients with the SCDs were included into the study. The SCDs are diagnosed with hemoglobin electrophoresis performed via high performance liquid chromatography (HPLC). Medical histories including smoking habit, regular alcohol consumption, painful crises per year, transfused RBC units in their lives, surgical operations, leg ulcers, and stroke were learnt. Due to their cumulative atherosclerotic effects together with the SCDs, patients with a history of one pack-year were accepted as smokers, and one drink-year were accepted as drinkers. A complete physical examination was performed by the same internist. Cases with acute painful crisis or another inflammatory event were treated at first, and the laboratory tests and clinical measurements were performed on the silent phase. A check up procedure including serum iron, iron binding capacity, ferritin, creatinine, liver function tests, markers of hepatitis viruses A, B, C and human immunodeficiency virus, a posterior-anterior chest x-ray film, an electrocardiogram,

a Doppler echocardiogram both to evaluate cardiac walls and valves and to measure systolic BP of pulmonary artery, an abdominal ultrasonography, a venous Doppler ultrasonography of the lower limbs, a computed tomography of brain, and a magnetic resonance imaging (MRI) of hips was performed. Other bones for avascular necrosis were scanned according to the patients' complaints. Associated thalassemia minors were detected with serum iron, iron binding capacity, ferritin, and hemoglobin electrophoresis performed via HPLC. The criterion for diagnosis of COPD is post-bronchodilator forced expiratory volume in one second/forced vital capacity of less than 70% (5). An x-ray film of abdomen in upright position was taken just in patients with abdominal distention or discomfort, vomiting, obstipation, or lack of bowel movement, and ileus was diagnosed with gaseous distention of isolated segments of bowel, vomiting, obstipation, cramps, and with the absence of peristaltic activity on the abdomen. Systolic BP of the pulmonary artery of 40 mmHg or higher is accepted as pulmonary hypertension (6). CRD is diagnosed with a persistent serum creatinine level of 1.3 mg/dL in males and 1.2 mg/dL in females. Cirrhosis is diagnosed with physical examination, liver function tests, ultrasonographic evaluation, and tissue samples in case of indication. Hepatosteatosi s is diagnosed, ultrasonographically. Digital clubbing is diagnosed with the ratio of distal phalangeal diameter to interphalangeal diameter which is greater than 1.0, and with the presence of Schamroth's sign (7, 8). An exercise electrocardiogram is performed just in cases with an abnormal electrocardiogram and/or angina pectoris. Coronary angiography is taken just for the exercise electrocardiogram positive cases. So CAD was diagnosed either angiographically or with the Doppler echocardiographic findings as the movement disorders in the cardiac walls. Rheumatic heart disease is diagnosed with the echocardiographic findings, too. Avascular necrosis of bones is diagnosed by means of MRI (9). Stroke is diagnosed by the computed tomography of brain. Sickle cell retinopathy is diagnosed with ophthalmologic examination in patients with visual complaints. Eventually male and female patients were collected into the two groups, and compared in between. Mann-Whitney U test, Independent-Samples t test, and comparison of proportions were used as the methods of statistical analyses.

Results

The study included 428 patients with the SCDs (208 females and 220 males). Mean ages of the patients were similar in males and females (30.6 versus 30.1 years, respectively, $P>0.05$). Prevalence of associated thalassemia minors were similar in males and females, too (72.2% versus 67.7%, respectively, $P>0.05$). Smoking (24.0% versus 6.2%) and alcohol consumption (5.0% versus 0.4%) were significantly higher in males ($P<0.001$ for both) (Table 1). Although the inflammatory nature induced severe weight loss of the SCDs and relatively younger mean ages of the patients, there were nine (4.0%) hepatosteatosi s cases in males and six (2.8%) in females ($P>0.05$). Their mean ages were 37.5 years in males and 31.8 years in females ($P>0.05$). Their mean body mass indexes (BMI) were 25.8

Table 1: Characteristic features of the study cases

Variables	Male patients with SCDs*	P-value	Female patients with SCDs
Prevalence	51.4% (220)	Ns†	48.5% (208)
Mean age (year)	30.6 ± 10.1 (5-58)	Ns	30.1 ± 9.9 (8-59)
Thalassemia minors	72.2% (159)	Ns	67.7% (141)
Smoking	24.0% (53)	<0.001	6.2% (13)
Alcoholism	5.0% (11)	<0.001	0.4% (1)

*Sickle cell diseases †Nonsignificant (P>0.05)

Table 2: Clinical features of the hepatosteatosi cases

Variables	Male patients with SCDs*	P-value	Female patients with SCDs
Prevalence of hepatosteatosi	4.0% (9)	Ns†	2.8% (6)
Mean age of hepatosteatosi (year) cases	37.5 ± 10.5 (23-58)	Ns	31.8 ± 9.6 (22-47)
Mean BMI‡ of hepatosteatosi (kg/m ²) cases	25.8 ± 3.2 (21.4-32.5)	Ns	23.2 ± 1.5 (20.8-25.2)

*Sickle cell diseases †Nonsignificant (P>0.05) ‡Body mass index

Table 3: Associated pathologies of the study cases

Variables	Male patients with SCDs*	P-value	Female patients with SCDs
Painful crises per year	5.0 ± 7.1 (0-36)	Ns†	4.9 ± 8.6 (0-52)
Transfused RBC‡ units	47.6 ± 61.6 (0-434)	0.000	28.4 ± 35.8 (0-206)
COPD§	25.4% (56)	<0.001	7.2% (15)
Ileus	7.2% (16)	<0.001	1.4% (3)
Cirrhosis	7.2% (16)	<0.001	1.9% (4)
Leg ulcers	20.0% (44)	<0.001	7.2% (15)
Digital clubbing	14.0% (31)	<0.001	6.2% (13)
CAD¶	18.1% (40)	<0.05	12.9% (27)
CRD**	10.4% (23)	<0.05	6.2% (13)
Stroke	12.2% (27)	<0.05	7.6% (16)
Pulmonary hypertension	12.7% (28)	Ns	12.5% (26)
Varices	8.6% (19)	Ns	5.7% (12)
Rheumatic heart disease	6.8% (15)	Ns	5.7% (12)
Avascular necrosis of bones	25.0% (55)	Ns	25.0% (52)
Sickle cell retinopathy	0.9% (2)	Ns	0.4% (1)
Mortality	7.2% (16)	Ns	6.7% (14)

*Sickle cell diseases †Nonsignificant (P>0.05) ‡Red blood cell §Chronic obstructive pulmonary diseases ¶Coronary artery disease **Chronic renal disease

kg/m² in males and 23.2 kg/m² in females (P>0.05) (Table 2). On the other hand, transfused RBC units in their lives (47.6 versus 28.4, P=0.000), COPD (25.4% versus 7.2%, P<0.001), ileus (7.2% versus 1.4%, P<0.001), cirrhosis (7.2% versus 1.9%, P<0.001), leg ulcers (20.0% versus 7.2%, P<0.001), digital clubbing (14.0% versus 6.2%, P<0.001), CAD (18.1% versus 12.9%, P<0.05), CRD (10.4% versus 6.2%, P<0.05), and stroke (12.2% versus 7.6%, P<0.05) were all higher in males, significantly. There were two cases with sickle cell retinopathy in males and

one in females (P>0.05). There were 30 mortality cases (16 males) during the ten-year follow-up period. The mean ages of mortality were 30.8 ± 8.3 years (range 19-50) in males and 33.3 ± 9.2 years (range 19-47) in females (P>0.05) (Table 3). Beside these, there were four patients with HBsAg positivity (0.9%) but HBV DNA was positive in none of them by polymerase chain reaction (PCR) method. Although antiHCV was positive in 5.8% (25) of the study cases, HCV RNA was detected as positive just in three (0.7%) by PCR.

Discussion

Chronic endothelial damage, as the most common type of vasculitis, may be the leading cause of aging, morbidity, and mortality in human beings. Physical inactivity induced weight excess, smoking, alcohol consumption, and chronic inflammatory processes including SCDs, rheumatologic disorders, prolonged infections, and cancers may accelerate the process. Probably whole afferent vasculature including capillaries are mainly involved in the process. Much higher BP of the afferent vasculature may be the major underlying cause by inducing recurrent injuries on endothelium. Thus the term of venosclerosis is not as famous as atherosclerosis in the literature. Secondary to the chronic endothelial inflammation, edema, and fibrosis, vascular walls become thickened, their lumens are narrowed, and they lose their elastic natures that reduce blood flow and increase systolic BP further. Although early withdrawal of causative factors may prevent final consequences, after development of cirrhosis, COPD, CRD, CAD, PAD, or stroke, endothelial changes cannot be reversed completely due to their fibrotic nature (10).

SCDs are life-threatening hereditary disorders affecting around 100,000 individuals in the United States (11). As a difference from other causes of chronic endothelial damage, the SCDs may keep vascular endothelium at the capillary level (12), since the capillary system is the main distributor of the hard RBCs into the tissues. The hard cells induced chronic endothelial damage, inflammation, edema, and fibrosis build up and advanced atherosclerosis in much younger ages of the patients. As a result, mean lifespans of the patients were 48 years in females and 42 years in males in the literature (13), whereas they were 33.3 and 30.8 years in the present study, respectively. The great differences may be secondary to delayed diagnosis of the diseases, delayed initiation of hydroxyurea therapy, and inadequate RBC support during severe medical or surgical events in Antakya region. Actually, RBC support must be given during all medical or surgical events in which there is evidence of clinical deterioration in the SCDs (14, 15). RBC support decreases sickle cell concentration in circulation and suppresses bone marrow for the production of abnormal RBCs. So it decreases sickling induced endothelial damage all over the body during such events. According to our ten-year experiences, simple RBC transfusions are superior to exchange. First of all, preparation of one or two units of RBC suspensions at each time rather than preparation of six units or higher provides time for clinicians to prepare more units by preventing sudden death of such patients. Secondly, transfusion of one or two units of RBC suspensions at each time decreases the severity of pain and relaxes anxiety of the patients and families in a short period of time. Thirdly, transfusions of lesser units of RBC suspensions at each time will decrease transfusion-related complications in the future. Fourthly, transfusion of RBC suspensions in secondary health centers may prevent some deaths developed during transport to tertiary centers for the exchange. On the other hand, longer lifespan of females in the SCDs (13) and longer overall survival of females in the world (16) cannot be explained by

the atherosclerotic effects of smoking and alcohol alone, instead it may be explained by higher physical and emotional stresses of male sex in life that may terminate with an exaggerated sickling and atherosclerosis all over the body (17).

Excessive fat accumulation in hepatocytes is called as hepatosteatosis. It is usually accepted as one of the hepatic manifestations of metabolic syndrome. It progresses to non-alcoholic fatty liver disease (NAFLD), steatohepatitis, fibrosis, cirrhosis, hepatocellular carcinoma, and hepatic failure. Blocking triglyceride secretion, subcellular lipid sequestration, lipolysis deficiency, enhanced lipogenesis, gluconeogenesis defects, or inhibition of fatty acid oxidation may be some of the development mechanisms (18). Hepatosteatosis may actually be one of the consequences of chronic inflammatory processes including physical inactivity induced weight excess, smoking, alcohol consumption, infections, cancers, and other inflammatory disorders, and is strongly associated with an accelerated atherosclerotic process not only in the liver, but all over the body. For example, hepatosteatosis is seen in one-third of cases with hepatitis B virus-related chronic liver disease (19). Similarly, higher fatty liver ratios were observed in children with non-Hodgkin lymphomas (20). The liver density measurement on contrast abdominopelvic computed tomography of colorectal cancer cases was low, which is consistent with NAFLD in another study (21). As an acute phase reactant, serum thrombopoietin levels increased in patients with NAFLD (22). Although serum levels of oxidizing agents including nitrate and advanced oxidation protein products increased, serum nitrite did not adequately increase as an antioxidant agent in patients with NAFLD in another study (23). As a result, hepatosteatosis is associated with an impaired carotid intima-media thickness (CIMT) and flow-mediated dilation that are considered as early markers of atherosclerosis (24). Furthermore, patients with NAFLD have more complex CAD (25). CIMT was correlated with BMI ($P < 0.001$), age ($P = 0.001$), and grade 2-3 NAFLD ($P < 0.001$), and CIMT and grade 2-3 NAFLD were associated with the severity of CAD ($P < 0.001$ for both) (26). Similarly, NAFLD was correlated with the severity of CAD and CIMT in another study ($P < 0.001$ for both) (27). As a result, there were reductions in hepatic artery flow volume, portal vein flow volume, and total flow volume while the degree of hepatosteatosis was increasing (28). Additionally, degree of hepatosteatosis was correlated with the right ventricular diastolic dysfunction (29). According to our opinion, hepatosteatosis may actually be one of hepatic consequences of the systemic atherosclerotic process in the SCDs.

COPD is the third leading cause of mortality in the world (30). It is an inflammatory disorder mainly affecting the pulmonary vasculature, and physical inactivity induced weight excess, smoking, and aging may be the major causes. Probably regular alcohol consumption also takes role in the inflammatory process. For example, both prevalence of alcohol consumption and COPD were significantly higher in males in the present study ($P < 0.001$ for both). Similarly, COPD was one of the most frequent associated

disorders in alcohol dependence in another study (31). Additionally, 30-day readmission rate to the hospitals was higher in COPD patients with alcoholism (32). Probably caused by an accelerated atherosclerotic process is the main structural background of the COPD. The endothelial process is enhanced by release of various chemicals by inflammatory cells, and terminates with endothelial fibrosis and tissue loss in the lungs. Although COPD may mainly be thought of as an accelerated atherosclerotic process of the pulmonary vasculature, there are several reports about coexistence of a disseminated endothelial inflammation all over the body, and close relationships were observed between COPD, CAD, PAD, and stroke (33, 34). Two-thirds of mortality cases were caused by cardiovascular diseases and lung cancers in smokers, and when the hospitalizations were researched, the most common causes were the cardiovascular diseases again in another study (35). Similarly, 27% of mortalities were due to the cardiovascular causes in the moderate and severe COPD cases (36). Due to the strong atherosclerotic nature of the SCDs and COPD, COPD maybe one of the terminal consequences of the SCDs is due to the higher prevalences of priapism, leg ulcers, digital clubbing, CAD, CRD, and stroke in the COPD group in another study (37).

Smoking has major effects on systemic atherosclerotic processes including COPD, digital clubbing, cirrhosis, CRD, PAD, CAD, stroke, and cancers (38). Its atherosclerotic effects are the most obvious in COPD and Buerger's disease. Buerger's disease has never been reported in the absence of smoking in the literature. Smoking induced endothelial damage is probably seen in pulmonary vasculature much more than the other organs due to the higher concentration of its products, there. But smoking may even cause cirrhosis, CRD, PAD, CAD, stroke, and cancers by the transport of its products within the blood. COPD may also be accepted as a localized Buerger's disease of the lungs. On the other hand, beside the strong atherosclerotic effects, smoking in human beings and nicotine in animals may be associated with some weight loss (39). There may be an increased energy expenditure during smoking (40), and nicotine may decrease caloric intake in a dose-related manner (41). Nicotine may lengthen intermeal time, and decrease amount of meal eaten (42). Similarly, BMI seems to be the highest in the former and the lowest in the current smokers (43). As a pleasure in life, smoking may also show the weakness of volition to control eating. For example, prevalences of HT, DM, and smoking were the highest in the highest triglyceride having group as a significant parameter of the metabolic syndrome (44). Additionally, although CAD was detected with similar prevalence in both sexes, smoking and COPD were higher in males against the higher prevalences of BMI and its terminal consequences including dyslipidemia, HT, and DM in females (38). Probably toxic substances of tobacco smoke cause a diffuse inflammation on vascular endothelium all over the body, and it is the major cause of loss of appetite during circulation of the substances within the blood, since the body can't eat anything during fighting. So regular smoking comes with a prominent weight loss in front of us, clinically. On the other hand, when we thought

of some antidepressant properties of smoking and alcohol consumption, the higher prevalences of them in males may also show some additional stresses and shortened survival in them.

Digital clubbing should alert physicians about some systemic disorders in the body (10). It is characterized by loss of normal $<165^\circ$ angle between the nailbed and fold, increased convexity of the nail fold, and thickening of the whole distal finger (45). Some authors detected clubbing in 0.9% of all patients admitted to the department of internal medicine (7), whereas the prevalence was 4.2% in the same department in our university (10). The exact cause and significance is unknown but chronic tissue hypoxia has been proposed (46). In the above study, only 40% of clubbing cases turned out to have significant underlying diseases while 60% remained well over the subsequent years (7). But according to our opinions, digital clubbing is frequently associated with pulmonary, cardiac, and/or hepatic disorders or smoking that are featuring with chronic tissue hypoxia. As an explanation for that lungs, heart, and liver are closely related organs that affect their functions in a short period of time. Similarly, digital clubbing may be an indicator of disseminated atherosclerosis at the capillary level in the SCDs, and we observed clubbing in 10.2% of patients with the SCDs in the present study. Beside the effects of SCDs, the higher prevalences of smoking, COPD, and clubbing in males ($P<0.001$ for all) may also show some additional roles of smoking, COPD, and male sex on clubbing.

Leg ulcers are seen in 10 to 20% of patients with the SCDs (47), and the ratio was 13.7% in the present study. Its incidence increases with age, male sex, and HbSS genotype (47). Similarly, its ratio was higher in males (20.0% versus 7.2%, $P<0.001$), and mean age of the patients with leg ulcers was higher than the others (35.1 versus 29.6 years, $P<0.000$) in the present study. The leg ulcers have an intractable nature, and around 97% of healed ulcers relapse in a period of one year (48). As an evidence of their atherosclerotic background, the leg ulcers occur in distal areas with less collateral blood flow in the body (48). The hard RBCs induced chronic endothelial damage at the capillary level may be the major cause in the SCDs (47). Prolonged exposure to the hard bodies due to blood pooling in the lower extremities may also explain the leg but not arm ulcers in the SCDs. The hard RBCs induced venous insufficiencies may also accelerate the process by accelerating pooling of causative hard bodies in the legs, and vice versa. Pooling of blood in the lower extremities may also have effects on the venous ulcers, diabetic ulcers, Buerger's disease, digital clubbing, and onychomycosis. Beside the hard bodies, smoking and alcohol may also have some effects on the leg ulcers since both of them are much more common in males, and their atherosclerotic effects are obvious in COPD, Buerger's disease, and cirrhosis (47). According to our ten-year experience, prolonged resolution of leg ulcers with hydroxyurea may also suggest that the leg ulcers may be secondary to increased WBC and PLT counts induced prolonged endothelial inflammation and edema at the capillary level in the SCDs.

Stroke is also a common complication of the SCDs (49). Similar to acute chest syndrome (ACS) and leg ulcers, it is more common with the HbSS genotype and with a higher WBC count (50, 51). Sickling induced disseminated endothelial damage and activations of WBC and PLTs may terminate with chronic endothelial inflammation, edema, and fibrosis in the brain (51). Stroke may not have a macrovascular origin, instead generalized endothelial inflammation and edema at the capillary level may be much more important in the SCDs. Infections, serious injuries, inflammatory disorders, and other stresses may precipitate the stroke since increased metabolic rate during such events may accelerate sickling and secondary endothelial inflammation and edema in the brain. Similar to the ACS and leg ulcers, a significant reduction with hydroxyurea may also suggest that a significant proportion of stroke is secondary to increased WBC and PLT counts induced disseminated endothelial inflammation and edema in the brain in the SCDs (52).

As a conclusion, SCDs are chronic inflammatory processes on vascular endothelium at the capillary level, and terminate with accelerated atherosclerosis induced end-organ failures in early years of life. Hepatosteatorosis may actually be one of the hepatic consequences of accelerated atherosclerotic process in the SCDs.

References

- Eckel RH, Grundy SM, Zimmet PZ. The metabolic syndrome. *Lancet* 2005; 365: 1415-1428.
- Helvacı MR, Kaya H, Sevinc A, Camci C. Body weight and white coat hypertension. *Pak J Med Sci* 2009; 25: 6: 916-921.
- Helvacı MR, Gokce C, Davran R, Akkucuk S, Ugur M, Oruc C. Mortal quintet of sickle cell diseases. *Int J Clin Exp Med* 2015; 8: 11442-11448.
- Helvacı MR, Kaya H. Effect of sickle cell diseases on height and weight. *Pak J Med Sci* 2011; 27: 361-364.
- Global strategy for the diagnosis, management and prevention of chronic obstructive pulmonary disease 2010. Global initiative for chronic obstructive lung disease (GOLD).
- Fisher MR, Forfia PR, Chamera E, Houston-Harris T, Champion HC, Girgis RE, et al. Accuracy of Doppler echocardiography in the hemodynamic assessment of pulmonary hypertension. *Am J Respir Crit Care Med* 2009; 179: 615-621.
- Vandemergel X, Renneboog B. Prevalence, aetiologies and significance of clubbing in a department of general internal medicine. *Eur J Intern Med* 2008; 19: 325-329.
- Schamroth L. Personal experience. *S Afr Med J* 1976; 50: 297-300.
- Mankad VN, Williams JP, Harpen MD, Mancı E, Longenecker G, Moore RB, et al. Magnetic resonance imaging of bone marrow in sickle cell disease: clinical, hematologic, and pathologic correlations. *Blood* 1990; 75: 274-283.
- Helvacı MR, Aydın LY, Aydın Y. Digital clubbing may be an indicator of systemic atherosclerosis even at microvascular level. *HealthMED* 2012; 6: 3977-3981.
- Yawn BP, Buchanan GR, Afenyi-Annan AN, Ballas SK, Hassell KL, James AH, et al. Management of sickle cell disease: summary of the 2014 evidence-based report by expert panel members. *JAMA* 2014; 312: 1033-1048.
- Helvacı MR, Aydın Y, Ayyıldız O. Hydroxyurea may prolong survival of sickle cell patients by decreasing frequency of painful crises. *HealthMED* 2013; 7: 2327-2332.
- Platt OS, Brambilla DJ, Rosse WF, Milner PF, Castro O, Steinberg MH, et al. Mortality in sickle cell disease. Life expectancy and risk factors for early death. *N Engl J Med* 1994; 330: 1639-1644.
- Charache S, Scott JC, Charache P. "Acute chest syndrome" in adults with sickle cell anemia. Microbiology, treatment, and prevention. *Arch Intern Med* 1979; 139: 67-69.
- Davies SC, Luce PJ, Win AA, Riordan JF, Brozovic M. Acute chest syndrome in sickle-cell disease. *Lancet* 1984; 1: 36-38.
- Mathers CD, Sadana R, Salomon JA, Murray CJ, Lopez AD. Healthy life expectancy in 191 countries, 1999. *Lancet* 2001; 357: 1685-1691.
- Helvacı MR, Ayyıldız O, Gundogdu M. Gender differences in severity of sickle cell diseases in non-smokers. *Pak J Med Sci* 2013; 29: 1050-1054.
- Sun Z, Lazar MA. Dissociating fatty liver and diabetes. *Trends Endocrinol Metab* 2013; 24: 4-12.
- Rastogi A, Sakhuja P, Kumar A, Hissar S, Jain A, Gondal R, et al. Steatosis in chronic hepatitis B: prevalence and correlation with biochemical, histologic, viral, and metabolic parameters. *Indian J Pathol Microbiol* 2011; 54: 454-459.
- Köse D, Erol C, Kaya F, Koplay M, Köksal Y. Development of fatty liver in children with non-Hodgkin lymphoma. *Turk J Pediatr* 2014; 56: 399-403.
- Aktas E, Uzman M, Yildirim O, Sahin B, Buyukcam F, Aktas B, et al. Assessment of hepatic steatosis on contrast enhanced computed tomography in patients with colorectal cancer. *Int J Clin Exp Med* 2014; 7: 4342-4346.
- Balcık OS, Akdeniz D, Cıplı H, İkizek M, Uysal S, Kosar A, et al. Serum thrombopoietin levels in patients with non-alcoholic fatty liver disease. *Saudi Med J* 2012; 33: 30-33.
- Çiftci A, Yılmaz B, Köklü S, Yüksel O, Özsoy M, Erden G, et al. Serum levels of nitrate, nitrite and advanced oxidation protein products (AOPP) in patients with nonalcoholic fatty liver disease. *Acta Gastroenterol Belg* 2015; 78: 201-205.
- Kucukazman M, Ata N, Yavuz B, Dal K, Sen O, Deveci OS, et al. Evaluation of early atherosclerosis markers in patients with nonalcoholic fatty liver disease. *Eur J Gastroenterol Hepatol* 2013; 25: 147-51.
- Agaç MT, Korkmaz L, Cavusoglu G, Karadeniz AG, Agaç S, Bektas H, et al. Association between nonalcoholic fatty liver disease and coronary artery disease complexity in patients with acute coronary syndrome: a pilot study. *Angiology* 2013; 64: 604-608.
- Inci MF, Özkan F, Ark B, Vurdem ÜE, Ege MR, Sincer I, et al. Sonographic evaluation for predicting the presence and severity of coronary artery disease. *Ultrasound Q* 2013; 29: 125-130.
- Öztürk H, Gümrükçüoğlu HA, Yaman M, Akyol A, Öztürk Ş, Akdağ S, et al. Hepatosteatorosis and carotid intima-

- media thickness in patients with myocardial infarction. *J Med Ultrason* (2001) 2016; 43: 77-82.
28. Karasin M, Tokgoz O, Serifoglu I, Oz I, Erdem O. The Doppler ultrasonographic evaluation of hemodynamic changes in hepatic vascular structures in patients with hepatosteatosis. *Pol J Radiol* 2014; 79: 299-304.
29. Bekler A, Gazi E, Erbag G, Binnetoglu E, Barutcu A, Sen H, et al. Right ventricular function and its relationship with grade of hepatosteatosis in non-alcoholic fatty liver disease. *Cardiovasc J Afr* 2015; 26: 109-113.
30. Rennard SI, Drummond MB. Early chronic obstructive pulmonary disease: definition, assessment, and prevention. *Lancet* 2015; 385: 1778-1788.
31. Schoepf D, Heun R. Alcohol dependence and physical comorbidity: Increased prevalence but reduced relevance of individual comorbidities for hospital-based mortality during a 12.5-year observation period in general hospital admissions in urban North-West England. *Eur Psychiatry* 2015; 30: 459-468.
32. Singh G, Zhang W, Kuo YF, Sharma G. Association of Psychological Disorders With 30-Day Readmission Rates in Patients With COPD. *Chest* 2016; 149: 905-915.
33. Mannino DM, Watt G, Hole D, Gillis C, Hart C, McConnachie A, et al. The natural history of chronic obstructive pulmonary disease. *Eur Respir J* 2006; 27: 627-643.
34. Mapel DW, Hurley JS, Frost FJ, Petersen HV, Picchi MA, Coultas DB. Health care utilization in chronic obstructive pulmonary disease. A case-control study in a health maintenance organization. *Arch Intern Med* 2000; 160: 2653-2658.
35. Anthonisen NR, Connett JE, Enright PL, Manfreda J; Lung Health Study Research Group. Hospitalizations and mortality in the Lung Health Study. *Am J Respir Crit Care Med* 2002; 166: 333-339.
36. McGarvey LP, John M, Anderson JA, Zvarich M, Wise RA; TORCH Clinical Endpoint Committee. Ascertainment of cause-specific mortality in COPD: operations of the TORCH Clinical Endpoint Committee. *Thorax* 2007; 62: 411-415.
37. Helvaci MR, Erden ES, Aydin LY. Atherosclerotic background of chronic obstructive pulmonary disease in sickle cell patients. *HealthMED* 2013; 7: 484-488.
38. Helvaci MR, Aydin Y, Gundogdu M. Smoking induced atherosclerosis in cancers. *HealthMED* 2012; 6: 3744-3749.
39. Grunberg NE, Greenwood MR, Collins F, Epstein LH, Hatsukami D, Niaura R, et al. National working conference on smoking and body weight. Task Force 1: Mechanisms relevant to the relations between cigarette smoking and body weight. *Health Psychol* 1992; 11: 4-9.
40. Walker JF, Collins LC, Rowell PP, Goldsmith LJ, Moffatt RJ, Stamford BA. The effect of smoking on energy expenditure and plasma catecholamine and nicotine levels during light physical activity. *Nicotine Tob Res* 1999; 1: 365-370.
41. Hughes JR, Hatsukami DK. Effects of three doses of transdermal nicotine on post-cessation eating, hunger and weight. *J Subst Abuse* 1997; 9: 151-159.
42. Miyata G, Meguid MM, Varma M, Fetissov SO, Kim HJ. Nicotine alters the usual reciprocity between meal size and meal number in female rat. *Physiol Behav* 2001; 74: 169-176.
43. Laaksonen M, Rahkonen O, Prattala R. Smoking status and relative weight by educational level in Finland, 1978-1995. *Prev Med* 1998; 27: 431-437.
44. Helvaci MR, Kaya H, Gundogdu M. Association of increased triglyceride levels in metabolic syndrome with coronary artery disease. *Pak J Med Sci* 2010; 26: 667-672.
45. Myers KA, Farquhar DR. The rational clinical examination. Does this patient have clubbing? *JAMA* 2001; 286: 341-347.
46. Toovey OT, Eisenhauer HJ. A new hypothesis on the mechanism of digital clubbing secondary to pulmonary pathologies. *Med Hypotheses* 2010; 75: 511-513.
47. Minniti CP, Eckman J, Sebastiani P, Steinberg MH, Ballas SK. Leg ulcers in sickle cell disease. *Am J Hematol* 2010; 85: 831-833.
48. Trent JT, Kirsner RS. Leg ulcers in sickle cell disease. *Adv Skin Wound Care* 2004; 17: 410-416.
49. Gueguen A, Mahevas M, Nzouakou R, Hosseini H, Habibi A, Bachir D, et al. Sickle-cell disease stroke throughout life: a retrospective study in an adult referral center. *Am J Hematol* 2014; 89: 267-272.
50. Majumdar S, Miller M, Khan M, Gordon C, Forsythe A, Smith MG, et al. Outcome of overt stroke in sickle cell anaemia, a single institution's experience. *Br J Haematol* 2014; 165: 707-713.
51. Helvaci MR, Aydogan F, Sevinc A, Camci C, Dilek I. Platelet and white blood cell counts in severity of sickle cell diseases. *Pren Med Argent* 2014; 100: 49-56.
52. Charache S, Terrin ML, Moore RD, Dover GJ, Barton FB, Eckert SV, et al. Effect of hydroxyurea on the frequency of painful crises in sickle cell anemia. Investigators of the Multicenter Study of Hydroxyurea in Sickle Cell Anemia. *N Engl J Med* 1995; 332: 1317-1322.

Studying the Extent of Compliance with the Standard Principles of Cardiopulmonary Resuscitation in the Selected Educational Centers of Mazandaran University of Medical Sciences 2016-2017

Narges Masoudi Sani (1)

Hedayat Jafari (2)

Mohammad Ali Heidari Gorji (3)

Nouroddin Mousavi Nasab (4)

Farzad Bozorgi (5)

Vida Nesarhosseini (6)

(1) MSc Student in Nursing, Student Research Committee, Faculty of Nursing and Midwifery, Mazandaran University of Medical Sciences Sari, Iran

(2) Traditional and Complementary Medicine Research Center, Addiction Institute, Medical Surgical Nursing Department, Mazandaran University of Medical Sciences, Sari, Iran

(3) Department of Medical- Surgical Nursing, Mazandaran University of Medical Sciences, Sari, Iran

(4) Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran

(5) Department of Emergency Medicine, Faculty of Medicine, Mazandaran University of Medical Sciences, Sari, Iran

(6) Department of Cardiology, Mazandaran University of Medical Sciences, Sari, Iran

Corresponding author:

Hedayat Jafari

Traditional and Complementary Medicine Research Center, Addiction Institute, Medical Surgical Nursing Department, Mazandaran University of Medical Sciences, Sari, Iran

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Narges Masoudi Sani. et al. Studying the Extent of Compliance with the Standard Principles of Cardiopulmonary Resuscitation in the Selected Educational Centers of Mazandaran University of Medical Sciences 2016-2017. *World Family Medicine*. 2018; 16(3):19-23. DOI: 10.5742/MEWFM.2018.93299

Abstract

Background and Purpose: Since relatively large changes have been applied to the American Heart Association's Guidelines 2015, skill, knowledge, and awareness of the resuscitation team of the latest guidelines can greatly affect the outcome of cardiopulmonary resuscitation. Therefore, the research team studied the performance of the resuscitation team by examining the extent of compliance with the standard principles of CPR based on the latest scientific and specialized guidelines.

Materials and Method: This was an observational cross-sectional study conducted in a one-year period, from December 2016 to December 2017 in connection with the efficiency and quality of resuscitation in 194 patients with deadly arrhythmias or cardiac arrest in emergency ward of Bu'ali Hospital in Sari, Aziz Hospital in Juybar and heart center of Fatemeh Zahra Hospital in Sari. The effectiveness of resuscitation in patients was measured by the relevant checklists and the results were analyzed and reported with SPSS 20.

Findings: The samples consisted of 40.7% women and 59.3% men with the mean age of 17.34 ± 68.56 years old and there was initial blood circulation return in 13.4% of them. There was 86.6% of compliance with the depth of chest compressions ≥ 2 inches, 91.8% of compressions over 100 /min, 32.6% of frequent discontinuation of cardiac compressions for various and less important reasons, and 26.8% of delayed resuscitation to make an airway.

Conclusion: Based on these findings, the result of cardiopulmonary resuscitation in hospitals was still low. In order to change this situation, re-educating, updating knowledge, and improving the skills of the medical staff as well as forming a skilled resuscitation team should be the priorities of hospital planning.

Key words: Cardiopulmonary resuscitation, quality and outcome of resuscitation, Utstein, cardiopulmonary resuscitation skills, Cardiac arrest in hospital

Introduction

Cardiac Arrest is an unfortunate event that can occur unexpectedly at any time and place with high mortality (1). Cardiopulmonary arrest is one of the most important and urgent medical issues (2) and it is one of the major causes of death in the world (3) which requires a quick and effective response (4). Cardiopulmonary resuscitation or CPR is a process by which the life of the individual can be sustained by restoring the vital organs of the body, the heart and the lungs (5). The ideal result of a resuscitation operation is the complete return of a patient, but it is worth noting that there are many issues involved, including underlying illnesses, the time between cardiac arrest and starting resuscitation, the availability of qualified staff and supplies required for this operation, and other issues (6). Quality resuscitation is the first component affecting cardiac arrest. Significant changes were made in the American Heart Association's (AHA) Guideline, with emphasis on implementing high quality CPR techniques with its five combined components of minimizing interruptions in chest compressions, performing compressions with the proper depth and number, avoiding unnecessary work between compressions, and hyperventilation (7). Given the changes in therapy algorithm of the cardiac rate rhythm during recovery, during resuscitation and the order of the steps, the knowledge, skills and awareness of the resuscitation team of the latest guidelines is an immediate and vital issue for saving human lives in the critical moment of struggling life which can greatly affect the outcome of cardiopulmonary resuscitation (8). Rescuing a patient from cardiac arrest involves the three components of medical science, effective training, and proper implementation. This suggests the importance of skill in saving the patient. Brain damage occurs 4-6 minutes after the delay in oxygenation to the brain; therefore, due to this short time, lack of enough information and skills leads to the death of people. Many hospitals have a cardiopulmonary resuscitation team that takes advantage of advanced technology during cardiopulmonary arrest. However, the patients' survival and discharge rates after cardiac arrest have remained stable at 14.7% in the United States and 16.7% in England over the past 30 years (9). Regarding the fact that many years have passed since the onset of cardiopulmonary resuscitation, unfortunately, the performance of the resuscitation team in hospitals is weak and disturbing, so that during a study conducted in three educational hospitals in Tehran, 64.4% of the resuscitations were unsuccessful and only 2.7% of the patients with moderate to good brain function were discharged from the hospital (10).

Given that nurses are the first to come to the patient at the time of cardiopulmonary arrest, their knowledge and skills in implementing the most up-to-date and most effective cardiopulmonary resuscitation protocols can have an effective role to help increase the success rate, reduce the CPR time, and thus reduce rate of mortality and morbidity. On the other hand, due to the annual holding of training courses for cardiopulmonary resuscitation in the selected treatment centers of Mazandaran University of Medical Sciences, we decided to study the degree of

compliance between knowledge gained and its practical implementation by the CPR team in the emergency department of these centers by examining the compliance with the CPR standard principles based on the latest scientific and specialized guideline.

Materials and Methods

The present study is a descriptive cross-sectional study in order to assess the compliance with the standard principles of cardiopulmonary resuscitation in the emergency department of Bu'ali and Fatemeh Zahra Hospitals in Sari and Azizi Hospital in Juybar affiliated to Mazandaran University of Medical Sciences during a 24-month period. The statistical population of the research included 194 over 18 years of age, non-traumatic patients with sudden cardiopulmonary arrest who were not pregnant women and who had cardiopulmonary arrest outside the hospital or in the acute and subacute emergency department of the hospital. Data collection tool in the first step was to use the Utstein standard form of cardiopulmonary resuscitation reporting in the hospital (11) which was completed by the researcher through observation and if necessary, using medical records and getting help from medical personnel and relatives of the patients present during resuscitation and after the completion of the resuscitation. In addition, the Advanced Cardiopulmonary Life Support Evaluation checklist was also used (12). This checklist contained 33 evaluation questions in a "Yes" and "No" manner based on basic resuscitation steps according to the algorithm of AHA 2015 (13) which considered score one for the performance at a standard level and zero for the performance below the standard level. Validity of this tool was examined in research by Smally et al. with a correlation coefficient of 0.96%, which was re-evaluated for its operation and use in this study based on the latest and the most recent American Heart Association Resuscitation algorithm (2015). The tool was translated into Persian and the validity of the tool was carried out in the form of content validity review, so that after translation, the checklists were given to 10 specialists of nursing, emergency medicine, and heart to examine the content and face validity of the tool and their comments were implemented on the checklist after arguing in a special panel. Then the tool was returned to them to have their opinion on its content validity. Subsequently, the content validity index (CVI) and the content validity ratio (CVR) were calculated as 0.89 and 0.85, respectively. After preparing the final checklist, in order to measure its reliability, despite reliable, the method of agreement between observers was used to confirm the reliability of the tool. For this purpose, the checklist was provided to the two observers, who simultaneously completed the checklist for 50 observations related to cardiopulmonary resuscitation, and then, in-class correlation coefficient between the scores obtained from the two observations was calculated as 0.85. To complete the checklist, a researcher and three research assistants (one from each center) were used who were trained for this purpose and developed basic and advanced CPR courses based on the protocol provided by the AHA for 2015. During a two-hour briefing session, they were given the information

on how to complete the checklist. The evaluators did not intervene at the time of the resuscitation, but if needed they participated in the resuscitation. Actually, the intended samples were removed from the study. The members of the resuscitation team did not have any information about the content of the checklists, but they were aware of the purpose of the researcher. Based on the patient's rhythm under the CPR, the necessary measures were taken in the same rhythm and presented step by step in the form of questions and the related questions about the same rhythm were filled and included rhythms of Bradycardia, Fibrillation and ventricular tachycardia without pulse and asystole and Pulseless Electrical Activity (PEA). In addition, the evaluators were continuously present in the resuscitation room before and after the arrival of the patient and the resuscitation team so that they observed the activities performed during the resuscitation process. The evaluators simultaneously reported the resuscitation by filling in the checklist the quality, number, and depth of chest compression, interruption for more than 10 seconds in checking the carotid pulse, the type and dosage of the drug used, the use of defibrillation when needed, and airway assessment based on the checklist. Each item was scored ultimately, correct performance of the skill or the correct method was scored one and incorrect performance or use of wrong method was scored zero. Initial results included the return of spontaneous circulation or failure to resuscitate and the secondary results included quality CPR and following international guidelines of CPR. Data from the study was analyzed using the SPSS 20.

Findings

The present study was conducted to determine the compliance with the standard principles of cardiopulmonary resuscitation in the selected centers of Mazandaran University of Medical Sciences and inclusion of 202 patients with cardiopulmonary arrest. Eight patients were not recognized eligible and were excluded from the study due to rigor and failure to perform resuscitation on them. The study was performed on 194 remaining patients. Of these, 115 (59.3%) were male and 79 (40.7%) were female. The mean age of the participants in this study was $68/56 \pm 17/34$ years (the age range was 18-98 years). In the study of rhythm frequency in the 194 patients in this study at the time of entering the hospital, 7.7% had a Shockable rhythm, 57.7% had un-shockable rhythm, 2.6% had Bradycardia rhythm, 0.5% had atrial fibrillation rhythm, and 4.9% had sinus rhythm. In the cases of sinus rhythm, 73.77% had rhythm changes due to asystole and 26.23% had rhythm changes due to other rhythms. The average resuscitation time, which is the time interval between the beginning and end of resuscitation, was 44.83 ± 24.56 minutes (range from 10 to 200 minutes). When the frequency of resuscitation operations was compared in four intervals of 6 hours (intervals of 12: 00 am -6: 00 am, 06: 00 am -12: 00 pm, 12: 00 pm -06: 00 pm and 06: 00 pm-12: 00 am), the most resuscitation operations were carried out between 12:00 pm to 06:00 pm and the lowest resuscitation operations were carried out at 12: 00 am - 6: 00. In the present study, Return of Spontaneous Circulation (ROSC) less than 20 minutes was considered as successful resuscitation, which

was seen in 26 patients (13.4%). When the relationship between resuscitation duration and ROSC was analyzed using Pearson correlation test, we found a significant negative correlation between these two parameters ($r = -0/338$ and $p = 0.000$). In other words, the patient's return and resuscitation success were more pronounced during the shorter resuscitation period.

In this study, the rate of observance of the standard principles of cardiopulmonary resuscitation during resuscitation operations on the patients was also examined through a checklist of questions. These questions were set up as a general intervention package for all patients and a series of special interventions that were tailored to the patients' initial rhythm. The measures taken to manage an airway in 26.8% happened with a delay of more than 10 seconds in resuscitation to insert the endotracheal tube. In total, 93.38% of resuscitation cases were performed with correct procedures for airway management in patients undergoing cardiopulmonary resuscitation. In the evaluation of the correctness of chest compression measures, the onset of 19.6% of chest compression was delayed and 32% of the resuscitations had repeated interruptions for various reasons. In total, chest compression in 86% of the cases of resuscitations was performed properly in these centers. In the evaluation of the correctness of medication in cardiopulmonary resuscitation operation, 32.4% of the amiodarone ampoule injections were less than the dose prescribed in the AHA resuscitation algorithm 2015. Moreover, due to the removal of atropine ampoule in the treatment algorithm for asystole rhythms and Pulseless Electrical Activity (PEA), 2.7% of the resuscitations cases still had injections of atropine ampoules. In total, medication in 96% of cardiopulmonary resuscitation operations in these centers was done correctly. In assessing the correctness of electrical shock during cardiopulmonary resuscitation, taking into account the asystole rhythms and PEA as un-shockable rhythms, electrical shock was used during 43.9% of resuscitation cases. In 100% of cases, the electric shock joule was between 120 and 200. Altogether, in 89% of the resuscitation cases, measures related to electrical shock during cardiopulmonary resuscitation operation were performed correctly in these centers.

Discussion

This study was conducted with the aim to evaluate the quality of skills performed during cardiopulmonary resuscitation operation. Thirty-three items were studied in the study, two thirds of which were performed correctly. In spite of the annual courses of cardiopulmonary resuscitation in the centers under this research and installation of cardiopulmonary resuscitation (2015) posters in the resuscitation rooms of all three centers, this study revealed some differences between the knowledge gained and its practical implementation by the cardiopulmonary resuscitation team at the emergency department. It is worth mentioning that the quality of cardiopulmonary resuscitation can affect its results(14). Numerous studies have shown that the probability of survival in those who had chest compression was higher than those who had no compression (14).

Chest compression is effective if it has the following three characteristics:

- Chest compression more than 100 /min
- Chest compression with a depth of more than two inches (6-5 cm)
- Interruptions at intervals of less than 10 seconds compression(15).

The results of the present study, after evaluating the quality of compression, were as follows: 91.8% of compliance with the rate of chest compression ≥ 100 /min, 86.6% of compliance with the depth ≥ 2 inches, and 91.2% of compliance with the appropriate angle and place. The highest incorrect actions while performing chest compression were failure of the chest to return to the initial state after each compression 32%, chest compressions was repeatedly interrupted for various and less important reasons 32%, and performing compression at a too high or too low speed 9.29% . In the study of Barimnejad et al. chest compression with inappropriate depth was 12% in the intervention group and 45.8% in the control group, inappropriate hand placement in the intervention group was 40% and in the control group was 76.8%, and inappropriate hand angle was 32.17% in the intervention group and 51.8% in the control group(8). In the study of Hesham et al., the number of compression ≥ 100 /min was 99/2%, depth ≥ 2 inches was 92/4%, and pause more than 10 seconds to check pulse was 48/7% (15). In the study of Pourmirezakalhari et al., nurses' knowledge and skills regarding correct compression depth was 87.9%, correct placement of hands 82.6%, and compliance with the proper ratio of compression to ventilation 30:2 was 72.2%(16). In the study of Hosseini Nejad et al., correct amount of compression per minute was reported 84% (17). Although the findings of this study were in line with the studies of Hesham et al., Barim Nejad et al., and Hosseini Nejad et

al., it showed many weaknesses during chest compression in these centers.

Despite the removal of the electric shock from the resuscitation algorithm in asystole and PEA rhythms, in the present study, there was an electric shock in 49.43% of patients with unshakeable rhythms. In the study of Pourmirezakalhari et al., nurses' knowledge of the amount of appropriate shock in VF/VT was reported as 26.8% (16).

In the present study, 26.8% of the resuscitations were interrupted due to delay in airway management. The results of the study of Barim Nejad et al., on oxygenation and airway management, delayed insertion of the endotracheal tube in the intervention group was 21.6% and it was 33.3% in the control group(8). In the study of Adib Hajbagheri et al. skills of nursing students, at three different times for airway management at the right time were evaluated and reported as 54/12%, 26% and 35/5%. In general, approximately 75 % of nursing students were successful in performing chest compression and respiration (3).

Giving medicine may be considered a simple process during resuscitation, but it is one of the most important skills of resuscitation. Given the many changes that have taken place in the cardiopulmonary resuscitation guideline 2015 on giving medicine, it should be emphasized that the awareness of our hospital's resuscitation team has not been very accurate in this regard. Amiodarone ampoule was used in 97/3% in VF/VT rhythms of which 32.4% of them was less than the appropriate dose. Atropine ampoule was also injected in 2.7% of the asystole / PEA rhythms despite its removal from the above medical algorithm. In the study of Hesham et al., Atropine was injected in 65 patients with asystole /PEA and the absence of amiodarone injection after the shock was reported in five patients (71.4%)(15).

Table 1: Data distribution in the studied indices in the evaluation of cardiopulmonary resuscitation

No (number (%))	Yes (number (%))	Items
(80/4) 156	(19/6) 38	Chest compression began with a delay.
(86/6) 168	(13/4) 26	Compression was done at a depth of 4-2 inches (6.5-9.8 cm).
(8/2) 16	(91/8) 178	120-100 compressions per minute were given.
(91/2) 177	(8/8) 17	The placement and angle of the hand for chest compression was inappropriate.
(9/3) 18	(90/7) 176	The hands were folded vertically without bending the elbows in the center of the patient's chest.
(18) 35	(82) 159	After each time, thoracic compression was given to the chest.
(99) 192	(1) 2	The masseur was one person during the entire resuscitation period.
(68) 132	(32) 62	Frequently interrupted chest compressions for various and less important reasons (Such as taking intravenous line, sticking chest leech, intubation, etc.)
(86/6) 168	(13/4) 26	Discontinuation of chest compression after every shock.
(70/1) 136	(29/9) 58	Heart rate compression was done very quickly or slowly.
(76/6) 25	(32/4) 12	Inappropriate amount of amiodarone or lidocaine in VF/VT was given.

In the study of Pourmizakellari et al., nurses' awareness in using amiodarone for ventricular dysrhythmia was reported as 58.6% (16).

Taking into account the results of this study, it is concluded that the skills, such as: continuous chest compression with the least interruption, use of electric shock, immediate start of resuscitation, and medicine use which is emphasized in the guidelines. Considering the fact that cardiac resuscitation is a complex process that is always under high stress, having the knowledge and skills in any of these cases can improve the results. While it is believed that CPR is performed correctly in the centers studied, despite cardiopulmonary resuscitation training classes annually for all medical personnel, the results of this study showed that CPR in these centers is still far from ideal. The difference between the gained knowledge and its practical implementation by the CPR team in emergency centers reveals the fact that the resuscitation team should consider these shortcomings and weaknesses and have more practical training such as a workshop with different scenarios and be alert in this regard.

Appreciation

The researchers are thankful to the dear management of nursing, chief and colleagues of Bu'ali Sina and Fatemeh Zahra Hospitals in Sari and Azizi Hospital in Juybar, respected patients, and all those who somehow helped us in this study.

References

- Kantamini P, Emani V, Saini A, Rai H, Duggal A. Cardiopulmonary resuscitation in the hospitalized patient: impact of system-based variables on outcomes in cardiac arrest. *The American journal of the medical sciences*. 2014;348(5):377-81.
- Saghizadeh M, Rahmani A, Ahangharzadeh Rezaie S. Investigation of nurses knowledge and practice working in CCU wards of Taleghani hospital of Urmia university of medical sciences regarding adult CPR, 1383. *UNMF*. 2006;4(3):99-103.
- Adib-Hajbaghery M, Azizi-Fini E. Longitudinal Study of Cardiopulmonary Resuscitation Knowledge and Skills among Nurse Interns of Kashan University of Medical Sciences. *Iranian Journal of Medical Education*. 2013;13(2):134-45.
- Fanshan M, Lin Z, Wenqing L, Chunlei L, Yongqiang L, Naiyi L. Functions of standard CPR training on performance qualities of medical volunteers for Mt. Taishan International Mounting Festival. *BMC emergency medicine*. 2013;13(1):S3.
- Mohsenpour M, Imani Z, Abdolkarimi M. The effect of education of cardiopulmonary resuscitation (CPR) on knowledge of nursing staff and CPR team members in a hospital in Kerman province. *J qualitative Res Health Sci*. 2010;9(1):2.
- Nasiripour A. A., Masoudi Asl I., Fathi E. The relationship of CPR success and time of patients' referring to emergency department. *Journal of Military Medicine*. 2012;14(1):21-5.
- Meaney PA, Bobrow BJ, Mancini ME, Christenson J, de Caen AR, Bhanji F, et al. Cardiopulmonary Resuscitation Quality: Improving Cardiac Resuscitation Outcomes Both Inside and Outside the Hospital. A Consensus Statement From the American Heart Association. 2013;128(4):417-35.
- Borimenejad L RM NNAR, Mohammadi H, Kheirati L. Effect of trained cardiopulmonary resuscitation team on the outcomes of cardiopulmonary resuscitation. *Babol university*. 2008;10(3):55-61.
- Kavosi A PnAM HM, Shariati AR, Joybari L, Sanagu A. Barriers to the success of cardiopulmonary resuscitation teams from the perspective of nurses. *Golestan-University-of-Medical-Sciences*. 2014;1(1):16-22.
- Reynolds JC, Bond MC, Shaikh S. Cardiopulmonary resuscitation update. *Emergency medicine clinics of North America*. 2012;30(1):35-49.
- Cummins RO, Chamberlain D, Hazinski MF, Nadkarni V, Kloeck W, Kramer E, et al. Recommended Guidelines for Reviewing, Reporting, and Conducting Research on In-Hospital Resuscitation: The In-Hospital 'Utstein Style'. *Circulation*. 1997;95(8):2213.
- McEvoy MD, Smalley JC, Nietert PJ, Field LC, Furse CM, Blenko JW, et al. Validation of a Detailed Scoring Checklist for Use During Advanced Cardiac Life Support Certification. *Simulation in healthcare : journal of the Society for Simulation in Healthcare*. 2012;7(4):222-35.
- Page RL, Joglar JA, Caldwell MA, Calkins H, Conti JB, Deal BJ, et al. 2015 ACC/AHA/HRS Guideline for the Management of Adult Patients With Supraventricular Tachycardia. A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society. 2015.
- Gallagher E, Lombardi G, Gennis P. Effectiveness of bystander cardiopulmonary resuscitation and survival following out-of-hospital cardiac arrest. *JAMA*. 1995;274(24):1922-5.
- Taha HS, Bakhoum SWG, Kasem HH, Fahim MAS. Quality of cardiopulmonary resuscitation of in-hospital cardiac arrest and its relation to clinical outcome: An Egyptian University Hospital Experience. *The Egyptian Heart Journal*. 2015;67(2):137-43.
- Kalhorri R, Naderipour A, Sabour B, Almasi A, Godarzi A, Mirzaii M. Survey of the awareness level of nurses about last guidelines 2010 of cardiopulmonary resuscitation (CPR) in educational hospitals. 2012:75-84.
- Hosseini-Nejad H, Afzalimoghaddam M, Hoseinidavarani H, Nedai HH-N. The validity of cardiopulmonary resuscitation skills in the emergency department using video-assisted surveillance: an Iranian experience. *Acta Medica Iranica*. 2013;51(6):394.

Antibiotic Prescription Patterns in an Academic Emergency Department in Iran

HamidReza Reihani (1)

HamidReza Nader (2)

Neema John Mehramiz (3)

Majid Khadem Rezaiyan (4)

Mahdi Foroughian (5)

(1) Emergency Medicine, Faculty of Medicine, Mashhad University of Medical sciences, Mashhad, Iran.

(2) Department of Infectious Diseases, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

(3) University of Arizona, College of Medicine, Tucson, AZ, USA.

(4) Resident of Community Medicine, Department of Community Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

(5) Emergency Medicine, Faculty of Medicine, Mashhad University of Medical sciences, Mashhad, Iran.

Corresponding Author:

Dr. Mahdi Foroughian

Department of Emergency Medicine,

Mashhad University of Medical Sciences,

Mashhad, Iran.

Tel: 05138525312;

Email: mf2600@yahoo.com

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: HamidReza Reihani et al. Antibiotic Prescription Patterns in an Academic Emergency Department in Iran 2016-2017. World Family Medicine. 2018; 16(3):24-29. DOI: 10.5742/MEWFM.2018.93300

Abstract

Introduction: It is estimated that between 30 to 60 percent of antibiotics are prescribed inappropriately. Antibiotic prescription for hospitalized patients, especially in the emergency department, and their frequent changes by various services is concerning. This study was performed to determine the status and pattern of antibiotic prescription in the emergency department of Imam Reza hospital.

Methods: Five-hundred and forty patients participated in this cross-sectional study, which was conducted at the emergency department of Imam Reza hospital, Mashhad, between August 2014 and July 2015. Demographic information, clinical symptoms during admission, prescribed antibiotic regimens (including type and dosage) and changes in the treatment regimen, were recorded and statistically analyzed.

Results: Patients who required more long-term hospitalization were provided a consultation. The most frequent consultation requests were sent to internal medicine (433, 80.2%), followed by infectious diseases (66, 12.2%) and surgery (38, 7%) wards. Three-hundred and seventy nine patients received at least

one antibiotic by various services; among them cephalosporins (85.2%) and macrolides (23.8%) were the most common. One-hundred and eleven patients who received antibiotics (29.2%) had at least one change in the prescribed antibiotic, among them changing the consumed antibiotics occurred once for 79, twice for 24, three times for 5, and four times for 3 patients.

Conclusions: The study indicates differences in antibiotic prescription patterns among physicians in emergency medicine department compared with those of other services. These differences and inconsistencies can be significantly reduced by periodic educational programs and review of the antibiotics prescribed for each patient.

Key words: Antibiotic prescription, Emergency department, Antibiotic regimens

Introduction

Appropriate use of medications is the cornerstone of pharmaceutical policies. The World Health Organization (WHO) considers the consumption of medications with effective treatment impact as a fundamental way to achieve this purpose (1, 2). However, many different reports suggest that approximately 30-60% of prescribed drugs have been inappropriate. Physicians, distributors and the patients, through self-treatment, have been responsible for such drug abuse (3, 4).

In 1990, 12% of the worldwide total sales of drugs were antibiotics (5). The contribution of developing countries to this sale has risen from 19% to 34% in a 10 years period, which reflects the increase in the cost of antibiotics especially in developing countries, despite efforts to limit the excessive use of antibiotics (5). In the United States, 450 million dollars is spent on antibiotics for the treatment of respiratory tract infections, bronchitis, and sinusitis, annually. Since most of these infections are viral, even if half of these prescriptions are incorrect, as studies have shown, every year about 225 million dollars are being wasted solely in the treatment of such infections (6). It is estimated that between 25 to 35 % of drug budgets are allocated to antibiotics (7). This ratio has been estimated to be 20 % in Iran (8).

Furthermore, inappropriate consumption of antibiotics has undesirable effects such as microbial resistance (9, 10). On the other hand, controlling the consumption of antibiotics leads to improved sensitivity (11). Iran is no exception to this global problem. Reports from Tehran showed that 57% of hospitalized patients received antibiotics (8). In addition, there are studies showing that more than 37% of antibiotics were inappropriately prescribed (12). Therefore, it seems necessary to implement new and more effective policies to control the inappropriate use of antibiotics, internationally (13-15).

Being fully aware of the details of antibiotic consumption and patterns of antibiotic prescription is of cardinal importance to be used as a basis for future interventional programs. Therefore, the present study was conducted in Imam Reza educational hospital, Mashhad, Iran with the aim of determining the status and pattern of antibiotic prescription.

Methods

This cross-sectional study was conducted between August 2014 and July 2015, at emergency department of Imam Reza hospital in Mashhad, Iran. Imam Reza hospital is an academic treatment center with approximately 250,000 entrances in year to its emergency department.

All patients admitted in the emergency department with triage levels of 1-3, who had a consultation with internal medicine, surgery, or infectious disease specialists and had at least 6 hours of stay, were included. The exclusion criteria were: a) lack of consent to hospitalization and

receiving treatment, b) patients without a definite primary diagnosis.

During the course of treatment, demographic characteristics, clinical symptoms on admission, antibiotic regimens prescribed (including type and dosage), and changes in the treatment regimen were investigated.

The sample size was determined with an alpha error of 5% with power of 80%. Finally, the data was collected from 540 patients by a checklist and were imported into SPSS software (version 11.5 for Windows, SPSS Science, Apache Software Foundation, Chicago, IL, USA) after being verified and corrected.

Quantitative data were described by mean \pm standard deviation (SD), while frequency and frequency percentage was used for qualitative data. T-Student test or One Way ANOVA were applied for quantitative variables and Chi-Square test was used for qualitative variables. In cases of non-normally distributed variables, appropriate non-parametric tests were applied. All tests with a P-value $<$ 0.05 were considered as statistically significant.

Results

Records of 540 patients, who qualified for the study, were completely analyzed. The mean age of the patients was 58.9 ± 19.5 years and 60.4% were male. Only 19 (5%) patients were transferred to hospital by pre-hospital emergency services. The most frequent chief complaints on admission were related to the gastrointestinal tract (details are shown in Figure 1).

The mean age of the patients admitted to surgery service (42.3 ± 21 years) was significantly lower than the patients admitted to the internal medicine (60.6 ± 18 years) and infectious diseases (60.1 ± 21 years) services ($P < 0.001$). No significant difference in gender distribution between the various services patients was observed ($P = 0.3$).

Patients requiring more long-term hospitalization were provided with a consultation according to the request of the emergency medicine physicians. Most frequent consultation requests were sent for specialists of internal medicine (433; 80.2%), followed by infectious diseases (66; 12.2%) and surgery (38; 7%).

No significant difference was observed regarding sex, age, or referral to the emergency department by Emergency Medical Service between the patients who received antibiotics and those who did not.

In this study, 379 patients received at least one antibiotic prescription, among whom 323 (85.2%) received cephalosporins and 128 (23.8%) received macrolides. Table 1 shows the frequency of antibiotics prescribed by different consultant services (internal medicine, surgery, and infectious diseases).

Figure 2 shows the change in the patients' prescribed antibiotic(s). As shown, 227 cases (60%) had a change in

Figure 1: Chief complaint categorized based on initial presentation to the emergency department

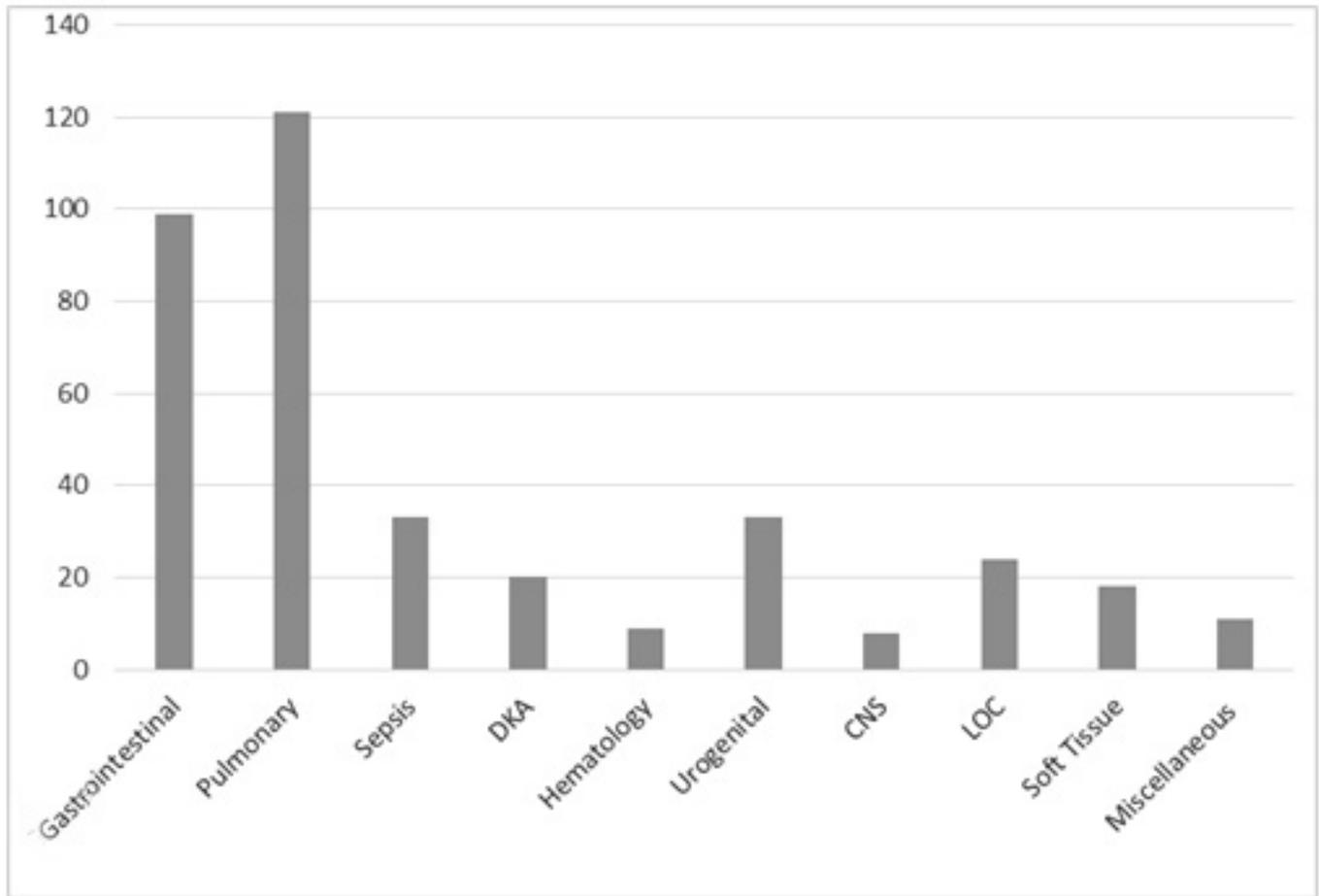


Figure 2: The frequency of administration of antibiotics for hospitalized patients in the emergency department

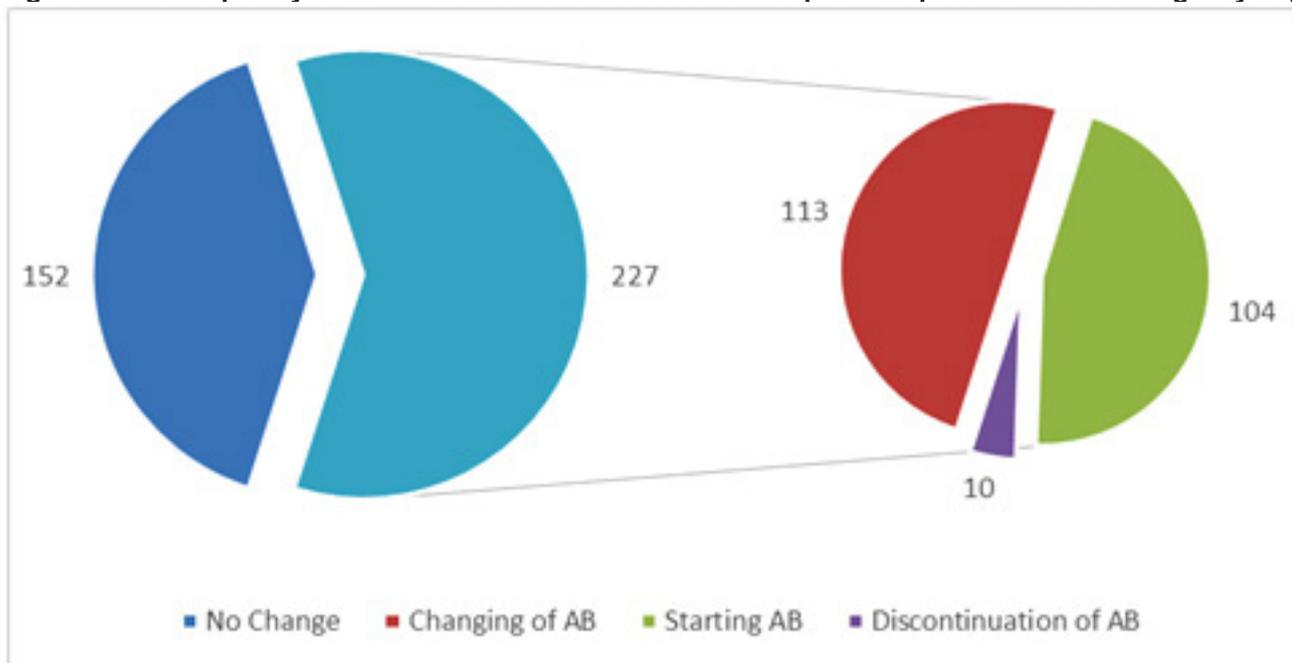


Table 1: Frequency of administration of various antibiotics by different specialties

Antibiotic	Emergency Medicine	Internal Medicine	Surgery	Infectious Diseases
Macrolide	81 (8.17) *	85 (19.7)	0 (0)	12 (11.7)
Cephalosporin	232 (51)	195 (45.1)	30 (53.6)	33 (32)
Carbapenem	19 (4.2)	49 (11.3)	0 (0)	9 (8.7)
Penicillin	38 (4.8)	21 (4.9)	1 (1.8)	16 (15.5)
Quinolones	23 (5.1)	29 (6.7)	0 (0)	11 (10.7)
Aminoglycoside	1 (0.2)	0 (0)	0 (0)	0 (0)
Vancomycin	25 (5.5)	18 (4.2)	0 (0)	16 (15.5)
Metronidazole	34 (7.5)	32 (7.4)	25 (44.6)	2 (1.9)
Acyclovir	2 (0.4)	3 (0.7)	0 (0)	4 (3.9)
Total	455 (100)	432 (100)	56 (100)	103 (100)

* Frequency (%)

their antibiotic administration status, including alteration in the type of prescribed antibiotic (113 cases; 50%), initiation of a new antibiotic (104 cases; 46%), and discontinuation of the prescribed antibiotic (10 cases; 4%). Among the alterations made in the type of prescribed antibiotics, 79 (70%) were done to achieve a higher range of efficacy, 21 (18.5%) was aimed at a less efficacious drug, and 13 (11.5%) were done to change the class of antibiotics. The majority of alterations were administered by internal medicine specialists. A hundred and eleven patients (30%) had at least one alteration in their antibiotic regimen. This change occurred once for 79, twice for 24, three times for 5, and four times for 3 patients.

Considering the change of antibiotics, the difference between the internal medicine and emergency medicine specialties was higher for three antibiotics (carbapenems, cephalosporins and quinolones). Internal medicine specialists tended to use wider spectrum antibiotics in 53 cases (71.6%). Concerning the change of antibiotics, the difference between the infectious diseases and emergency medicine specialists was higher for three antibiotics (carbapenem, cephalosporins and macrolides). The infectious diseases specialists also tended toward the use of wider spectrum antibiotics in 22 cases (62.9%). Concerning the change of antibiotics, the difference between the emergency medicine and surgeons was observed only in 3 cases. The surgeons in all these three cases tended toward the use of wider spectrum antibiotics.

Regarding the initiation of the antibiotics, the difference between the internal medicine and emergency medicine specialists was higher for three antibiotics (carbapenems, cephalosporins and macrolides). Gastroenterology and pulmonary medicine's involvement ranked first and second respectively, with 28 (34%) and 22 (27%) of cases. In this regard, the difference between the emergency medicine and infectious diseases specialists groups was observed only in 6 cases. Diabetic foot and sepsis, ranked highest with 3 (50%) and 2 (33%) cases, respectively. The

difference between the emergency medicine and surgeons was observed in 17 cases for the initiation of antibiotics. Involvement of the gastrointestinal system in 16 (94%) cases, ranked first among the reasons for prescribed medication.

With regard to the discontinuation of the antibiotics, the difference between the emergency medicine and internal medicine specialists was observed in 9 cases. Involvement of the gastrointestinal system with 5 (55%) cases, ranked first. Cephalosporins were the most frequent discontinued medication in 8 cases (89%). The difference in discontinuation of antibiotics between the emergency medicine and infectious diseases specialists was observed in only 1 case, for whom a macrolide was discontinued with impression of non-infectious lung disease. No discontinuation of antibiotics was observed in the surgical services.

No significant difference was observed in sex of the patient regarding the alteration status of antibiotics. Likewise, no difference was observed between different specialists regarding the change in the efficacy of antibiotics. No difference was observed regarding the alteration of antibiotics between most likely involved organs. In addition, mean age did not make any difference regarding start, discontinuation, or variation of antibiotics.

Introduction

During this study, at least one antibiotic was prescribed for 70% of patients, by one or multiple services. In 30% of cases, antibiotics prescribed by emergency medicine physicians were modified by other specialists. Moreover, we observed administration of new antibiotics in 28% of cases, and discontinuation of antibiotics in 2.6% of cases. This might be related to the differences in approaching methods or reference books of different specialists, alterations in the clinical course of patients in the emergency setting, availability of preliminary examinations, or considering

other possible diagnoses. However, such inconsistencies in practice can entail many unnecessary medical costs and prescriptions. For example, in a study in Brazil, 24% of the antibiotics prescribed were inappropriate (16). Another study from Latvia posits that most of the prescribed antibiotics were not based on proved indications, and that prophylaxis antibiotics had been prescribed more than the expected duration (17). In a study conducted by Erbay et al. 35.8% of the prescribed antibiotics were inappropriate (18). Therefore, having adequate knowledge of the indications of antibiotic therapy is not necessarily sufficient to make a change and antibiotic prescribing habits of physicians should be changed as well.

Antibiotic variations administered by internal medicine services were observed in 26.4% of cases while in 71.6% of them, the prescribed antibiotic was changed to one with higher coverage level. In most cases, antibiotics were changed once. Results of a study on patients hospitalized in an internal medicine ward in Mashhad revealed that in 94% of cases antibiotics had been inappropriately prescribed, which included selection of inappropriate antibiotic type, inappropriate prescribed medication dosage, or dosage intervals, duration of prophylaxis or treatment, and indication of antibiotic prescription (19). However, this rate has been reported to be 60% in another study (20).

In 55.6% of patients who had a visit by infectious disease specialists, antibiotics were changed, 62.9% of which tended toward the use of antibiotics with greater range of coverage. Similar to the internal medicine group, in most cases, antibiotics were changed once. Since sepsis and complications associated with CNS had the highest frequency, associating the clinical views of these two clinical specialist groups seems necessary in this regard. Since the majority of patients admitted to the emergency department with surgical problems are generally operated, the rate of alteration in antibiotic prescription by surgery specialists was not high. However, a study conducted in Rasht, Iran on patients with elective and emergency surgery, suggest that more than 30% of cases visited by surgeons had inappropriate antibiotic prescription; and antibiotics were prescribed in 30% of cases with inappropriate coverage levels. Furthermore, treatment duration had not been in accordance with appropriate principles of treatment in more than half of the cases (21). In another study conducted in Mashhad, inappropriate antibiotics were prescribed for 98% of patients admitted to a surgical ward (19).

Some studies have explained the use of antibiotics in health centers (22-26). Guidelines have been set with the aim of reducing the consumption as well as establishing appropriate and reasonable administration of antibiotics through the control of antibiotic use (27, 28). In a study by Senn et al. it was shown that reassessment of antibiotic prescription as a new solution can lead to improved administration of antibiotics (29).

In accordance with studies carried out in other parts of Iran, the results of this study also showed that the most commonly used antibiotic category in Iran is cephalosporins, which is probably due to its various generations and wide coverage level (8, 12, 19, 30).

In most studies, the importance of an infectious diseases consultation on appropriate antibiotic prescriptions has been noted (31, 32); similarly, this study showed a high rate of antibiotic alteration upon consultation with infectious diseases specialists. This might be due to the flaws in diagnosis of infections, or choosing proper antibiotic therapy by the primary visiting specialists.

Although few studies have been conducted on the consumption of antibiotics in Iran, none of them specifically examined the use of antibiotics in the emergency department. On the other hand, the strengths of this study are the sampling methods and administration of this project over a year. In addition, this hospital is the only University Hospital with an academic based emergency medicine department, which can also be listed as strengths of this study.

One of the limitations of this study is its retrospective design. Use of patients' medical records to retrieve data may cause biased information. However, since the antibiotics are rechecked by medical care team at the emergency department, the likelihood of such bias is weak. In addition, because Imam Reza Hospital is a referral based tertiary care center, the results of this study can be extended beyond the citizens of the city of Mashhad.

Conclusion

Antibiotic changes made by the infectious diseases specialists were more than the other services. Although providing all the patients in the emergency department with an infectious disease consultation seems impossible, development of medical and inter-divisional protocols for empirical administration of drugs in accordance with clinical symptoms and early diagnosis can be a valuable attempt. Prescription of cephalosporins, macrolides and carbapenems entailed the highest differences in terms of antibiotic discontinuation, initiation and alteration. The differences and inconsistencies between antibiotic prescription pattern of different specialists can be significantly reduced by periodic educational programs and review of the antibiotics prescribed for each patient. Arranging relevant educational workshops is strongly recommended, as it would be a necessary step toward achieving higher consistency and uniformity in the management of infections.

Declarations:

This study approved by Mashhad University of Medical Sciences ethics committee. This retrospective study waived need of informed consent by ethic committee.

Acknowledgements:

We thank Mashhad University of Medical Sciences for financially support.

References

1. Management sciences for health. Managing drug supply. West Hartford, Connecticut, USA: Kumarian Press, 1997.
2. Benko R, Bacskai T, Hajdu E, Matuz M, Soos G. Analysis of antibiotic consumption of five different clinical departments, especially considering the features of hematology departments. *Acta Pharm Hung* 2002; 72 (4): 245-51.
3. Raveh D, Levy Y, Rudensky B, Yinnon, AM. Longitudinal surveillance of antibiotic use in the hospital. *QJ Med* 2001; 94: 141-51.
4. Beringer PM, Wong-Beringer A, Rho JP. Economic aspects of antibacterial adverse effects. 2005; 1998 (13): 35-49.
5. Liss RH, Batchelor FR. Economic evaluations of antibiotic use and resistance-a perspective: report of Task Force 6, *Rev Infect Dis* 1987; 9 (Suppl 3): S297-S312.
6. Kunin CM, Chambers S. Responsibility of the infectious disease community for optimal use of antibiotics: views of the membership of the Infectious Diseases Society of America. *Rev Infect Dis*. 1985 Jul-Aug; 7 (4):547-59.
7. Counts GW. Review and control of antimicrobial usage in hospitalized patients. A recommended collaborative approach. *JAMA*. 2000 Nov 14; 283 (20):2170-2.
8. Hajebi G, Mortazavi AR, Goudarzi J. The pattern of consumption of antibiotics in Taleqani hospital with respect to disease category in 2001. *Research in Medicine (Journal of the Faculty of Medicine)* 2005; 29 (2), 157-164.
9. Ansari F, Salamzadeh J, Feizi M, Rasekh HR. Antibiotic consumption patterns in various divisions of Bouali (Tehran) hospital during the first 6 months of 1994. *The Researcher*, Winter 1998; 11, 99-107.
10. With KD, Meyer E, Steib-Bauert M, Schwab F, Daschner FD, Kern WV. Antibiotic use in two cohorts of German intensive care units. *Journal of Hospital Infection* 2006; 62: 200-206.
11. McNulty C, Logan M, Donald IP, Ennis D, Taylor C, Baldwin RN: Successful control of *Clostridium difficile* infection in an elderly care unit through use of a restrictive antibiotic policy. *J Antimicrob Chemother* 1997; 40:707-11.
12. Khoshdel A, Panahande QR. Determining the consumption pattern of antibiotics in the pediatric division of Hajar (Shahre-kord) Hospital in 2009 and 2010. *Journal of Medicine of Shaheerkord Medical Sciences* 2012; 14 (5): 54-62.
13. World Health Organization. Control of antibiotic-resistant bacteria: Control of antibiotic-resistant bacteria: memorandum from a WHO meeting, WHO Scientific Working Group on Antimicrobial Resistance. *Am J Hosp Phar* 1984; 41: 1329-37.
14. Kunin CM. Resistance to antimicrobial drugs-a worldwide calamity. *Ann Intern Med* 1993; 118: 557-61.
15. Loeffler JM, Garbino J, Lew D, Harbarth S, Rohner P. Antibiotic consumption, bacterial resistance and their correlation in a Swiss university hospital and its adult intensive care units. *Scand J Infect Dis* 2003; 35 (11-12): 843-50.
16. Carneiro M, Ferraz T, Bueno M, Koch BE, Foresti C, Lena VF. Antibiotic prescription in a teaching hospital: a brief assessment. *Rev Assoc Med Bras*. 2011 Jul-Aug; 57 (4): 414-7.
17. Dumpis U, Gulbinovic J, Struwe J, Lagergren A, Giskevicius L, Bergman U. Differences in antibiotic prescribing in three university hospitals in the Baltic region revealed by a simple protocol for quality assessment of therapeutic indications. *Int J Clin Pharmacol Ther*. 2007 Oct; 45 (10): 568-76.
18. Erbay A, Colpan A, Bodur H, Cevik MA, Samore MH, Ergönül O. Evaluation of antibiotic use in a hospital with an antibiotic restriction policy. *Int J Antimicrob Agents*. 2003 Apr; 21 (4): 308-12.
19. Sarvghad MR, Javedan K, Asadi A. The application of antibiotics in the internal and surgical wards of 17 Shahrivar (Mashhad) Hospital, 1998. *Journal of faculty of Medical Sciences, University of Mashhad*. Winter 2002; 45 (78): 55-59.
20. Mokhtari H, Habibi F, Gazerani M. An evaluation of antibiotics therapy and use in the internal sections of Arya and Bahman 22nd hospitals in Mashhad (2003-2004). *J Med Sci Islamic Azad Univ Tehran*. 2006; 2 (2): 19-23.
21. Behboudi F. Antibiotic's prescription in general surgical wards of Rasht (Iran) educational hospitals (77-75). *Journal of Babol University of Medical Sciences: Winter* 2000; 3 (1): 47-51.
22. Schwartz B, Bell DM, Hughes JM. Preventing the emergence of antimicrobial resistance. A call for action by clinicians, public health officials, and patients. *JAMA*. 1997 Sep 17; 278 (11): 944-5.
23. McGowan JE Jr. Do intensive hospital antibiotic control programs prevent the spread of antibiotic resistance? *Infect Control Hosp Epidemiol*. 1994 Jul; 15 (7): 478-83.
24. Goldmann DA, Weinstein RA, Wenzel RP, Tablan OC, Duma RJ, Gaynes RP. Strategies to Prevent and Control the Emergence and Spread of Antimicrobial-Resistant Microorganisms in Hospitals. A challenge to hospital leadership. *JAMA*. 1996 Jan 17; 275 (3): 234-40.
25. Dunagan WC, Woodward RS, Medoff G, Gray JL, Casabar E, Lawrenz C. Antibiotic misuse in two clinical situations: positive blood culture and administration of aminoglycosides. *Rev Infect Dis*. 1991 May-Jun; 13 (3): 405-12.
26. Lee KR, Leggiadro RJ, Burch KJ. Drug use evaluation of antibiotics in a pediatric teaching hospital. *Infect Control Hosp Epidemiol*. 1994 Nov; 15 (11): 710-2.
27. Owens RC Jr. Antimicrobial stewardship: Antimicrobial stewardship: concepts and strategies in the 21st century. *Diagn Microbiol Infect Dis*. 2008 May; 61(1): 110-28.
28. Ohl CA, Dodds Ashley ES. Antimicrobial stewardship programs in community hospitals: the evidence base and case studies. *Clin Infect Dis*. 2011 Aug; 53 Suppl 1:S23-8; quiz S29-30.
29. Senn L, Burnand B, Francioli P, Zanetti G Improving appropriateness of antibiotic therapy: randomized trial of an intervention to foster reassessment of prescription after 3 days. *J Antimicrob Chemother*. 2004 Jun; 53(6): 1062-7.
30. Ebrahimzade MA, Ansari F, Ramezani A, Shokrzade M, Shabankhani B, Saidi Saravi SS, Baqerzadegan Z. Antibiotic consumption patterns in various divisions of Imam Khomeini hospital, Sari. *Journal of Medicine, Mazandaran Medical Sciences University* 2012; 17 (61): 166-169.
31. Apisarnthanarak A, Danchaivijitr S, Bailey TC, Fraser VJ. Inappropriate antibiotic use in a tertiary care center in Thailand: an incidence study and review of experience in Thailand. *Infect Control Hosp Epidemiol*. 2006 Apr; 27(4):416-20.
32. Sunenshine RH, Liedtke LA, Jernigan DB, Strausbaugh LJ; Infectious Diseases Society of America Emerging Infections Network. Role of infectious diseases consultants in management of antimicrobial use in hospitals. *Clin Infect Dis*. 2004 Apr 1; 38(7):934-8.

Investigating the Relationship between Serum Bilirubin Levels in the First Week of Life with Season of Birth

Mohsen Hojat (1)
Nabi Zarezadeh (2)
Vahid Mogharab (3)
Ehsan Rahmanian (3)

(1) Phd of Nursing, Research Center for Noncommunicable Diseases , Jahrom University of Medical Sciences, Jahrom, Iran.

(2) Department of Health Services Management, Jahrom University of Medical Sciences, Jahrom, Iran.

(3) Department of Pediatrics, Jahrom University of Medical Sciences, Jahrom, Iran.

Corresponding Author:

Ehsan Rahmanian

Department of Pediatrics, Jahrom University of Medical Sciences,
Jahrom, Iran

Email: ehsanrahmanian90n@yahoo.com

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Mohsen Hojat et al. Investigating the Relationship between Serum Bilirubin Levels in the First Week of Life with Season of Birth. World Family Medicine. 2018; 16(3):30-33. DOI: 10.5742/MEWFM.2018.93301

Abstract

Introduction: Hyperbilirubinemia is a physiological phenomenon; however, it can be influenced by many factors, such as the season of birth.

Methodology: This analytical cross-sectional study was conducted in Jahrom University of Medical Sciences during 2016-2017. Using simple random sampling, 100 infants were selected in each season. The inclusion criteria included: surviving within the first 24 hours of birth, lack of any kind of congenital abnormalities, avoiding the use of specific drugs (mothers) that may raise neonates' bilirubin levels, no history of hepatic disorders (mothers), gestational age between 38-42 weeks, absence of Rh and blood type incompatibility, absence of G6PD deficiency, normal birth weight (2500-3400 g), maternal age between 18-35 years, normal Apgar scores at 1 and 5 minutes and completion of all patients' records. Using capillary technique, the serum bilirubin levels in the first week were taken and the bilirubin levels were calculated. Data were analyzed in SPSS 16.

Results: 49.5% of the infants were female. The mean gestational age was 38.28 (1.416) weeks. The mean bilirubin level at the time of birth was 10.61 (3.24). The highest bilirubin level was observed in winter 10.86 (3.23). Based on the Spearman's test, there was no statistical significant relationship between season of birth and bilirubin levels in the first

week of life (Sig. = 0.951; $r = -0.003$). However, the stepwise multivariate linear regression test showed that only type of delivery and gestational age (3.7% and 5.2%, respectively) predicted the changes in the serum bilirubin levels in the first week of life (Beta= - 0.213; Beta= -0.123).

Conclusion: There was no significant relationship between season of birth and serum bilirubin levels in the first week of life; however, the contradictions observed in various studies highlights the need to conduct further research in this area.

Key words: neonatal, jaundice, hyperbilirubinemia, season.

Introduction

Neonatal jaundice is one of the most common neonatal diseases; as, up to 60% of full term infants and 80% of preterm infants develop jaundice during the first week of life (1, 2). In the first few weeks of life, most newborns experience hyperbilirubinemia and develop jaundice symptoms. This physiological phenomenon is the result of the relative impairment of the bilirubin excretion mechanisms (3). Non-conjugated bilirubin is crucially dangerous for the nervous system. The severity of jaundice varies among different infants and may be associated with factors such as race, nutrition, climate and season of birth (4-6). The possible impact of season of birth on physical and psychological characteristics of infants as well as their susceptibility to diseases has been studied by researchers for many years (7, 8).

Bottini conducted a study on 343 newborns to investigate the relationship between serum bilirubin levels in the first week of life and season of birth and found that bilirubin levels were significantly lower in autumn than other seasons. There was no significant difference between other seasons. Meanwhile, this increase (in spring and winter) was significantly higher among female infants (9). Bottini in another study in 2010 observed that phototherapy has been mostly applied in May and August. He also observed significant relationships between season of birth and phototherapy usage with the probability of developing jaundice (10 and 11). Gonzales conducted a study on 61 neonates with hyperbilirubinemia and observed significantly higher increases in bilirubin levels in summer, compared to other seasons (10). Cerna in a study compared increases in bilirubin levels in winter and summer in preterm and full term neonates and found significantly higher increases in bilirubin levels in winter and higher phototherapy usage in summer (12). Studies conducted on the relationship between bilirubin levels and season of birth have provided different results (9-7). Due to the lack of evidence on the impact of season of birth on bilirubin levels, the researcher conducted this study to investigate the relationship between bilirubin levels in the first week of life and season of birth. This study provides useful information to the medical team responsible for protecting infants, to identify risk factors and the possibility of neonatal jaundice in different seasons.

Methodology

This analytical cross-sectional study was conducted in Jahrom University of Medical Sciences during 2016-2017. The sample size was determined based on Bottini's study and using simple random sampling, 100 infants were selected in each season. The inclusion criteria included: surviving within the first 24 hours of birth, lack of any kind of congenital abnormalities, avoiding the use of specific drugs (mothers) that may raise neonates' bilirubin levels, no history of hepatic disorders (mothers), gestational age between 38- 42 weeks, absence of Rh and blood type incompatibility, absence of G6PD deficiency, normal birth weight (2500-3400 g), maternal age between 18-35 years, normal Apgar scores at 1 and 5 minutes and completion of all patients' records. Informed written consent was obtained from all infant's parents. The principle of anonymity was observed. Routine treatments were carried out immediately for infants with high bilirubin levels. Data were analyzed in SPSS 16.

Findings

Most of the births occurred during summer (1319), autumn (1304), winter (1222) and spring (1095), respectively. 40% of the deliveries were cesarean and 60% of them were normal deliveries. In addition, 49.5% of the infants were female. The mean gestational age was 38.28 (1.416) weeks. The mean bilirubin level at the birth time was 10.61 (3.24). The highest bilirubin level was observed in winter 10.86 (3.23) (Table 1). The mean weight of the infants was 3127.00 (452.142). The mean of the first and second minutes Apgar scores was 8.98 (0.412) and 9.96 (0.281), respectively. The ANOVA test showed no statistically significant difference between season of birth and bilirubin levels after birth (Sig. = 0.290; F = -1.254). However, the stepwise multivariate linear regression test showed that only type of delivery and gestational age (3.7% and 5.2%, respectively) predicted the changes in the serum bilirubin levels in the first week of life (Beta= - 0.213; Beta= - 0.123).

According to the independent t-test, there was no significant relationship between: type of delivery and the mean bilirubin levels (Sig. = 0.065; F = 3.425); neonate's gender and the mean bilirubin levels (Sig. = 0.813; F = 0.056) and multiple birth and bilirubin levels (Sig. = 0.403; F = 0.764).

Table 1: The mean and standard deviation of the characteristics of the neonates in terms of season

	Pregnancy age M(SD)	Bilirubin M(SD)	Weight M(SD)	Apgar-1 M(SD)	Apgar-5 M(SD)	NVD %	Boy %	Twin %
spring	38.09(1.33)	10.69(2.92)	3.09 (.43)	9.09(.43)	9.99(.10)	76	44	1
summer	38.31(1.72)	10.82(3.62)	3.13(.46)	8.96(.43)	9.98(.14)	54	50	.5
autumn	38.26(1.292)	10.06(3.17)	3.08 (.47)	8.92(.44)	9.93(.43)	58	51	1
winter	38.48(1.26)	10.86(3.23)	3.20 (.43)	8.93(.33)	9.96(.32)	52	51	1
Total	38.28(1.42)	10.61(3.24)	3.12 (.45)	8.98(.41)	9.96(.28)	60	49	

Table 2: The results of the multivariate regression test using stepwise method

Model Summary						
Model	R	R Square	Adjusted R Square		Std. Error of the Estimate	
1	.192 ^a	.037	.034		3.186	
2	.227 ^b	.052	.047		3.165	
ANOVA ^c						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	150.126	1	150.126	14.793	.000 ^a
	Residual	3917.254	386	10.148		
	Total	4067.380	387			
2	Regression	209.825	2	104.912	10.471	.000 ^b
	Residual	3857.555	385	10.020		
	Total	4067.380	387			
Coefficients ^c						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12.629	.550		22.962	.000
	kind of delivery	-1.267	.330	-.192	-3.846	.000
2	(Constant)	24.136	4.746		5.086	.000
	kind of delivery	-1.403	.332	-.213	-4.225	.000
	age of pregnancy	-.295	.121	-.123	-2.441	.015
Excluded Variables ^c						
Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	season	-.041 ^a	-.810	.419	-.041	.974
	age of pregnancy	-.123 ^a	-2.441	.015	-.123	.972
	sex	.080 ^a	1.606	.109	.082	1.000
	Weight	-.041 ^a	-.826	.409	-.042	.998
	Apgar-1	.026 ^a	.524	.601	.027	.999
	Apgar-5	-.053 ^a	-1.063	.288	-.054	1.000
2	season	-.033 ^b	-.664	.507	-.034	.970
	sex	.089 ^b	1.802	.072	.092	.994
	Weight	-.003 ^b	-.059	.953	-.003	.898
	Apgar-1	.029 ^b	.586	.558	.030	.998
	Apgar-5	-.041 ^b	-.811	.418	-.041	.988
a. Predictors: (Constant), kind of delivery						
b. Predictors: (Constant), kind of delivery, age of pregnancy						

Discussion

This study showed that season of birth does not affect bilirubin levels in the first week of life. The bilirubin levels were slightly higher in winter, compared to other seasons. However, there was no statistically significant difference between other seasons. Similar to the present study, Bottini's study also showed that there was no statistically significant difference between various seasons in terms of bilirubin levels (9). In another study in 2000, Bottini investigated the relationship between season and bilirubin levels in the neonatal period using phototherapy analysis on 5,540 newborns. Bottini observed that phototherapy was mostly applied in May and August. He also observed significant relationships between season of birth and phototherapy usage with the probability of developing jaundice. The author disproved the impact of sunlight on serum bilirubin levels in infants (10 and 11). Therefore, the findings of this

study are also consistent with our study. Cerna in a study compared increases in bilirubin levels in winter and summer in preterm and full term neonates and found significantly higher increases in bilirubin levels in winter and higher phototherapy usage in summer and the author disproved the impact of sunlight on serum bilirubin levels in infants (12). In the present study, higher bilirubin levels were observed in winter and summer; however, the differences were not statistically significant. Gonazales conducted a study on 61 neonates with hyperbilirubinemia and observed significantly higher increases in bilirubin levels in summer. High temperature during summer and subsequently higher dehydration rate may be the main cause of this increase in bilirubin levels (10). However, higher bilirubin levels were observed during winter in the present study. In the winter, parents often increase the baby's room temperature to prevent hypothermia. This causes dehydration and increases serum bilirubin levels. Therefore, it can be

concluded that since there is less sunlight in the winter, the decomposition of bilirubin decreases in this season and this in turn will increase serum bilirubin levels.

In the first few weeks of life, most newborns experience hyperbilirubinemia and develop jaundice symptoms. This physiological phenomenon is the result of the relative impairment of the bilirubin excretion mechanisms (2-4). Non-conjugated bilirubin is crucially dangerous for the nervous system; however, the protective role of bilirubin against oxidative stresses should not be ignored. Factors such as race, religion, eating habits and seasonal differences can affect the severity of jaundice in various populations (3, 11). Another possible reason that needs further research is the differences in eating habits of mothers in different seasons of the year. For instance, mothers are more susceptible to viral diseases during winter and have to take more drugs. Due to the lack of similar studies in this area in Iran and ignoring climatic and environmental factors in performed studies, more extensive research is needed to find the environmental factors involved in increasing bilirubin levels in different seasons. The limited number of samples, ignoring climatic factors as well as mothers' diets during pregnancy and especially at the last trimester of pregnancy were some of the limitations of this study.

Conclusion

Unlike some previous studies, in the present study, no significant relationship was observed between season of birth and serum bilirubin levels in the first week of life. However, the aforementioned studies have also confirmed the effects of variables such as reduced light or increased ambient temperature. Therefore, it is suggested to examine other effective environmental variables in each season separately and independent of the seasons.

Acknowledgment

Hereby, the author of this article would like to thank the Vice Chancellor for Research of Jahrom University of Medical Sciences and Motahari Hospital Management. The present study was approved at the Ethics Committee of Jahrom University of Medical Sciences (code: jums.212195).

References

1. Ambalavanan N, Carlo WA. Jaundice and hyperbilirubinemia in the newborn. In: Kliegman RM, Stanton BF, St. Geme JW, Schor NF, Behrman RE, editors. *Nelson Textbook of Pediatrics* 19th ed. Philadelphia: Elsevier; 2011. p. 603-7.
2. Ding G, Zhang S, Yao D, Na Q, Wang H, Li L, et al. An epidemiological survey on neonatal jaundice in China. *Chin Med J (Engl)* 2001;114(4):344-7.
6. Bélanger S, Lavoie JC, Chessex P. Influence of bilirubin on the antioxidant capacity of plasma in newborn infants. *Biol Neonate* 1997;71(4):233-8
9. Bottini N, Dituri F, Bottini FG. Season of birth and early neonatal events. The rise of serum bilirubin. *Biol Rhythm Res* 2000;31:50-5.
10. González de Dios J, Moya Benavent M, Sirvent Mayor MC, Durá Travé T. Seasonal differences in neonatal jaundice. *An Esp Pediatr* 1996;45(4):403-8.
11. Bottini M, Meloni GF, Bottini FG. Seasonal pattern of phototherapy: A study in the Sardinian population. *Biol Rhythm Res* 2003;34:13- 21.
12. Cerna M, Vitek L, Mala K, Konickova R. 1185 seasonal nature of neonatal jaundice. *Pediatr Res* 2010;68:586.

The evaluation of the success rate, complications and mid-term follow up results of patients with peripheral arterial disease of lower limb treated using endovascular therapy: A single center study

Mohammad Hasan Namazi (1)

Fatemeh Abedi (1)

Morteza Safi (1)

Hossein Vakili (1)

Habibollah Saadat (1)

Saeed Alipour Parsa (1)

Isa Khareshi (1)

Soroush Veisi (2)

(1) Cardiovascular Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

(2) Faculty of medicine, Tehran University of Medical Sciences, Tehran, Iran

Corresponding author:

Soroush Veisi

Faculty of medicine, Tehran University of Medical Sciences, Tehran, Iran

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Mohammad Hasan Namazi et al. The evaluation of the success rate, complications and mid-term follow up results of patients with peripheral arterial disease of lower limb treated using endovascular therapy: A single center study. World Family Medicine. 2018; 16(3):34-38. DOI: 10.5742/MEWFM.2018.93302

Abstract

Background: Peripheral arterial diseases (PAD) as a highly prevalent disease all over the world is one of the major causes of limb amputations. Endovascular treatments have surpassed surgery in the past decades and are recommended in most of the cases but there is not adequate data regarding the safety and success rate of the procedure. In this study we evaluated the success rate, complications and follow up results of lower limb endovascular interventions.

Methods: 80 consecutive patients went under the procedure from January 2016 to February 2017. Demographic data, comorbidities and risk factors, ABI, Rutherford and Fontaine score before and after the procedure and six months later and periprocedural complications were recorded for each patient. Analyses were done using Chi-square, Wilcoxon signed rank test, Mauchly's test of sphericity and estimated marginal means with a P-value <0.05 indicating significance.

Results: There were 80 patients in this study (87.5% males). Mean age \pm SD was 63.98 ± 9 years. The most common complications were hypertension (78.8%), cardiac disease (77.5%) and smoking (71.3%). PTA for the lesions below the knee was done in 66.3% of the participants. Drug balloon and stents were used in 18.8% and 42.5% of the individuals respectively. More than 50% of the patients had no complication. Dissection (23.8%), contrast-induced nephropathy (10%) and hematoma (10%) were the most common complications. ABI, Rutherford and Fontaine scores showed significant improvement after the procedure and after the six months and creatinine levels didn't exhibit any significant increase overall.

Conclusion: Endovascular treatments for lower limb arterial disease are a safe procedure with a low rate of complications despite the existence of comorbidities in patients with PAD, and satisfactory results in mid-term follow up for patients with both below and upper the knee lesions.

Key words: peripheral artery disease, lower limb, endovascular therapy, Iran

Introduction

Peripheral arterial disease (PAD) is estimated to affect more than 200 million people all over the world (1). With trauma being the second leading cause, PAD remains the first cause of all limb losses accounting for about half of all amputations. It is estimated that the number of limb amputations due to vascular disorders will still increase in the next 30 years (2). PAD places a high burden on social, economic and health resources as the patients deal with higher rates of hospitalization, work and daily activity impairment and health-care related expenditure (3).

Percutaneous Transluminal Angioplasty (PTA) has been used as a revascularization method in different medical conditions such as lower extremities ischemia for the past decades (4). Given the lower amount of invasiveness, the risk of peri-procedural complications in PTA tend to show a marked decrease in comparison with the surgical interventions (5). Currently, endovascular procedures are the preferred treatment for some of the various types of stenosis and occlusions (e.g. Type A and B of Inter-Society Consensus classification –TASC II) (6, 7).

In this study, we aimed to evaluate the success rate of the procedure after completion, complications and follow up results within six months.

Methods

Patients

80 patients were enrolled in this study from January 2016 to February 2017, all of whom were candidates for endovascular intervention based on their clinical signs and symptoms including rest pain, ischemic ulcer and disabling claudication as well as failure to respond to medical therapy. The Institutional Review Board approved the study protocol, and patients provided informed written consent.

Demographic data was obtained for each patient. Patients were assessed for comorbidities and risk factors including hypertension, diabetes mellitus, hyperlipidemia and smoking. Previous history of renal, carotid and PAD interventions were recorded as well as a history of ulcer and amputation.

In each procedure, the time patient was exposed to the contrast, total time of procedure, time of fluorescent exposure, and the use of drug balloon or stent were recorded. Patients underwent an evaluation for Ankle-Brachial Index (ABI); creatinine and hemoglobin before the procedure and right after the procedure was done. These three factors were also measured after six months for the follow-up. An evaluation for the complications including hematoma, dissections, contrast-induced nephropathy, under-operation CVA, MI and mortality was done after the procedure.

Rutherford and Fontaine score was measured for each patient before the procedure and six months after the procedure.

Statistical Analysis

Statistical Package for the Social Sciences software (SPSS Inc, Chicago, IL USA) was used to analyze all data. Categorical data are presented as counts and percent while continuous data are presented in mean \pm SD. The association between comorbidities and predisposing factors with the level of PTA was tested using Chi-square test. Patients' ABI was compared using Mauchly's test of sphericity in each step. Fontaine and Rutherford score before and six months after the procedure was compared using Wilcoxon-signed ranks test. Estimated marginal Means for creatinine levels before and after the procedure was calculated as well as six months later and pairwise comparisons were done.

Results

There were 80 consecutive patients (70 males, 87.5%) studied over a 6 months period. The mean age for the patients was 63.98 ± 9 years (ranging from 36 to 80). Hypertension (78.8%), cardiac disease (77.5%), smoking (71.3%), diabetes mellitus (56.3%), hyperlipidemia (50%), and a history of CABG (36.6) were the most common comorbidities. 12.5% of patients had a previous carotid intervention. 6.3% had a renovascular disease but none had undergone a renal intervention. 17.3% of patients had experienced previous PAD and 16.3% had a past PAD intervention (13 out of 14). 26 patients (32.5%) had ulcer and 3 patients (3.8%) had an amputation history.

Of these, 53 (66.3%) underwent PTA for the vessels below the knee and 27 (33.7%) had the lesions above the knee. Drug-balloon was used in 15 patients (18.8%) and stents were utilized in 34 patients (42.5%). Most of the patients ($n = 45$, 56.3%) completed the procedure without any complications but 8 out of the 35 developed a contrast-induced nephropathy (10%), 19 patients presented with dissection (23.8%), and hematoma was found in 8 of them (10%). No CVA or MI was detected in any of the patients. After six months, there were 56 (70%) patients of stage I, 2 (2.5%) in stage IIA, 19 (23.8%) in stage IIB and 3 (3.8%) in stage III based on Fontaine classification system. Based on Rutherford score, the distribution of patients was 53 (66.3%) with a grade of 0, 4 (5%) with a grade of I, 20 (25%) with a grade of II and 3 (3.8%) with a grade of III after six months.

Ulcers were present in only 4 (5%) of the patients after six months.

There was no association between gender, hyperlipidemia, family history, opium use, cardiac disease, MI, CABG, past carotid or PAD intervention, amputation and the level of vascular involvement ($P > 0.05$). On the other hand, hypertension, smoking, diabetes, insulin dependency, history of CVA, and the existence of ulcer showed a significant association with the PTA level ($P < 0.05$). No association between the occurrence of complication or its type and the PTA level was observed ($P = 0.212$). Although ulcer existence and Fontaine score after six months showed no significant association with the PTA level, Rutherford score displayed significance ($P = 0.031$). (Table 1)

Table 1: The comorbidities and factors prevalence and association with the level of the PTA

Factors		Number	Percent	Association with the PTA level	P-value
Sex	Male	70	87.5%	No	0.09
	Female	10	12.5%		
Hypertension		63	78.8%	Yes	0.002
Hyperlipidemia		40	50%	No	0.48
Diabetes		45	56.3%	Yes	0.001
Smoking		57	71.3%	Yes	0.013
Family History		11	13.8%	No	0.38
Opium		24	30%	No	0.64
Insulin		24	30%	Yes	0.034
Cardiac disease		62	77.5%	No	0.28
MI		22	27.5%	No	0.45
CABG		29	36.3%	No	0.38
Past carotid intervention		10	12.5%	No	0.79
Past PAD intervention		14	17.5%	No	0.43
Amputation		3	3.8%	No	0.21
Ulcer		26	32.5%	Yes	0.004
Drug balloon		15	18.8%	No	0.52
Stent		34	42.5%	Yes	<0.001
Complications		35	43.7%	No	0.21
Ulcer after six months		4	5%	No	0.7
Fontaine after six months		-	-	No	0.1
Rutherford after six months		-	-	Yes	0.03

Table 2: The distribution and changes of Rutherford classification of patients before and six months after the procedure

		Rutherford six months after the procedure				Total
		0	1	2	3	
before the procedure	1	1	0	0	0	1
	2	13	2	1	0	16
	3	24	2	4	2	32
	4	15	0	15	1	31
Total		53	4	20	3	80

ABI scores showed a significant increasing trend just after the intervention and six months post-procedure ($P < 0.001$). Mean \pm SD values for ABI was 0.71 ± 0.26 before treatment, 0.80 ± 0.22 after the treatment and 0.84 ± 0.20 six months after the procedure.

Rutherford scores were compared before the procedure and six months later. Results show that 77 individuals (96.2%) presented better score (lower grades) at six months and only three didn't show any progress. Of these three one had a score of 2 and two had a score of 3 ($P < 0.001$). Most patients with any initial Rutherford score were evaluated

"asymptomatic" along with a zero Rutherford score. In twenty of the cases a Rutherford score of 4 showed a two-step decline and patients were relieved from rest pain. More details of the comparisons are presented in Table 2.

Wilcoxon-signed Rank test for Fontaine score showed similar results to Rutherford score. Out of 80 patients, 77 (96.2%) got a better score in the six-month evaluation and 3 showed no change. Fifty-six patients who were at stages II and III became symptom-free at six months after the procedure. Table 3 shows more details of the comparisons.

Table 3: The distribution and changes of Fontaine classification of patients before and six months after the procedure

		Fontaine six months after the procedure				Total
		I	IIA	IIB	III	
Fontaine before the procedure	IIB	15	1	1	0	17
	III	26	1	3	2	32
	IV	15	0	15	1	31
Total		56	2	19	3	80

Although there was a rise in mean creatinine levels after the procedure no significant difference was observed in any data sets of before, after and six months later compared two by two.

Discussion

Our data here show that there has been a regression of the disease stage in 96% percent of patients enrolled in this study in a 6 months follow-up period after a procedure of PTA either below or above the knee. There was an alleviation from the intolerable symptom of rest pain in 31 patients of which 15 were completely free of symptoms. The total number of patients who did not show any symptoms after 6 months was 56 based on Fontaine score which accounted for 70% of all participants.

Several other studies presented similar results of success and follow-up patency rate as our study. Korkmaz et al. reported a primary patency rate of 84% and freedom from re-intervention for 8 years at a 76% rate in a similar single-center study(8). Another study done by Guo et al. showed a successful revascularization rate of 95% and a 77% first-year primary patency rate for the TASC II D lesions (7, 9). These results together seem promising and a prediction of the shift from open surgery to newer endovascular techniques doesn't seem unreasonable.

More than half of the patients were complication-free after the procedure despite the high prevalence of comorbidities among the patients. There were no major complication such as MI or death following the procedure and according to Axisa et al. the occurrence of such complications or those requiring emergent therapy is rare (10). In the study of Korkmaz et al. dissection and hematoma were complications in 12.1% and 3.2% as opposed to 23.2% and 10% of cases in our study respectively (8). These complications were not so emergent or life-threatening to pose a high negative mark on the decision of choosing PTA as a choice of treatment. Although contrast-induced nephropathy was present in 10% of patients following the treatment overall long-term creatinine levels didn't show a significant change, thus not adding any worries to the procedure.

Our study had some limitations with the length of follow-up period being the most important one. Data from other similar papers suggest that risk of re-occlusion and the need for re-intervention increases with time therefore studies with long-term follow-ups can show the patency rate more accurately (8, 9, 11). Another limitation was the study being carried out in a single center without the diversity of equipment and expertise therefore not representing a bigger population.

In conclusion, there has been a paradigm shift in terms of management for peripheral arterial diseases in the recent years. Gradually, a preference fo using endovascular techniques has been established mainly as a result of approximately equal or yet better outcomes along with a lower rate of complications and higher feasibility. There is a new arising trend of treating arterial diseases of higher severity through endovascular means.

References

1. Fowkes FG, Rudan D, Rudan I, Aboyans V, Denenberg JO, McDermott MM, et al. Comparison of global estimates of prevalence and risk factors for peripheral artery disease in 2000 and 2010: a systematic review and analysis. *Lancet* (London, England). 2013;382(9901):1329-40.
2. Ziegler-Graham K, MacKenzie EJ, Ephraim PL, Travison TG, Brookmeyer R. Estimating the Prevalence of Limb Loss in the United States: 2005 to 2050. *Archives of Physical Medicine and Rehabilitation*. 2008;89(3):422-9.
3. Marrett E, DiBonaventura Md, Zhang Q. Burden of peripheral arterial disease in Europe and the United States: a patient survey. *Health and Quality of Life Outcomes*. 2013;11:175-.
4. Becker GJ, Katzen BT, Dake MD. Noncoronary angioplasty. *Radiology*. 1989;170(3):921-40.
5. Ouriel K. Peripheral arterial disease. *The Lancet*. 2001;358(9289):1257-64.
6. Robertson L, Paraskevas KI, Stewart M. Angioplasty and stenting for peripheral arterial disease of the lower limbs: an overview of Cochrane Reviews. *Cochrane Database of Systematic Reviews*. 2017(2).
7. Norgren L, Hiatt WR, Dormandy JA, Nehler MR, Harris KA, Fowkes FGR. Inter-Society Consensus for the Management of Peripheral Arterial Disease (TASC II). *Journal of Vascular Surgery*.45(1):S5-S67.

8. Korkmaz K, Gedik HS, Budak AB, Gunaydin S, Cagli K. Endovascular Repair of Peripheral Arterial Disease: Midterm Results From a Single Center. *Innovations (Philadelphia, Pa)*. 2017;12(4):287-92.
9. Guo X, Xue G, Huang X, Xie H, Liang W, Zhang J, et al. Outcomes of endovascular treatment for patients with TASC II D femoropopliteal occlusive disease: a single center study. *BMC cardiovascular disorders*. 2015;15:44.
10. Axisa B, Fishwick G, Bolia A, Thompson MM, London NJM, Bell PRF, et al. Complications following peripheral angioplasty. *Annals of The Royal College of Surgeons of England*. 2002;84(1):39-42.
11. Baril DT, Chaer RA, Rhee RY, Makaroun MS, Marone LK. Endovascular interventions for TASC II D femoropopliteal lesions. *J Vasc Surg*. 2010;51(6):1406-12.

Depression and burden level in the natural caregiver of the demented patient : A Tunisian experience

Latifa Ghanmi (1)
 Sonia Hammami (2)
 Salem Bouomrani (3)
 Amine Jabri (4)
 Mouna Abbes (1)
 Khalifa Zitoun (1)
 Lobna Zouari (5)
 Mohamed Maalej (5)

(1) Psychiatry department, Regional Hospital, Gabes. 6000 Tunisia
 (2) Internal Medicine Department, Geriatric Unit, CHU Fattouma Bourguiba, Monastir. Tunisia
 (3) Internal Medicine Department. Military Hospital, Gabes, Tunisia
 (4) Medical Inspection of Labor, Gabes, Tunisia
 (5) Psychiatry C department, Hedi Chaker University Hospital, Sfax, Tunisia

Corresponding author:

Dr Latifa Ghanmi
 Psychiatry department, Regional Hospital, Gabes. 6000,
 Tunisia
 Tel : +21697244350; Fax : +21675292530
 Email : ghanmi_latifa@yahoo.fr

Received: January 30, 2018; Accepted: February 10, 2018; Published: March 1, 2018. Citation: Latifa Ghanmi et al. Depression and burden level in the natural caregiver of the demented patient : A Tunisian experience. World Family Medicine. 2018; 16(3):39-46. DOI: 10.5742/MEWFM.2018.93298

Abstract

Background : Home care for the patient with Alzheimer's disease is often tiring and can lead to exhaustion of caregivers.

Aims: Assessment of the level of burden and frequency of depression among caregivers in Alzheimer's disease, and identification of the main factors associated with the burden and depression in these caregivers.

Methods: We conducted a cross-sectional, descriptive and analytical study. This survey took place at the psychiatric department of the Regional Hospital of Gabes. All caregivers who accompanied their relatives with Alzheimer's disease to their appointments from 01 November 2016 to 15 January 2017 were invited to take part. We used a questionnaire containing the patient's and the caregiver's socio-demographic and medical data, as well as the characteristics of the care relationship. The autonomy of the patient was assessed by Katz's autonomy scale (ADL). The Zarit Burden Interview and the Beck Depression inventory were the Instruments used to measure burden and depression in the caregiver.

Results: The caregivers were women in 74% of cases with a mean age of 46 and cohabiting with the patient in 68% of the cases. The mean Zarit Burden

Interview score for the caregivers surveyed was 43. The burden was perceived as high by 48% of caregivers. A high caregiver burden was significantly associated with the absence of recreational activity (57% vs 83%, $p = 0.04$), being the primary caregiver of the patient (50% vs 83%, $p = 0.01$) and cohabiting with him/her (53% vs 83%, $p = 0.02$). Regarding patient variables, only the level of dependence of the patient correlated with a high level of caregiver burden (38% vs. 79%, $p = 0.004$). The mean score of the Beck scale was 8.18 (± 6.3). Depression was moderate to severe in 44% of caregivers. Caregiver depression was significantly associated with the absence of caregiver activity (50% vs 86%, $p = 0.007$), being the spouse of the caregiver (0% vs. 31%, $P = 0.02$) and cohabiting with him/her (53 vs 86, $p = 0.01$).

Conclusion: The level of burden and depression in caregivers caring for a patient with Alzheimer's disease is high. This rate can be reduced by all members of the family sharing in the care of the patient, and by resorting to institutional care in the advanced stages of the disease.

Key words: Alzheimer's disease, caregivers, stress, depression

Introduction

Alzheimer's disease is a dementia that is characterized by impaired cognitive function and psycho-behavioral disorders. It particularly affects people over 60 years old (1). In Tunisia, the prevalence of Alzheimer's disease among the Tunisian population aged 65 and over was 3.2% in 2012 (Alzheimer's disease affected more than 24,371 people) (1).

At an advanced stage, patients have a total and irreversible dependence. They require ongoing care and careful monitoring 24 hours a day, 365 days a year. The family is the main source of support for the patient with Alzheimer's disease and plays a key role in their care. This care is often demanding and requires much time and willingness, which can lead to the exhaustion of the caregivers. It is within this framework that our work has been carried out, in order to study the psychological health of the caregivers of the patient suffering from Alzheimer's disease.

The objectives of this study were firstly, to develop the socio-demographic profile of the natural caregiver of the patient, secondly to assess the level of burden and frequency of depression among caregivers and finally to identify the factors associated with the burden and depression of these caregivers.

Patients and Methods

This is a descriptive and analytical cross-sectional study. This investigation took place at the psychiatric consultation of the regional hospital of Gabes (South-Eastern Tunisia). All caregivers who accompanied their loved ones with Alzheimer's disease to their appointments, from November 1, 2016 to January 15, 2017 were invited to take part in the study. Caregivers who were unable to answer questions (n=4) or refused to participate in the study (n=11) were not included. All included patients gave their oral and written consent to take part in the survey and to answer the questions put to them.

Investigative methods included:

- A semi-structured questionnaire administered to the caregiver, which included socio-demographic data, lifestyle, past medical history as well as the caring relationship (relationship with the patient, primary caregiver or not, the period of care)
- The autonomy scale of Katz with 6 items. This is the "Activity of Daily Living" scale (ADL) (2).
- Zarit's burden inventory of 22 items (3).
- The abbreviated Beck inventory of depression of 13 items (7).

Course of the study

We conducted a pre-survey of 5 families to ensure the feasibility, clarity and relevance of our questionnaire. The objectives and modalities of this study were presented to families. Each caregiver was interviewed alone. The survey was conducted by the same investigator.

Statistic study

Descriptive analyzes (mean, standard deviation, frequency) were used to present the socio-demographic and clinical characteristics of our sample. We used the comparative analysis of the two groups of caregivers according to their levels of burden and depression. We chose parametric comparison statistics.

For each crossing performed, a Pearson Chi-squared statistical test was performed when the objective was to test the link between two qualitative variables, a T-test for independent samples was performed when the objective was to test the link between two qualitative and quantitative variables. The result of this test will confirm or refute our hypotheses. This is a statistical test used in the analysis of categorical responses. It provides a "p" value, which, if it is less than "0,05", leads us to accept the hypothesis that we can conclude that there is a link between the variables involved in the analysis.

All these descriptive and comparative analyzes were done by SPSS software (version 21).

Results

We were able to recruit 50 caregivers. The mean age of the patients was 77 years, with a standard deviation of 10 years, 54% were women (sex ratio H / F of 0.35) and 68% were illiterate. The average duration of disease progression was 4 years with a standard deviation of 2 years, and 58% were dependent.

The socio-demographic characteristics of caregivers are summarized in Table 1.

The average age of caregivers was 46 years old. Of those surveyed, 74% were women and 76% were married. One third of these caregivers had organic disease. The characteristics of the care relationship are summarized in Table 2.

The caregivers surveyed were the main caregivers in 66% of the cases, the children of the patients in 60% of the cases and living with them in 68% of the cases. The mean duration of care was 4 ± 2 years with an average of 6 hours care per day.

The average Beck score in our sample was $8,18 \pm 6,3$ ranging from 1 to 26.. Forty four percent (44%) of the caregivers had a score above 8 and therefore a moderate to severe depressive state. Perceived burden as identified by Zarit score averaged 43, ranging from 16 to 68. The score high than 43 points was categorized as high overload considering as an approximate value for the threshold of a high burden, the level of 43. Thus, 24 caregivers (48%) had a high burden and 26 (52%) had a low burden. A high burden level was significantly correlated with the presence of depression (33% vs 67%, $P = 0.002$).

Table 1: Sociodemographics characteristics of natural caregivers

	N=50 Number (%)
Age of respondent (mean±SD)	46 ± 13
Gender	
Female	37 (74)
Male	13 (26)
Level of education	
Illiterate	8 (16)
Primary school	19 (36)
Secondary school	11 (22)
High school	12 (24)
Employment status	
Not employed	30 (60)
Retired	3 (6)
Liberal profession	8 (16)
Employee	9 (18)
Marital status	
Married/living with partner	38 (76)
Single/widowed	12 (24)
Children	3 ± 2
Socioeconomic status	
Low	5 (10)
Middle	41 (82)
High	4 (8)
Leisure practice	
No	35 (70)
Yes	15 (30)

SD : Standard Deviation.

Caregivers were defined as those currently caring for an adult relative with Alzheimer's disease or dementia,

We found a significant correlation between depression and the following factors: the lack of employment activity in the caregiver ($p = 0,007$), being the child of the patient ($p = 0,025$) and living with him ($p = 0,014$). A high burden level was significantly correlated with the presence of depression (33% vs 67%, $P = 0.002$).

We found a significant correlation between depression and the following factors: the lack of employment activity in the caregiver ($p = 0,007$), being the child of the patient ($p = 0,025$) and living with him ($p = 0,014$). A high burden level was significantly associated with being the primary caregiver ($p = 0.013$) and living with the patient ($p = 0,026$) (Table 3 and 4).

Table 2: Distribution of caregivers by characteristics of the helping relationship

	Mean \pm SD/ Number (%)
Relationship	
Child	30 (60)
Husband/Wife	7 (14)
Daughter-in-law	7 (14)
Others	6 (12)
Residence	
With patient	34 (68)
Not with patient	16 (32)
Main caregiver	
No	17 (34)
Yes	33 (66)
Number of years of assistance	4 \pm 2
Duration of assistance per day (hour / day)	6 \pm 3

Table 3: Correlations of socio-demographic and medical characteristics of caregivers with level of burden and depression

	Burden			Depression		
	Low burden (N=26)	High burden (N=24)	P	Not Depressed caregiver (N=28)	Depressed caregiver (N=22)	P
	Mean \pm SD/ Number (%)	Mean \pm SD/ Number (%)		Mean \pm SD/ Number (%)	Mean \pm SD/ Number (%)	
Age of caregiver (years)	42 \pm 12	50 \pm 12	NS	42 \pm 12	50 \pm 12	NS
Gender						
Female	17 (65)	20 (83)	NS	19 (68)	18 (81)	NS
Male	9 (35)	4 (17)		9 (32)	4 (19)	
Level of education						
Illiterate	4 (16)	4 (17)	NS	5 (18)	3 (14)	NS
Educated	22 (84)	20 (83)		23 (82)	19 (86)	
Employment status						
Not employed or retired	14 (54)	19 (79)	NS	14 (50)	19 (86)	0,007
Liberal profession/Employee	12 (46)	5 (21)		14 (50)	3 (14)	
Marital status						
Married	19 (73)	19 (79)	NS	21 (75)	17 (77)	NS
Single or widowed	7 (27)	5 (21)		7 (25)	5 (23)	
Children	2 \pm 2	3 \pm 2	NS	2 \pm 2	3 \pm 2	NS
Socioeconomic status						
Low	2 (8)	3 (13)	NS	3 (11)	2 (9)	NS
Middle/ High	24 (92)	21 (87)		25 (89)	20 (91)	
Leisure practice						
No	15 (57)	20 (83)	,048	19 (68)	16 (72)	NS
Yes	11 (43)	4 (17)		9 (32)	6 (28)	
Diagnosed comorbidities						
No	20 (78)	17 (71)	NS	21 (75)	16 (72)	NS
Yes	6 (22)	7 (29)		7 (25)	6 (28)	

Table 4: Correlations of socio-demographic and medical characteristics of caregivers with level of burden and depression

	Burden		Depression			
	Low burden (N=26)	High burden (N=24)	P	Not Depressed caregiver (N=28)	Depressed caregiver (N=22)	P
	Mean \pm SD/ Number (%)	Mean \pm SD/ Number (%)		Mean \pm SD/ Number (%)	Mean \pm SD/ Number (%)	
Relationship						
Son/ Daughter	17 (66)	13 (54)	NS	20 (72)	10 (46)	0,025
Husband/wife	1 (4)	6(25)		0 (0)	7 (31)	
Daughter-in-law	3 (11)	4 (17)		4 (14)	3 (14)	
Others	5 (19)	1 (4)		4 (14)	2 (9)	
Residence						
With patient	14 (53)	20 (83)	0,026	15 (53)	19 (86)	0,014
Not with patient	12 (47)	4 (17)		13 (47)	3 (14)	
Main caregiver						
No	13 (50)	4 (17)	0,013	12 (43)	5 (23)	NS
Yes	13 (50)	20 (83)		16 (57)	17 (77)	
Number of years of assistance	4 \pm 2	4 \pm 2	NS	4 \pm 2	4 \pm 2	NS
Duration of assistance per day (hour / day)	5 \pm 3	7 \pm 3	NS	5 \pm 2	7 \pm 3	NS

Discussion

In our study, the socio-demographic description of our caregivers replicates some classic data (8,9). The younger age of caregivers and the predominance of female are also reported by other studies from Arab countries (9). In this population, scores in Zarit Burden scale tend to be higher than older caregivers (10). In our study, the average burden was 43. Of the caregivers, 48% had a high level of burden. Similar results were reported by the Sfax study: the average burden in this region was 42 (8). In the literature, the burden level appears to be lower (5, 6, 10-12). These differences can be explained by a long duration of help in our study: 4 \pm 2 years, and the younger age of our population. The high level of the Zarit Burden score may be related to the high prevalence of dependent Alzheimer's patients (58 %).

Among the caregivers in our study, Beck's mean score (8,18 \pm 6,3) was higher than that of the general population (7 \pm 7,05) (13), but lower than that found in a sample of Spanish carers (28 \pm 8) (11). The rate of moderate to severe depression among caregivers in our study (44%) was higher than that observed in the Kerhervé study (22,8%) (5). These caregivers were referred to the psychiatric outpatient clinic.

The Zarit and Beck burden inventory scores were strongly correlated in our study ($p = 0,002$). Our results are consistent with several studies concluding that depression is significantly involved in the subjective experience of burden (5, 11, 14).

The Zarit and Beck burden inventory scores were strongly correlated in our study ($p = 0,002$). Our results are consistent with several studies concluding that depression is significantly involved in the subjective experience of burden (5, 11, 14).

In our study, the sociodemographic factors of patients do not seem to influence the level of burden and depression among caregivers. This result is consistent with the literature (6, 11, 14).

We also noted that 58% of the patients were dependent. The caregivers who reported the greatest burden and distress were those who reported the greatest loss of autonomy in their loved ones. Several studies are consistent with our results: the decrease in the basic activities of daily living of demented patients reflects a dependence on caregivers, which is undoubtedly an emotional, physical and financial burden for the caregiver (8, 10-12, 15). Despite the literature, we did not find a correlation between the level of burden and depression in caregivers and the aggressiveness of patients towards caregivers (6, 8).

Since the caring relationship usually extends over a long period of time, the question of the influence of the number of years as a caregiver is important. The increase in the number of years spent in this status increases depression in the caregiver (16). This result was not found in our study: the mean duration of disease progression was 4 years (± 2) with no correlation with the level of burden and depression among caregivers.

Comparing the level of burden with that of not having a leisure activity gives a significant relationship. This could be explained as follows: The greater the burden felt by the caregiver, the more exhausted he is and the less time he can find for his leisure time.

In our study, there was a statistically significant relationship between depression and lack of employment activity of the caregiver. Work would play a moderating role in the onset of depression in our caregiving population.

In our study, there was no correlation between age, gender, educational level, socio-economic level, and past medical history of caregivers with level of burden and depression. The data in the literature differ on this finding. Indeed, some authors highlight the lack of relationship between the age, gender and educational level of the caregiver on the one hand and the level of the burden on the other hand (10, 11). However, Andrieu S. shows that women report a higher level of burden than men (6). Cinar E. finds that only a low level of caregiver education is associated with a high level of burden (14). Ben Thabet J. in his study of depression and burden of family caregivers of demented subjects in Sfax found that a high level of caregiver burden is correlated with the medium to high socio-economic level of caregivers (8). Ozlem E. shows that depression among caregivers is associated with female sex (17).

One of the factors that is recognized as a predictor of the burden for caregivers is the isolation of caregivers. Being

the main, if not the only person on whom the patient's care is based, increases the feeling of burden. Conversely, perceiving the environment as available and providing adequate support decreases the burden felt by caregivers (5).

In our study, 66% said they were the sole caregivers of the patient and 68% of caregivers lived with the patient. Both factors were associated with the burden. Several studies on the assessment of the level of burden among caregivers of demented patients are consistent with our findings in concluding that being the principal caregiver and living with the patient may be a predictor of the burden on caregivers (5, 8), (10).

We did not find a statistically significant relationship between the level of burden, the duration of care, and the number of hours of care per day. These results are consistent with the literature (6, 10).

In our study, spouses had significantly more depression. On the other hand, for the principal caregiver, the duration of care and the number of hours of care per day do not present factors of depression. In his study José Maria Garcia (11) did not find a significant correlation between the relationship with the patient, the hours of care per day and depression among caregivers.

The value of the care provided by the family for a person with Alzheimer's disease is recognized. But this care has a negative impact on the health of the caregivers, in particular their mental health.

Conclusion

Our results reflect the distress of caregivers of Alzheimer's disease patients. The factors correlated with a high level of burden and depression are, in part, unmodifiable (kinship and degree of autonomy of patients). However, they allow us to target a population at risk that may receive special attention. Some modifiable factors (lack of work activity for carers, leisure activities of caregivers, living space shared with the patient and the situation of primary caregiver) could be the subject of appropriate care, and this as soon as the first symptoms appear, to relieve caregivers.

References

1. Hajem SO, Ben Mansour N, Y Mejdoub, Hsairi M. Epidemiology of dementia in Tunisia. *NPG Neurology - Psychiatry - Geriatrics*. December 2014; 14 (84): 326-33.
2. Katz S DT, HR Cash, Grotz RC. Progress in Development of the Index of ADL. *Gerontologist*. 1970; 10 (1): 10-30.
3. Zarit SH RK, Bach-Peterson J. Relative of the odd elderly: correlates of feelings of burden. *Gerontologist*. 1980; 20 (6): 649-55.
4. Réjean Hébert GB, Girouard D. Fidelity of the French translation of three assessment instruments for natural caregivers of demented patients. *Canadian Journal on Aging* 1993; 12 (3): 324-37.

5. Kerhervé H GM-C, Vrignaud P. Psychic health and burden of caregivers of people with Alzheimer's disease or related disorders. *Medico-Psychological Annals*. 2008; 166 (4): 251-9.
6. Andrieu S BL, Gillette-Guyonnet S, Bocquet H, Cantet C, Albarede J L, Vellas B, Grand A. The burden felt by informal carers of patients with Alzheimer's disease in the REAL.FR study: measurement method and associated factors. *The Journal of Internal Medicine* . 2003; 24: 351-9.
7. Collet L. Cottraux J. Abbreviated Inventory of Beck Depression (13 items). Competitive validity study with the scales of Hamilton and Widlcher. *The Brain*. 1986; 12 (2): 77-9.
8. Ben Thabet J, Charfi N, Zouari L, Zouari N, Maalej M. Depression and burden level among family caregivers of demented subjects in Tunisia. *The Pan African Medical Journal*. 2011.
9. Verrecchia S. The burden of caregiving by the caregiver of the patient with Alzheimer's disease (qualitative study on factors promoting exhaustion) [General Medicine]: University Claude Bernard-Lyon 1- Faculty of Medicine and Medicine Lyon-South Charles Merieux; 2015
10. Raggi A, Panerai S, Neria W., Ferri R. The burden of distress and related coping processes in families of patients with Alzheimer's disease living in the community. *Journal of the Neurological Sciences*. 2015; 358 (1-2): 77-81.
11. García-Alberca JM, Lara JP, Garrido V, Gray E, Lara A, Castilla C. Disengagement coping partially mediated the relationship between caregiver burden and depression in caregivers of people with Alzheimer's disease. Results from the MÁLAGA-AD study. *Journal of Affective Disorders*. 2012; 136 (3): 848-56.
12. Durkin M, Gupta S, Freedman D, Chapnick J. The Association between Dependent Patient and Caregiver Burden in Alzheimer's Disease. *The American Journal of Geriatric Psychiatry*. March 2013; 21 (3): 134-5.
13. Bocquet H AS. The "burden", a specific indicator for family carers. *Gerontol Soc*. 1999; 89: 155-66.
14. Cınara E KM, Yesilb Y, Halilb M, Cankurtaranb M, Ariogulb S. Assessment of factors affecting caregiver burden in Alzheimer disease (AD). *European Geriatric Medicine*. September 2012; 3: 138.
15. Lacey L, Trigg R, Niecko T. Caregiver burden as illnesses in Alzheimer's disease (AD): Association with patient dependence on others and other factors- Results from the Dependence in Alzheimer's Disease in England (DADE) study. *Alzheimer's & Dementia*. July 2012; 8 (4): 248-9.
16. Loubatieres H. Factors influencing the burden of the primary caregiver of Alzheimer's patients living at home: a systematic review of the literature [General Medicine]: University Toulouse III - Paul Sabatier Faculty of Medicine of Rangueil; 2014.
17. OE Aki YK, S Isikli, S Kibaroglu, ED Ciftci, UA Can. Depression, anxiety, burden and coping mechanisms in the family caregivers of Alzheimer's dementia patients in a Turkish sample. *The Am J Geriatr Psychiatry* . 2014 Mar; 22 (3): 12

Evaluation of the Effect of Aloe Vera Ointment with Chamomile Ointment on Severity of Children's Diaper Dermatitis: A randomized, double-blind clinical trial

Sima Ghanipour Badelbuu (1)

Yousef Javadzadeh (2)

Mahnaz Jabraeili (3)

Shiva Heidari (4)

Mohammad Arshadi Bostanabad (5)

(1) MSc Student in Pediatric Nursing, Student Research Committee, Faculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran

(2) Professor, Department of Pharmaceutics and Biotechnology Research Center, Faculty of Pharmacy, Tabriz University of Medical Sciences, Tabriz, Iran

(3) PhD Candidate, Department of Pediatric Nursing, Faculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran

(4) MS in Nursing, Faculty of Nursing and Midwifery school, Urmia Islamic Azad University, Urmia, Iran

(5) PhD, Assistant Professor, Department of Pediatric Nursing, School of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran

Corresponding Author:

Mohammad Arshadi Bostanabad

Department of Pediatric Nursing, School of Nursing and Midwifery,

Tabriz University of Medical Sciences,

Tabriz, Iran

Email: arshadi_m@yahoo.com

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Sima Ghanipour Badelbuu et al. Evaluation of the Effect of Aloe Vera Ointment with Chamomile Ointment on Severity of Children's Diaper Dermatitis: A randomized, double-blind clinical trial. *World Family Medicine*. 2018; 16(3):47-51. DOI: 10.5742/MEWFM.2018.93304

Abstract

Introduction: Diaper dermatitis is an inflammation of the skin under the diapers of children, and is relatively common. The disease is seen in children and adolescents with a degree of urinary incontinence. The aim of this study is to replace uncomplicated herbal medicines in the treatment of this disease instead of chemical drugs.

Materials and Methods: This is a randomized, double-blind, clinical trial that was performed on 90 children under 2 years of age who were referred to the Pediatric Department of Tabriz Pediatric Hospital and who used diapers. The children were randomly divided into three groups of 30, and formed a routine group and two other groups, with routine ointment and chamomile and Aloe Vera Ointment. Sampling was performed on the first, third and sixth days of the study using a five point scale. Data were analyzed using SPSS software (version 22) and descriptive and analytical statistics.

Results: According to the statistical results, the severity of dermatitis in all three groups improved during the study on the sixth day compared to the first day, but there was no significant difference in the severity of diaper dermatitis between the three groups during the study period. ($P > 0.05$)

Conclusion: Regarding the treatment process in all three groups and having positive results in the treatment of dermatitis, the three groups of drugs were effective in treatment, but they were not superior to each other.

But due to the lower side effects of herbal medicine, its use is recommended to treat this condition.

Key words: Aloe vera ointment, chamomile ointment, diaper dermatitis

Introduction

Diaper dermatitis is the most common type of contact dermatitis (1). Diaper dermatitis is the most common type of contact dermatitis in children (2). It is present in areas under diapers (3). Although the main cause of this disease is still unclear, several factors such as wear, moisture, urine and stool and PH changes in the area are effective in creating it (3, 4). According to Borujeni Research, the frequency of disease in various studies is from 7 to 35 percent, and in some cases up to 50 percent (2). Irritation of the area and burning, dryness, scratching and skin irritation are key features. Infiltration of agents and germs can cause infectious, bacterial and fungal infections (2-4). Quoted from Emdadi are The most important age groups in children is age 6 to 12 months, and usually the 3 month old age group should be investigated for differential diagnosis of pemphigus, burn and syphilis and seborrheic dermatitis [5]. Many treatments include zinc oxide ointment, corticosteroid and vitamin A + D, talcum powder, some of which, including talcum powder and corticosteroids, have many side effects, including allergic dermatitis, Skin atrophy, respiratory tract disorders and so on (2, 4, 6). The presence of appropriate therapeutic effects and low side effects is one of the effective factors in increasing plant use in the treatment of diseases (7). The use of herbal medicines such as calendula, chamomile, aloe vera, beeswax, and herbs are important factors in the treatment of diaper dermatitis (5).

Chamomile is one of the most effective medicinal plants in the world (8). Chamomile applications include eczema, infections, inflammation, burns, and laparoscopic rheumatism (8). Aloe Vera is also known as Aloebarbazenesis (Aloe verbabens). It is widely used in the treatment of various diseases (9). Among these uses, it can be used to treat stomach ulcer, cancer, diabetes, and wound healing and anti-inflammation (9). With regard to the above, it can be concluded that herbs can have fewer complications and can be more effective treatments for diseases than chemical drugs. In this study, we try to reveal the superiority of one of the two Chamomile and Aloe vera plants to the other in treating the severity of diaper dermatitis.

Materials and Methods

This study was a double-blind, randomized clinical trial that was conducted in Tabriz Children's Hospital between February and June 2006 in children under 2 years of age who use diapers in the hospital. Ninety children were selected through simple sampling.

Inclusion criteria included children from the age of 0-24 months, disposable diapers and no known systemic diseases, and the absence of systemic drugs, and criteria for the exclusion of this study was to have a fungal infection, the use of cloth nappies, sensitivity to study drugs and positive culture of faeces.

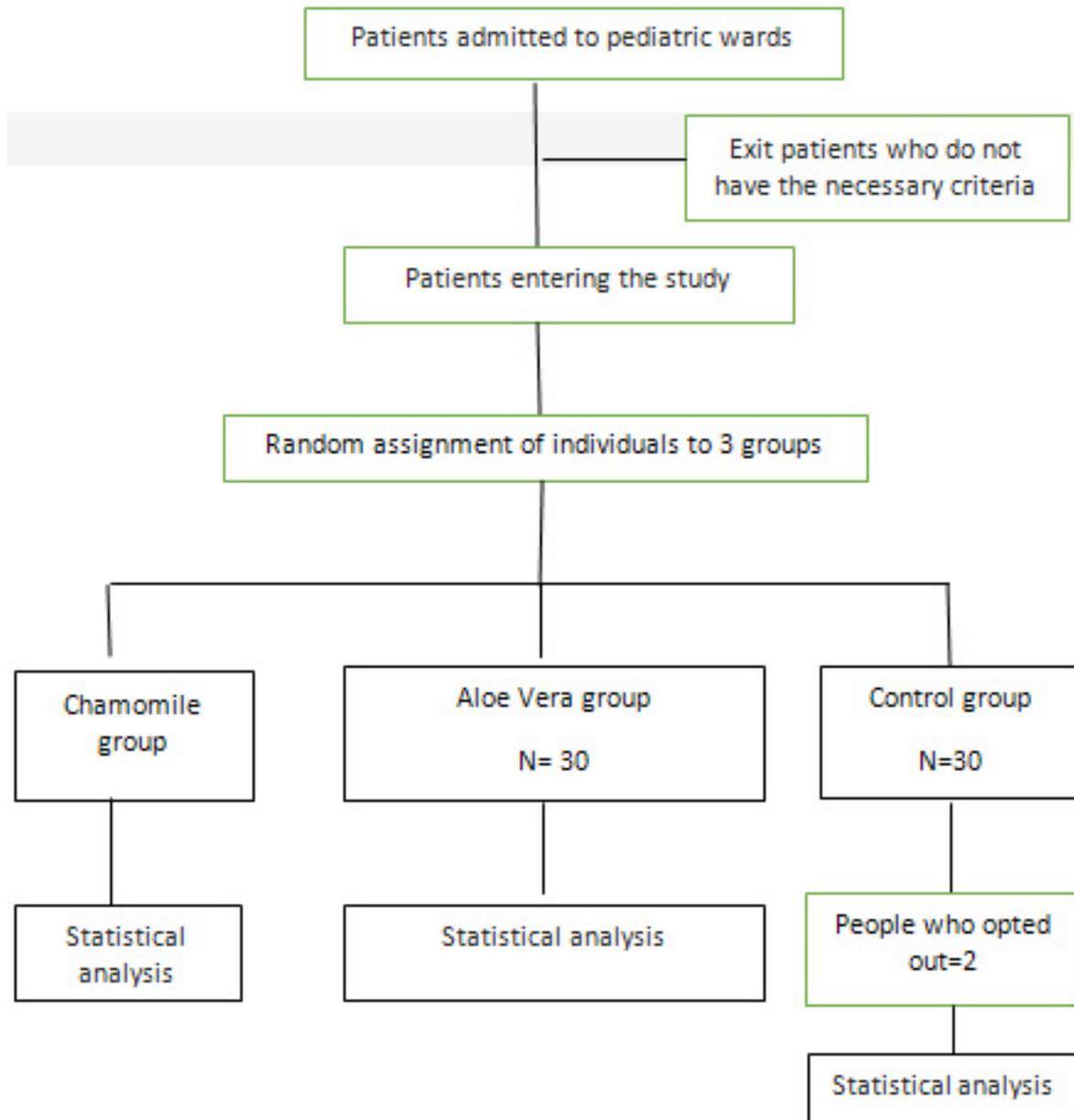
The sample size in this study was based on the study of Panahi et al. (6) with $\alpha = 0.05$ with a power of 80% and a 10% reduction in the ratio between the two groups of 90. The sample was taken as a simple random sampling. Patients who had inclusion criteria were classified according to Rand List software using six blocks, to three intervention groups, control, chamomile group and Aloe vera group. It should be noted that the groups receiving chamomile and aloe vera with ointments received routine treatment according to the instructions of the practitioner (see Figure 1 - next page).

$$n = \frac{z^2 \cdot p(1-p)}{d^2}$$

In order to examine skin allergy, a little ointment was applied to the child's arm (1 × 1 cm) and controlled after 20 min. In case of no skin sensitivity, 3% chamomile ointment and 95% Aloe Vera ointment with the same shape and weight as A and B specified by the pharmacist were given to the mother by the researcher. It should be noted that the ointment selected for all 89 participants was in closed envelopes, and the researcher and mothers were not aware of the type of the ointment used and selected for each participant.

In the groups, the mothers were trained on how to use the ointments, washing the area, clearing the ointments used as routine treatments, rubbing the ointment on the dermatitis area, and covering the dermatitis area with chamomile or Aloe Vera ointment. They were asked to rub a layer of the ointment on dermatitis area such that it would cover the lesion, three times a day after changing the diaper and washing the area by warm water and drying the area by a soft cloth without damaging. All the participants were evaluated by a trained nursing expert who was not aware of the method of allocating the participants to groups. (At first, informed consent was obtained from the mothers. The tents made at the Pharmacy Faculty of Tabriz were provided to mothers free of charge and were taken on a three-day basis once a day. The assessment was carried out during the first, third and sixth days (in form Summary). Coverage of the lesion, then severity of dermatitis in the first, third and sixth days of the study was estimated by the researcher. It should be noted that routine treatment (hydrocortisone, colutrimazole, zinc oxide) was not eliminated from the ointment group A and B. The instrument used by the researcher in this study was to evaluate the severity of dermatitis using the five-point diaper rash (10) used in AL Waill's study. In this instrument, the severity of diaper dermatitis was defined as 0 = no erythema 1 = mild erythema 2 = moderate erythema 3 = severe erythema with erosion 4 = severe erythema with tenderness and ulcers. Validity and reliability of the tools used in recent research by Afshari and Panahi were confirmed. All samples were evaluated by the researcher who did not know who was assigned to the groups. It should be noted that in this research two parts were used: the first part was a demographic questionnaire and the second part contained a Diaper rash five point scale.

Figure1: The Consort E- FLOWCHART



The significance level was 0.05 and the confidence coefficient was 0.95%.

This study was conducted with the written permission of the Ethics Committee of Tabriz University of Medical Sciences (Code: IR.TBZMED.REC.1395.872) and with all the considerations of clinical trial such as informed consent, randomness of the choice of samples in studying and having the right of Cancellation of subjects from the IRCT (IRCT2016082813691N10) the system was studied at each stage of the study, and the patient information was kept confidential.

In the Aloe Vera group, 17 (56.7%) were girls and 13 children (43.3%) were male; in the chamomile group, 19 (63.3%) were girls and 11 (36.7%) were male, and in control group, 14 (46.7%) were girls and 14 (46.7%) were boys. From the control group, two infants were discharged during the study. The mean age of the children in the control group

was 74.22 ± 55.58 days; in the Aloe vera group it was 140.20 ± 90.96 days and in the chamomile group 146.73 ± 103.00 days. According to the statistical results, the mean age of mothers in the chamomile group was 27.71 ± 5.55 years, in the Aloe vera group was 6.36 ± 28.53 and in the control group was 26.30 ± 6.29 years. According to statistical results, the groups were homogeneous in terms of the demographic characteristics mentioned above.

The results of ANOVA test showed that there was no significant difference between the groups in terms of maternal age and weight ($P > 0.05$). Also, the results showed that there was a significant difference between the data ($p < 0.05$) in the type of children's nutrition, bathing the baby and the type of cleansing, abdominal function and mother's education. Also, the family status ($P = 0.00$), maternal occupation ($P = 0.03$), maternal education level ($P = 0.03$) were significantly different in the three groups ($P < 0.05$).

Table 1: Comparison of the severity of dermatitis based on baby's age, weight, and Mother's age

Group	Aloe vera N=30		Chamomile group N= 30		control group N= 29		Statistics	
	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation	F	P
Age of the baby (days)	90.96	140.20	103.00	146.73	55.58	146.73	1.137	0.32
Age of the Mother (years)	28.53	6.36	27.71	5.55	26.30	6.29	1.02	0.36
Baby weight (grams)	4272.93	2261.78	4061.37	2926.47	3610.17	2003.56	0.56	0.57

Table 2: Comparison of the severity of dermatitis in different treatment days in intervention and control group

Groups under Treatment The severity of dermatitis	Aloe vera		Chamomile		Control		F	P
	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation		
First day	1.80	.76	1.93	.83	1.70	.70	.70	.49
third day	1.53	.82	1.62	.82	1.33	.72	1.23	.29
Sixth day	.76	.86	1.00	1.10	.60	.67	1.49	.23

Table 2 shows the severity of diaper dermatitis among the groups treated with study drugs. According to the diagram, there is no statistically significant difference in the severity of diaper dermatitis among the three groups according to $P > 0.05$, but the severity of dermatitis in each group was significant with a $P < 0.05$. That is, all three groups were significantly improved during the study in terms of severity of dermatitis found.

Discussion and Conclusion

The aim of this study was to investigate the effect of chamomile ointment and Aloe Vera ointment and routine treatment on the improvement of severity of diaper dermatitis in children under the age of two years. According to the results, improvement in the severity of dermatitis during the six-day study in all three groups, had an upward trend towards the relief of severity of dermatitis ($P < 0.05$). However, in evaluating the severity of dermatitis in the three groups, no group was superior to another for determining the superiority of one group ($p > 0.05$). According to a study chitra In the wound healing of the group that used the Aloe vera gel healed faster than the other group(11). However, the results of the Julan study are not consistent with our study, because in this study, the repair of abdominal surgery wounds in the group using Aloe Vera gel was lower, which could be due to the drop in the samples (12). Also, Saeedi's study was effective in restoring the Aloe Vera breast bone fracture and is consistent with the results of this study (13). Also, in the study of Hys-Gel, Aloe Vera has been effective in treating Lichen Planus, which is in accordance with our study. However, in the Aloe Vera Penile Gel study, in comparison to Calendula, the treatment of diaper dermatitis had a lower rate of improvement that was not consistent with

our study. (14). Also, in the study of Rajar, the Aloe vera gel has been effective in treating lichen planus and is consistent with our study (15). In the study of Afshari in the treatment of dermatitis, chamomile ointment is more successful than calendula, and the results are in agreement with this study (4). Also, in the study of Patzlet, treatment of diaper dermatitis was more effective than chamomile ointment and hydrocortisone and consistent with our study (16). In the study of diabetes, which was the effect of chamomile and steroids on the treatment of ulcers around colostomy, chamomile was more effective than steroids in the study (17). In the study of Aertgeerts, the effect of chamomile ointment on the removal of hand eczema was better than steroids and non steroid, which was the result of this study (8).

In the study of Aertgeerts, the effect of chamomile ointment on the removal of hand eczema was better than steroid and non steroid, which was the result of this study.

According to other studies, this study emphasized the anti-inflammatory effect of Chamomile and Aloe Vera, but Chamomile's superiority on Aloe Vera or vice versa was not proven in the present study.

Acknowledgments

The authors of Tabriz University of Medical Sciences's research assistant to finance and provide the conditions for this study, Tabriz Children's Hospital staff and the parents of hospitalized children participating in research to collaborate with researchers to undertake this research. This article is derived from the Master's Thesis for Pediatric Nursing, No. 667. This study was sponsored by Tabriz University of Medical Sciences. The researcher does not disclose any conflicts of interest in the study.

Research limitations and suggestions for future studies

In the present study, according to the study conditions, the researcher was unable to select samples from children whose background conditions were similar, as well as the type of diapers and auxiliary food in children, which was widely available in other studies. Also, this study was not conducted in children with fungal and bacterial infections, and it is suggested that further studies be carried out on such children. Also, the researcher did not remove the routine treatment in the recipients of Chamomile and Aloe vera, which, if possible, would be appropriate to study the effects of these two drugs by removing routine treatments from the samples. Also, individual differences in response to treatment were one of the limitations of the researcher.

References

1. Shin HT. Diaper dermatitis that does not quit. *Dermatologic therapy*. 2005;18(2):124-35.
2. Rouhi Boroujeni H, Noorbakhsh MK, Mobasheri M, Masoudi R, Keivani Hafshejani Z. Magnesium cream treatment in diaper rash in pediatric.s *Journal of Clinical Nursing and Midwifery*. 2015;4(3).
3. Wong D, Brantly D, Clutter L, De DS, Lammert D, Nix K, et al. Diapering choices: a critical review of the issues. *Pediatric Nursing*. 1992;18(1):41-54.
4. Afshari Z, Jabraeili M, Asaddollahi M, Ghojazadeh M, Javadzadeh Y. Comparison of the Effects of Chamomile and Calendula Ointments on Diaper Rash. *Evidence Based Care*. 2015;5(2):49-56.
5. Emdadi M, BAZM AH. The Frequency of Diaper Dermatitis in 0-2 years old children at nursing homes in Hamadan on 2000-2001. 2004.
6. Panahi Y, Sharif MR, Sharif A, Beiraghdar F, Zahiri Z, Amirchoopani G, et al. A randomized comparative trial on the therapeutic efficacy of topical aloe vera and Calendula officinalis on diaper dermatitis in children. *The Scientific World Journal*. 2012;2012.
7. Baharestani MM, Ratliff CR. Pressure ulcers in neonates and children: an NPUAP white paper. *Advances in skin & wound care*. 2007;20(4):208-20.
8. Adib-Hajbaghery M, Mahmoudi M, Mashaieki M. The effects of Bentonite and Calendula on the improvement of infantile diaper dermatitis. *Journal of research in medical sciences: the official journal of Isfahan University of Medical Sciences*. 2014;19(4):314.
9. Charousaei F, Dabirian A, Mojab F. Using chamomile solution or a 1% topical hydrocortisone ointment in the management of peristomal skin lesions in colostomy patients: results of a controlled clinical study. *Ostomy-Wound Management*. 2011;57(5):28.
10. Al-Waili N. Clinical and mycological benefits of topical application of honey, olive oil and beeswax in diaper dermatitis. *Clinical microbiology and infection*. 2005;11(2):160-3.
11. Chithra P, Sajithlal G, Chandrakasan G. Influence of Aloe vera on collagen characteristics in healing dermal wounds in rats. *Molecular and cellular biochemistry*. 1998;181(1):71-6.
12. Schmidt JM, Greenspoon JS. Aloe vera dermal wound gel is associated with a delay in wound healing. *Obstetrics & Gynecology*. 1991;78(1):115-7.
13. Tafazoli M, Saeedi R, Gholami Robatsangi M, Mazloom R. Aloe vera gel Vs. lanolin ointment in the treatment of nipple sore: a randomized clinical trial. *Tehran University Medical Journal*. 2010;67(10).
14. Rajar U, Majeed R, Parveen N, Sheikh I, Sushel C. Efficacy of aloe vera gel in the treatment of vulval lichen planus. *J Coll Physicians Surg Pak*. 2008;18(10):612-4.
15. Patzelt-Wenczler R, Ponce-Pöschl E. Proof of efficacy of Kamillosan (R) cream in atopic eczema. *European journal of medical research*. 2000;5(4):171-5.
16. Dabirian A, Yaghmaei F, Rassouli M, Tafreshi MZ. Quality of life in ostomy patients: a qualitative study. Patient preference and adherence. 2011;5:1.

Reviewing the barriers to the implementation of the strategic plans from the perspective of hospital managers in Jahrom

Hamideh Akbari (1)
 Navid Kalani (2)
 Abdolazim Jokar (3)
 Nabi Zarezadeh (2)
 Seyed Hamed Hojati (4)
 Esmail Rayat Dost (1)

(1) Department of Emergency Medicine, Jahrom University of Medical Sciences, Jahrom, Iran.

(2) Department of Health Services Management, Jahrom University of Medical Sciences, Jahrom, Iran.

(3) Dept of Nursing, Peimanieh Hospital, Jahrom University of Medical Sciences, Jahrom, Iran

(4) Student Research committee, Jahrom University of Medical Sciences, Jahrom, Iran.

Corresponding author:

Esmail Rayat Dost
 Department of Emergency .
 Tel: 0098+ 9177396014.
Email: e.rayat.dost@gmail.com

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Akbari H. et al. Reviewing the barriers to the implementation of the strategic plans from the perspective of hospital managers in Jahrom. *World Family Medicine*. 2018; 16(3):52-57. DOI: 10.5742/MEWFM.2018.93306

Abstract

Introduction: We have to consider organizational dimensions, which show the specific characteristics of the organization, to know an organization. In spite of the importance of strategic planning and its critical effect on reaching organizational goals, managers sometimes face serious problems in implementation of strategic decisions. The purpose of this study was to determine the barriers to implementation of the strategic plan from the standpoint of managers of educational hospitals of Jahrom University of Science.

Materials and Methods: This descriptive cross-sectional study was conducted in hospitals of Medical Sciences of Jahrom in 2017. The population was 62 managers, internal managers, quality improvement and nursing offices, and executives of the strategic plan of hospitals with sampling done in census. The questionnaire used in this research was developed using similar literature and studies, and based on John M. Bryson's view with four barriers - key human, process, structural, and institutional - in implementation of the strategic plan. The face and content validity of this questionnaire had been tested in the study by Ameriun et al. Data analysis was done using inferential tests such as Pearson correlation coefficient and descriptive statistics through SPSS21.

Results: In the human barriers sphere, the most important barrier from managers' viewpoints was inadequate training of the staff to implement the strategic plan (3.64 ± 1.14). Concerning process factors, the most important barrier according to the managers was the lack of adequate supervision of a domestic supervisor system on the progress of activities (3.64 ± 0.98). In the area of structural factors, the lack of financial resources for implementation of the strategic plan (3.65 ± 1.18) was identified as the most important barrier according to the managers. Concerning institutional factors, the lack of motivation among senior managers (3.58 ± 1.03) was the most important barrier in the implementation of strategy in managers' view.

Conclusion: According to the managers of hospitals in Jahrom, process factors were the most important barriers in implementation of strategic organizational programs. These results reveal the greater importance of monitoring a domestic observer system to better address these barriers.

Key words: strategic plan, barriers, managers, educational hospitals.

Introduction

To know an organization, we need to consider those dimensions of it that express the specific characteristics of that organization (1). Organizational dimensions are divided into two categories: structural and content. Structural dimensions show the internal characteristics of an organization. Those called the organizational structure provide a base for measuring and comparing organizations (2). Hall believes that the organizational structure has three main tasks: helping produce organizational output to achieve the organization's goals and minimizing the effect of individual variations on the organization. The effect of individual variation on the organization is minimized and is an area where organizational decisions are made and power is applied (3). Three structural dimensions can be considered for organizations, which represent the specific characteristics of the organization: complexity, formality and focus (4). On the other hand, there are some factors that affect the organizational structure and its dimensions. Among these factors, strategy, size, environment, and technology can be cited. One of the most important factors is the strategy. The strategy is in fact a kind of internal integration. The nature of strategy development is linking a company with those around it (5). The main element of the organization's strategy is to achieve its goals and how it is structured. An appropriate structure does not guarantee success, but increases the chances of an organizational success. Besides identification and defining a strategy through the influence of authority and responsibility, the organization's structure can facilitate or prevent the implementation of the strategy (6). Bryson analyzes strategic planning models and analyzes the conditions for their use in the public and non-profit sectors, and in the end it provides self-management that can be applied in the public and non-profit sectors. This model includes a continuous process in accordance with the scheduling and repeatability definition that has begun before the adoption of any decision and continues after that decision. Among the characteristics of this process is that the results of each stage can be used for the elaboration or completion of the earlier stages (7): 1) Initial agreement, 2) stakeholder analysis, 3) determination of organization duties, 4) mission of the organization, 5) knowing the organization's environment, 6) determination of strategic issues, 7) identification of the strategy, 8) describing the projects and measures, 9) organizational vision, and 10) annual operational plans. The ever-increasing complexity of highly variable activities and environment have exposed the managers to so much trouble that their slightest neglect of the issues and environment surrounding them will result in irrecoverable outcomes, which has made the managers of these organizations understand that the traditional way cannot solve their problems anymore (8). Despite the importance of strategic planning and its critical impact on the goals of the organization, managers sometimes face serious difficulties in implementing and running strategic decisions (9). Hospitals are among the organizations whose managers' success depends on formulating strategic planning (10). Strategic planning in hospitals alone does not imply the success of the hospital,

and the development of strategies alone cannot encourage hospital managers to achieve their goals, and unless these strategies are implemented, there will be no effect on success and achievement goals, which is improving the quality of patient care (11). In the study by Han et al., the constraints of financial resources, managers' constraints and difficulties, an inflexible corporate culture, inefficient organizational structure and so on are among the obstacles to the implementation of a strategic plan (12). The results of Barnes' study suggest that the problems faced by the executives in implementing strategic plans are lack of superordinate's support in implementing the program, inadequate labor, and unmotivated labor (13). Strategic plans in hospitals will not be implemented on their own, and hospital managers who want to use strategic planning for breakthroughs have barriers to strategic planning and implementation (14). In the status quo, given the competitive environment among health service provider systems, it is essential that hospital managers pay more attention to implementing strategic decisions. Although in recent years, the Ministry of Health has paid a lot of attention to strategic planning and implementation of hospitals' accreditation standards, studies have shown not much research on identifying the main factors of failure of strategic decisions in Iranian hospitals. Therefore, the purpose of this study is to investigate the viewpoints of managers to identify the barriers of the implementation of a strategic plan developed in hospitals, so that its results can help better manage strategic planning in hospitals.

Methods

This descriptive cross-sectional study was conducted in 1396 in educational and therapeutic hospitals in Jahrom. The total number of samples was 62 executives, internal managers, quality improvement and nursing offices, and executives of the strategic plan of hospitals. Sampling was done by census. The inclusion criteria were having at least one year history of managing a hospital, management, quality improvement and nursing offices. Exclusion criteria were lack of completion of the questionnaire and lack of consent for participation in the study. The tools used in this research were developed using similar literature and studies, and based on John M. Bryson's view with four barriers - key human, process, structural, and institutional - in implementation of the strategic plan. The face and content validity of this questionnaire had been tested in the study by Ameriun et al. The questionnaire consisted of two parts: the first part was demographic information, and the second part consisted of 4 areas: human factors (8 questions), process factors (7 questions), structural factors (11 questions) and institutional factors (6 questions). Each item was rated based on a 5-option Likert scale. Scores 1 to 5 - totally agree to totally disagree - were assigned to score the responses. The questionnaire was distributed by the researcher in the presence of managers with ethical considerations, the purpose of the research was explained to the participants, and they completed the questionnaire anonymously, and were ensured of the confidentiality of their information.

Results

Fifty one managers of hospitals in Jahrom participated in the study. Their mean age was 39.21 ± 5.89 and 58.8% were females with the rest male; 86.3% were officially employed; work experience of 72.5% of them was over 12 years; 37.8% of them were supervisors and 45.9% were internal managers. The results of analysis of the barriers to the implementation of the strategic plan in Table 1 showed that from the perspective of the managers of the hospitals in Jahrom, process factors had highest rate (33.20 ± 8.09) as the main obstacle to implementing the strategic plan in the hospitals of Jahrom.

Table 1: Mean score of strategic program areas

Area	Total score
Human Factors	26.3 ± 16.50
Process factors	33.20 ± 8.09
Structural factors	26.2 ± 14.88
Institutional factors	26.50 ± 6.48

In human factors, the most important barrier from managers' viewpoint was inadequate training of staff to implement the strategic plan (3.64 ± 1.14). In the area of process factors, the most important barrier from managers' viewpoint was the lack of adequate supervision of a domestic supervisor system on the progress of activities (3.64 ± 0.98). In the area of structural factors, the lack of financial resources for implementation of the strategic plan (3.65 ± 1.18) was identified as the most important barrier from managers' viewpoint. In the area of institutional factors, lack of motivation among senior managers (3.58 ± 1.03) for the implementation of strategy was the most important barrier from managers' viewpoint (Table 2 - next page).

The results of t-test in Table 3 showed no significant relationship between gender and score of the factors of the implementation of the strategic plan ($p\text{-value} > 0.05$).

Table 3: The relationship between gender and strategic implementation factors

	Gender		p-value
	Male	Female	
	Standard deviation \pm mean	Standard deviation \pm mean	
Human Factors	27.05 ± 7.55	25.80 ± 5.73	0.0505
Process factors	34.38 ± 8.72	32.37 ± 7.67	0.387
Structural factors	20.05 ± 5.60	20.41 ± 4.39	0.797
Institutional factors	27.76 ± 7.08	25.59 ± 5.96	0.245

The results of the Spearman test in Table 3 shows no significant relationships between age and work experience with the factors of the implementation of the strategic plan ($p\text{-value} > 0.05$).

Table 4: The relationship between age, work history, relationships and strategic implementation factors

		Human Factors	Process factors	Structural factors	Institutional factors
Age	r	0.259	0.237	0.282	0.208
	p-value	0.102	0.135	0.077	0.198
Work history	r	0.161	0.146	0.242	0.236
	p-value	0.260	0.306	0.091	0.098

Table 2: Obstacles to implementation of the strategic plan

	The items in question	Standard deviation ± mean
Human factors	Lack of experience for managers to implement a strategic plan	3.39±1.04
	Lack of staff knowledge and skills about implementing the strategic plan	3.49±1.08
	Lack of enough management and leadership by department administrators	3.40±1.03
	Internal disagreement between managers at different levels of the hospital	2.96±1.08
	Lack of human resources to implement the strategic plan	3.25±1.12
	Reduction in the level of interest of senior hospital managers after the program is developed	3.25±1.06
	Lack of management skills of senior managers	3.51±0.95
	Inadequate training of staff to implement the strategic plan	3.64±1.14
Process factors	Unclear responsibilities of individuals in implementing strategies	3.16±1.22
	Not having a plan to perform activities related to the implementation of the program	3.20±0.98
	The poor participation of responsible units in implementing the strategic plan	3.44±1.05
	The weak formulation of the strategic plan: ambiguity, generalization and incorrect foundation	3.41±0.98
	Mismatch of the written programs with hospital structure	3.29±1.15
	The creation of internal chaos due to the lack of attention of managers to the implementation of the strategic plan	3.63±1.13
	Time-consuming nature of the implementation of a strategic plan reduces the motivation of managers.	3.25±1.16
	Insufficient oversight of an internal oversight system, on the progress of activities	3.64±0.98
	The lack of coordination between the activities of the various units of the hospital	3.37±0.92
	The development of a strategy plan was based solely on obtaining a hospital accreditation score and managers do not pay attention to its implementation.	3.49±1.21
Structural factors	Poor understanding and employees' lack of familiarity with the concepts of strategy implementation	3.58±1.05
	Disproportionate incentive system and compensation for employees' implementation of the strategies	3.56±0.87
	Lack of sufficient authority for executives to implement a strategic plan	3.24±1.0
	Continuous change of directors (power changes) in the hospital	3.64±1.07
	Lack of financial resources to implement the strategic plan	3.65±1.18
	Due to the activity of rival hospitals, the diversion of managers' attention from strategy implementation	3.36±1.07
Institutional factors	Inefficient structure and ambiguity in the division of tasks for the implementation of the strategic plan	3.40±0.99
	Impact of uncontrollable factors in the external environment of the hospital, in the absence of the program	3.47±0.97
	The attachment of managers to past strategies and the desire to maintain the status quo	3.33±1.09
	Resisting change by managers	3.40±1.23
	Resisting change by employees	3.45±0.96
	Lack of commitment among staff to implement the strategy	3.33±1.11
	Managers' hardships often cause them to think about their own business or personal income instead of loyalty to the hospital.	3.31±1.21
	Lack of motivation among senior executives to implement the strategy	3.58±1.03

Discussion

Strategic planning is a process for identifying the future direction of the organization, which involves setting targets and then defining different strategies for achieving them (16). As organizations, hospitals need a strategic plan to show the future routes of the hospitals (17). The results showed that process factors are the most important and main barriers in the implementation of management strategy plans from the viewpoint of hospital managers. From among these factors insufficient monitoring of a domestic supervisor was the greatest barrier to these activities with the highest score. In the study by Jooste, the lack of precise knowledge and awareness of employees about their mission in implementing programs and the lack of communicating strategy plans to organizations were introduced as the most important barriers (18). In Koseoglu et al., among the major obstacles to the implementation of strategic plans were the lack of effective role of administrators in formulating and lack of unanimity among decision-makers at the time of programming, lack of proper communication in the organization, lack of coordination, lack of adequate information system and uncertainty, and unknown executive regulatory policies (19). The results of the study by Ford-Eickhoff showed that the current processes of hospitals do not provide managers with the ability to achieve strategic decisions. If programs are related to work processes, the job descriptions of employees and units, the success rates in their implementation will be higher (20). The second barrier to the implementation of the strategic plans was institutional factors, from the point of view of managers, with lack of motivation among top executives to implement the appropriate strategy as the most important factor in this area. In the study of Hamorzade et al., the increase in payroll was the reason for 90.9% motivation increase among hospital managers (21). Moreover, in his study, Safe stated that a person who has an incentive for development tends to do his job well and evaluate it (22). Thus, according to the study by Delgoshaei, there are managers who have remained in the organization for many years with only organizational coercion as the factor to make them remain. Hence, such managers suffer reluctance and non-commitment, posing problems for the organization in achieving predetermined goals (23). These results show that the strategic plans should be evaluated and developed to increase the motivation and commitment of the managers in their activities. The third effective factor in lack of managers' access to their strategic plans was human factors, where the most important barrier was insufficient training of staff to implement strategic plans, according to managers. The presence of human resources has been proven to be the most expensive and most valuable asset and resource of organizations in the operating chain of the organizations. Organizations with significant achievements have focused on this topic (24). In their study, Kaplan and Norton called management non-commitment as one of the main obstacles to implementing strategic plans (25). Moreover, Cater and Puco identified poor leadership as the most important barrier to implementing strategic plans (26). Hung et al. have identified limitations in financial resources,

managers' constraints and difficulties, an intangible organizational culture, inefficient organizational structure, poor understanding of weak strategies, and weak links in the organization as barriers to implementing a strategic plan (27). Furthermore, Murphy and Hanchett introduced the conflict between the priorities of top managers and the lack of group work in the organization as a problem of strategic plans. To avoid this problem, senior executives need to focus on some important actions and goals and clearly define communications and priorities (28). In the present study, the last factor mentioned as a barrier to strategic programs was structural factors. In structural factors, the lack of financial resources for implementation of the strategic plan was identified as the most important barrier according to the managers. In fact, the structural dimensions state the internal characteristics of an organization. They are called organizational structure and base on which organizations can be measured and compared (29). Zaribaf and Bayrami stated that most of the managers of the organization have scheduling, energy and a lot of money to formulate a strategy, but do not provide enough input for its proper implementation (30). Brenes, Mena & Molina also showed that organizational structure and design are important because they involve decisions on allocating resources for different units and activities in the business ecosystem (31). Piers and Robinson introduced the organizational structure as the most important priority highlighted in implementation of strategic plans developed by the organization and indicated that there should be coordination between structure and strategy (32). However, most of these studies have stated structural factors as the most important barrier to the implementation of strategic plans, which was inconsistent with the results of this study, which could reflect different organizational conditions in each hospital.

Conclusion

Finally, the results of the study, indicating the managers' barriers to implementation of strategic programs, showed that these strategic barriers were different in different hospitals according to their organizational status. According to the managers participating in this study, these factors were procedural, institutional and structural factors, respectively. Therefore, by identification of these factors with open mindedness, managers can have better foresight on implementation of strategic plans.

References

1. Hinings, Christopher R, Royston G. Disconnects and consequences in organization theory? *Administrative Science Quarterly* 2002; 47(3): 411-421.
2. Miles, RE., Charles C.S. Organization theory and supply chain management: an evolving research perspective. *Journal of Operations Management* 2007: 25(2): 459-463.
3. Abolqasem A. Impact of Organizational culture on organizational structure. MSc Thesis of Islamic Azad University. Tehran. 1386

4. Annem-Walsh K, Sabot S. Factors Influencing strategy selection in Academy Health centers. *Journal of Healthcare Management* 2002; 47(6): 37-45
5. Poister, TH., Gregory S. Elements of strategic planning and management in municipal government: Status after two decades. *Public administration review* 2005; 65(1): 45-56.
6. Asgari N. Relationship between organizational factors of ministry of labor with knowledge management strategy. MSc thesis of Tehran University, Tehran. 2006
7. Brayson JM. *Strategic Planning for Governmental and Nonprofit Organizations*, Translation by Abbas Monourian, Tehran, Public Administration Center for Governmental Education.
8. Brayson JM. *Strategic planning for public and non-profit organizations*. Tehran: Training institute of public management; 2002.
9. Miller S, Hickson D, Wilson D. From strategy to action: involvement and influence in top level decisions. *Long Range Planning*. 2008;41(6):606–28.
10. Kaissi AA, Begun JW. Strategic planning processes and hospital financial performance. *J healthcare management*. 2008;53(3):197-208.
11. Jacobovitz S, Weissman NJ, Soman P. New Strategic Plan Charts Next Chapter in College's History: Implications for the Cardiovascular Imager. *JACC: Cardiovascular Imaging*. 2014;7(5):537-9.
12. Hong K, Yamkasikorn M. Obstacles to effective implementation of strategic management system plan in Cambodian dual-system school. *Burapha University's Journal*. 2015;26(1):47-64.
13. Brenes ER, Mena M, Molina GE. Key Success Factors for Strategy Implementation in Latin America. *Journal of Business Research*. 2008;61(6):590-8.
14. Grigoroudis E, Orfanoudaki E, Zopounidis C. Strategic performance measurement in a healthcare organisation: A multiple criteria approach based on balanced scorecard. *Omega*. 2012;40(1):104-119.
15. Amerion A, Shahabi nejad M. Assessing the Barriers of Strategic Plan Implementation from Hospital Managers' Perspective in Kerman City. *jhosp*. 2015; 14 (4) :95-102
16. Sánchez Abril, P., A. Levin, et al. (2012). "Blurred Boundaries: Social Media Privacy and the Twenty-First-Century Employee." *American Business Law Journal*49(1): 63-124
17. Jafari, G., et al. (2010). *Hospital accreditation standards in Iran*. Tehran, Iran: Seda publication.
18. Jooste C, Fourie B. The role of strategic leadership in effective strategy implementation: Perceptions of South African strategic leaders. *Southern African Business Review*. 2009;13(3):51-68. *Strategic Management (JGSM)*. 2009;3(2):77-90.
19. Koseoglu MA, Barca M, Karayormuk K, Edas M. A study on the causes of strategies failing to success. *Journal of Global*
20. Ford-Eickhoff K, Plowman DA, McDaniel Jr RR. Hospital boards and hospital strategic focus: The impact of board involvement in strategic decision making. *Health care management review*. 2011;36 (2):145-54.
21. Hamidzadeh P, Sadeghifar J, Moradkhani B. Factors affecting to motivate managers' job in teaching hospitals of Urmia University of Medical Sciences. *Journal of Faculty of Nursing and Midwifery* 2011;9(1):15-22. (Persian)
22. Saif A. *Educational Psychology: Psychology of Learning and Instruction*. 7th edition, Tehran, Agha Publisher, 2013. (Persian)
23. Delgoshaei B, Tofighi S, Kermani B. The relationship between organizational climate and organizational commitment in teaching hospitals of Hamedan University of medical sciences. *Ofogh-e-Danesh GMUHS Journal*. 2009;14(4):60- 9.[Persian].
24. Abdolahi B, Navehabrahim A, Empowerment of staff is the golden key for Human Resources Management. Tehran: Virayesh Publication; 2008.
25. Kaplan RS, Norton DP. *Strategy-driven organization*. 9th ed. Tehran: Industrial Management Institute; 2011. p. 559.
26. Cater, T., & Pucko, D. (2010). Factors of effective strategy implementation: Empirical evidence from Slovenian business practice. *Journal for East European Management Studies*, 15(3), 207-236.
27. Hong K, Yamkasikorn M. Obstacles to effective implementation of strategic management system plan in Cambodian dual-system school. *Burapha University's Journal* 2015 26(1):47-64.
28. Murphy, D. M., M. Hanchett, et al. (2012). Competency in infection prevention: A conceptual approach to guide current and future practice." *American Journal of Infection Control*40(4): 296-303.
29. Miles, RE., Charles C.S. Organization theory and supply chain management: an evolving research perspective. *Journal of Operations Management* 2007: 25(2): 459- 463.
30. Zaribaf, M., & Bayrami, H. (2010). An effective factors pattern affecting implementation of strategic plans. *Academic and Business Research Institute*.
31. Brenes, E. R., Mena, M., Molina, G E. (2008). Key success factors for strategy implementation in Latin America. *Journal of Business Research*, 61(6), 590-598.
32. Piers J, Robinson R. *Planning and strategic management*. 2nd ed. Tehran: Yadvareh Ketab; December 2014. p. 624

How do Iranian Elderly People Conceptualize Social Welfare? A Content Analysis Study

Mirtahter Mousavi (1)

Hassan Rafiey (2)

Robab Sahaf (3)

Mohammad Ali Mohammadi (4)

Meroe Vameghi (5)

Seyed Hossein Mohaqeqi Kamal (6)

Faeze Joghataei (7)

Arya Hamedanchi (8)

(1) Assistant professor, Ph.D in Sociology, Social Welfare Management Research Center, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran.

(2) MD, Psychiatrist, Associate professor, Social Welfare Management Research Center, University of Social Welfare and Rehabilitation, Tehran, Iran.

(3) MD, PhD in Gerontology, Associate professor, Iranian Research Center on Aging, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran.

(4) Ph.D in Sociology, Associate professor, Social Welfare Management Research Center, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran.

(5) MD, Psychiatrist, Associate Professor, Social welfare Management Research Center, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran.

(6) Ph.D in Social Welfare and Social Health, Department of Social Welfare, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran.

(7) M.A in Sociology, Social Welfare Management Research Center, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran.

(8) MD, MPH, Ph.D Candidate, Iranian Research Center on Aging, University of Social Welfare and Rehabilitation Sciences, Kodakyar st., Daneshjoo Blv, Tehran, Iran.

Corresponding author:

Arya Hamedanchi

Iranian Research Center on Aging, University of Social Welfare and Rehabilitation Sciences, Kodakyar st., Daneshjoo Blv ,
Tehran, Iran.

Postal code: 1987513834

Email: dr.hamedanchi@gmail.com

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: **Mirtahter Mousavi** et al. How do Iranian Elderly People Conceptualize Social Welfare? A Content Analysis Study.

World Family Medicine. 2018; 16(3):58-63. DOI: 10.5742/MEWFM.2018.93312

Abstract

The sharp increase in life expectancy and the growing number of elderly people mean that more attention needs to be paid to their welfare. However, only a few studies have been done on the welfare of elderly people in Iran. This study examines the concept of social welfare from their perspective. Data were collected through semi-structured interviews with 20 elderly people and the results were analysed through content analysis. Two categories of concepts -material and non-material, were extracted. Material concepts include the sub-categories 'economic situation, housing, physical access to outdoor space, health, leisure facilities,

and social support' while non-material concepts include the subcategories of "emotions" and "relationships". The results of this study reveal multi-dimensional concepts which can also be used to develop welfare indicators for the Iranian elderly.

Key words: Elderly, Social welfare, Qualitative research, Iran

Introduction

The past century has witnessed a significant increase in life expectancy. The number of elderly people around the world is increasing; this increase has changed the population structure.

Soon there will be more elderly people than children. Over the next few years, for the first time in human history, the number of people 65 years and older will be equal to the number of children under five. By 2050, their number will be greater than the number of children under 14 years (WHO, 2012). The elderly population in the country has grown substantially, from 5.3% in 1966 to 8.2% in 2011; it has now reached the number of 6.2 million. It is predicted that in the next 30 years, the share of the population aged over 65 years will be around 18–20% (i.e. almost one in five people will be elderly (UNFPA, 2012).

The aging phenomenon has far-reaching effects on the social and economic aspects of the communities and influences the social welfare of the elderly as well (Galassoa & Profetab, June 2007). In other words, the increasing number of elderly people in recent years has led to an increase in social needs, such as need for healthcare, in many countries (Thorslund & Parker, 1995). For this reason, some governments have devoted more attention to this phenomenon and have made changes in their economic systems (Bengtsson & Scott, 2009). It should be noted that measurement, planning, and verification of the details of examination of the concept of well-being, while the evidence shows that there is no single definition of this concept.

The notion arising from some definitions includes only economic and physical aspects of well-being, while some of the other definitions touch upon non-financial and non-material concepts as well (Greve, 2008). Social welfare can be examined at the individual or the social level. Individual well-being pays attention to the micro-level and social welfare makes up the macro-level well-being of the whole society. So far, there have been several different views towards social welfare. For Bentham, social welfare means maximum satisfaction and happiness (Masur, 2010), while Pigou pays more attention to the financial issues and argues that well-being is a concept associated with dreams and desires that can be measured monetarily (Mohaqeqi Kamal, Rafiey, Sajjadi, Abassian, & Rahgozar, 2014). John Rawls touches upon the field of justice and morality. For Rawls, a society with equitable distribution of resources has a better welfare situation than a society in which resources are not fairly distributed (Pigou, 2013).

While these concepts are often objective, Easterlin refers to their close association with subjective concepts such as satisfaction and happiness, which are beyond material concepts. Therefore, the numerous given definitions of well-being are not similar (Easterlin, 2001a).

Dolgoff, in his definition of welfare, says that 'social welfare includes those non-profit functions of society, public or voluntary, which are clearly aimed at alleviating

distress and poverty or at ameliorating the conditions of the casualties of society' (Dolgoff & Feldstein, 1980). In a broader definition of a person's social welfare, in addition to health, Fitzpatrick includes education, security, housing, money, and resources, as well as relative well-being in comparison to others (Fitzpatrick, 2011).

In this context, the United Nations has provided the following definition: 'Social welfare as an organized function is regarded as a body of activities designed to enable individuals, families, groups, and communities to cope with the social problems of changing conditions. But in addition to and extending beyond the range of its responsibilities for specific services, social welfare has a further function within the broad area of a country's social development' (Casimir & Samuel, 2015).

At the same time, it is important to keep in mind that these concepts can change, depending on the expectations and aspirations of the individuals in the courses of their lives (Easterlin, 2001b). On the other hand, it should be noted that elderly people have their own special needs and expectations. Thus, they may have different views and expectations with regard to social welfare than others, i.e. the definition of social welfare may be different for them (Sarkisian, Hays, & Mangione, 2002) and it also is important to compare these differences in various cultures (Greve, 2008).

In Iran, very few studies have been conducted on the various aspects of elderly people (Tajvar, Arab, & Montazeri, 2008). Among them, one can refer to the study by Mohagheghi et al. on social welfare, which indicates that social welfare in Iran has six dimensions or categories, namely employment, social security, economy, education, health, and housing allocation (Mohaqeqi Kamal et al., 2014). This study was designed for the general population rather than only the elderly. Another study by Hezarjaribi in Tehran on the sense of well-being in people aged 15–65 years shows that the variables of 'confidence in the performance of officials, religiosity, socio-economic status of individuals, and a sense of social justice' have a direct positive impact on the welfare of the people, while variables such as social alienation and fatalism have a negative effect (Hezarjaribi & ShaliReza, 2012).

In summary, it can be concluded that there is no single definition or consensus on social welfare (Fitzpatrick, 2011); rather, different socio-economic, political, and cultural interpretations exist. Although the definition of social welfare can also depend on the intellectual and cultural backgrounds of individuals, many of the presented concepts are objective and primarily consider the economic and financial problems (Greve, 2008). In light of the multidimensional concept of welfare and its dependence on cultural and age conditions and the lack of proper studies in this field, this study, a qualitative content analysis approach to the concept of social welfare in the view of the elderly, has been undertaken.

Methods

In the course of this study, from April to October 2015, the views of elderly people on the issue of social welfare for the elderly were collected and studied through the inductive content analysis approach.

Participants:

In this method, the qualitative data was obtained from interviews. A purposive maximum variation sampling was chosen, so that people from diverse economic, social, family, and educational backgrounds could participate. Participants from three geographic regions, northern, central, and southern Tehran were selected and the level of education varied from illiteracy to PhD (Table 1).

Inclusion criteria were being older than 60 and having cognition, while lack of cognition and unwillingness to participate in the study were the exclusion criteria.

The number of interviews were not pre-specified; interviews were conducted until data saturation. Ultimately, 10 women and 10 men participated in the study.

Interviews:

Semi-structured interviews were conducted, with key questions designed by the academic board members. Interviews were conducted by three interviewers. Based on the well-designed interview guide, various dimensions of welfare were investigated. The main questions were: 'What is the purpose of social welfare and what are its different aspects? Which of these aspects have more importance?'

Before starting the study, each interviewer did an interview for a pilot study and the results were controlled in a meeting with supervisors. Each interview lasted for 40–60 minutes.

Analysis:

Interviews were recorded and transcribed. Afterwards, each interview was analysed through the inductive content analysis method, which involves reading the transcript a number of times to make sense of the data, identifying the meaning units and open coding, sorting codes into the subcategories and core categories, and describing the concepts that already have been defined (Elo & Kyngas,

2008). According to the classification made, the texts were reviewed many times. Interviews continued until the point of data saturation.

Rigour:

During the study, researchers had 'prolonged involvement' with the data. Interviewers had useful prior experience through in-depth interviews with the elderly. Regular debriefing sessions were held between researchers and supervisors. Each encoding was checked by two other interviewers, and also used the iterative questioning approach. The results were submitted to an expert panel consisting of four professors specializing in the field of social welfare. A researcher from outside the project acted as a referee to control and evaluate the findings. The results were compared with other similar studies. Finally, in member checking, the participants agreed that the extracted concepts expressed their views about the welfare of the elderly.

Ethical considerations

This study was approved by the University of Welfare and Rehabilitation Sciences, with registration number 801/93/8656/1. While taking consent from the respondents, explanations about the purpose of the investigation were given to them by the interviewer and they were informed that they can refuse to participate in the study at any time they wish. All reports were prepared anonymously and the specifications that could lead to identification of individuals have been concealed.

Results

The results of data analysis, obtained via in-depth interviews with the elderly to explain their opinions on their social welfare, are divided into two categories and eight subcategories. Based on the findings of this study, there are two main categories: material and non-material concepts.

Material concepts

The material concepts of the results of the present research are split into six subcategories: appropriate economic situation, suitable housing, physical access to outdoor space, physical health, leisure facilities, and social support.

Table 1: Sex, Age and Education of Participants

No	Sex	Age	Education	No	Sex	Age	Education
1	Female	80	Elementary School	11	Female	63	Elementary School
2	Female	62	Master Degree	12	Female	62	High School
3	Male	74	Secondary School	13	Female	75	Master Degree
4	Male	63	Secondary School	14	Male	76	PhD
5	Female	60	Secondary School	15	Male	71	Doctorate
6	Male	73	Master Degree	16	Female	61	High School
7	Male	65	High School	17	Male	61	High School
8	Male	78	Elementary School	18	Female	62	High School
9	Female	63	Master Degree	19	Female	62	Illiterate
10	Male	64	Bachelor Degree	20	Male	61	Master Degree

Economic situation

The elderly participants of this research considered appropriate economic situation as one of the important factors of welfare, and its absence as an effective factor reducing the welfare. *'Financial ability is the first word in the life of an elderly person'*, said a 62-year old lady on the importance of this matter. An appropriate economic situation requires sufficient income. *'Welfare means the income you should earn to spend; otherwise, you always have to beg from others'*, continued the same participant on the role of the aforementioned factor in well-being. Receiving sufficient pension is another economically significant matter for the elderly. *'Low pension makes living difficult for the elderly'*, said a 75-year old woman about the pension. In a number of the conducted interviews, the economic situation was mentioned as a basis for the other dimensions of welfare. *'Economic situation is like a chain that connects different aspects of life to each other; no money entails no good food, no sleeping, no housing, and no physical and mental health; that is why it is said that money talks'*, said a 63-year old woman.

Suitable housing

The elderly participants in this survey highlighted housing as a main component of social welfare. The results of the study demonstrate that owning a house is a key factor in this connection, a rented house does not resolve the relevant concerns. *'It is my right to own a house'*, said a 62-year old widow who lives in a nursing home.

Enjoying peace and quiet at home is another aspect. *'Home must be a quiet place to rest with no annoying noises'*, maintained a 63-year old man in this regard.

Making the house physically suitable is very important for the elderly. The elderly participants expressed that they expect their home to be arranged in a way that they could live without problems, such as climbing stairs. They expect to live in a house where the design is convenient. A 76-year old man elaborated on this: *'The equipment inside the house, including cooking equipment, heating devices, etc., is expected to be easily usable for the elderly without much physical effort.'*

Another man of 74 said about the physical features of houses for the elderly: *'The house is expected to have good lighting and no slipperiness in the bedrooms, bathrooms, and kitchen. An elderly person lives with less sense and energy. An unsafe house increases the risk of injury for such a person.'*

Easy physical access to outdoor spaces

The elderly participants of the current study considered easy physical access as an important factor influencing their social welfare. This subcategory has different dimensions, such as suitable public transport system, improvement in public places, and easy access to urban pathways like sidewalks. *'There can be no well-being if an elderly person cannot go out and walk on the sidewalks'*, said a 61-year old man on the relationship between urban access and the social welfare of the elderly.

Physical health

The interviews conducted with the elderly revealed that they do not expect to have a completely healthy status with no illness; rather, they expect to enjoy sufficient health to meet their daily needs.

'For an elderly person, it is important to avoid disease and disability so that s/he can meet her/his needs without help from anyone else', a 74-year old man pointed out.

On the other hand, the elderly people are in need of easy access to treatment facilities in case of illness. They also pointed out the importance of having access to healthcare services in the event of disease or disability:

'Physical health is highly important because I need the help of others during illness. Nobody is there to care for me', a 63-year old man said.

Proper nutrition is another significant factor affecting the health of the elderly. The participants remarked that, with age, their diets change and there are many things that they can no longer eat. *'We cannot eat as before; we suffer from hypertension and we cannot digest fat'*, a 74-year old man said. A factor that was reported to be fundamental to the health and social welfare of the elderly was access to health information. *'It would be very helpful if I am given some information on my health and how I should take care of myself and treat my health problems'*, said a 65-year old man in this connection.

Leisure facilities

In social welfare, the elderly people emphasized the importance of leisure. They said that they have more free time and need to have access to leisure facilities that are suitable for the elderly. *'It is possible to offer tourism services, group tours, exhibitions, poetry nights, and fiction events'*, a 75-year old man expressed. Although some of these activities can be done individually, such as reading or walking in the open air, the results of the study unveiled that elderly people are very interested in gathering with other senior citizens. A 61-year old man maintained in this connection: *'If they gather together in a park, neighbourhood municipal complex, or any place arranged by the municipal services, you can see them sitting together for five to six hours a day.'*

Social support

The participants of this study believe that they are in need of social services and hence their needs must be covered by some organization. A 64-year old man said on the role of government and volunteers in founding such an organization: *'If we could establish an organization of volunteers and philanthropists within a state-budgeted structure, this could enable the elderly to meet their needs and increase their welfare by reducing the problems.'* A 65-year old retired woman elaborated on social support: *'Elderly people expect to have at least a small house, insurance, and social security services, and of course these services should be available and easy to access.'* Another component of social support is insurance. In

the elderly people's views, a good insurance is one that covers medical expenses and is tailor-made to the client's requirements, so that an elderly person faces no trouble at the time of diseases and problems. *'For elderly people, there must be a good and efficient insurance coverage for medical expenses, to relieve material and living-related concerns'*, replied a 61-year old woman in an interview.

Non-material concepts

The non-material concepts are divided into two subcategories "emotions" and "relationships".

Emotions

Not all elderly welfare-associated factors are material, but emotions are also important for the elderly. Emotions comprise a wide range of expressed welfare-related feelings. One such emotional need is avoiding loneliness and having a companion. According to the findings, elderly people avoid loneliness and feel that it hampers their welfare. They consider it as a serious challenge and believe that having a companion could protect them from loneliness. *'The elderly need to be taken care of, in terms of both material and spiritual dimensions; feeling lonely is a very difficult experience at this point in life'*, said a 60-year old woman.

The expressed views of the elderly represent the significance of mental health to them. They expect to experience this feeling in their old age. *'An elderly person needs to be free from mental concerns. The more the distress, the more illness s/he would suffer from. In other words, mental disorders entail physical illness'*, said a 60-year old woman in this connection. *'Well-being means independence, a feeling of satisfaction, and a good mood in spirit'*, answered a 71-year old participant. Feeling individually independent is preferred among the elderly participants. The elderly people prefer to make their life decisions on their own, and want to avoid feeling disempowered in this. An elderly person who used to live in a nursing home objected to the lack of individual independence, saying: *'I would feel better if I were independent and outside of here.'* The elderly people under study felt satisfied being part of a family and believed it to be worthwhile. *'The relatives meet our spiritual needs well and it is valuable to be in touch with family members'*, said a 75-year old man

Relationships

The elderly participants of the present study described convenient family and social relationships as another dimension of their well-being. They said that they are interested in social presence and participation. One of the participants elaborated on social participation: *'An elderly person is willing to take active part in different issues. S/he hates feeling unnoticed and expects others to use her/his experiences. S/he needs a place where the elderly people can get together and take part in matters at hand.'* They said that they expect others, within the family and social relationships, to give them social dignity and respect them without discrimination. *'Elderly people socially expect others to respect their rights and treat them like other people with no discrimination'*, said a 63-year old man in this connection. In particular, enjoying warm and lovely

relationships with others, especially with family members, makes the elderly feel supported; this affection is soothing and contributes to their mental health improvement. In line with this, a man of 65 who lives in a nursing home said: *'It is very important for me to be in touch with my family members; I have access to a telephone here and feel happy when they call me up.'* The absence of this type of communication and affection from others may cause them trauma. *'When an elderly person does not receive affection and love from others, it makes him/her sick physically and mentally'*, said a 61-year old man.

Discussion and Conclusion

The present study attempts to investigate the views of elderly people on social welfare via in-depth interviews and the content analysis method. The obtained results reveal that the concept of social welfare among the elderly has different dimensions, including material and non-material aspects. 'Financial ability' and 'sufficient pension' are important material subcategories and are considered to affect the well-being of the elderly. These subcategories, according to the participants, may considerably affect other dimensions of social welfare. In spite of the importance of economic dimensions for the elderly, their social well-being is not restricted solely to material aspects. According to the findings of the current research, positive emotions, mental health, and warm family and social relationships are key to achieving an appropriate level of social welfare.

Not many qualitative studies have been carried out on the concept of welfare in the view of elderly people; however, the results obtained in this research are comparable to a number of relevant proposed definitions. According to Saxena, social welfare consists of efforts made by governments and voluntary organizations to help families. Such attempts include generation of income and maintaining it at a reasonable level, providing medical care and public healthcare services, providing housing, providing access to social development, paving the way for ease of social adjustment, and providing recreational facilities (Saxena, 2006). These points are very consistent with what has been expressed by the elderly participants of this study. The presented non-material concepts related to the social welfare of the elderly are consistent with the subjective concepts set forth by Easterlin, including happiness (Easterlin, 2001a). Some of the results of this study, such as need for care and sufficient pension, are directly associated with aging, implying that social welfare-related concepts may change during the lifetime, depending on the age. Apart from the importance of economic dimensions for the elderly, they mentioned other factors such as social and emotional relationships in their remarks, revealing that their social well-being is not restricted to material aspects. Thus, contrary to what Pigou suggested (Pigou, 2013), their social welfare may not be measurable solely by monetary standards.

The elderly participants of this study also pointed out the role of mental and social health and support in their social welfare. These results are consistent with those of research by Alipour et al. on 100 Tehran-based elderly

people (Alipoor, Sajadi, Forozan, & Biglarian, 2009).

In an investigation by Teymouri et al. on the welfare conditions of the Iranian elderly, three dimensions of physical health, mental health, and social health were considered significant for the social welfare of elderly people (Teymouri, Dadkhah, & Shirazikhah, 2006). These three dimensions are significant in this study as well.

Mohagheghi et al., in research on the non-elderly population of Iran, identified social security, economy, education, health, and housing as the important dimensions of welfare in Iran (Mohaqeqi Kamal et al., 2014), out of which the economic situation, health, housing, and social support are investigated and discussed in the present study as well. The need for health-related education is examined in the findings of this research; however, it has not been considered as an independent factor of social welfare by the elderly participants. Social and emotional relationships, identified in the results of this study, are not reported in the said research of Mohagheghi, possibly due to the age difference in the populations considered in the two studies. It may be concluded that with aging, people feel more need for social and emotional relationships. To investigate this more deeply and accurately, further studies are needed, using grounded theory approach for example.

In conclusion, the present study maintains that the welfare of the elderly is a multi-dimensional concept which comprises both material aspects, such as financial ability, and non-material aspects, such as positive feelings. The results of this study may contribute to further elaboration of the indicators of social welfare among the elderly.

Acknowledgments:

The authors would like to thank Zafaranyeh Health House, Comprehensive Rehabilitation of Amal Charity, Kahrizak Charity Nursing Home for their collaboration in this study.

References

Alipoor, F., Sajadi, H., Forozan, A., & Biglarian, A. (2009). The role of social support in elderly quality of life. *Social Welfare*, 8(33), 149-167.

Bengtsson, T., & Scott, K. (2009). *Population Ageing: A Threat to European Welfare? How Unified Is the European Union?* (pp. 117-137): Springer.

Casimir, A., & Samuel, E. (2015). A Towering Critique of the Ambience of Social Welfare, Social Work and the Social Development Paradigm—An African Analysis. *Open Journal of Political Science*, 5(04), 236.

Dolgoft, R., & Feldstein, D. (1980). *Understanding Social Welfare*: JSTOR.

Easterlin, R. A. (2001a). Income and happiness: Towards a unified theory. *The economic journal*, 111(473), 465-484.

Easterlin, R. A. (2001b). Life cycle welfare: Evidence and conjecture. *The Journal of Socio-Economics*, 30(1), 31-61.

Elo, S., & Kyngas, H. (2008). The qualitative content analysis process. *J Adv Nurs*, 62(1), 107-115. doi:10.1111/j.1365-2648.2007.04569.x

Fitzpatrick, T. (2011). *Welfare theory: an introduction to the theoretical debates in social policy*: Palgrave Macmillan.

Galassoa, V., & Profetab, P. (June 2007). How does ageing affect the welfare state? *European Journal of Political Economy*, 23 (2), 554–563.

Greve, B. (2008). What is Welfare? *Central European Journal of Public Policy*, 2(1), 50-73.

Hezajaribi, J., & ShaliReza, S. (2012). An investigation rate of having social welfare and factors affecting on it among Tehran's citizens. (Master Degree), Tehran Unversity, Tehran. Retrieved from <http://www.icnc.ir/index.aspx?pid=289&metadatald=db209630-f135-4198-8207-39e06f51b88c>

Masur, J. (2010). *Welfare as Happiness*. *Georgetown Law Journal*, 98, 1583.

Mohaqeqi Kamal, H., Rafiey, H., Sajjadi, H., Abassian, E., & Rahgozar, M. (2014). Estimating social welfare in Iran using a new composite index. *Social Welfare*, 14(52), 7-32.

Pigou, A. C. (2013). *The economics of welfare*: Palgrave Macmillan.

Sarkisian, C. A., Hays, R. D., & Mangione, C. M. (2002). Do older adults expect to age successfully? The association between expectations regarding aging and beliefs regarding healthcare seeking among older adults. *Journal of the American Geriatrics Society*, 50(11), 1837-1843.

Saxena, A. (2006). *Encyclopaedia of Social Welfare* (Vol. 2). New Delh: SBS Pub.,

Tajvar, M., Arab, M., & Montazeri, A. (2008). Determinants of health-related quality of life in elderly in Tehran, Iran. *BMC public health*, 8(1), 1.

Teymouri, F., Dadkhah, A., & Shirazikhah, M. (2006). Social welfare and health (mental, social, physical) status of aged people in Iran. *Middle East Journal of Age and Ageing*, 3(1), 39-45.

Thorslund, M., & Parker, M. G. (1995). Strategies for an ageing population: expanding the priorities discussion. *Ageing and Society*, 15(02), 199-217.

UNFPA. (2012). *Situation Analysis of Ageing in the I.R. Iran*. Retrieved 27 Dec 2017, from UNFPA <https://www.un.org.ir/resources/publications/item/3438-unfpa-one-pager-on-situation-analysis-of-ageing-in-i-r-iran-report-en>

WHO. (2012). *World Health Day 2012: ageing and health: toolkit for event organizers*. Retrieved 1 Feb 2016, from World Health Organizarion whqlibdoc.who.int/hq/2012/WHO_DCO_WHD_2012.1_eng.pdf

The Relationship between Spiritual wellbeing, Anxiety and Depression in Old Adults: A cross sectional study of Shiraz Clinics, Iran

Nader Aghakhani (1)
 Davood Vahabzadeh (1)
 Soudabeh Niroomand (2)
 Zoleikha Asgarlii (2)
 Foroozandeh Zaravar (3)

(1) Patient Safety Research center, Urmia University of Medical Sciences, Urmia, Iran.(2) Zanjan University of Medical Sciences, Zanjan, Iran
 (3) Shiraz University of Medical Sciences, Shiraz, Iran.

Corresponding author:

Foroozandeh Zaravar
 Shiraz University of Medical Sciences,
 Shiraz, Iran
Email: foroozandehzaravar@yahoo.com

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Nader Aghakhani et al. The Relationship between Spiritual wellbeing, Anxiety and Depression in Old Adults: A cross sectional study of Shiraz Clinics, Iran. World Family Medicine. 2018; 16(3):64-67. DOI: 10.5742/MEWFM.2018.93315

Abstract

Introduction: Spiritual well-being can serve as an important factor affecting older adults' quality of life, reduce their psychological abnormalities, boost their interpersonal relationships, and relieve the severity of their potential illnesses. This research investigated the relationship between spiritual well-being and anxiety and depression in older adults who attended clinics in Shiraz, Iran, in 2012.

Methods: This study was a cross sectional research which investigated the condition of 128 old patients who attended the clinics of Shiraz University of Medical Sciences in 2012. The data were collected through a demographic questionnaire, the Depression, Anxiety and Stress scale (DASS), and Paloutzian and Ellison spiritual well-being questionnaire. The data were then analyzed via student's t-test and Pearson chi square test in SPSS 18.

Results: The participants were aged 70.8±8 years, 35.4% of them were male, 64.6% were female, 74% were married, 39.4% were illiterate, and 29.1% had certificates below the high school diploma. The findings revealed that the mean score on depression was 57.9±4.28 and that on spiritual well-being was 83.43±5.2. All participants showed severe depression and anxiety, 91.3% had extreme stress, and 8.7% suffered from severe stress. Although old adults with higher levels of spiritual well-being were less influenced by mental disorder,

according to the Pearson statistical test, no statistically significant correlation was observed between high levels of stress, anxiety and depression and spiritual well-being ($P \geq 0.05$).

Conclusion: Results from the current study showed that we can address the function of spiritual well-being in enhancing old adults' quality of life during the nursing care process.

Key words: Spiritual wellbeing, anxiety, depression, stress, elderly

Introduction

Old age is one of the critical stages of human life (1). Old age is a consequence of a wide range of cellular and molecular atrophies in the human body over time. Apart from biological changes, aging people may experience a variety of important events in life, such as retirement, moving out to a more favorable place for life, death of friends or partners, loneliness and isolation, and social exclusion (2).

In many countries, people aged 60 years or older are considered to be old adults. Today, there are about 125 million people beyond the age of 85. It has been predicted that by 2050, the population of the elderly will be several times as great as the population of children under 5 years of age. Current estimates of the global population of people aged 60 years and above suggest that there are 600 million old individuals, and the proportion of these people will double by 2025 and will reach nearly 2 billion in 2050 (2, 3).

According to the 2011 Census in Iran, there are more than six million and two hundred people aged 60 and beyond in the country. Using statistical and demographical instruments and indicators, one could observe that the Iranian society has been growing old (4). Considering the problems that this age-group faces, and the increasing rate of its expansion, it is necessary to formulate anticipatory plans that can help them to control the issues threatening the future of this age-group (5).

As old adults' rate of population increases, their health-related problems, including both physical and psychological issues, must be seriously taken into consideration (6). Prevalent psychological disorders which are likely to threaten old people are depression and anxiety (7, 8). Estimates suggest that the prevalence of anxiety among the elderly ranges between 4% and 6%, while symptoms of depression among the general public of old adults is about 10-5% (9). Depression is thought to be the most widespread disorder among the elderly; studies confirm that 72% of old people suffer from clinical depression, while nearly 33% have major depressive disorders (8). Anxiety may be unmarked as in the cases of generalized anxiety disorder, or may be markedly visible as in the cases of phobias, obsessive-compulsive disorder, and panic attack.

One of the most significant notions in studies concerned with psychological assessment is "spiritual well-being." The notion, as a health dimension, subsumes several indicators and includes two sub-types, namely existential and religious. Religious well-being brings about satisfaction as a result of being in contact with a supreme power, whereas existential well-being is associated with attempts to make sense of the meaning and purpose of life (10).

According to research, spirituality is strongly related to an individual's general health; more specifically, religion and spirituality have been regarded as forces that help people adapt themselves to the tensions of everyday life (11, 12).

Old adults with reinforced levels of spiritual well-being can effectively adapt to their illnesses(11).

As a result, spiritually and religiously motivated support and being connected to a higher power are effective aspects of spiritual well-being and can help improve life quality, reduce psychological disorders, increase interpersonal interaction, relieve the severity of disorders, and bring about positive medical effects (13). Religion and spiritual credence, besides internally motivating people, involve external sources of motivation that make it possible for people to (a) adapt themselves to positive conditions; (b) avoid negative sentiments and inner pressures; and (c) achieve self-worth and social respect (14).

Despite the fact that aging can physically limit people's engagement in religious rituals, there is evidence suggesting that old people may experience remarkably increased religious attitudes and sentiments. This experience can strongly predict health, happiness and life satisfaction in these people (15). Generally speaking, measures of religiosity and performing divine commands are relatively higher in old adults who usually associate their happiness with their faith (16, 17).

The purpose of the present study was to investigate the relationship of spiritual well-being to depression, anxiety and stress in old adults who attended clinics in Shiraz, Iran. The findings can reveal to policy-makers the importance and effectiveness of spiritual well-being in old adults' lives.

Material and method

This study was a cross-sectional, descriptive-analytic research that sought to investigate spiritual/mental well-being in a sample of old patients who referred to clinics of University of Medical Sciences, Shiraz, Iran. After the Ethics Committee of the University authorized the research protocol, the researchers coordinated the research procedure under the supervision of competent authorities. As a result, among the health and medical centers of Shiraz, 10 centers were randomly selected. According to study of Kandasamy in 2011 we randomly selected 128 patients, out of the population of old people attending these centers. The data were gathered through questionnaires which included ten questions addressing the participants' age, gender, education level, marital status, life conditions, and social participation. Content validity of the demographic section of the questionnaire was validated and confirmed by the opinions of five university professors.

Paloutzian and Ellison's spiritual well-being scale was used to measure the spirituality of the participants. There were 20 questions in the scale; 10 of the questions dealt with religious issues and the other 10 questions addressed existential matters, based on a 6-point Likert scale (ranging from "I totally agree" to "I totally disagree"). The range of possible scores for each of the two sub-scales was between 10 and 60. A participant's final score was the aggregate of both existential and religious scores, ranging from 20 to 120. The scores finally observed could be divided into three groups: low spiritual well-being (20-41); moderate

spiritual well-being (41-99); high spiritual well-being (100-120) (28).

The instrument used to measure the levels of depression, anxiety and stress was DASS-21 standard scale, which included a total number of 21 questions (7 questions were implemented to identify each of the three disorders). This scale was formulated according to a self-report 4-point Likert scale, including these items: "Never", "rarely", "sometimes", "most of the time." The minimum possible score on each question was 0 and the maximum was 3. In the cases of stress and anxiety, the questionnaire included such items as relaxation, reaction to different situations, energy used for everyday activities, nervousness and faintness, patience, and fear of stressful situations (18).

During a meeting with the participants, research goals and procedures were explained to them, and they were asked to submit their written consent for their participation in the research project. It was also clarified that all of the information collected through the study would remain confidential. To reach the final results, the data were analyzed based on Student's t-test and ANOVA processed in Predictive Analytics Soft Ware (PASW) SPSS 18.

Ethical considerations:

This article is derived from a research project approved by No. 6694 in 2012.4.29. After the Ethics Committee of the University authorized the research protocol, the researchers coordinated the research procedure under the supervision of competent authorities.

Results

A total number of 128 old adults participated in this study. Their mean \pm SD age was 70.8 \pm 8 years. Demographically speaking, 64.6% of the participants were female, 74% were married, 29.1% had certificates below the high school degree, 16.5% had poor economic conditions, and 30.7% lived in their children's homes.

Results of the statistical analysis revealed that the mean score on depression was 57.9 \pm 4.28, and the mean score on spiritual well-being was 83.43 \pm 5.2. All of the participants displayed severe anxiety and depression. As far as stress was concerned, 91.3% of the participants had extreme and 8.7% suffered from severe stress.

All participants scored moderately on spiritual well-being, and there was no significant relationship between the demographic variables and spiritual well-being, except for the gender variable. In other words, females' scores were significantly associated with spiritual well-being, although there was a reverse statistical relationship between spiritual wellbeing (good, moderate, poor) and stress, anxiety and depression. That is to say, the patients with a high level of spiritual well-being, experienced a lower level of stress, anxiety and depression. Pearson test did not reveal any statistically significant association between the two scores in the participants ($p>0.05$).

Discussion

Spiritual well-being can serve as an important factor affecting older adults' quality of life. In this study the mean score of the old adults' spiritual well-being showed a high measure (83.43 \pm 5.2), which was compatible with the results of relevant studies. Jadidi et al. (2012), too, concluded that the mean score on spiritual well-being of nursing home care residents was high (96.26 \pm 17.9) (19). Meanwhile, in another study, Rykkje et al. (2013) observed that religion and spirituality were important in older age (20). One of the reasons for this tendency was that the elderly might develop a sense of religiosity to gain power and support from spiritual forces.

Rykkje and colleagues' research also found no significant association between depression and spiritual well-being. In the study conducted by Jadidi et al. (2012), no significant relationship was observed between spiritual well-being and mental health of old residents of Kahrizak nursing home. Yet, there are findings that are not compatible with the observations of the present study. For instance, some researchers detected a significant association between religiosity/spirituality and mental health in old adults. Hedayati et al. (2016) observed a relationship between spiritual well-being (religious and existential well-being) and situational anxiety; their study suggested that increased levels of spiritual well-being could reduce anxiety (21).

Investigating the spiritual well-being in patients with cancer, Chong et al. (2007) also showed a reverse correlation between spiritual well-being and anxiety (22). Generally speaking, in the majority of studies, including that of Hmong Wong (2015), social participation and religious engagement were linked with reduced risks of developing depression in the elderly (17, 23). The present study was on a relatively limited sample, so next coming studies can use random sampling in larger populations. More studies can probe into how spiritual well-being can be improved and how it may reduce anxiety.

Conclusion

We can emphasize spiritual well-being to encourage nurses to improve patients' life quality, especially in the case of old adults, by considering spiritual aspects of human life. Identifying old patients' spiritual needs, the medical staff can provide the grounds for enhancing such patients' spiritual well-being, as a factor that can alleviate their depression and anxiety. Through spiritual/religious intervention, nurses can also help improve patients' psychological status.

References

1. Pedram M, Mohammadi M, Naziri G, Aeinparast N. Effectiveness of cognitive-behavioral group therapy on the treatment of anxiety and depression disorders and on raising hope in women with breast cancer. *JOURNAL OF WOMAN AND SOCIETY* 2011;1(4):61-75.
2. WHO. Ageing and health World Health Organization: Consultation on Global Strategy and Action Plan on Ageing and Health. 2015.

3. Zhou W, He G, Gao J, Yuan Q, Feng H, Zhang CK. The effects of group reminiscence therapy on depression, self-esteem, and affect balance of Chinese community-dwelling elderly. *Archives of gerontology and geriatrics*. 2012;54(3):e440-e7.
4. Yazdani A, Fekrazad H, Sajadi H, Salehi M. Relationship between social participation and general health among the elderly. *Journal of Kermanshah University of Medical Sciences (J Kermanshah Univ Med Sci)*. 2015;18(10):599-606.
5. Rashedi V, Gharib M, Yazdani AA. Social participation and mental health among older adults in Iran. *Iranian Rehabilitation Journal*. 2014;12(1):9-13.
6. Fathi M, Valiee S, Shami S, Salehnejad G. The meaning of health for Iranian elderly: A qualitative content analysis. *Health Sciences*. 2016;5(9S):137-41.
7. Clements WM, Koenig HG. *Aging and God: Spiritual pathways to mental health in midlife and later years*: Routledge; 2014.
8. Mhaoláin AMN, Fan CW, Romero-Ortuno R, Cogan L, Cunningham C, Kenny R-A, et al. Frailty, depression, and anxiety in later life. *International Psychogeriatrics*. 2012;24(8):1265-74.
9. Steffens DC, Fisher GG, Langa KM, Potter GG, Plassman BL. Prevalence of depression among older Americans: the Aging, Demographics and Memory Study. *International Psychogeriatrics*. 2009;21(5):879-88.
10. Elham H, Hazrati M, Momennasab M, Sareh K. The effect of need-based spiritual/religious intervention on spiritual well-being and anxiety of elderly people. *Holistic nursing practice*. 2015;29(3):136-43.
11. Ilali E, Taraghi Z, Yazdani J, Golmohammadi M, Savasari R, Mosavi Jarrahi A. The Relationship Between Praying and Spiritual Health Among Iranian Older People With Cerebrovascular Accidents. *Iranian Journal of Ageing*. 2016;11(3):424-31.
12. Mehri Nejad SA, Ramezan Saatchi L, Paydar S. Death Anxiety and Its Relationship with Social Support and Adherence to Religion in the Elderly. *Iranian Journal of Ageing*. 2017;11(4):494-503.
13. Ellison CG, Fang Q, Flannelly KJ, Steckler RA. Spiritual struggles and mental health: Exploring the moderating effects of religious identity. *International Journal for the Psychology of Religion*. 2013;23(3):214-29.
14. Thøgersen-Ntoumani C, Ntoumanis N. The role of self-determined motivation in the understanding of exercise-related behaviours, cognitions and physical self-evaluations. *Journal of sports sciences*. 2006;24(4):393-404.
15. Khodayarifard M. Preparation of religiosity scale and measuring levels of religiosity among Iranians from throughout Iran. University of Tehran, The faculty of psychology and education.[cited 2009 apr 15].
16. Allahbakhshian M, Jaffarpour M, Parvizy S, Haghani H. A Survey on relationship between spiritual wellbeing and quality of life in multiple sclerosis patients. *Zahedan Journal of Research in Medical Sciences*. 2010;12(3):29-33.
17. Roh HW, Hong CH, Lee Y, Oh BH, Lee KS, Chang KJ, et al. Participation in physical, social, and religious activity and risk of depression in the elderly: a community-based three-year longitudinal study in Korea. *PloS one*. 2015;10(7):e0132838.
18. Osman A, Wong JL, Bagge CL, Freedenthal S, Gutierrez PM, Lozano G. The depression anxiety stress Scales—21 (DASS-21): further examination of dimensions, scale reliability, and correlates. *Journal of clinical psychology*. 2012;68(12):1322-38.
19. Jadidi A, Farahaninia M, Janmohammadi S, Haghani H. The relationship between spiritual well-being and quality of life among elderly people residing in Kahrizak senior house. *Iran Journal of Nursing*. 2011;24(72):48-56.
20. Rykkje LL, Eriksson K, Rahlm MB. Spirituality and caring in old age and the significance of religion—a hermeneutical study from Norway. *Scandinavian journal of caring sciences*. 2013;27(2):275-84.
21. Hedayati E, Hazrati M, Momennasab M, Afkari F. The relationship between spiritual health and anxiety in the elderly hospitalized in the coronary care unit. *Iranian Journal of Ageing*. 2016.
22. Sang O, Won-Hee L, editors. Relationship between spiritual health and depression of patients with hematological malignancies. 32nd Annual Oncology Nursing Society Congress; 2011.
23. Koenig HG, Berk LS, Daher NS, Pearce MJ, Bellinger DL, Robins CJ, et al. Religious involvement is associated with greater purpose, optimism, generosity and gratitude in persons with major depression and chronic medical illness. *Journal of psychosomatic research*. 2014;77(2):135-43.

Investigate the Relationship between Marital Satisfaction and Parenting Self-Efficacy among Parents of Primary School Students

Mina Hajhashemi (1)

Maryam Amidi-Mazaheri (2)

(1) MSc Student in Health Education, Department of Health Education and Promotion, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran.

(2) Associate Professor, Department of Health Education and Promotion, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Mina Hajhashemi, Maryam Amidi-Mazaheri. Investigate the Relationship between Marital Satisfaction and Parenting Self-Efficacy among Parents of Primary School Students. *World Family Medicine*. 2018; 16(3):68-73. DOI: 10.5742/MEWFM.2018.93314

Abstract

Objectives: Parenting Self-Efficacy is a very important cognitive construction of the individual assessment of their capability or competency to fulfill their parental role and implies it is favorable and encouraging. The present study aimed to examine the relationship between marital satisfaction and parenting Self-Efficacy among primary school students' parents in Khomeini Shahr city, Iran.

Methods: A correlation study on 104 parents of primary school students was carried out in Khomeini Shahr city. Data were collected by demographic, parenting Self-Efficacy and marital satisfaction questionnaires and were analyzed by SPSS version 20.0 software.

Results: The findings showed that the mean and standard deviation of participant's age was 36 ± 5.17 . Half of the participants were women. The highest education level of 48% was diploma, 37% just went to primary school and 15% went to university. According to the Pearson correlation test there is a significant correlation among total parenting Self-Efficacy score, its domains and marital satisfaction ($r=0.362$, $p=0.001$). Among the different domains of parenting Self-Efficacy, feelings and emotions of children and the pressure were not significantly correlated with marital satisfaction. The highest correlation was found between the domain of discipline and marital satisfaction ($r=0.092$, $p=0.372$).

Conclusion: The findings of this study indicate a direct and significant relationship between parenting Self-Efficacy and marital satisfaction. It is recommended that schools and other educational institute organize educational intervention to increase marital satisfaction and successful parenting.

Key words: Parenting Self-Efficacy, Marital Satisfaction, Parents, Iran

Introduction

Parent's opinions about, and being capable of affecting their child in a way that raises their confidence adjustment and development are called "parenting Self-Efficacy"(1).

Parenting Self-Efficacy can be described as one of the main determinants of effective and positive parental behaviors (2).

Parenting Self-Efficacy is based on Bandura's Self-Efficacy theory. This theory explains that previous experiences of completing tasks efficaciously are the most effective way of creating strong feelings of Self-Efficacy (3). According to this theory the level of a person's Self-Efficacy controls how much strength they are willing to employ when meeting a condition(4).

Therefore, prior experiences of success in certain events shape confidence in an individual's ability to influence future opportunities and produce desired consequences. As a result, experiences of struggle, difficulty, and challenge may weaken or deteriorate a person's emotional state of efficacy. On the other hand, parenting Self-Efficacy beliefs are described as the individual's own evaluation of his/her abilities to be a successful and competent parent(5).

It is noticeable that parents are the main factor in warranting the healthy physical, emotional and social, cognitive development of their child. Previous studies demonstrated that the onset of behavioral problems in early childhood have been related with later problems, comprising: illegal behavior, drug and alcohol abuse, and mental and physical health problems(6).

Recently numerous researchers in various majors have paid attention to parenting Self-Efficacy(7).

Likewise the influence of various main related factors such as demographic factor comprising: age, income, parity, educational level, marital status, partner support and quality of partner relationship on parenting Self-Efficacy have been examined in numerous studies(2).

One of the main related factors to parenting Self-Efficacy is marital quality, which has a robust effect on parental well-being, the family functioning as well as child development(8).

Marital satisfaction was rated according to desire and satisfaction among marriage. This concept was determined according to people's ideals and couples' interactions in various aspects of their lives that contribute to a parent's mental health and to control stress and facilitate a properly functional family(9).

Previous studies revealed that a suitable marital relationship is related to desirable effects on child outcomes as well as parent-child relationship and parenting (4).

Similarly, individuals with suitable marital satisfaction have vigorous and good nutrition, and less psychological difficulties such as depression (10).

However there are some controversies and disagreements in the relationship between marital satisfaction and parenting Self-Efficacy(8), for instance several studies indicated that parents who have perception of high level of Self-Efficacy have low level of stress whereas low level of parental Self-Efficacy has been associated with divorce proneness that indicates lower level of marital satisfaction(8, 11). In some studies parenting Self-Efficacy was not related to marital satisfaction(12).

Considering the importance of parenting and its impact on the overall health and social, emotional and cognitive development of the child, as well as the effect on the performance and psychological adjustment of parents, as well as the differences between researchers regarding the relationship among marital satisfaction and parenting Self-Efficacy; this study was performed to examine the correlation among marital satisfaction and parenting Self-Efficacy among parents of primary school students in Khomeini Shahr city.

Methods

1. Study design and population

This correlational study was conducted in both fathers and mothers of primary school students who were recruited by multistage random sampling, in Khomeini Shahr city, Iran, in 2017.

2. Methods

At first 4 primary schools in Khomeini Shahr city were selected randomly, then 150 students who were 7 and 8 years old were entered based on random number table. The parents of selected students were invited to participate to the study by phone call. One hundred and twelve parents answered the invitation; responding rate was 74.6%. Interested parents were evaluated for inclusion. Only four pair (8 parents) who did not completely fill out questionnaires, were excluded. Consent was achieved from the chiefs of the 4 primary schools in Khomeini Shahr city, and all participants gave their agreement before participating in this study. A total of 52 questionnaires from mothers and 52 questionnaires from fathers were collected; the reappearance rate was 92.8% which was acceptable.

3. Measuring tools

Demographic and marital satisfaction and parenting Self-Efficacy data were measured through self-report questionnaires.

To achieve pertinent information regarding participants' sex, age, number of children, education and employment status a demographic questionnaire was used.

ENRICH Marital Satisfaction Questionnaire: This questionnaire contains 47 items; which need to be responded to on a 5-point Likert scale (1= completely agree, 2= agree, 3= not agree not disagree, 4= disagree, and 5= totally disagree). Scores range is from 47 to 235, the higher scores demonstrating better marital satisfaction. The Persian version of this questionnaire is valid among

the Iranian population. This questionnaire was tested in previous studies and its validity and reliability was approved(13).

The parenting Self-Efficacy was measured by TOPSE which is a program evaluation questionnaire and takes into account the experiences and opinions of parents from a diverse range of educational, cultural and social backgrounds(6). The theoretical supporting of TOPSE is based on the Albert Bandura Self-Efficacy questionnaire(14). This multi-dimensional questionnaire consist of 48 items within eight subscales, each subscale having six items and demonstrating a divergent aspect of parenting: play and enjoyment, emotion and affection, empathy and understanding, discipline and boundaries, control, pressures, self-acceptance, knowledge and learning. Rated on an 11-point Likert scale where 0 exemplifies totally disagrees and 10 represents totally agree. The scale contains negatively and positive phrased items and the answers are summed to make a total score; the lower the score indicates the lower level of Parenting Self-Efficacy(15).

All items of this instrument were translated from English to Persian, and then back-translated to English by 2 expert translators. Inconsistencies among the Persian and English forms were evaluated and discussed through an appraisal meeting. The cultural relevance and content validity of the instrument was assessed by an expert panel. The panel contained 8 experts with experience in fields of health education and promotion and psychology. An expert panel agreed that the translated items were culturally relevant and valid among the Iranian population.

4. Inclusion and exclusion criteria

Criteria for inclusion were that parents must (a) be able to read and write, (b) were the biological father or mother of at least one child 7 or 8 years old, and (c) be married to the biological parent of this child, (d) be interested in participating. They were excluded if they had filled out the questionnaire incompletely.

5. Ethical consideration

The Research Ethics committee in Isfahan Medical University approved the moral ethics in our study. A license from Isfahan University of Medical Sciences and Education Department of Khomeini Shahr City was acquired. Questionnaires were analyzed anonymously by the research team.

6. Data Analyses

Data were evaluated by SPSS version 20.0 and by descriptive statistics, chi-square test, T-test and were applied to compare groups on the demographic items. Pearson correlations, with pairwise deletion of missing data, were applied to examine relationships between the parenting Self-Efficacy and marital satisfaction. The level of Statistical significant was set as 0.05.

Results

The results indicated that the mean age and mean number of children of participants respectively were 36 ± 5.17 , 2 ± 0.62 . Half of the participants were women. Most of the participants (48%) had Diploma. About 47% of the participants were employed and 50% were non-employed, it is noteworthy that housewives were considered as non-employed. In case of marital satisfaction scores, 41.2% of the participants had a great satisfaction and none of them were very unsatisfied (Table 1). To assess the relationship between marital satisfaction and parenting Self-Efficacy scores Pearson's correlation coefficient was used; the results are shown in Table 2. According to the Pearson correlation test, there was a significant relationship among Parenting Self-Efficacy and marital satisfaction scores ($r= 0.362$, $p= 0.001$), Therefore by the increase of marital satisfaction, Parenting Self-Efficacy, also increased. Likewise Pearson correlation coefficient showed that between the parenting Self-Efficacy score and fields of play and enjoyment, empathy and understanding, child control, discipline boundaries self-acceptance, learning and knowledge with marital satisfaction score there are a direct relationship ($p<0.001$), but no relationship were observed with the fields of emotion and affection of children and pressures. The mean score for parenting Self-Efficacy and marital satisfaction respectively were 326 ± 50 , 61 ± 16.3 .

Among the different components of parenting Self-Efficacy, only two components, emotion and affection of children and pressures did not have a significant correlation with marital satisfaction. The highest correlation was found between discipline and boundaries components and marital satisfaction ($r=0.092$, $p=0.372$). The results of Pearson correlation coefficient showed that the age of parents with learning and knowledge component and number of children with pressures component had an inverse relationship. However, there was no significant relationship with other parenting Self-Efficacy component and parental marital satisfaction score (Table 3). The results of Spearman correlation coefficient showed that the level of education of parents with learning and knowledge component score had a direct relationship. However, there was no significant relationship with other parenting Self-Efficacy component and parental marital satisfaction score (Table 3).

The results of Chi-square test showed that there was no significant difference between the parenting Self-Efficacy total scores and employment status of parents. Based on Chi-square test results, the parenting Self-Efficacy total scores employed and non-employed parents was significant only in the dimension of pressure. The descriptive results of the study are summarized in Tables 1, 2 and 3.

Discussion

The present study's aim was to determine the relationship between marital satisfaction and parenting Self-Efficacy among primary school students parent, in Khomeini Shahr city in 2017. The results revealed that there is a significant relationship among parenting Self-Efficacy and marital satisfaction total scores.

Table 1: Frequency distribution of marital satisfaction level of the parents

Marital satisfaction	Number	Percent
Very low	0	0
Low	11	10.8
Medium	36	35.3
High	42	41.2
Very High	13	12.7

Table 2: Pearson correlation coefficients between marital satisfaction and parenting Self-Efficacy total score and its components in the parent study

Parenting Self-Efficacy Total Score and Its Components	Marital satisfaction	
	r	P-value
Emotion and Affection	0.089	0.383
Play and Enjoyment	0.278	0.005
Empathy and Understanding	0.325	0.001
Control	0.228	0.025
Discipline and Boundaries	0.422	<0.001
Pressures	0.092	-0.372
Self-Acceptance	0.252	0.012
Learning and Knowledge	0.330	0.001
Total TOPSE	0.362	<0.001

TOPSE= Tool to measure Parenting Self-Efficacy

Table 3: Pearson correlation coefficient between age, number of children and Spearman correlation coefficient between educational level with parenting Self-Efficacy total score and its components and marital satisfaction total score in the parent study

Parenting Self-Efficacy Total Score and Its Components	Age		N-Child		Level of Education	
	r	P-value	r	P-value	R	P-value
Emotion and Affection	-0.190	0.060	-0.095	0.352	0.064	0.527
Play and Enjoyment	0.041	0.690	-0.084	0.407	0.039	0.704
Empathy and Understanding	-0.186	0.065	-0.071	0.483	-0.012	0.907
Control	-0.029	0.778	-0.082	0.425	0.060	0.560
Discipline and Boundaries	-0.119	0.248	0.023	0.826	0.011	0.916
Pressures	0.058	0.574	-0.218	0.033	-0.169	0.100
Self-Acceptance	0.053	0.607	0.049	0.631	-0.088	0.390
Learning and Knowledge	-0.276	0.006	-0.103	0.314	0.283	0.005
Total TOPSE	-0.119	0.257	-0.108	0.304	0.024	0.817
Marital Satisfaction	0.068	0.499	0.197	0.049	0.030	0.768

These findings are similar to those of Kwok and colleagues in the Hong Kong population(4). The Bryanton study reviews the predictors of early parenting Self-Efficacy; the results showed that Parents who had more satisfaction with their marital relationship had higher parenting Self-Efficacy(2).

Among eight dimensions of parenting Self-Efficacy; there was direct relationship between six dimensions: play and enjoyment, empathy and understanding, child control, discipline and boundaries, self-acceptance, learning and knowledge with marital satisfaction score ($p < 0.001$).

The relationship between parenting Self-Efficacy and marital satisfaction has been confirmed in several studies for example, Kwan study(8), and Stutzman study which

indicated that marital satisfaction has a positive effect on child development(16). As well in the study of Chang and colleagues, the quality of marital relationship has an inverse correlation with children's behavioral problems(8). The results of the present study revealed that there is a reverse and significant relationship between age with knowledge and learning score; there is no significant relationship with other areas; the reason can be stated that with increasing age, knowledge and learning of parents decreases.

In contrast with our findings various researcher suggested that older fathers may have Haier resource and fathering role identification(17).

The results of the present study indicated that between the numbers of children with pressure scores there is a reverse and significant relationship; the reason for this can be the experience and ability of parents to grow with their children, and parents with more children naturally had more experience in this field and felt less pressure.

The study also revealed that there is a direct correlation between the level of education and the knowledge and learning domain score ($r= 0.283$, $p= 0.005$). This finding points to the necessity for intervention for fathers with lower literacy level.

The present study's results revealed that there is no significant relationship between sex with parenting, Self-Efficacy total score and its domains ($p>0.05$); contrary to these findings, the results of study by Kwan and colleagues showed that the father's role in the care of their children is less than mothers(8).

The present study's results showed that there is a significant relationship between employment status and pressure scores; and employed parents, although having less time, can better manage the pressures.

The present study's results revealed that there was no significant relationship between marital satisfaction and educational level; this finding was in alignment with the study and uneven with the studies of Heshmati(18), Azarian(19), Ziaei(13), and Kwan(8).

These findings are confirmed by other similar studies(20). In contrast with our findings in some studies in our country marital satisfaction was higher among those with higher education (8, 13, 18, 19).

It seems that the lack of correlation between these two variables is that only the attention to the level of education cannot be regarded as indicative of an increase in the level of culture and a factor for adaptation in marital relations. Also, the results of this study revealed that there was no significant relationship between marital satisfaction and age, which was aligned with the study of Alder and colleagues(20), Ismail and colleagues(21) and Ziaei and colleagues(13) study and uneven with the Kwok(4) study.

Also, the results of the present study revealed that there is a significant relationship between marital satisfaction and the number of children. This finding was consistent with the Kwan study(8) and inconsistent with the Ismail(21), Ziaei(13) and Kwok(4) studies.

Also, the results of this study showed that there is no significant relationship between marital satisfaction and gender ($P=0.348$).

Additionally, there was no significant relationship between marital satisfaction and employment status; contrary to our study, Kwan's study (8) showed that the employment situation is a significant negative predictor for marital satisfaction of fathers.

Limitations

There are several limitations to our study. Firstly, although the size of the sample was acceptable, broader generalizing must importune a larger and more diverse sample. Second, we can use self-reporting tools to study the variables of the study, and also because the research project is of a correlation type, cognitive explanations and explanations cannot be deduced from its findings.

Conclusion

The results of the study indicate a significant and direct relationship between parenting Self-Efficacy and marital satisfaction. Hence, it is recommended that schools and other educational institute organize educational intervention to increase marital satisfaction and successful parenting.

Acknowledgements

This study was approved as a Master's thesis in Health Education submitted to the School of Health at Isfahan University of Medical Sciences (code: 395846). The authors declares their appreciation to the Vice-Chancellor for Research at Isfahan University of Medical Sciences and the Educating and Training Department of Khomeini Shahr city and all parents who participated in the study, appreciation comes into action.

References

1. Glatz T, Cotter A, Buchanan CM. Adolescents' Behaviors as Moderators for the Link between Parental Self-Efficacy and Parenting Practices. *J Child Fam Stud*. 2017;26:989-97.
2. Bryanton J, Gagnon AJ, Hatem M, Johnston C. Predictors of Early Parenting Self-Efficacy Results of a Prospective Cohort Study. *Nursing Research* 2008;57(4):252-9.
3. Bandura A. On the Functional Properties of Perceived Self-Efficacy Revisited. *J Manage*. 2012;38(1):9-44.
4. Kwok SYCL, Ling CCY, Leung CLK, Li JCM. Fathering Self-Efficacy, marital satisfaction and father involvement in Hong Kong. *J Child Fam Stud*. 2013;22(8):1051-60.
5. Molenda-Kostanski Z. Asian American Men and Fatherhood: Relationship between Acculturation, Gender-Role Conflict, Parenting Self-Efficacy, and Father Involvement. *Seton Hall University Dissertations and Theses (ETDs)*. 2016:2204.
6. Bloomfield L, Kendall S, Applin L, Attarzadeh V, Dearnley K, Edwards L, et al. A qualitative study exploring the experiences and views of mothers, health visitors and family support centre workers on the challenges and difficulties of parenting. *Health and Social Care in the Community*. 2005;13(1):46-55.
7. Bryanton J, Gagnon AJ, Hatem M, Johnston C. Predictors of early parenting Self-Efficacy: results of a prospective cohort study. *Nursing research*. 2008;57(4):252-9.
8. Kwan RWH, Kwok SYCL, Ling CCY. The Moderating Roles of Parenting Self-Efficacy and Co-parenting Alliance on Marital Satisfaction Among Chinese Fathers and Mothers. *J Child Fam Stud*. 2015;24(12):3506-15.

9. Keshavarz-Afshar H, Sheikh M, Jahanbakhshi Z, Karimian A, Ghahvehchi-Hosseini F. Relationships between attachment to God and marital satisfaction, and mental health in parents of children with special needs. *Int J Behav Sci.* 2016;10(2):84-8.
10. Asghari A, Shirdelzade S, Saadati M, Ghodsi A, Bayat R, Ramezanzadeh Tabrizi E, et al. The relationship of postpartum negative affects with marital satisfaction in parents referred to healthcare centers. *Int J Med Res Health Sci.* 2016;5(11):612-6.
11. Moore M, Buehler C. Parents' divorce proneness: the influence of adolescent problem behaviors and parental efficacy. *J Soc Pers Relat.* 2011;28(5):634-52.
12. Rochlen A, Mckelley R, Suizzo M, Scaringi V. Predictors of relationship satisfaction, psychological well-being and life satisfaction among stay-at-home fathers. *Psychol Men Masc.* 2008;9(1):17-28.
13. Ziaei T, Jannati Y, Mobasheri E, Taghavi T, Abdollahi H, Modanloo M, et al. The Relationship between Marital and Sexual Satisfaction among Married Women Employees at Golestan University of Medical Sciences, Iran. *Iran J Psychiatry Behav Sci.* 2014;8(2):44-51.
14. Bandura A. Regulation of cognitive processes through perceived Self-Efficacy. *Developmental Psychology.* 1989;25(5):729-35
15. Bloomfield L, Kendall S. Parenting Self-Efficacy, parenting stress and child behaviour before and after a parenting programme. *Primary Health Care Research & Development.* 2012;13:364-72.
16. Stutzman SV, Miller RB, Hollist CS, Falceto OG. Effects of marital quality on children in Brazilian families. *Journal of Comparative Family Studies.* 2009;40(3):475-92.
17. Castillo J, Welch G, Sarver C. Fathering: The relationship between fathers' residence, fathers' socio-demographic characteristics, and father involvement. *Maternal Child Health Journal.* 2011;15(8):1342-9.
18. Heshmati H, Behnampour N, Arabameri S, Khajavi S, Kohan N. Marital Satisfaction in Refereed Women to Gorgan Health Centers. *Iran J Psychiatry.* 2016;11(3):198-200.
19. Azarian A, Fatlaki FF, Nouri E. Interactive role of psychological and demographic factors, marital satisfaction and level of education, a Communication Plan. *International Journal of Humanities and Cultural Studies (IJHCS).* 2016(Special Issue):808-16.
20. Alder ES. Age, Education Level, and Length of Courtship in Relation to Marital Satisfaction. *School of Professional Psychology.* 2010:1-39.
21. Ismail R, Azlan H, Yusoff F. Assessing the Relationship between quality of life and marital satisfaction among Malaysian married couples. *E-BANGI Journal.* 2015;10:65-71.

Effect of humour on reduction of hopelessness and increase of social adjustment in mothers of children with intellectual disability

Jahanshir Tavakolizadeh (1,2)
Nasrin Jokar Ghochani (3)

(1) Associate Professor of Psychiatry Department, School of Medicine, Gonabad University of Medical Sciences, Gonabad, Iran

(2) Postdoctoral course student in psychosomatic medicine and psychotherapy, Psychosomatic Research Center, Isfahan University of Medical Sciences, Isfahan, Iran

(3) Master of Psychology, Islamic Azad University, Qaenat Branch, Qaen, Iran

Corresponding Author:

Nasrin Jokar Ghochani,

Master of Psychology, Islamic Azad University, Qaenat Branch,
Qaen, Iran

Email: jokarnasrin@yahoo.com

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Jahanshir Tavakolizadeh, Nasrin Jokar Ghochani. Effect of humour on reduction of hopelessness and increase of social adjustment in mothers of children with intellectual disability. *World Family Medicine*. 2018; 16(3):74-78.
DOI: 10.5742/MEWFM.2018.93309

Abstract

Introduction: This study aims to determine the effect of humour training on reducing hopelessness and increasing social adjustment in mothers of children with intellectual disability.

Method: In this quasi-experimental study, the statistical population was all the mothers of children with intellectual disability in District 7, city of Mashhad, in the 2015-2016 school year. Using multi-stage sampling 50 mothers of children with intellectual disability among those randomly selected were allocated into case and control groups (each group, n = 25). At first, Beck Hopelessness and Bell social adjustment questionnaire was implemented as a pretest in both groups, after which, only the case group was given humor training for 8 one and a half hour sessions. At the end the posttest was carried out in the two groups. The data were analyzed by SPSS-21 software and Covariance analysis test.

Results: The results show that humour training reduces hopelessness ($P < 0.05$) and increases social adjustment of mothers of children with intellectual disability ($P < 0.05$) significantly.

Discussion and Conclusion: According to the findings, humor training has a significant effect on reduction of hopelessness and increase of social adjustment in mothers of children with intellectual disability. Thus, it is recommended to use this training for mothers of these children, by specialists.

Key words: Sense of humour, Hopelessness, Intellectual disability, Children

Introduction

Intellectual disability in children, as a crisis, can deeply affect the family communications and actions, and the families who have open, effective, and permanent relationships and show flexibility in their roles can well adapt to this crisis. (Venables, and Simon, 2001). One of the limitations of mentally retarded children is the weakness of their strength and sensory-motor abilities (Afrooz, 2004). Due to the lack of behavioral appropriateness, these children suffer from hopelessness, and are considered the most important problem for their parents and teachers (Durand, 1995).

Intellectually disabled children have difficulties in social interaction and communication almost since their childhood. Some do not show willingness to being embraced by parents, some not feel anxious of staying in alien places, and some are not able to understand and interpret the thoughts and feelings of others. Social cues such as smiles, winks, and emotions may be meaningless to these children (Kooshesh, 2008). Another issue which has attracted the attention of experts in this regard is lack of social and participative games for intellectually disabled children. Unlike normal children, mental organization in intellectually disabled children has not reached the extent of development that makes them able to visualize abstract affairs and take part in puzzle games through domination of internalization over externalization (Mansour, 2007).

Mothers of such children may often show undesirable features such as despair and social conflict in dealing with the problems of their children. Hopelessness in these have foreboding about the child's future. This can lead to problems such as sadness, suicidal tendencies, indifference, difficulty in concentration, and sleep disorders (Ervin & Henricus, 1997). According to opinions of some researchers such a situation firstly causes hopelessness and then depression. As a result of hopelessness, a person becomes severely inactive and loses the ability to assess their situations and make decisions. Hopelessness breaks people and makes them defenseless in the face of stressors. Over time, this hopelessness and depression affects the patient's relations with the surrounding social environment (Mandler, 1972). Hopelessness can lead to other negative consequences. Hopeless people do not find any way to get out of stressful situations (Zimmerman, and et al, 2005). Low ability in creating an optimistic outlook, egocentricity, lack of emotional self-regulation, and failure in showing flexible responses to unpredictable events make the experience of hopelessness harder and may warrant psychotherapy interventions (Williams, 2008).

Another negative feature that mothers of children with intellectual disability may show is difficulty in social adjustment (Beck, and Lester, 1974). Social adjustment is a multidimensional complex communication process between a person and society (Hosseinchari, and Fadakar, 2005). Social adjustment skills are a process that enables individuals to understand and predict the behavior of others, control their own behaviors, and adjust their social interactions (Slomowski, and Dunn, 1996). Studies have

shown that the birth of an intellectually disabled child can cause mental stress and crises in such mothers and put their adjustment and physical and mental health at risk (Saloviita, Itälänna, & Leinonen, 2003). They also may become socially isolated and more vulnerable to post-traumatic stress (Friedrich, and Friedrich, 1981). Some even acknowledge that these adverse effects not only affect the parents but also change family relationships (Gupta, and Singhl, 2004). However, the extent to which the social relations of a family with an intellectually disabled child are limited depends on the severity of the child's disability; the greater the severity of child's intellectual disability, the more limited the leisure time and social communications of their family (Shariati, and Davarmanesh, 1995).

One of the important coping skills in the face of life's problems associated with hopelessness and social adjustment is having a sense of humor. This concept, as part of positive psychology, carries inclusive and multiple concepts. Humor can be defined as individual differences in behaviors, experiences, emotions, attitudes, and abilities in fun, laughing, joking, and so on (Martin, 2007). Humour can be seen as a complex emotional and cognitive feature which exists in different societies and cultures (Ziegler, 1998). Humour is effective in reduction of anxiety, stress, depression, and isolation, increasing self-esteem, energy, and hope, and creating a sense of power, domination, and control. Humorous people can express their problems easier and try to support others in the face of everyday problems in order to lessen their burden of grief, and this makes them enjoy more interaction with others and feel more helpful and beneficial (Nezlek, and Derks, 2001).

According to theoretical foundations mentioned about humour and its important role in reduction of anxiety and depression and increasing social interaction and also existence of few studies about the effects of humour on reducing hopelessness and increasing the adjustment of parents of intellectually disabled children, the present study has been done to answer the important question, can the humour training have an influence on decreasing hopelessness and increasing social adjustment of mothers of children with intellectual disability.

Objectives and hypothesis

The present study aims to determine the effectiveness of humour in reducing hopelessness and increasing the adjustment of mothers of children with intellectual disability. The main research hypotheses are as follows:

1. Humour training is effective in reducing the hopelessness of mothers of children with intellectual disability.
2. Humour training is effective in increasing social adjustment of mothers of children intellectual disability.

Introduction

Participants

The present research was a quasi-experimental study. The statistical population included all mothers of intellectually disabled children who were studying in Mashhad in the academic year 2014-2015. Among them, 50 mothers were selected as the sample by multistage random sampling

and randomly divided into two case and control groups (25 subjects in each group).

Instruments

Research tools were as follows:

1- Beck Hopelessness Scale (BHS): This questionnaire has been developed by Aaron T. Beck in 1979 and aims to examine and measure people's negative expectations about future events. In this questionnaire, a person's views and opinions about the world, future, the personal experiences and the way of interpreting these three dimensions are evaluated. BHS has been developed for people aged 17-80 and the score range is between 0 and 20. Higher scores are indicative of higher levels of hopelessness. The items are scored by 1 (true) and 0 (false). After obtaining scores of each item, the questionnaire's subscales can be calculated. Validity and reliability of this scale have been evaluated in various studies, particularly in the field of suicidal tendencies and various correlations such as 0.36-0.76 BHS and 0.56 by clinical scale of hopelessness have been reported. This scale has shown high ability in measurement of hopelessness structures and negative expectations (Beck, 1988). Dezhkam (2004) obtained the reliability of this scale to be 0.79 using internal consistency coefficient (Cronbach's alpha). In the present study, the reliability of BHS was calculated as 0.76 using Cronbach's alpha. This figure for subscales of feeling about the future, lack of motivation, and hope and expectation of the future was obtained as 0.69, 0.71, and 0.70, respectively.

2- Bell Adjustment Inventory: This questionnaire consists of 160 items (five 32-item subscales) and the respondents express their views by answering "Yes" or "No". Five subscales of this questionnaire include adjustment at home, physical adjustment, emotional adjustment, job adjustment, and social adjustment. In the present study, the items related to job adjustment were eliminated because the studied children had no job. Lower scores on this scale indicate high adjustment and higher scores suggest low adjustment. Reliability coefficient of this questionnaire using Spearman-Brown formula was obtained as 81.91, 88.00, 0.91, and 0.00 for family, physical, social, and emotional dimensions, respectively. Inner correlation coefficient among the dimensions of adjustment has been reported to range from 11% to 60%. Reliability of this questionnaire in the present study was calculated as 0.833 using Cronbach's alpha. This figure for family, physical, social, and emotional dimensions of adjustment was obtained 0.612, 0.555, 0.650, and 0.787, respectively. The items related to various dimensions of adjustment are answered by choosing one of three options of "Yes", "No", and "I do not know". Each item is scored according to the normalized table.

Procedure

After selecting a random sample of 50 mothers of children with intellectual disability and randomly dividing them into two groups of case and control and also obtaining permission and doing the related correspondence, all of the subjects were pretested using the two questionnaires mentioned above in a session lasting 2 hours. Before handing out the questionnaires, the subjects were

briefed on the research subject and its importance, the importance of accuracy in filling out the questionnaires, and confidentiality of results. Subjects in the case group received an eight 90-minute training course (direct comment method) once a week. The topics of these eight sessions included introduction and familiarity with the rules of the group, identifying the uniqueness of humour style of people, laughing exercise, the ability to play with words and telling jokes, conscious searching of humour and fun in everyday life, learning of laughing at self, the use of humour and jokes at the height of tension and discomfort, and summarization and exchange of experiences. At the end of this training course, posttest was performed for both groups.

Data Analysis

The obtained data was analyzed using SPSS-16 software. The statistics were defined in tables, means, as well as in inferred statistics, by using Covariance analysis test (ANCOVA).

Results

As it can be seen in Table 1, mean score of hopelessness reduction after intervention is 15.48 ± 1.63 in the case group and 13.52 ± 0.02 in the control. This shows an increase in the case group compared to the control. In order to make sure of consistency between the groups in terms of studied parameters, Levene test was used. The results of this test showed that F-value is equal to 0.61 which is not significant at the level of $p > 0.05$. Therefore, the assumption of equality of variances was confirmed, and regarding the compliance with other assumptions, the statistical test can be done for analysis of data.

The findings presented in Table 2 show that training sense of humour has a significant impact on the reduction of hopelessness in mothers of children with intellectual disability ($p < 0.01$, $F = 83.78$).

According to Table 3, mean score of social adjustment after intervention is 4.92 ± 0.90 in the experimental group and 3.52 ± 0.87 in the control. This shows an increase in the experimental group compared to the control. In order to make sure of consistency between the groups in terms of studied parameters, Levene test was used. The results of this test showed that F-value is equal to 0.54 which is not significant at the level of $p > 0.05$. Therefore, the assumption of equality of variances was confirmed, and regarding the compliance with other assumptions, the statistical test can be done for analysis of data.

Table 4 shows that training sense of humour has a significant impact on social adjustment in mothers of children with intellectual disability ($p < 0.01$, $F = 27.19$).

Discussion and Conclusions

The results confirmed the first research hypothesis which indicates that "Humour training is effective in reducing the hopelessness of mothers of intellectually disabled children". This is consistent with the findings of Troller (2003), Richman (2007), Kevin, and Meyer (2007), Abdel-

Table 1: Mean and standard deviation of hopelessness scores in pretest and posttest for each group

Group	Stage	Number	Mean	SD
Case	Pre test	25	13.44	2.14
Control		25	13.40	2.02
Case	Post test	25	15.48	1.63
Control		25	13.52	2.02

Table 2: A summary of the results of covariance test about the effect of humour on reduction of hopelessness

Source of influence	Sum of squares	Degree of freedom	Mean square	F-value	P
Pre test	136.42	1	136.42	246.13	0.000
Groups	46.44	1	46.44	83.78	0.000
Error	26.05	47	26.05		
Total	10723	50			

Table 3: Mean and standard deviation of social adjustment scores in pretest and posttest for each group

Group	Stage	Number	Mean	SD
Experimental	Pretest	25	2.88	1.20
Control		25	3.28	0.73
Experimental	Posttest	25	4.92	0.90
Control		25	3.52	0.87

Table 4: A summary of the results of covariance test about the effect of humour on social adjustment

Source of influence	Sum of squares	Degree of freedom	Mean squares	F-value	P
Pretest	1.65	1	1.65	2.13	0.15
Groups	21.07	1	21.07	27.19	0.000
Error	36.42	47	0.77		
Total	953.000	50			

Khalek, and Lester (2006) and Mawdsely, et al, (2006), who reported that humour can reduce death, anxiety, and discomfort and bring peace. The results are also consistent with the findings of Khoshooiy (2007), Motalebzadeh (2005), Golestaneh (2012), Kakavand, and Shams (2010), and Behpazhou, et al (2009) inside Iran who stated that humor improves mental health, happiness, and adjustment and reduces mental disorders, grief, mental diseases, and hopelessness. From the interpretation of these findings, it can be stated that since hopelessness is a dominant feature of mothers of intellectually disabled children, it seems that humour, as a cognitive and emotional strategy, can help such mothers to cope with emotional conflicts or stressful external factors through giving importance to humorous and entertaining aspects of life. Therefore, hopelessness of mothers of intellectually disabled children can be reduced through humor training.

The study findings also confirmed the second hypothesis which argues that "Humour training is effective in increasing social adjustment of mothers of intellectually disabled children". This is consistent with the findings of Williams (2001) who concluded that humour has a significant impact on general adjustment, positive self-concept, and ability to make good social relationships, self-esteem, and increased social adjustment. This

result is also consistent with the findings of Naderi and Shokouhi (2010), Zahed, et al (2012), Behpazhou (2009), Khodayarifard, and Rahiminejad (2006), and Azin and Mousavi (2009) inside Iran who reported that humour can predict death anxiety, increase social, emotional, and academic adjustment, improve mental health, and reduce shyness of students. It seems that, with the training of humour as an important coping skill, mothers have managed to show more resistance to life's problems and interpersonal stresses and tensions and improve their individual and social adjustment and flexibility by reducing these tensions. Some researchers and experts consider social adjustment synonymous with social skills. In their opinion, social skill is the ability to establish mutual relations with others in a specific social context in a way that is acceptable and valuable to the community. It seems that training of sense of humour has helped mothers of intellectually disabled children to reduce hopelessness and its negative outcomes such as depression, isolation, and loneliness, find the opportunity for acquiring social skills and constructive interactions with others, and finally improve their social adjustment.

References

- Abdel-Khalek, A. & Lester. (2006). Optimism and pessimism in Kuwaiti and American college students, *International journal of social psychiatry*, 52(2); 110-126.
- Afroz, G. (2004). *An Introduction to Psychology and Education of Exceptional Children*; Tehran University Press.
- Azin, A., Mousavi, S. M. (2009). Studying the role of educational factors in social adjustment of high school students in Fereyduhshahr; *Journal of Applied Sociology*, 22 (1): 183-200.
- Beck, A. & Lester, D. (1974). Assessment of pessimism: the hopelessness scale. *Journal of Counseling and Clinical Psychology*, 42, 861-86.
- Beck, A.T., and Steer, R.A. (1988). *Beck hopelessness scale*. The Psychological Corporation, San Antonio.
- Behpazhou, A., Soleymani, M., Afroz, G., & Lavasani, M. (2009). Effect of social skill training on social adjustment and academic performance of slow-learning students; *Journal of Educational Innovations*, 9 (33); 163-186.
- Dejkam, K. (2004.) *Adaptability and standardization of Beck Hopelessness Scale with students of Islamic Azad University*. Unpublished Master's thesis. Islamic Azad University, Tehran Branch.
- Durand, B.M.(1995). *Severe Behavior Problem. A Functional Communication Training Approach*. New York: N. Y. the Guilford Press.
- Ervin A., and Henricus, M. (1997). *An ethological approach of interpersonal theories of depression*. Available at <http://dissertations.ub.rug.nl>.
- Friedrich, W.N., & Friedrich, W.L. (1981). Psychosocial assets of parents of handicapped and no handicapped children. *American Journal of mental deficiency*, 530-585: 551
- Golestaneh, S. M. (2012). Role of personality traits, creativity, and humor styles in predicting mental well-being of university students; *Persian Gulf University of Bushehr, Journal of Personality and Individual Differences*, 1, 98-114.
- Gupta, A. and Singhl, N. (2004). Positive perceptions in parents of children with disability. *Asia pacific disability rehabilitation journal*, 15 (1): 22-34.
- Hosseinchari, M., Fadakar, M. M. (2005). Studying the effect of university on communication skills based on a comparison between school students and university students; *Journal of Behavior Scholar*, 4(33); 67-85.
- Kakavand, A. R., Shams, H. (2010). Relationship of humor styles of university students with their general health; *Journal of Applied Psychology*, 2, 32-43.
- Kevin, J., & Meyer, M .S. (2007). *The relationship between therapist's use of humor and therapeutic alliance*. Unpublished PhD thesis. Ohio State University, 10-27.
- Khodayarifard, M., Rahiminejad, A. (2006). Studying the factors affecting social adjustment of control and non-control students; a research project in association with the Office of Research of Foundation of Martyrs and Veterans Affairs and Tehran University.
- Khoshooiy, M. (2007). *Psychology of Humor*. Isfahan: Kankash Publication.
- Kooshesh, M. (2008). *Studying the treatment of communication problems in children with learning disorder; The sixth Congress on Mentally Retarded Children with an Emphasis on Communication Disorders*, Tehran, Social Welfare and Rehabilitation Sciences University.
- Mandler, G. (1972). Helplessness: Theory and research in anxiety. In C. D. Spielberger (Ed.), *Anxiety: Current trends in theory and research* (pp. 359-374). New York: Academic Press.
- Mansour, M. (2007). *Genetic Psychology: Psychological Developments from Birth to Senescence*; Tehran, SAMT Publication.
- Martin, R.A. (2007). *The Psychology of humor: An integrative approach* (chapter 1 and 7), Buring-ton, MA: Elsevier Academic press.
- Mawdsely, R., Verazin, E., Bersch, E., Crowly, M, E. (2007). Relationship between humor and Physical Therapist Student's Anxiety. *The Journal of Physical Therapy Education*, 21(1), 70.
- Motalebzadeh, A. (2005). *Studying the effect of humor on mental health and mental happiness of high school students in Shiraz*; Unpublished Master's thesis, Faculty of Psychology and Educational Sciences, Shiraz University.
- Naderi, F., & Shokouhi, M. (2010). Relationship of optimism, humor, and social maturity with death anxiety among nurses of Golestan Hospital in Ahwaz; *Journal of New Findings in Psychology*, 21, 43-59.
- Nezlek, J. B., & Derks, P. (2001). Use of humor as a coping mechanism, psychological adjustment, and social interaction. *Humor*, 14(4), 395-414.
- Richman, J. (2007). The role of Psychotherapy and humor for Death anxiety, Death wishes, and Aging, *Journal of Death and Dying*, 54: 41-5.
- Saloviita, T., Itälänna, M., and Leinonen, E. (2003). Explaining the parental stress of fathers and mothers caring for a child with intellectual disability: A double ABCX model. *Journal of Intellectual Disability Research*, 47(4-5), 300-312.
- Shariati, N., Davarmanesh, A. (1995). *Effects of mental disabilities of children on families (a summary of a study)*; Tehran, State Welfare Organization, Social Welfare and Rehabilitation Sciences University; 120-300.
- Slomowski, C. and Dunn, J. (1996). *Young Children Understands of Other People's Feeling and Beliefs*. *Child Development*. 62,
- Troller, P. J. (2003). *Taking the "grim" out of grim reaper : families, humor and the dying process*. Unpublished PhD thesis. University of Wisconsin-Stout. 1352-1336.
- Venables, G., Simon, G. (2001). *Adolescent in Clinical Psychiatry*. Britain: Arnild.
- Williams, F. Ch. (2001). *Humor and the retention of lecture by student athletes to information session*; Unpublished PhD thesis. Pennsylvania University, 15-29.
- Williams, G. C. (2008). *Adaptation and Natural Selection: A Critique of Some Current Evolutionary Thought: A Critique of Some Current Evolutionary Thought*. Princeton University Press.
- Zahed, A., Rajabi, S., Omid, M. (2012). Comparison of social, emotional, and academic adjustment and learning self-regulation among the students with and without learning disabilities; *Journal of Learning Disabilities*, 1 (2): 43-63.
- Ziegler, J. B. (1998). Use of humour in medical teaching. *Medical Teacher*, 20(4), 341-348.
- Zimmerman, S., Williams, C. S., Reed, P. S., Boustani, M., Preisser, J. S., Heck, E., & Sloane, P. D. (2005). Attitudes, stress, and satisfaction of staff who care for residents with dementia. *The Gerontologist*, 45(suppl. 1), 96-105.

The Association of socio-demographic problems on Marital Instability between women with sexual dysfunction and general population in Mashhad, Iran 2017: A Case- Control Study

Tahereh Molkara (1)
 Malihe Motavasselian (2)
 Seyed Reza Moallem (3)
 Farideh Akhlaghi (4)
 Roshanak Salari (5)
 Reza Goldoozian (6)
 Veda Vakili (7)

(1) Ph.D. Student of Persian Medicine, Student research committee, Department of Persian and complementary Medicine, School of Persian and Complementary Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

(2) Assistant Professor, Department of Persian and Complementary Medicine, School of Persian and Complementary Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

(3) Student Research Committee, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

(4) Professor of Gynecology, Department of Obstetrics and Gynecology, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran,

(5) Ph.D. of Drug Control, Assistant Professor, Department of Clinical Persian Pharmacy, School of Persian and Complementary Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

(6) General Practitioner, Farhangian University of Khorasan Razavi province, Mashhad, Iran.

(7) Department of Community Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

Corresponding Author:

Veda Vakili,

Department of Community Medicine, Mashhad University of Medical Sciences,
 Mashhad, Iran

Tel: 09153171073

Email: vakiliv@mums.ac.ir

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Molkara T. et al. The Association of socio-demographic problems on Marital Instability between women with sexual dysfunction and general population in Mashhad, Iran 2017: A Case- Control Study. World Family Medicine. 2018; 16(3):79-85.

DOI: 10.5742/MEWFM.2018.93308

Abstract

Background: The present study was conducted with the aim of comparing the effects of different factors affecting marital instability between women from the general population and those with sexual dysfunction.

Methods: This Case Control study was conducted on 96 women with sexual dysfunction and 338 women from the general population who did not report any sexual dissatisfaction in Mashhad, Iran 2017. The sexual function of the participants was assessed using the Female Sexual Function Index (FSFI), and the patients with a score lower than 28 were considered as having sexual dysfunction. Where the duration of female sexual dysfunction was more than six months a Gynecologist visited the case group to rule out gynecological and anatomic problems. The survey assessed the effects of several socio-demographic factors on Marital Instability Index (MII) in the subjects. The data analysis was performed through SPSS version 11.5. The probability values less than 0.05 ($p < 0.05$) were considered significant.

Results: The mean score of MII was significantly higher in the case group, compared to the control group (23.02 ± 7.04 and 19.89 ± 9.17 , respectively; $P < 0.005$). Furthermore, the total score of MII had a significant relationship with the housing state of the couple, physical or mental illness, and expression of emotions by the husbands ($P = 0.008$, $P = 0.02$, and $P = 0.004$, respectively). However, there was no significant relationship between the mentioned factors and MII score in the control group ($P > 0.05$).

Conclusion: As the findings of the present study indicated, the socio-demographic problems could have a more destructive effect on the lives of the women with sexual dysfunction, compared to women from the general population. Therefore, it is highly recommended to educate the couples on these factors.

Key words: Marital Instability, Sexual Dysfunction, Sexual Function, Women

Background

Sexual dysfunction is a prevalent, progressive, and age-related disorder, which can negatively affect the quality of life of couples (1). This disorder is reported to be more frequent in women than in men (2, 3). Female sexual dysfunction is the abnormality of interest, arousal, and, orgasm or dyspareunia, lasting for at least six months (4). According to the statistics, sexual dysfunction has affected 22.2-43.1% of the females in the USA (1). In Iran, it is estimated that about one third of the female population have sexual dysfunction (5).

The high prevalence of this dysfunction, combined with its associated social and marriage conflicts, leads to an increased divorce rate among the affected couples, which itself is an indicator of marital instability (3, 6). Many factors can affect sexual function, including psychological, vascular, neurologic, and hormonal disorders (3, 7-9). The psychological and socio-cultural factors as well as the interpersonal relations play an important role in normal sexual function (8-10).

There is a close association between the couples' interpersonal relationships and their sexual activity. Accordingly, one method of marital therapy is the improvement of sexual attraction and romantic love (11). It is also reported that the emotional problems can prolong and maintain sexual dysfunction (8). There are reports indicating the importance of psychological factors and interpersonal relations in normal sexual function. However, to the best of our knowledge, there are no studies assessing the extent that marital instability can affect sexual dysfunction among the women.

The evaluation of the correlation of marital instability and sexual dysfunction can facilitate the identification of the importance of resolving marital problems before attempting to correct the dysfunction using conventional interventions. With this background in mind, the present study was conducted to investigate the relationship between marital instability and sexual dysfunction

Materials and Methods

This Case Control study was conducted on 96 women with sexual dysfunction and 388 women from the general population who did not report any sexual dissatisfaction. Case selection was performed during 2016 but controls were historical and recruited during 2014 from the general population of Mashhad, Iran where validity and reliability were established prior (12, 13). Mashhad is the second most populous city in Iran and is the capital of Razavi Khorasan Province. These 96 healthy married women were referred to the gynecology clinics of Mashhad University of Medical Sciences due to sexual dysfunction.

The inclusion criteria were: 1) age of 18-35 years, 2) having a proven husband 21 days in a month, 3) no pregnancy or lactation, 4) lack of any chronic diseases, 5) lack of sexual dysfunction in partner, and 6) no use of specific drugs (including the medications improving sexual function) or

alcohol. The duration of female sexual dysfunction was more than six months.

To identify the women with sexual dysfunction, they completed the Female Sexual Function Index (FSFI), which was translated into Persian and was appropriate to be used in the Iranian community culture and validity and reliability were established prior (0/70)(3). This index consists of 19 items covering six aspects of female sexual function. The total score of this index is obtained by summing up the individual values of each item multiplied by the corresponding factor. One physician determined the performance score. Based on this index, women with a score of < 28 were diagnosed with sexual dysfunction and assigned into the case group.

In the next step, a gynecologist visited all case group participants to rule out the gynecologic diseases and anatomical causes of sexual dysfunction and performed breast examination. These women also underwent a pap smear test as well as uterus and ovaries sonography, if necessary. The data were collected using a demographic checklist and the Marital Instability Index (MII)(6). The checklist included the socio-demographic characteristics and factors related to the marriage of the respondents.

The MII consists of 18 items rated on a five-point Likert scale (never=1 to always=5) that were divided into two sections, including parts A and B covering marital instability (14 items) as well as attraction and obstacles in each family (4 items), respectively. The scores of 70 for part A and 4 for part B indicated a higher level of marital instability. On the other hand, the scores of 14 for part A and 20 for part B signify the lowest level of marital instability. We used the Persian version of this index, which was valid and reliable(13, 14).

The demographic information of the women in the two groups was recorded. These data included age, occupation, education level, religion, income status, level of emotional connection, re-marriage, extra-marital relations, the amount of time spent with spouse at home, history of smoking, drug, and alcohol abuse, etc. After completing the MII questionnaire and demographic checklist for the two groups, their data were compared with each other.

This study was approved by the Ethics Committee of the Mashhad University of Medical Sciences and recorded in the clinical trial center (No: IRCT2015122425681N1). In addition, the interviewers explained the study objectives to the participants and assured them about the confidentiality of their personal data. All precipitants were registered with ID number without name.

Statistical analysis

The normality of the data was checked through the Kolmogorov-Smirnov test. The standard descriptive statistics were applied to describe the basic features of the data. In addition, the independent t-test and Mann-Whitney U test were applied for the data with normal and non-normal distributions, respectively. Furthermore, the correlation analysis was performed using the Pearson and Spearman correlation tests. The confounding factors were in the analysis that the matching was done. All the

tests were 2-tailed, and the p-values less than 0.05 were considered statistically significant. The data analysis was performed using the SPSS version 11.5 (SPSS Inc., Chicago, Illinois, USA).

Results

The participants of this study included 434 women, 77.9% (338 subjects) and 22.1% (96 subjects) of whom were placed in the general population and sexual dysfunction groups, respectively. The mean age of the patients was 34.56 ± 11.15 years (age range: 17-82 years). The mean number of parities was 1.63 ± 1.4 (range: 0-8). The frequency of demographic factors is shown in Table 1 (next page). The means of total scores of MII scale were 23.02 ± 7.04 and 19.89 ± 9.17 in the Case and control groups, respectively. Also, Mann-Whitney U test showed the MII mean scores of the two groups were significantly different ($Z = -4.44$; $P < 0.005$). The comparison of subjects based on total score of MII in term of different variables is shown in Table 2.

Age and total score of MII were not significantly correlated in the general population ($r = -0.105$; $P = 0.54$) and sexual dysfunction ($r = -0.045$; $P = 0.66$) groups. There was no significant correlation between parity and total MII score in the sexual dysfunction ($r = -0.07$; $P = 0.47$) and general population ($r = -0.71$; $P = 0.19$) groups. Furthermore, there was no significant correlation between age at marriage and total score of MII, in the sexual dysfunction ($r = 0.042$; $P = 0.68$) and general population ($r = -0.018$; $P = 0.74$) groups. There was no significant correlation between age of marriage and total MII score in sexual dysfunction ($r = -0.003$; $P = 0.97$) and general population ($r = -0.103$; $P = 0.058$) groups. In addition, there was no significant correlation between engagement duration and total MII score in the sexual dysfunction ($r = -0.016$; $P = 0.87$) and general population ($r = -0.09$; $P = 0.09$) groups. There was no significant correlation between marital age gap and total MII score in the sexual dysfunction ($r = -0.09$; $P = 0.38$) and general population ($r = -0.039$; $P = 0.47$) groups.

The comparison of the second part of MII between the two groups showed a significant difference in eating with the spouse ($\chi^2 = 55.41$; $P = 0.015$), visiting friends with the spouse ($\chi^2 = 55.41$; $P = 0.015$), cooperating with the housework ($\chi^2 = 54.88$; $P = 0.017$), doing recreational activities with the spouse ($\chi^2 = 55.41$; $P = 0.015$), re-selecting the spouse ($\chi^2 = 58.26$; $P = 0.015$), and having similar religious beliefs ($\chi^2 = 55.02$; $P = 0.017$). Based on the obtained results, there was a significant relationship between total score of the second section of MII and all the items. In the sexual dysfunction group; however, there was no significant relationship between total score of the second section of MII and all the items in the general population, except for the Re-selection of the spouse, Religious beliefs, Suspicion, History of friendship, History of imprisonment items.

In this study, regression analysis was employed to estimate the relationships among effective factors in marital instability, which is shown in Table 3. In the regression model, age, age at marriage, marriage duration, engagement duration, and age gap were assessed to determine the predictors of marital satisfaction, which showed the regression model was significant for one variable ($F = 13.83$; $P < 0.0005$). Based on the regression model, age can predict the variance of marital satisfaction among couples ($\beta = -0.12$; $P = 0.25$).

Also, regression model reflected that educational level, occupational status, income, and financial dependence were predictors of marital satisfaction and showed the regression model was significant for two variables ($F = 15.36$; $P = 0.001$). Based on the regression model, occupational status ($\beta = 0.55$; $P = 0.001$) and income ($\beta = -0.32$; $P = 0.04$) can predict the variance of marital satisfaction in couples.

The evaluation of educational level, belief system, socioeconomic status, location, and housing status based on the regression model showed that the model was significant for two variables ($F = 25.06$; $P < 0.0005$). Based on the regression model, belief system ($\beta = 0.18$; $P = 0.002$) and socioeconomic status ($\beta = 0.13$; $P = 0.03$) can predict variance of marital satisfaction in couples.

The evaluation of illness, having children, consanguineous marriage, and infertility based on the regression model depicted that the model was significant for one variable ($F = 14.34$; $P < 0.0005$).

Further, regression model was applied to determine the predictive effects of previous divorce, parental divorce, premarital friendship, parental marriage success, and parental interference on marital satisfaction. The obtained results showed the regression model was significant for three variables ($F = 30.55$; $P < 0.0005$). Among these variables, suspicion ($\beta = -0.32$; $P < 0.0005$), parental interference ($\beta = -0.19$; $P < 0.0005$), and previous divorce ($\beta = -0.120$; $P = 0.013$) were predictors of marital dissatisfaction.

The assessment couples' interest in each other and husband's violence based on the regression model exhibited that the model was significant for three variables ($F = 40.5$; $P < 0.0005$). Based on the regression model, wife's interest ($\beta = 0.18$; $P < 0.0005$), husband's interest ($\beta = 0.14$; $P = 0.003$), and domestic violence ($\beta = -0.36$; $P < 0.0005$) can predict the variance of marital satisfaction in couples.

The evaluation of eating with the spouse, visiting friends with the spouse, doing housework, having fun together, religious beliefs, and tendency to marry the same person if they go back in time exhibited that the model was significant for three variables ($F = 38.95$; $P < 0.0005$). Based on the regression model, eating with the spouse ($\beta = -0.17$; $P < 0.0005$), doing housework ($\beta = -0.11$; $P < 0.0005$), and tendency to marry the same person if they go back in time ($\beta = 0.36$; $P = 0.02$) can predict the variance of marital satisfaction in couples.

Table 1. The frequency of demographic information

Variables		Sexual dysfunction		General population		χ^2	p-value
		Frequency	Percent	Frequency	Percent		
Education level	Illiterate	1	1.1	5	1.5	55.38	0.01
	Elementary	9	9.5	21	6.3		
	Secondary school	10	10.5	27	8.0		
	Diploma	45	47.4	89	26.5		
	Associate Degree	20	21.1	51	15.2		
	Bachelor's degree or higher	10	10.5	143	42.6		
Job status	Unemployed	6	6.8	11	3.3	53.6	0.02
	Clerk	11	12.5	6	1.8		
	Worker	0	0	117	34.7		
	Student	6	6.8	34	10.1		
	Housewife	56	63.6	129	38.3		
	Self-employment	9	10.2	40	11.9		
Location	Urban	94	98.9	325	97.3	56.02	0.013
	Rural	1	1.1	9	2.7		
Religion	Shia	92	97.9	338	100	--	--
	Sunni	2	2.1	0	0		
Housing status	Yes	44	48.4	202	60.8	56.4	0.012
	No	47	51.6	130	39.2		
Illnesses	Yes	3	3.3	12	3.6	58.7	0.02
	No	88	96.7	323	96.4		
Smoking	Husband	21	21.9	6	1.8	54.5	0.019
	Both	1	1.0	53	15.9		
	Women	0	0	2	.6		
	Neither	74	77.1	273	81.7		
Age of marriage (month)	<18	41	43.2	80	24.0	55.1	0.016
	18-25	49	51.6	206	61.7		
	>25	5	5.3	48	14.4		
Number of children	<2	73	83.9	248	76.5	49.5	0.02
	2-4	14	16.1	59	18.2		
	>4	0	0	17	5.2		
Duration of marriage (month)	<10	46	49.5	163	50.0	53.3	0.02
	10-20	47	50.5	72	22.1		
	>20			91	27.9		
Age gap	<3	41	43.6	125	37.5	58.7	0.007
	3-6	30	31.9	107	32.1		
	>6	23	24.5	101	30.3		

Table 2: the comparison of subjects based on total score of MII in term of different variables

Variables	Group			
	General population		sexual dysfunction	
	Z	p-value	Z	p-value
Housing status	-0.55	0.58	-2.65	0.008
Physical or mental illnesses	-0.36	0.71	-2.26	0.02
Cultural similarity	-2.93	0.003	-4.43	<0.0005
Socio-economic similarity	-2.36	0.18	3.804	<0.0005
participants' parents' marital success	-3.11	0.002	-2.404	0.016
husband's parents' marital success	-0.97	0.33	-1.51	0.13
Parental interference	-2.67	0.008	-3.75	<0.0005
Showing affection toward the spouse	-1.77	0.076	-2.85	0.004
Affection received from the husband	-2.5	0.012	-4.43	<0.0005
Violence	-4.601	<0.001	-5.23	<0.0005

Table 3: Regression analysis among effective factors in marital instability

Predictive variable	B	β	P
Age	-2.04	-0.129	0.025
Occupational status	1.42	0.55	0.001
Income	-2.96	-0.32	0.04
Socioeconomic status	2.22	0.13	0.03
Belief system	3.16	0.18	<0.0005
Suspicion	-2.46	-0.32	<0.0005
Parental interference	-3.44	0.19	<0.0005
previous divorce	-1.66	-0.12	0.013
wife interest	2.4	0.18	<0.0005
husband interest	3.52	0.14	0.003
husband's violence	-6.83	-0.368	<0.0005
eating with the spouse	-1.312	-0.17	<0.0005
doing housework	-0.757	-0.11	0.02
tendency to marry	3.704	0.36	<0.0005

Discussion

In this study, we investigated the association between marital instability and female sexual dysfunction. As the findings of the present study indicated, marital instability and its associated factors could affect females who had sexual dysfunction more negatively than the other group. Marital instability and its related factors were more prevalent in the women with sexual dysfunction than control group. But lack of completion the FSFI questionnaire by the control group was a limitation of our study. The control group women announced their sexual satisfaction verbally.

When comparing the two groups, we found that there was a significant difference between the SD group and the control group regarding: eating food together, visiting friends, doing housework, participating in recreational activities, having similar religious beliefs and the tendency to choose the same person as spouse if they could change their decision.

Based on the results of the first part of the MII questionnaire, the housing state of the couple, marital success of the females' parents, and the low expression of affection by their husbands could significantly deteriorate the marital

stability of the women with sexual dysfunction. However, these factors were not significantly associated with total MII score in the control group. The results obtained from the second part of the MII and different items of this questionnaire demonstrated a significant difference between the subjects with sexual dysfunction and those with general population.

There was a significant relationship between the MII score and several factors in the case group.

In this study, we found out that performing daily routines with the spouse, such as eating, visiting friends, cooperating in doing housework, and involving in recreational activities were significantly associated with the MII score. Interpersonal relation between the couples and marriage-related factors could also influence MII score. Some of these factors were being suspicious of the spouse, previous divorce, history of premarital relationships, parental interference and domestic violence. There are several studies indicating the important role of the couple relationship on female sexual function and dysfunction. It has been reported that low or absent sexual desire is the most common form of sexual dysfunction among females. One of the main risk factors for lower sexual desire is dissatisfaction with partner relationships (15). Several

other studies have shown similar results. Carvalho et al. demonstrated that low sexual desire could be caused by low dyadic cohesion of the couples, low affection expressed by the husband, and couples' poor sexual and non-sexual communication (16). In addition, the previous studies revealed that relationship dissatisfaction was a major predictor of sexual problems among the females (17). Another group of studies indicated that the intimacy of couples could reduce the negative effects of physical problems. Blair et al. reported that in the women with chronic vulvar and pelvic pain, intimacy with husband reduced the impact of pain on the couple relationships (18). Another study indicated that sexual satisfaction was positively improved with sexual intimacy (19). Overall, there was a strong correlation between the well-being of the interpersonal relations and sexual satisfaction of the females.

In addition, we found that other than interpersonal relationship, socioeconomic factors could also influence MII score and predict marriage success. These factors were, occupational status and income, socioeconomic status, religious beliefs, smoking habits and history of imprisonment. The results reported in the literature are consistent with our findings in terms of the effectiveness of socioeconomic factors in female sexual function. Bagherzadeh et al. indicated that desire, arousal, lubrication, and other aspects of sexual function were affected by the age, education level, economic status, and smoking behavior of the females as well as the age, education level, and occupation of their husbands (20). Several studies have reported the effect of education on sexual interest (21-23). Laumann et al. revealed that a 20% decrease in household finance could lead to reduced interest in sex and lubrication as well as increased dyspareunia among the females (21).

Totally, the findings of the present study revealed that there were several items negatively affecting the marital stability of the females with sexual dysfunction. Additionally, the factors that led to marital instability were more prevalent and in the women with sexual dysfunction, compared to those from the general population.

Implications of the study

In line with the previous studies, we found that several factors were associated with sexual dysfunction in the females with no other known complication. In this study, we investigated the effects of several determinants, which were not assessed in the previous studies. Therefore, it could be concluded that the couples should be educated about the factors, affecting their marital instability to be enabled to strengthen their marriage by considering the deteriorating factors in this regard.

Suggestions for future studies

Future studies are suggested to use a research design that can reflect the causative relationship of the factors discussed in this study. It is notable that the influence of these factors could be different in the subjects with different cultural backgrounds.

Acknowledgements

The present study was supported by a grant from the Research Council, Mashhad University of Medical Sciences, Mashhad, Iran. The trial was registered at the Iranian Registry of Clinical Trials with the Irct ID: IRCT2015122425681N1).

References

1. Shifren JL, Monz BU, Russo PA, Segreti A, Johannes CB. Sexual problems and distress in United States women: prevalence and correlates. *Obstet Gynecol.* 2008;112(5):970-8.
2. Ito TY, Trant AS, Polan ML. A double-blind placebo-controlled study of ArginMax, a nutritional supplement for enhancement of female sexual function. *J Sex Marit Ther.* 2001;27(5):541-9.
3. Ramezani MA, Ahmadi K, Ghaemmaghami A, Marzabadi EA, Pardakhti F. Epidemiology of Sexual Dysfunction in Iran: A Systematic Review and Meta-analysis. *Int J Prev Med.* 2015;6:43-.
4. Association AP. Diagnostic and statistical manual of mental disorders (DSM-5®): American Psychiatric Pub; 2013.
5. Safarinejad MR. Female sexual dysfunction in a population-based study in Iran: prevalence and associated risk factors. *Int J Impotence Res.* 2006.
6. Althof SE, Leiblum SR, Chevret-Measson M, Hartmann U, Levine SB, McCabe M, et al. Psychology: psychological and interpersonal dimensions of sexual function and dysfunction. *J Sex Med.* 2005;2(6):793-800.
7. Berman JR, Berman LA, Werbin TJ, Goldstein I. Female sexual dysfunction: anatomy, physiology, evaluation and treatment options. *Curr Opin Urol.* 1999;9(6):563-8.
8. Brotto L, Atallah S, Johnson-Agbakwu C, Rosenbaum T, Abdo C, Byers ES, et al. Psychological and Interpersonal Dimensions of Sexual Function and Dysfunction. *J Sex Med.* 2016;13(4):538-71.
9. Atallah S, Johnson-Agbakwu C, Rosenbaum T, Abdo C, Byers ES, Graham C, et al. Ethical and Sociocultural Aspects of Sexual Function and Dysfunction in Both Sexes. *J Sex Med.* 2016;13(4):591-606.
10. McCabe MP, Sharlip ID, Lewis R, Atalla E, Balon R, Fisher AD, et al. Risk Factors for Sexual Dysfunction Among Women and Men: A Consensus Statement From the Fourth International Consultation on Sexual Medicine 2015. *J Sex Med.* 2016;13(2):153-67.
11. Roberts TW. Sexual attraction and romantic love: forgotten variables in marital therapy. *J Marit Fam Ther.* 1992;18(4):357-64..
12. Yin C, Seo B, Park HJ, Cho M, Jung W, Choue R, et al. Acupuncture, a promising adjunctive therapy for essential hypertension: a double-blind, randomized, controlled trial. *Neurol Res.* 2007;29 Suppl 1:S98-103.
13. Stefanou C, McCabe MP. Adult Attachment and Sexual Functioning: A Review of Past Research. *J Sex Med.* 2012;9(10):2499-507.
14. Eplöv L, Giraldi A, Davidsen M, Garde K, Kamper-Jørgensen F. Original Research-Epidemiology: Sexual Desire in a Nationally Representative Danish Population. *J Sex Med.* 2007;4(1):47-56.

15. Kingsberg SA, Woodard T. Female Sexual Dysfunction. *Obstet Gynecol.* 2015;125(2):477-86.
16. Carvalho J, Nobre P. Sexual desire in women: an integrative approach regarding psychological, medical, and relationship dimensions. *J Sex Med.* 2010;7(5):1807-15.
17. Oberg K, Sjogren Fugl-Meyer K. On Swedish women's distressing sexual dysfunctions: some concomitant conditions and life satisfaction. *J Sex Med.* 2005;2(2):169-80.
18. Blair KL, Pukall CF, Smith KB, Cappell J. Differential Associations of Communication and Love in Heterosexual, Lesbian, and Bisexual Women's Perceptions and Experiences of Chronic Vulvar and Pelvic Pain. *J Sex Marital Ther.* 2015;41(5):498-524.
19. Bois K, Bergeron S, Rosen NO, McDuff P, Gregoire C. Sexual and relationship intimacy among women with provoked vestibulodynia and their partners: associations with sexual satisfaction, sexual function, and pain self-efficacy. *J Sex Med.* 2013;10(8):2024-35.
20. Bagherzadeh R, Zahmatkeshan N, Gharibi T. Prevalence of female sexual dysfunction and related factors for under treatment in Bushehrian women of Iran. *Sexual Disabil.* 2010;28(1):39-49.
21. Laumann EO. *The social organization of sexuality: Sexual practices in the United States*: University of Chicago Press; 1994.
22. Raboch J, Raboch J. Infrequent orgasms in women. *J Sex Marital Ther.* 1992;18(2):114-20.
23. Al-Harasi S, Ashley P, Moles D, Parekh S, Walters V. *Hypnosis for children undergoing dental treatment*. Chichester, UK: John Wiley & Sons, Ltd; 2008. p. CD007154-CD.

Barriers to effective advocacy for normal birth; Ethics in educational strategy of maternity care system: A qualitative study

Ali Ramezankhani (1)

Tayebe Samieizadeh Toosi (2)

Nahid Akbari (3)

(1) Professor of Public Health Department, Health school , Shahid Beheshti University of Medical Science

(2) PhD student in Health education and promotion, Shahid Beheshti University of Medical Science.

(3) Assistant Professor, Reproductive Health Department, School of Nursing and Midwifery, Iran University of Medical Science. Tehran, Iran

Corresponding Author:

Tayebe Samieizadeh Toosi

PhD student in Health education and promotion
Shahid Beheshti University of Medical Science.

Email: samieizadeht@gmail.com

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Ramezankhani A. et al. Barriers to effective advocacy for normal birth, Ethics in educational strategy of maternity care system, A qualitative study. World Family Medicine. 2018; 16(3):86-90. DOI: 10.5742/MEWFM.2018.93311

Abstract

Introduction: Improvement of mothers' and infants' health is a vital issue. Obstetricians and midwives play a key role in health advocacy, so that the commitment of midwives has been emphasized to advocate for normal birth in the international declaration of midwifery care. It can help mothers make correct decisions for type of their delivery, or can change the attitude of stake holders to introducing normal birth as a low-risk and healthy behavior for mother and baby outcome. Therefore, it is necessary to recognize specific barriers to planning, and advocacy for normal birth.

Methodology: This qualitative-exploratory study aimed to explain barriers to advocacy for normal birth, using grounded theory and based on the Strauss and Corbin paradigm. Participants were selected from the obstetricians and midwives involved in normal birth in governmental and non-governmental hospitals as well as private clinics in Tehran, Iran, and 4 mothers who had normal delivery and cesarean section. 22 interviews were conducted among participants during May-January 2016; in depth interviews were conducted, and they took 35-120 minutes.

Analysis: All interviews were recorded and transcribed; they were implemented with MAXQDA 10 Software. Coding and analysis steps were taken using Strauss and Corbin Scale based on grounded theory.

Results: One of the main themes was educational inefficiencies in the maternal care system which is a conditional cause of barriers to advocacy for normal birth, based on the Strauss and Corbin paradigm. This paper aims to explain the category "inattention to ethics in human resource training system".

Discussion and Conclusion: Inefficient teaching in the healthcare system such as weak performance in training human resources in the field of maternal care system prevents obstetricians and midwives as employees of healthcare system from supporting natural childbirth. Some strategies such as changing the educational content and special planning in field of human dignity and professional ethics are necessary in clinical training.

Key words: Ethics, advocacy, normal birth, Clinical Training

Introduction

Type of childbirth and its results like many of modern health implications are subjected to a complicated interaction between several factors including personal, behavioral, social, and economic factors in a woman's life (1). According to scientific evidence in normal conditions, normal birth is the best delivery type for mother and baby health (2). However, the increasing rate of Cesarean in many countries around the world has led to concern of researchers and officials in the field of public health (3). In the opinion of researchers, only 6-16% of cesareans are medically reasonable (4). World Health Organization has declared that the cesarean rates above 10-15% are followed by health risk factors (5). A high percentage of unnecessary cesarean sections is one of the risk factors for health of mother and baby(6).

Researchers have emphasized on the necessity of strengthening public health training about complications of cesarean and social support for women to help them become ready for childbirth (7). On the other hand, obstetricians and midwives play a vital role in advocacy for normal birth. Commitment of midwives to advocate for normal birth has been emphasized in the ICM declaration considering the international philosophy of midwifery care (ICM, 2005a) (8).

The support process is subjected to continuous efforts to translate information related to justifying reasoning, and making good relationships with decision makers. Advocacy process shares strategies through public relationships but usually involves in competitive definition of the subject. Therefore advocates are usually involved in public conflicts. Opponents sometimes are powerful beneficiaries and sometimes are governmental individuals who resist changes (9). A normal birth promotion program consists of committees in governmental and private hospitals and universities in order to create facilities for improvement of delivery environments for mothers, monitoring cesarean rates in these centers, granting reward systems and educational management rules to increase normal birth in Iran (10). Findings obtained from a qualitative study about sponsorship in this field indicated that factors affecting barriers to advocacy for patients were a negative attitude of health personnel to advocacy, non-compliance with instruction as a tool, and lack of sufficient information about advocacy (11).

Health practitioners should cooperate, listen to the mother, pay attention to her voice, and respect her; they must help mothers to make wise decisions about childbirth in order to provide safety (12).

Physicians and midwives are the first lines who mothers refer to for pregnancy and childbirth care; in this regard, they have a high effect on decisions and cooperation of mothers in normal birth. It is essential to find barriers preventing healthcare employees to advocate for normal birth (8). Qualitative analysis of grounded theory which conducts the field of healthcare professionals, midwives

and obstetricians, can identify barriers to advocacy for normal birth, and factors affecting it, as well as the relation between variables.

Methodology

Interviews were tape-recorded, transcribed verbatim, and analyzed using the Grounded Theory method based on the paradigm of Strauss and Corbin [11]. This method seeks to reduce the material to its essential content in a systematic manner by following a four-step sequence model resulting in a summary of the main statements and a paradigm. Based on the recommendations of Strauss and Corbin the qualitative data was used to develop a paradigm that presents the interrelations between barriers and facilitating factors for advocacy to normal birth in the Iranian health care context. To develop the paradigm, the interview statements were divided into several meaning units and categorized according to different content domains. This was followed by the interpretation of the content domains in regard to their impact on advocacy. This process was conducted by a team of researchers independently to allow for researcher triangulation. Results were obtained after reaching agreement with discussion between researchers regarding the interpretation of the data.

Participants were selected targeted among health personnel who had required awareness and experience about normal birth; these individuals tended to participate in research. Hence, obstetricians and midwives who work in private and governmental healthcare centers of universities in medical sciences in Tehran were interviewed to collect data.

The place for interviews was Health care centers and hospitals, obstetricians' clinics, and offices, based on the agreement between researcher and participants. Interviews and sampling continued until researchers reached data saturation when analysis of the data in coding had not new concept. Saturation in data was achieved after performing 22 deep interviews. Inclusion criteria consisted of age, gender, education level, responsibility type, and work place in private and governmental hospitals' clinics of Tehran.

To evaluate validity or accuracy of study, external check and peer debriefing was used. In this regard, the text of interview along with results obtained from coding and extracted categories was given to the research team and one of the experts in qualitative research to find understanding of researcher in order to attract complementary and critical opinions. Research review was also conducted and data were examined by guide professors, and advisors in order to make sure of consistency between categories and opinions of participants (13). In this research, the researcher kept all documents during research steps in order to validate study. Analysis of qualitative data was done using grounded theory approach at the time of interview based on the interviews with participants, coding and interpreting data. Analysis of interviews was based on Strauss and Corbin benchmark (14).

All recorded interviews were implemented word-by-word and text files were prepared in frame of Word then these files of stepwise interview were transferred to MAXQDA10 Software. Analysis was coded (14) the tables were coded and main subjects and categories were prepared. The coded data were used at this step to determine scope and specifications, and relation between categories and main subjects.

Results

954 codes were analyzed. 163 concepts were formed totally. Of these concepts, 45 secondary categories, 16 main categories and 5 important themes were obtained.

One of the main themes was inefficient training in maternal care system as conditional situation, with two main categories of weak human resource training and inefficient community awareness in field of normal birth.

Inefficient training in maternal care system is described in this paper. This category consists of two sub-categories: 1: inattention to ethics in human resource training system and 2: weakness in clinical teaching system; the first option is described in this paper completely. It has three parts:

1-Inattention to ethics in human resource training system

• 1-1: Ignoring human dignity training and inattention to academic teaching for dignity of pregnant woman in university courses.

Participants in this study declare that human dignity training is ignored in teaching issues in our universities, and it must be considered inattention to academic teaching for dignity of pregnant woman in university courses.

One obstetrician and university professor said: "I always tell my students to look at the woman who is giving the birth as a human; she may be at a low socio-economic position but you should seek permission before entering"; she may not like to be seen at that moment. The delivery situation is itself annoying and you should not intensify it. Students should respect the woman who is giving birth. Human dignity should be considered here so that the woman should not be seen as a person who is coming here just to give birth. I always say this, but maybe some other professor does not mention it and students always forget importance of ethics".

• 1-2: weak professional ethics in human resource training

Midwives explained in this field that unethical governance in the teaching system, including humiliating midwifery students by residents, disrespecting the midwife, discrimination between resident and midwifery student in learning opportunities, limiting the power of instructor to attend, interference of resident in work of instructor and destroying the character of midwives. Participants suggested taking professional ethics seriously and selecting ethical individuals for midwifery. In this field, a male obstetrician who had 28 years' work experience in a private hospital described, "Human and ethical criterion

should be considered when selecting medical and midwifery students; otherwise, everybody is not able to work in this profession and should have a conscience. The patients always want us to be calm and kind with them. Nowadays they have credible behavior with us and we must be patient. "

• 1-3: physician dominant in training system

Lack of cooperation and support for clinical instructors, physician-centered teaching, lack of mutual cooperation between midwife and obstetrician in clinical training, humiliation of midwives, and lack of clinical support of midwifery student by obstetricians, the gap between obstetricians and midwife, inattention to midwifery students in educational system, resistance of some attendants and residents against some supportive methods, like aromatherapy for example and so on, for birth in governmental centers, priority of intern to midwifery students in clinical learning, not allowing midwifery students to work by residents, not allowing midwifery students in high risk cases, in petitioning instructors, lack of participation of obstetricians in midwifery clinical training, and inattention of residents to opinion of midwife for physiologic childbirth.

One of the midwives with 20 years' work experience in clinical instruction stated, "there were some attendants who were against us, beside residents. Our student got prepared to do delivery and the resident tended to do this while faced with resistance of attendants. We had even a problem for the final exam. attendants ignore midwifery students. Hence, there is a gap between attendants, midwives and instructors. We never had any meeting to find why the doctor does not allow midwifery students to do delivery, and ignore them in the education system".

Context: Social field, the physician-centered culture and tendency of people for specialists can be named as some factors leading to medical interference in human resource training. Therefore, such culture allows physicians to feel power and less considerate of midwifery students. On the other hand, mothers stimulate the situation.

A midwife with 22 years' work experience in private hospital expressed: "our patients do not like to visit a midwife for prenatal care; unfortunately all of my friends prefer to visit a specialist during their pregnancy, whereas they do not appreciate midwives and normal birth! How they could encourage mothers toward normal birth! ".Poor communication between the physician, midwife and mother has been mentioned by most participants in this study. One 30 years old mother who gave birth in a private hospital said" I had gone to a public hospital at first, the students were very moody and did not pay attention to me with all my pain which I had at that moment. Even they did not talk to me about procedures. But I wanted to consider more."

Discussion

Advocacy to improve mothers' and infants' health in the case of normal birth, for midwives consists of notification, support and protection of women, mediating role between them and obstetricians and their colleagues, midwife sponsorship to help mothers and facilitate their wise choices. Midwives are responsible for respecting human dignity; they look after women as humans with human rights, they have respect for them and make them feel important (ICM, 8) (2005).

It is seen that medical performance is concerned with valuating instead of paying attention to human dignity and academic training to respect pregnant woman's dignity in academic courses has been seen in our data and contexts.

Poor communication between the physician midwife and mother, lack of emotional relationship with mother in preparation classes for childbirth and maternity care, inattention to human dignity, making the women feel embarrassed, not paying attention to privacy of women, observing human principles, and inappropriate behavior with women who are giving birth can be named as barriers to advocacy for normal childbirth. It has been expressed that there is less emphasis on protecting human dignity in educational courses. It is recommended to teach human dignity in clinical courses, change and teach lessons related to sponsorship and communicational skills, strengthening and increasing lessons related to patient and social sciences, teaching behaviors and methods to support the woman in order to use sponsorship skills for improved natural childbirth.

Moreover, professional ethics should be taken seriously when selecting ethical individuals for midwifery. Roxana Behroozi conducted a study in which participants expressed more attention and concentration of physicians on practical skills than to spend their time for the mother. She writes, "the culture of valuating medical performance is a barrier to natural childbirth without interference in specialized hospitals, because high risk pregnancy is more important in specialized medical cases compared to the time spent for the mother. In addition, the attitude of using opportunities for specialized learning development and skill training in these hospitals makes physicians move toward medical interference, because they are valued based on their medical performance" (15).

Barbara writes, "Midwifery model of maternity care is usually done by midwives and can be done also by physicians. Considering the focus on reduced technological interference and individual support, the midwifery care model can reduce the cost without harming delivery safety and can improve delivery results and access to economical health care" (16).

Although the physician dominant culture is seen among people, Jennifer Hall states that 62% of women agree with the following sentence in national survey of Lavender, "I feel insecure if a specialized physician is not available

at the time of my delivery" while 20% agreed with the sentence "I want to be cared by midwife and prefer not to see other physicians in my childbirth" (Jennifer Hall quoted from Lavender) (17&18).

Participants in this research expressed that there is a luxury culture in which, people believe in physician, not midwife. Physician is more recognized by mother compared to midwife in private hospitals, physician dominant culture, tendency of people toward physician and acceptance of the word of physicians about cesarean, while it is recommended to healthcare physicians to create security and trust in planning for mother's childbirth and making mother participate in wise decision-making about care of themselves (12).

In a study conducted by Giorgio, some concepts including lack of professional recognition, defect in basic and continuous education were introduced as barriers to support for natural childbirth. The major educational issues including quality of basic teachings, weak positions of clinical training and inaccessibility to a wide range of practical midwifery skills were determined by midwives. Some midwives expressed that what is presented to women is the medical case so that many were disappointed when saw their failure in natural childbirth despite their effort. They believed that the main reason is that basic teachings do not cover issues related to sponsorship, independence and rehabilitation. Participants introduced issues related to medical dominance in the medical system as a disappointing factor for prominent advocators of natural childbirth (8).

Physician-centered culture in the education system, lack of cooperation and support for clinical instructors are some of the concepts described by participants. Some strategies obtained from analysis of such suggestions to remove these barriers by participants are: physician-centered culture should be removed from the education system, cooperation and support of clinical instructors, giving opportunity to midwifery students, and paying attention to midwifery students in clinical learning by attendants. In this case, midwifery students feel valuable and their skill and self-confidence will be increased. A graduated midwife who could not do delivery perfectly, how can advocate for normal birth?! . Strengthening clinical training system should be done for midwifery students and skilled clinical instructors to enable doing natural childbirth; on the other hand, midwife students should cope with high risk childbirth conditions.

In a qualitative study in Australia researchers found that: The system of maternity care was identified as being dominated by medicine, not evidence based and restricting of women's choices, with midwifery autonomy not recognized or supported(19).

Juybari et al. conducted a study in which, three major common concepts between students and instructors were introduced in field of specifications of efficient clinical instructor; these concepts include scientific and practical capabilities, educational management ability, and good

behavior. Participants mentioned a wide range of barriers to productivity of instructor and effectiveness of clinical learning including inefficient facilities, old educational centers, medicine dominant culture in education centers, and lack of interest of nursing students in their major (20).

Conclusion

Inattention to human dignity training and respect for human honor among midwifery students, and weak professional ethics in human resource teaching indicate inattention to ethics in human resource training in educational hospitals of universities of medical sciences in Tehran, Iran. The mentioned factors are barriers for midwives and obstetricians who graduated within a weak educational context that is ruled by physician dominant culture to advocacy for normal birth. In this regard, sense of security and independence is weak among midwifery students leading to their low self-confidence to play their supportive role in normal birth process for mothers who are giving birth in such hospitals. Moreover, physician-centered culture in people makes them interested in medical interference in natural childbirth so that physicians and midwives are not interested in learning physiologic childbirth skills. On the other hand, difficulty in cooperating with residents who are not desired and have not enough time to spend for physiologic childbirth is a barrier to advocacy by midwives and instructors for normal birth. Lack of ethics in clinical training of midwifery students as lack of equal opportunity for clinical training in physician dominant context leads to weak practical skills of graduated midwives in field of natural childbirth and reduction in their motivation for delivery care and advocacy for natural childbirth.

Acknowledgement

This paper is a part of PhD dissertation conducted in Shahid Beheshti University of Medical Sciences in Ethic committee as code number IR.SBMU.RAM.REC.1395. The authors would like to acknowledge the midwives and obstetricians for graciously sharing their thoughts and feelings regarding their experiences. We would also like to appreciate research deputy of university and professors who collaborate with us. In addition, we appreciate all managers and officials of private and governmental hospitals of Tehran who let us to conduct interviews in there.

References

- Oguta T.J. Psychosocial Determinants of Elective Cesarean Section Deliveries in Selected Obstetric Facilities in Nairobi, Kenya: Walden University Scholar Works; 2015.
- Sakala C, Mayberry LJ. Vaginal or Cesarean Birth? Application of an Advocacy Organization-Driven Research Translation Model. *Nursing Research* 2006;55(25):s68-s74.
- K O. . Beyond Numbers: The Multiple Cultural Meanings of Rising Cesarean Rates Worldwide. *Am J Bioeth.* 2012;12(7):54-6.
- Khunpradit S, Tavender. E, Lumbiganon P, Laopaiboon. M, Wasiak. J, Gruen RL. Non-clinical interventions for reducing unnecessary caesarean section. Editorial Group: Cochrane Effective Practice and Organisation of Care Group. Published Online: 15 JUN 2011. Assessed as up-to-date: 28 MAR 2010. DOI: 10.1002/14651858.CD005528.pub2. . 2011
- Jeremy LA, Betrán AP, Merialdi M, Wojdyla D. Determinants of caesarean section rates in developed countries: supply, demand and opportunities for control. World Health Organization, 2010 Contract No: 29.
- Althabe F, Sosa, C., Belizán, J.M., Gibbons, L., Jacquerioz, F., & Bergel, E. Cesarean section rates and maternal and neonatal mortality in low-medium and high-income countries: an ecological study. *Birth* 2006;33:270-7.
- Miesnik SR, Reale BJ. A review of issues surrounding medically elective cesarean delivery. *Journal of Obstetric, Gynecologic, & Neonatal Nursing.* 2007;36(6):605-15.
- Hadjigeorgiou E, Coxon K. In Cyprus, 'midwifery is dying'. A qualitative exploration of midwives' perceptions of their role as advocates for normal childbirth. *Midwifery.* 2014 Sep 30;30(9):983-90.
- UNAIDS. *advocacy_toolkit*. A practical toolkit for young people who are passionate about advancing HIV and sexual and reproductive health and rights through national advocacy in the post-2015 agenda: Running from September 2013 to September 2015, ACT!2015. UNAIDS Youth Advisory Forum.; 2015
- Health Promoting Natural Health Project. A Healthcare Development Plan Instructions . ministry of Health and Medical Education. 1393: 52-61
- Sibel Altin, Anna Passon, Sibylle Kautz-Freimuth, Bettina Berger, and Stephanie Stock. A qualitative study on barriers to evidence-based practice in patient counseling and advocacy in Germany *BMC Health Serv Res.* 2015; 15: 317. Published online 2015 Aug 11. doi: 10.1186/s12913-015-0979-9 PMID: PMC4542047
- Jukelevics, Nicette, MA, ICCE. Advocating for Women's Rights to Evidence-Based Care and Childbirth Alternatives in the United States: The Time Is Now. *International Journal of Childbirth Education; Minneapolis Vol. 24, Iss. 3, (Sep 2009): 19-22*
- Corbin JS, Strauss A. A. 2008. Basics of qualitative research: Techniques and procedures for developing grounded theory.;3.
- Waltz ,C. Strickland,O.Henz,E.,2010.Measurment in nursing and health research. 4 rd ed. New York: Springer publishing Company
- Roxana Behruzi1, Marie Hatem, Lise Goulet and William Fraser. *BMC Womens Health* 2011, 11:53 <http://www.biomedcentral.com/1472-6874/11/53>
- Barbara A. Hotelling, BSN, CD (DONA), LCCE, FACCE and Sharron S. Humenick, PhD, RN, LCCE, FACCE, FAAN:. Advancing Normal Birth: Organizations, Goals, and Research. *J Perinat Educ.* 2005 Spring; 14(2): 40–48. doi: 10.1624/105812405X44727 PMID:PMC1595246
- Jennifer Hallowell, Yangmei Li, Reem Malouf and James Buchanan. Women's birth place preferences in the United Kingdom: a systematic review and narrative synthesis of the quantitative literature. *BMC Pregnancy and Childbirth* (2016) 16:213. DOI 10.1186/s12884-016-0998-5
- Lavender T, Chapple J. How women choose where to give birth. *Pract Midwife.* 2005;8(7):10–5.
- Juybary Leila, Sanagu Akram. Effective educator: A deep look at the experiences and views of students and educators. *Developmental Steps in Medical Education: Autumn & Winter 2009, Volume 6, Issue 2; p 119 - 128.*
- Addressing the barriers to midwifery – Australian midwives speak out. Available from: https://www.researchgate.net/publication/11037546_Addressing_the_barriers_to_midwifery_-_Australian_midwives_speak_out [accessed Jun 23, 2017].

A study of influential factors on chest compression in cardio pulmonary resuscitation from the perspective of personnel of pre-hospital emergency of central hub in Iran in the first half year, 2016

Shahbazi Akbar (1)
 Shahin Faramarz (2)
 Sharifi Abolghasem (3)
 Molavi Choobini Z (3)

(1) Research Committee, Isfahan University of Medical Sciences, Isfahan, Iran.
 (2) Director of the Center for Disaster Management and Medicine Emergency, Shahrekord University of Medical Sciences, Shahrekord, Iran.
 (3) Deputy of Research and Technology, Shahrekord University of Medical Sciences, Shahrekord, Iran.

Corresponding author:

Molavi Choobini Z
 Deputy of Research and Technology, Shahrekord University of Medical Sciences, Shahrekord, Iran
 Tel: +98 09132827486
 Email: molavi_z@ymail.com

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: K Shahbazi Akbar, Shahin Faramarz, Sharifi Abolghasem, Molavi Choobini Z. A study of influential factors on chest compression in cardio pulmonary resuscitation from the perspective of personnel of pre-hospital emergency of central hub in Iran in the first half year, 2016. World Family Medicine. 2018; 16(3):91-94. DOI: 10.5742/MEWFM.2018.93313

Abstract

Introduction: According to the latest guidelines of cardio pulmonary resuscitation (CPR), the American Heart Association, advises 6 centimeters for maximum chest compression in CPR; but unfortunately, so far has not mentioned any explanatory guidelines to factors affecting the amount of chest compression. Therefore, this study was aimed at assessing factors affecting the chest compression cardiopulmonary resuscitation from the perspective of personnel of pre-hospital emergency of central hub in Iran.

Methodology: The present study is descriptive analytical conducted randomly among 306 individuals of emergency service personnel in central hub of Iran. Data were collected by self-made questionnaire and analyzed by SPSS, with descriptive statistics (frequency, mean, standard deviation).

Results: 306 individuals participated in the study and mean age was calculated as 34.75 ± 3.45 . According to personnel of the emergency service, chest compression in CPR depends on rib curve, skeletal abnormality of chest, injured weight, elasticity of chest and stability of chest and the most influential factor on chest compression was (0.99.34) rib curve.

Conclusion: Results of this study show that chest compression is not the same among all individuals and not consistent with instructions of American Heart Association. It is possible that chest compression in CPR is more than 6 centimeters or less than 5 centimeters.

Key words: Emergency medicine, Chest, CPR

Introduction

Heart and brain failure is a very serious situation in which heart beat and respiration stops completely. This situation requires quick and correct reaction. Heart and brain failure in Iran is the second factor causing death. On a global scale, heart failure outside the hospital is the most important cause of death(1), but unfortunately according to quantitative advancements observed in the last 30 years, the level of rescue of heart failure in patients is less than 10 percent out of the hospital(2-3).

Heart pulmonary failure is one of the most important causes of death in the modern world. Having enough knowledge in CPR of patients with pulmonary heart failure is one of the requirements of medical staff (4-5).

In the USA, 2 million individuals die annually and 25 percent of them are as a result of acute pathophysiology and these cases happen before old age and in the absence of incurable disease. Among them, of 250,000 individuals undergoing CPR operations, most of them die. Many of the patients have irreversible damage. The goal of CPR is reducing this kind of death (6).

CPR is a process to survive vital functions of heart, pulmonary system and brain that saves individuals' life and prevents sudden death. It can save individuals' life due to heart failure (7-8). The survival of those patients is due to different clinical features and due to locations, as emergency medical services differ (9-10).

Although many factors play a role in low possibility of survival among heart failure patients, if CPR operations are on time, results will improve (11). Therefore delay in CPR operations should be avoided because not performing these actions results in brain death in less than 4 to 6 minutes (the golden time) and if survival operations are performed quickly, in 40 to 60 percent of cases they can rescue individual lives (12-13).

If blood circulation stops for 35 seconds, cell metabolism is stopped. This failure continues for 5 minutes and irreparable injuries occur in brain tissue. Heart massage in CPR circulates blood by increasing pressure of chest and direct compression of chest. It delivers oxygen to heart and brain. According to the latest changes in CPR in Heart Association instructions of 2015, in CPR, heart massage should be conducted for 2 or 5 centimeters for adults for heart massage with higher depth and more than 2.4 inches or 6 centimeters should be avoided. Given that the use of external cardiac massage with hand massage is preferred to mechanical method of heart massage, but unfortunately revivalists conduct this contrary to the recommendations (Press firmly, quickly press) depth chest compression is not enough and resuscitation will fail (14-15). This results in negative consequences for society including irreparable injuries, increasing time and energy consumption, low motivation and self-esteem among personnel, reduction of operation quality and dissatisfaction in the society(16).

It is obvious that inattention to weak operation of revival teams result in death and increase negative consequences. So, authorities in emergency triage need ways to overcome these problems and the first step is identification of success obstacles. The present study tries to study influential factors on chest compression in CPR.

Methodology

This research is descriptive analytical. Research population included central hub personnel of emergency service in Iran, in the first half of 2016. According to Cochran's formula 1500 sample population, reliability co-efficient 95 percent and 30 samples were selected randomly.

$$n = \frac{\frac{z^2 pq}{d^2}}{1 + \frac{1}{N} \left(\frac{z^2 pq}{d^2} - 1 \right)}$$

Entrance feature of samples in this research was successful revival experience. At the beginning the research goal was explained for research units and participants and they participated in the study with their satisfaction.

Data collection tools were self-made questionnaire titled "study of influential factors in chest compression for CPR and included demographic data of personnel (name, last name, age, experience in emergency service, field of study). Answers were yes or no, yes (1) and no (0). If yes choice was selected the intensity is low (1), average (2), high (3). The maximum score was for yes (100 percent) and minimum score was for no (0 percent). If yes was selected, according to intensity, maximum score was for high (18) and minimum score was for low (6); validity of tools was determined. By studying books, and journals , research tools were prepared, modifications were performed based on the opinion of 15 professors of emergency medicine. Data collection tools were validated according to scientific reliability and by questionnaire test-retest method.

In this method, 20 samples received questionnaires and they were gathered after completion after two weeks when the same questionnaires were distributed and reliability of questionnaire was 95 percent.

Information of questionnaires was analyzed by SPSS, descriptive analysis (frequency, average, standard deviation) and inference statistics (t-test, K2) were analyzed.

Results

In this study 306 individuals participated and average age was 34.75 ± 3.45 . ; 27.3% of these individuals had work experience less than 5 years, 57.2% had work experience between 5 to 10 years and 15.5% had work experience more than 10 years. 91.75% studied emergency medicine, 3.5% studied nursery, 2.5% studied anesthesia services and 2.25% studied surgery services.

Table 1: Frequency percent of influential factors on chest compression in rib cage

Influential factors on compression of chest cage	percent		Influential factors on chest compression in rib cage	Influential factors on chest compression in rib cage	Influential factors on chest compression in rib cage
	yes	no			
Rib bend	99.34%	65%	low	Average	High
			67%	2.30%	94.3%
Skeletal abnormality in rib cage	98.03%	1.3%	34%	1.32%	98.34%
Elasticity of rib cage	98.03%	1.96%	2.66%	3%	94.34%
Injured weight	90.19%	1.96%	1.35%	3.66%	94.99%
Stability of ribs in rib cage		9.80%	3.26%	6.16%	90.58%

According to personnel of emergency medical services, the most important influential factors on chest compression in CPR were:

The proportion of chest compression depends on rib bend and the lower the rib bend the higher is chest compression (99.34%).

Chest compression depends on the injured person and since chest compression is lower in infants, chest compression is lower in thin individuals rather than fat ones (98.03%).

Chest compression depends on elasticity of chest cage and lower elasticity in rib cage results in higher chest compression. Chest compression depends on stability of ribs in rib cage and in old individuals stability of ribs is lower than the young. Stability of women's rib is higher than men (99.03%). Chest compression depends on stability of ribs in chest cage (Table 1).

Test retest showed that there is no significant relationship between education level, field of study workplace and research result. Q2-test showed that there is no significant relationship between average of dimensions with demographic features of emergency personnel ($p>0.05$).

Conclusion

Results show that chest compression is affected by factors like rib bend, skeletal abnormality of rib cage, injured weight, elasticity of rib cage and rib stability. If rib bend is low, rib cage looks like barrel and elasticity of rib cage is low. Chest compression is higher CPR and if stability of ribs in chest cage is lower and the chest looks like a cone, is injured or is low-weight the rib bend is higher. So, chest compression in CPR is lower. According to the results,

we conclude that chest compression in CPR is different according to the mentioned factors and chest compression is not the same among all individuals.

In 2015, the latest instruction for CPR was published by the American Heart Association as a reference for CPR. According to the instructions the reviver should massage the heart with minimum depth of 2 inches or 5cm for adults. They should avoid massage with depth of 2.4 or 6cm and more than that, but results of the present study show that chest compression is affected by rib bend, skeletal abnormality in chest cage, injured weight, elasticity of rib cage and strength of ribs. According to those factors, chest compression in CPR may be lower than 2 inches or 5cm or more than 2.4 inches or 6cm, Therefore, results of this study are not consistent with instructions of the American Heart Association.

Acknowledgment: We would like to thank all of participants who cooperated in this research.

References

- 1- Berdowski J, Berg RA, Tijssen JG, Koster RW. Global incidences of out-of-hospital cardiac arrest and survival rates: Systematic review of 67 prospective studies. *Resuscitation*. 2010; 81(11):1479-87.
- 2- Sasson C, Rogers MA, Dahl J, Keller Mann AL. Predictors of survival from out-of hospital cardiac arrest: a systematic review and meta-analysis. *Circ Cardio vasc Qual Outcomes*. 2010; 3: 63–81.
- 3- Dysona K, Braya J, Smitha K, Bernarda S, Finn J: A systematic review of the effect of emergency medical service practitioners' experience and exposure to out-of-hospital cardiac arrest on patient survival and procedural performance. *Resuscitation*. 2014; 85: 1134–1141.

- 4- Stromsoe A, Andersson B, Ekstrom L, Herlitz J, Axelsson A. Education in cardiopulmonary resuscitation in Sweden and its clinical consequences. *Resuscitation*. 2010; 81(2): 211- 16.
- 5- Nolan JP, Hazinski MF, Billi JE, Boettiger BW, Bossaert L, de Caen AR, et al. Part 1: Executive summary: 2010 International consensus on cardiopulmonary resuscitation and emergency cardiovascular care science with treatment recommendations. *Resuscitation*. 2010; 81: 1–25.
- 6- Joshua C , Bond M, Shaikh S. Cardiopulmonary resuscitation update; Review article. *Emerg Med Clin North Am*. 2012; 30(1): 35-49.
- 7- Hossainian A, Daneshkohan A, Gusheh R. *First Aid and Emergency Medicine*. 1th ed. Tehran: Bustan Publishing; 2013.
- 8- Bonow RO, Mann DL, Zipes DP, Libby P. *Braunwald's Heart Disease*. USA: Saunders; 2008.
- 9- Mohsenpour M, Imani Z, Abdolkarimi M. The effect of education of cardiopulmonary resuscitation (C.P.R) on knowledge of nursing staff and C.P.R team members in a hospital in Kerman province. *J Qualitative Res Health Sci*. 2010; 9 (1, 2):1-7.
- 10- Tropy JM, Lynn C, Glass RM. JAMA patient page, cardiopulmonary resuscitation. *JAMA*. 2010; 304(13): 20-12.
- 11- Dysona K, Braya J, Smitha K, Bernarda S, Finn J: A systematic review of the effect of emergency medical service practitioners' experience and exposure to out-of-hospital cardiac arrest on patient survival and procedural performance. *Resuscitation*; 2014. 85: 1134–1141.
- 12- Hossainian A, Daneshkohan A, Gusheh R. *First Aid and Emergency Medicine*. 1st ed. Tehran: Bustan Publishing; 2013.
- 13- Goodrich C. Cardiopulmonary resuscitation: where are we now? *AACN Adv Critl Care*. 2009; 20(4):373-83.
- 14- Kleinman ME, Brennan EE, Goldberger ZD, Robert A, Swor RA, Terry M, et al. Part 5: Adult Basic Life Support and Cardiopulmonary Resuscitation Quality: 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2015; 132:S414-S435.
- 15- Idris AH, Guffey D, Pepe PE, Brown SP, Brooks SC, Callaway CW, et al. Chest compression rates and survival following out-of-hospital cardiac arrest. *Crit care med*. 2015;43(4):840-8
- 16- Update; Review Article. *Emergency Medicine Clinics of North America*. 2012; 30(1): 35-49.

The Effects of a Hypothermia Prevention Program on the Body Temperature and Shivering in Women Undergoing Cesarean Section

Fatemeh Bameri (1)
Ali Navidian (2)
Asadollah Shakeri (3)
Zahra Pishkarmofrad (4)

(1) Master student of Medical - Surgical Nursing, Department of Nursing and Midwifery, Zahedan University of Medical Sciences, Zahedan, Iran.

(2) Associate Professor, Pregnancy Health Research Center, Zahedan University of Medical Sciences, Zahedan, Iran.

(3) Anesthesiologist Professor, Zahedan University of Medical Sciences, Zahedan, Iran.

(4) Instructor, Community Nursing Research Center, Zahedan University of Medical Sciences, Zahedan, Iran

Corresponding author:

Zahra Pishkarmofrad

Community Nursing Research Center, Zahedan University of Medical Sciences, Zahedan, Iran

Email: Pishkarz@gmail.com

Received: January 30, 2018; Accepted: February 10, 2018; Published: March 1, 2018. Citation: Fatemeh Bameri et al. The Effects of a Hypothermia Prevention Program on the Body Temperature and Shivering in Women Undergoing Cesarean Section. World Family Medicine. 2018; 16(3):95-101. DOI: 10.5742/MEWFM.2018.93322

Abstract

Introduction and objective: Hypothermia is a common condition during general and spinal anesthesia which itself causes unpleasant complications including shivering, cardiovascular disorders, infection and delayed wound healing, coagulation disorders, delayed recovery, and prolonged hospitalization time. The present research aimed to study the effects of a hypothermia prevention program on the central body temperature and shivering in women undergoing a cesarean section.

Methodology: The present research was a quasi-experimental study in which 92 pregnant women undergoing cesarean section by spinal anesthesia in Ali-ibn Abi Talib Hospital of Zahedan during summer 2017 were purposively selected as the sample and randomly assigned to the intervention (hypothermia intervention program) and control (conventional care) groups. The participants were examined in terms of hypothermia and shivering and their central body temperature was measured 7 times. The obtained data were statistically analyzed using analysis of variance with repeated measures in SPSS-21.

Findings: The results showed that the pattern of body temperature changes over time was different in the two groups ($p=0.001$). The results also indicated that 23.9%, 30.4%, and 17.4% of patients in the control group experienced mild, moderate, and severe shivering, respectively. These figures for the intervention group were 6.5%, 19.6%, and 4.3%. These data suggest that there is a difference between the two groups in terms of shivering ($p=0.001$).

Conclusion: The study findings indicate that a hypothermia prevention program can greatly prevent the reduction in central body temperature and its complications, including shivering, in women undergoing a cesarean section. Hence, this inexpensive and effective care program is recommended to be used for patients undergoing major chest, abdominal, and pelvic surgery.

Key words: Hypothermia prevention program; Central body temperature; Cesarean section; Shivering

Introduction

Postoperative hypothermia, which refers to a decline in central body temperature below 36°C, is a serious and common complication caused by anesthesia and surgery that accompanies many postoperative side effects [1]. There are many risk factors for reduced body temperature during and after a surgery such as prolonged exposure of a large surface of skin and internal organs to cold air of operating room during the surgery [2], surgery type (opening of the chest, abdomen or pelvis), low ambient temperature of the operating room, infusion of a large volume of cold intravenous fluids, rinsing of the surgery site, breathing cold and dry gas and blowing cool air into the body cavities, duration of anesthesia, and female sex [3-5]. Recent studies have shown that more than 46% of patients undergoing abdominal or pelvic surgery develop hypothermia during the surgery that continues until entering the recovery room in one-third of them [6].

Shivering is a very important complication of hypothermia which occurs in about 40-60% of light anesthesia cases with different patterns of muscle activity [7]. In addition to increasing the oxygen consumption, shivering causes hypoxia, increased carbon dioxide production, blood pressure, intracranial pressure, intraocular pressure, intensified pain on the surgery site, and stitches opening [8].

In addition to shivering, other complications of hypothermia include cardiac ischemia, platelet and coagulation disorders, the susceptibility of surgical wounds to infection, a decrease in the metabolism of anesthetic drugs such as muscle relaxants, and prolonged hospitalization length [2, 9]. Many patients with hypothermia are complaining of cold after anesthesia as one of the worst surgical experiences [10]. Hypothermia prolongs the length of effect of inhaled and intravenous drugs as well as the duration of effect of nervous and muscle drugs [3].

Patients who are more prone to unintentional hypothermia include old people and children, female patients, patients with more risk of anesthesia (grades 3 to 4), and patients with cachexia, burn, adrenal glands failure, and hypothyroidism [11].

Caesarean section is one of the most common surgical procedures and its frequency from 4.5% of all deliveries in 1970 increased to 31.8% in 2007 [12-13].

Anesthetizing pregnant women for cesarean section, due to the effect of anesthetic drugs on vessels, body temperature regulation mechanisms, abdominal openness, and wetting of surgical coatings with blood and amniotic fluid, expose them to a further drop in body temperature [14].

Nowadays, different pharmaceutical and non-pharmaceutical solutions have been developed and used to prevent hypothermia. Some of these methods examined in previous studies include warming and moistening the air pathways [15, 16], warming the skin using warm coats [17], the use of a system of circulating water and compressed

air [17, 18], infusion of warm intravenous fluids, and warm rinsing [15, 19, 20].

Diagnosis of postoperative hypothermia by nurses is essential for the safe management of patients [21]. Since patient support is one of the roles of nurses and this is the responsibility of operative and anesthetic nurses in the operating and recovery room [22], it is necessary to apply solutions to prevent hypothermia and shivering. Given that few studies have been conducted about the effects of several interventions simultaneously on the prevention of hypothermia and shivering, the authors, after reviewing the operating room and anesthesia nursing literature and guidelines recommended by the American Society of Peri-Anesthesia Nurses for the prevention of unwanted postoperative hypothermia, decided to perform a hypothermia prevention program consisting of three types of inexpensive nursing care (warm prep solution, infusion of warm liquids, and the use of a recovery bed for patient admission after the surgery) without complication in order to reduce the severity of postoperative hypothermia and shivering and take effective steps towards the promotion of health and comfort of patients and prevention of hypothermia complications. The present research aimed to study the effects of a hypothermia prevention program on the central body temperature and shivering in women undergoing cesarean section by spinal anesthesia.

Methodology

The present research was a quasi-experimental study, with a clinical trial code of IRCT20171002036505N1, which was conducted on pregnant women undergoing cesarean section in Ali-ibn Abi Talib Hospital of Zahedan in the period between July and September 2017, after approval by Deputy of Research and Technology and Ethics Committee of Zahedan University of Medical Sciences.

Based on the incidence of shivering in previous studies and considering a confidence level of 95% and a test power of 90%, the sample size of each group was calculated to be 42 using the following equation. In addition, after assuming the possible attrition, the sample size was determined to be 92 (46 in each group).

$$n = \frac{(z_1 - \frac{\alpha}{2} + z_1 - \beta)^2 [p_1(1 - p_1) + p_2(1 - p_2)]}{(p_1 - p_2)} = 41/38$$

The participants were selected using convenience sampling method and based on the inclusion and exclusion criteria. Then they were randomly assigned to the intervention and control groups. The inclusion criteria were non-use of corticosteroids, non-steroidal anti-inflammatory drugs, and magnesium sulfate; non-affliction with thyroid disorders, diabetes, cardiovascular diseases, chronic hypertension, and preeclampsia; termination of pregnancy at the time of term (37 to 42 weeks), no fever or addiction, non-rupture of amniotic sac, polyhydramnios, oligohydramnios, and existence of no precaution to control body temperature through the tympanic membrane. The exclusion criteria also included the occurrence of any condition that affects the normal course of anesthesia and surgery, receiving

blood and blood products during the surgery, a substantial drop in blood pressure during the surgery (20% lower than before anesthesia), and prolongation of surgery time (more than one hour).

Data collection tools included an information registration form (patient's personal information, type of surgery, and type of anesthesia) and a checklist for recording the desired parameters in operating and recovery rooms. The validity of the information registration form was assessed using content validity and based on the views and comments of some faculty members. The reliability of devices and monitoring was also determined by measuring their accuracy, calibration, and sensitivity. In addition, post-anesthetic shivering was measured using the scale described by Crossley and Mahajan: 0 = no shivering; 1 = no visible muscle activity but piloerection, peripheral vasoconstriction, or both are present (other causes excluded); 2 = muscle activity in only one muscle group; 3 = moderate muscular activity in more than one muscle group but not generalized shaking; 4 = violent muscular activity that involves the whole body [24].

After receiving the necessary permission from the Research Ethics Committee of Zahedan University of Medical Sciences and the head of Ali-ibn Abi Talib Hospital, the researcher visited the operating room of this hospital and briefed the medical staff on the research objective and procedure. The participants were randomly assigned to the intervention and control groups. Participants in the control group received the routine operating room care, including Prep, Drep, and infusion of fluids at room temperature, and then were transferred to the recovery room with a blanket cover. Central body temperature was measured 7 times including before the beginning of anesthesia, after the induction of anesthesia and before the surgery, 30 minutes after the beginning of surgery, after the surgery, at the beginning of recovery, 30 minutes after the beginning of recovery, and 1 hour after the beginning of recovery. The occurrence of shivering in patients in the recovery room was examined by an experienced anesthesiologist. After completing the control group, 46 pregnant women who met the inclusion criteria were selected for the intervention group. Participants in this group went through the desired intervention as follows:

- Before the intervention, the participants were briefed on objectives and methodology and then a written consent form was obtained from them.
- As soon as placing on the operating room bed, participants were prepared using povidone-iodine heated up to 32°C.
- Injectable fluids prescribed by the anesthesiologist were heated up to 38-40°C by a warmer (KAVOOSH MEGA) and then were infused.
- After the end of the surgery, the participants were transferred to the recovery bed which was prepared half an hour before the recovery according to the standard method and warmed by three hot water bags.
- The central body temperature of participants was measured 7 times the same as the control group. The tympanic membrane temperature was measured using a thermometer (EMPEROR) in accordance with standard methods.

- The temperature and humidity of the operating room, recovery room, and the corridors were measured during the surgeries using a thermometer and a humidity meter and were maintained in the range of 23-24°C and 50-55%, respectively.

- The obtained data were statistically analyzed in SPSS-21. The data were described using descriptive statistics (mean, frequency, standard deviation, and percentage). To compare quantitative and qualitative demographic variables between groups, independent t-test and chi-square were used, respectively. In addition, analysis of variance with repeated measures was used to determine the effectiveness of the intervention. All statistical analyses were performed at the 0.05 level of significance.

Findings

The results showed that there was no significant difference between the control and intervention groups in terms of age, gestational age, duration of surgery, temperature and humidity of the operating room and recovery room, and volume of serum received ($p > 0.05$) (Table 1).

The central body temperature of mothers was measured 7 times and compared between the two groups (Table 2). The mean body temperature in the control group was 36.57°C after entering the operating room and reduced to 35.20°C 60 minutes after entering the recovery room. In the intervention group, these figures were 36.37°C and 36.32°C, respectively. The pattern of changes was not the same in the two groups and the reduction of mean body temperature in the control group was more than the intervention group. Except at the time of anesthesia induction that there was no significant difference between the two groups in the mean body temperature, it was significantly lower in the control group than the intervention group after the anesthesia induction until 60 minutes after entering the recovery.

The results of analysis of variance with repeated measures (Table 3) showed there was a significant difference between the control and intervention groups in terms of the mean body temperature ($f=37.56$, $df=1$, $p=0.001$), as the central body temperature of mothers in the control group was lower than that of the intervention group. This means that mothers who received the hypothermia prevention program during the surgery and recovery developed less hypothermia than those in the control group. On the other hand, the relationship between group and time was statistically significant ($f=394.961$, $df=1$, $p=0.001$). This suggests that the pattern of temperature variation was not the same in the two groups and its reduction was more in line with the occurrence of possible hypothermia in the control group. Therefore, it can be stated that the prevalence of hypothermia among mothers in the intervention group was lower than the control group. In fact, the hypothermia prevention program managed to cause a reduction in this condition during the cesarean section in the intervention group.

Table 1: Mean and standard deviation of individual and clinical characteristics of women undergoing cesarean section in intervention and control groups

Variable	Group	Control	Intervention	Independent t-test result
		Mean ± SD	Mean ± SD	
Age (year)		32.48±7.229	30.63±7.362	P=0.8
Gestational age (week)		38.13±1.147	38.22±0.867	P=0.1
Serum volume (liter)		2.924±0.2349	3.098±0.3269	P=0.2
Surgery length		0.8833±0.21156	0.8957±0.20051	P=0.5

Table 2: Mean and standard deviation of central body temperature women undergoing cesarean section in intervention and control groups

Time	Group	Control	Intervention
		Mean ± SD	Mean ± SD
After entering the operating room		36.547±0.2832	36.374±0.3654
After the induction of anesthesia		36.417±0.3696	36.318±0.4307
30 minutes after the beginning of surgery		35.650±0.4718	36.057±0.4113
After the end of surgery		35.359±0.4712	35.904±0.4221
After entering the recovery room		35.300±0.5038	35.917±0.4291
30 minutes later		35.917±0.4291	36.165±0.4196
60 minutes later		35.207±0.4090	36.326±0.3165

Table 3: Analysis of variance with repeated measures on central body temperature of women undergoing cesarean section before, during, and after the intervention in intervention and control groups

Source of change	Sum of squares	Degree of freedom	Mean	Test statistic	Significance level	Impact size	Test power
Time	46.007	1	46.007	556.048	0.001	0.861	1
Time + Group	32.697	1	32.697	394.961	0.001	0.814	1
Error	7.447	90	0.083				
Group	37.080	1	37.080	37.560	0.001	0.294	1
Error	88.850	90	0.987				

Table 4: Frequency distribution of shivering among women undergoing cesarean section in intervention and control groups

Shivering level	Group	Control		Intervention		Chi-square test result
		Frequency	Percentage	Frequency	Percentage	
No shivering		13	28.3	32	69.6	X ² = 17.281 P=0.001 df=3
Mild shivering		11	23.9	3	6.5	
Moderate shivering		14	30.4	9	19.6	
Severe shivering		8	17.4	2	4.3	
Total		46	100	46	100	

The highest frequency of shivering in the intervention group was related to "no shivering" (69.6%), and mild, moderate, and severe levels of shivering were observed in 6.5%, 19.6%, and 4.3% of participants in this group, respectively. In the control group, the highest frequency of shivering was found in the moderate level (30.4%). In addition, 23.9% and 17.4% of mothers experienced a mild and severe level of shivering and 28.3% of them had no

shivering (Table 4). The results showed that the pattern of shivering was not the same in the two groups, as 33 mothers in the control groups had shivering in different levels but only 14 mothers in the intervention group experienced shivering of different levels. The results of chi-square test showed that there was a significant difference between the two groups in terms of the frequency distribution of shivering ($p=0.001$).

Discussion

The study findings showed that the application of a hypothermia prevention program can prevent the occurrence of hypothermia and thereby shivering, as the reduction in central body temperature during the surgery and at the recovery room was significantly lower in the intervention group than the control. In addition, the frequency of shivering presented a significant difference between the groups, as the hypothermia prevention program caused a reduction in the occurrence of both hypothermia and shivering in the intervention group. This is consistent with the findings of similar studies.

Yokayama et al. (2009) conducted a study on women under cesarean section by spinal anesthesia who received intravenous fluids of 40°C from the delivery until 45 minutes later and compared them with a group of control patients who were treated with serum at room temperature. Their results showed that the central body temperature of participants in the intervention group was significantly higher than those in the control group [25]. The consistency of findings can be attributed to the warming of intravenous fluids and similarity of the anesthesia method.

Abbasi et al. (2011) studied the effects of general anesthesia and spinal anesthesia on central body temperature of mother and infant in cesarean section. They used intravenous fluids heated up to 37°C during the surgery and maintained the room temperature at 26°C. Their results indicated that mothers and infants of none of the two groups developed hypothermia during the surgery, while mild hypothermia was observed in both groups in the recovery room [26]. The reason for no obvious drop in body temperature during the surgery is the infusion of warm fluids. However, due to the application of no method to prevent hypothermia in the recovery room, a temperature reduction was observed at this stage.

The findings of Volnov et al. (2009) also demonstrated that warming intravenous fluids in heating compartments is as effective as warming them by the Hot Line heater. They also showed that increasing the temperature of intravenous fluids up to 41°C and 45°C has greater effects on maintaining the body temperature of mothers higher, but this solution has no impact on postoperative shivering [27]. The consistency between the results of Volnov et al. and findings of the present study can be attributed to the heating of intravenous fluids. A similar study was conducted by Behdad on women undergoing a cesarean section and the results showed that heating the intravenous fluids by a warmer up to 37°C prevented the occurrence of shivering and hypothermia for half an hour and one hour after entering the recovery room [28].

Chuckler et al. (2014) studied the effects of heated resistance mattress on hypothermia in women undergoing a cesarean section and reported that the use of this mattress reduces the prevalence of unwanted postoperative hypothermia [29]. Ashwandi et al. (2014) and XU HX et al. (2010) also showed that the infusion of warm intravenous

fluids prevents central body temperature drop and reduces the occurrence of post-anesthetic shivering in women undergoing a cesarean section or abdominal surgery [30, 31]. This is consistent with the findings of the present study. The study results also indicated that following the non-development of tangible hypothermia in women receiving the hypothermia prevention program, the incidence of shivering among them was significantly lower than those in the control group, as about 24% of participants in the intervention group and 48% of participants in the control group experienced a moderate and severe level of shivering. The results of several studies corroborate this finding. Ashwandi et al. (2011) showed that only 13% of women treated with warm serum felt shivering but 35% of women in the control group experienced shivering [32]. Troussian et al. (2015) conducted a systematic review study titled "Prevention of unwanted hypothermia complications during the surgeries" and stated that it's better to actively warm up the patients 20-30 minutes before the surgery, and, if blood transfusion is required at a rate of 500 ml/hour, it's better to warm the blood before transfusion. In addition, appropriate drugs can be prescribed in the case of shivering [33]. Dabir et al. (2010) showed that halothane, an anesthetic preservative, injection of higher volumes of intravenous crystalloids during surgery, and spinal anesthesia increases the risk of postanesthetic shivering in women's surgical procedures, while hypothermia is not associated with shivering. In their study, no specific intervention other than routine care was performed and women undergoing different surgeries with different anesthetics and medications were studied. They reported that the overall prevalence of shivering among the participants was equal to 18.5% [34].

It is very necessary for nurses to be aware of physiological effects of hypothermia on patients undergoing a surgery and pay special attention to hemodynamic parameters of patients. In this regard, nurses can maintain the body temperature of patients before, during and after the surgery through precautionary measures and different techniques.

One of the limitations of this study was the possible instability of temperature and humidity in the operating and recovery rooms. However, it was tried to measure these variables using standard tools and maintain them in the normal range in coordination with the operating room staff. In addition, the occurrence of rare complications of surgery and anesthesia for patients was another limitation of this research, in this case, the patient was replaced by another one who met the inclusion criteria.

Conclusion

The hypothermia prevention program was effective in the control of hypothermia and shivering caused by spinal hypothermia in women undergoing a cesarean section. Considering the positive effect of hypothermia prevention program, it is recommended to use interventions to reduce the complications of postoperative hypothermia in a large number of patients. In addition, the effects of this preventive

program on the occurrence of hypothermia and shivering caused by surgeries in adults and children undergoing major abdominal and chest surgeries can be an area of research for future studies.

Acknowledgements:

The present paper was extracted from a thesis approved and financially supported by Zahedan University of Medical Sciences (a research code of 8319 and an ethics code of IR.Zaums.Rec.1396.59). The authors would like to thank Deputy of Research and Technology of this university, the staff of operating room of Ali-ibn Abi Talib Hospital, and all patients who helped us in this research.

References

1. Al-Qahtani AS, Messahel FM. Benchmarking inadvertent perioperative hypothermia guidelines with the National Institute for Health and Clinical Excellence. *Saudi Medical Journal* 2011; 32(1):27–31. [PUBMED: 21212912]
2. Madrid E, Urrutia G, Roqué I Figuls M, Pardo-Hernandez H, Campos JM, Paniagua P, Maestre L, et al. Active body surface warming systems for preventing complications caused by inadvertent perioperative hypothermia in adults. *Cochrane Database Syst Rev*. 2016 Apr 21; 4:CD009016. Doi: 10.1002/14651858.CD009016.pub2.
3. Reynolds L, Beckmann J, Kurz A. Perioperative complications of hypothermia. *Best Pract Res Clin Anaesthesiol*. 2008 Dec; 22(4):645-57.
4. Campbell G, Alderson P, Smith AF, Warttig S. Warming of intravenous and irrigation fluids for preventing inadvertent perioperative hypothermia. *Cochrane Database Syst Rev*. 2015 Apr 13 ;(4):CD009891. Doi: 10.1002/14651858.CD009891.pub2.
5. Kiekkas P, Pouloupoulou M, Papahatzi A, Souleles P. Effects of hypothermia and shivering on standard PACU monitoring of patients. *AANA J*. 2005 Feb; 73(1): 47-53.
6. Hedrick TL, Heckman JA, Smith RL, Sawyer RG, Friel CM, Foley EF. Efficacy of protocol implementation on incidence of wound infection in colorectal operations. *J Am Coll Surg* 2007; 205(3):432-8.
7. Hosseinzadeh H, Eidi M, Kolahdouzan KH, Pessianian I, Dadashzadeh S. The effect of preoperative hydrocortisone on the rate and severity of post anesthesia shivering. *Pharmaceutical Sciences*, autumn (2005) 33-37.
8. Alfonsi P. Postanaesthetic shivering. *Epidemiology, Pathophysiology and approaches to prevention and management*. *Minerva Anesthesiol* 2003 may; 69(5):438-42.
9. Melling AC, Ali B, Scott EM, Leaper DJ. Effects of preoperative warming on the incidence of wound infection after clean surgery: a randomised controlled trial. *Lancet* 2001; 358(9285):876-880.
10. Widman J, Hammarqvist F, Sellden E. Amino acid infusion induces thermogenesis and reduces blood loss during hip arthroplasty under spinal anesthesia. *Anesth Analg* 2002; 95(6):1757-1762.
11. Sessler D. Complications and treatment of mild hypothermia. *Anesthesiology* 2001; 95:531–43. [PUBMED: 9148354]
12. Martin JA, Hamilton BE, Ventura SJ. Births: preliminary data for 2007. *Natl Vital Stat Rep* 2009; 57(12):1-18.
13. MacDorman MF, Menacker F, Declercq E. Cesarean birth in the United States: epidemiology, trends, and outcomes. *Clin Perinatol* 2008 Jun; 35(2):293-307. 3
14. Andrzejowski J, Hoyle J, Eapen G, Turnbull D. Effect of prewarming on post-induction core temperature and the incidence of inadvertent perioperative hypothermia in patients undergoing general anaesthesia. *Br J Anaesth*. 2008 Nov; 101(5): 627-31.
15. Miller RD, Eriksson LI, Fleisher LA, Wiener-Kronish JP, Young WL. *Miller's anesthesia*. 7th ed. New York: Churchill Livingstone; 2010.
16. Hoseinkhan Z, Behzadi M. [Morphine, Pethidine and Fentanyl in postoperative shivering control: a randomized clinical trial]. *Tehran University Medical Journal*. 2007; 64(12): 57-63. (Persian)
17. Movassaghi Gh. R, Palideh H. [Comparison between anti-shivering effects of Meperidine and Methadone]. *The Razi Journal of Medical Sciences*. 2002; 9(28): 107-112. (Persian)
18. Kranke P, Eberhart LH, Roewer N, Tramer MR. Postoperative shivering in children: a review on pharmacologic prevention and treatment. *Paediatr Drugs*. 2003; 5(6): 373-83.
19. Bhattacharya PK, Jain RK, Agarwal RC. Post anesthesia shivering (PAS): A review. *Indian J. Anaesth*. 2003; 47(2): 88-93.
20. Hasankhani H, Mohammadi E, Nighzade MM, Moazzami F, Mokhtari M. The Effects of Warming Intravenous Fluid on Perioperative Hemodynamic Status, Postoperative Shivering and Recovery in Orthopedic Surgery. *Shiraz E-Medical Journal*. 2004 Jul; 5(3).
21. Fikkert JA. Postoperative Responses to Hypothermia: Nursing Considerations. Chapter *Cardiac Surgery*. 1992. PP: 117-125.
22. Andrzejowski J, Hoyle J, Eapen G, Turnbull D. Effect of prewarming on post-induction core temperature and the incidence of inadvertent perioperative hypothermia in patients undergoing general anaesthesia. *Br J Anaesth*. 2008 Nov; 101(5): 627-31.
23. Pikus E, Hooper VD. Postoperative rewarming: are there alternatives to warm hospital blankets. *J Perianesth Nurs*. 2010; 25(1):11-23.
24. Crossley AW. Six months of shivering in a district general hospital. *Anaesthesia*. 1992; 47(10): 845-8.
25. Yokoyama K, Suzuki M, Shimada Y, Matsushima T, Bito H, Sakamoto A. Effect of administration of pre-warmed intravenous fluids on the frequency of hypothermia following spinal anesthesia for Cesarean delivery. *J Clin Anesth* 2009; 21(4):242-8.
26. Abbasi H.R, Ayatollah V, Behdad Sh, Zare H, Trzjany M, Heyranizadeh N. The effect of general anesthesia and spinal anesthesia for cesarean delivery on maternal and neonatal the core temperature. *Journal of Anesthesiology and Pain* Fall 2011; 5 (2) (Persian)
27. Woolnough M, Allam J, Hemingway C, Cox M, Yentis SM. Intra-operative fluid warming in elective caesarean section: a blinded randomized controlled trial. *Int J Obstet Anesth*. 2009 Oct; 18(4):346-51.

28. Behdad Sh, Abdollahi M.H, Ayatollah V, Hajjesmaeili M.R, Molanouri H, Heyranizadeh N. The effect of heating liquids on the temperatures central mother cesarean section delivery. *Journal of Anesthesiology and Pain Summer* 2012; 8 (2).(Persian)
29. Chakladar A, Dixon MJ, Crook D, Harper CM. The effects of a resistive warming mattress during caesarean section: a randomized, controlled trial. *International Journal of Obstetric Anesthesia* (2014) 23, 309–316.
30. Oshvandi Kh, Hasan Shiri F, Fazel MR, Safari M, Ravari A. The effect of pre-warmed intravenous fluids on prevention of intraoperative hypothermia in cesarean section. *Iran J Nurs Midwifery Res.*2014 Jan-Feb; 19(1):64-69. (Persian)
31. Xu HX, You ZJ, Zhang H, Li Z. Prevention of hypothermia by infusion of warm fluid during abdominal surgery. *J Perianesth Nurs* 2010; 25(6):366-70.
32. Oshvandi Kh, Hasan Shiri F, Safari M, Safari M, Fazel MR, Salavati M, Hassan Tehrani T. Effect of Pre-warmed Intravenous Fluid Therapy on Prevention of Postoperative Shivering after Caesarean Section. *Journal of HAYAT.*2011; 17(4):5-15.
33. Torossian A, Bräuer A, Höcker J, Bein B, Wulf H, Horn E-P. Preventing Inadvertent Perioperative Hypothermia. *Deutsches Ärzteblatt International.* 2015;112(10):166-172. doi:10.3238/arztebl.2015.0166.
34. Dabir Sh, Parsa T, Radpay B. The Incidence of Postanesthesia Shivering and Clinical Relevant Factors in Women in Javaheri Hospital in Tehran. *J Mazand Univ Med Sci* 2010; 20(78): 42-48 (Persian).

Comparison of *Bifidobacterium* spp. and *Lactobacillus* spp. Count in Faeces of Patients with Type 2 Diabetes Mellitus and healthy people

Abdullah Aliloo (1, 2, 3)

Shahram Arbabi (2, 3)

Akbar Aliasgharzadeh (1)

Reza Ghotaslou (1,2, 3)*

(1) The Endocrine Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

(2) The Liver and Gastroenterology Diseases Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

(3) Department of Microbiology, School of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran

Corresponding author:

Reza Ghotaslou,

The Liver and Gastrointestinal Diseases Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

Telefax: + 984133364661.

Email: rzgottaslo@yahoo.com

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Reza Ghotaslou, Shahram Arbabi, Akbar Aliasgharzadeh Abdullah Aliloo. Comparison Of Bifidobacterium SPP. and Lactobacillus SPP. Count In Faeces Of Patients With Type 2 Diabetes Mellitus And Healthy People. World Family Medicine. 2018; 16(3):102-106. DOI: 10.5742/MEWFM.2018.93316

Abstract

Type 2 diabetes mellitus is a metabolic disease that is associated with factors such as nutrition and lifestyle. Recent studies have shown a relationship between normal intestinal flora and diabetes. The aim of this study was to compare the number of different species of *Lactobacillus* and *Bifidobacterium* in Type 2 diabetic patients and healthy individuals. From February to October 2015, 20 patients with Type 2 diabetes mellitus and 20 healthy individuals as controls were selected. To distinguish these two groups, 2-hour postprandial glucose test, fasting blood sugar and glycosylated hemoglobin in both groups were measured. Fresh fecal samples were cultured on selective mediums for identification of 4 species of *Lactobacillus* (*L. acidophilus*, *L. salivarius*, *L. fermentum*, and *L. reuteri*), and 3 species of *Bifidobacteria* (*B. langum*, *B. bifidum*, and *B. adolescentis*). To determine the absolute number of Bifidobacterium and Lactobacillus spp., in gut microbiota, pour plate assay was used.

Interestingly, comparison of *Bifidobacterium* and *Lactobacillus* spp. in the two groups showed a significant decrease in most species except *B. adolescentis* in Type 2 diabetic patients. In studied samples, *L. reuteri* was not found in diabetic patients. The study shows that imbalance in the intestinal microbiota can be one of the risk factors for Type

2 diabetes mellitus. Also, it suggests that suitable species of *Lactobacillus* and *Bifidobacterium* can be used in the diet of Type 2 diabetes mellitus as a treatment approach.

Key words: *Bifidobacterium*; *Lactobacillus*; Probiotic, Microbiota; Type 2 diabetes mellitus; Gut

Introduction

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disease characterized by increased blood glucose and therefore emergence of related diseases [1]. Complications such as cardiovascular disease, nephropathy and retinopathy can lead to conflict and high mortality [1, 2]. According to the World Health Organization (WHO), there are 346 million people with diabetes in the world. Without any intervention, it is likely to double by 2030. Furthermore, current treatments are expensive and painful, and investigators are looking for easier and cheaper ways to combat this disease [2].

Recently, meta-genetics have defined a hypothesis. More than 100 trillion microorganisms in the human gut and feces make up nearly 60% and 150 times the mass of their eukaryotic genome [3, 4]. This profile shows that more than 99% of microbiota are anaerobes and 98% contain several families including *Firmicutes* (64%), *Bacteroidetes* (23%), *Proteobacteria* (8%) and *Actinobacteria* spp. (3%) [3, 5]. Normal intestinal flora can improve the intestinal peristalsis, food intake, drug metabolism, vitamins and hormones endogen, and also prevent toxic and carcinogenic effects. The changes in the intestinal flora, towards Gram-negative bacteria, cause the release of endotoxins. Thus, unusual changes in diet can have a significant impact on the endotoxin cycle, and this is evident in the case of diabetics [6]. Probiotics such as *Bifidobacteria* and *Lactobacilli* are microorganisms that live in the small intestine and colon. In fact, adding probiotics and prebiotics in the diet, may be a non-drug alternative to treat chronic inflammatory diseases such as T2DM [7]. According to the data, the difference between *Lactobacillus* and *Bifidobacterium* spp. among diabetic patients was observed in two studies [8, 9]. In this case, it is clear that there is need for further studies to investigate this further. The aim of the present study is to determine the difference between *Bifidobacterium* and *Lactobacillus* spp. in T2DM and healthy people.

Materials and methods

1. Subjects

During February to October 2015, 20 patients with T2DM and 20 healthy subjects, of similar body mass index (BMI), were selected from Imam Reza Hospital in Tabriz, Iran; confirmed by Endocrinologist. All patients and healthy individuals were confirmed by testing of fasting blood sugar (FBS), 2-hour postprandial blood glucose test (2-HPPBGT) and glycosylated hemoglobin (HbA1c) by a standard enzymatic assay (Randox Laboratories Ltd., and UK) [4, 8, 10]. Participants did not take probiotics or prebiotics before sampling, and were between 30 to 80 years old (Table-1). The eating habits/nutrition of the both groups was similar. The exclusion criteria were antibiotics use, the presence of severe infections, acute gastrointestinal disorders such as constipation, diarrhea and abdominal pain 2 weeks prior to fecal sampling; and chronic intestinal inflammatory disease, heart failure, kidney diseases, autoimmune diseases, and hepatitis B

and C. This study was approved by the Ethical Committee of Tabriz University of Medical Sciences (9371, 4 Aug 2014).

2. Stool sample collection

Stool sterile containers were given to the participants. The fresh stool samples were collected in the morning and were promptly transferred to the microbiology laboratory. One gram of each sample was diluted in 9 ml of sterile saline solution (0.85% (m/v) NaCl) supplemented with 0.05% L-cysteine (MERCK, Germany) and mixed thoroughly. From each sample, serial dilutions (10 fold) were made [11].

3. Culture and Identification of Lactobacilli and Bifidobacteria spp.

To obtain the absolute count of *Lactobacillus* and *Bifidobacterium* spp., standard quantitative plating was used. For *Lactobacilli* and *Bifidobacterium* count, MRS agar medium (MERCK, Germany) and *Bifidobacterium* agar medium (MERCK, Germany) were used, respectively. The plates were placed in anaerobic jars and favorable conditions (0% = O₂, 10% = CO₂, 10% = H₂) with anoxomat (MART, Netherland) and specimens were created. The plates were incubated at 37°C for 72 hours.

Generally, identification of *Lactobacillus* and *Bifidobacterium* spp. are based on cell morphology, biochemical tests, enzyme activity and ability to use carbohydrates [11, 12]. Finally, to detect *Bifidobacterium* spp., the determination of fructose-6-phosphate phosphoketolase enzymes described by Scardovi (1986) and also resistance to mupirocin disk, the most important phenotypic confirmatory tests were used [13]. To establish the *Lactobacillus* and *Bifidobacterium* spp., carbohydrate fermentation tests were performed [14].

4. Statistical analysis

All data were analyzed by SPSS software version 20.0 (SPSS Inc, Chicago, IL, USA). Differences between groups were compared using t- test and ANOVA test. The two-tailed χ^2 test and Fisher's exact test were used for categorical data. A p-value of ≤ 0.05 was considered to be significant.

Results

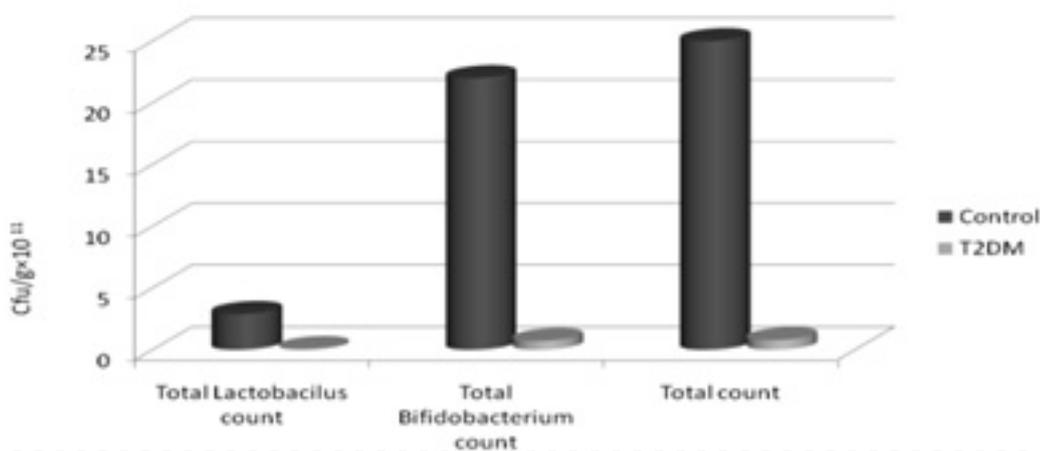
In this study, 20 patients with T2DM and 20 healthy controls were studied. Anthropometric characteristics showed that FBS in T2DM patients is significantly different from the control group (158.4 \pm 37.02 vs. 85.3 \pm 6.7, p-value <0.000), and the HbA1c also has a great difference between the two groups (5.54 \pm .42 vs. 7.7 \pm .63, p-value <0.029). These differences between the two groups are reasonable [Table-1 - next page].

Four species of *Lactobacillus* spp. (*L. acidophilus*, *L. salivarius*, *L. fermentum* and *L. reuteri*), and 3 *Bifidobacteria* spp. (*B. langum*, *B. bifidum* and *B. adolescentis*) were identified in the fecal samples. In the studied samples, *L. reuteri* was not observed in diabetic patients. The analysis of *Lactobacillus* and *Bifidobacterium* spp. count between the two groups show the differences in the most species

Table: 1. Demographic and laboratory data

Parameter	Control	T2DM	P-value
Sex (M/F)	10/10	10/10	1.00
Age (years)	54 ± 12	55 ± 12.50	0.93
BMI (kg/m ²)	24 ± 3.1	24.60 ± 3.50	0.46
2-HPPBGT (mg/dL)	102.20 ± 12.0	212.40 ± 48.90	0.004
FBS (mg/dL)	85.3 ± 6.7	158.4 ± 37.02	0.001
HgA1c (%)	5.54 ± 0.42	7.7 ± 0.63	0.02

M, male; F, female; BMI, body mass index; 2-HPPBGT, 2-hour postprandial blood glucose test; FBS, fasting blood sugar; HbA1c, glycosylated hemoglobin A1c

Figure 1: The total *Lactobacillus* and *Bifidobacterium* spp. Count in the stool of patients with Type 2 Diabetes Mellitus and healthy people

[Figure-1]. No significant changes in *B. adolescentis* numbers were noted. The results of the study are presented in Table 2. The total number of *Lactobacillus* and *Bifidobacterium* spp. in patients with T2DM was lower than the healthy group; there was a significant difference between the two groups (P-value ≤ 0.05).

Discussion

In the present study, we examined the differences between the counts of *Lactobacillus* and *Bifidobacterium* spp. in stool samples of T2DM and healthy groups. This study showed that there was a significant decrease in the count of *Lactobacillus* and *Bifidobacterium* spp. (except *B. adolescentis*) in patients with T2DM.

Currently, the reason for gut microbiota difference between healthy and T2DM patients is uncertain; however the influence of intestine microbiota on metabolism and nutrition absorption has been suggested as a potential mechanism. Otherwise, an imbalance in gut microorganisms may alter the contact to diabetogenic environmental chemical compounds. The studies in mice with high fat diet has shown the insulin resistance and inflammatory reactions associated with lipopolysaccharide of Gram-negative bacteria [15]. Additionally, current reports have also shown that probiotics and prebiotics have a significant role in the treatment of gastrointestinal disorders due to immune-inflammatory effects and prevent some infectious diseases. It also is a promising hypothesis that the use

of probiotics in order to prevent T2DM, can be effective [16]. However, few studies have been undertaken in order to determine the differences in the number of beneficial intestinal bacteria between diabetic and healthy individuals. In a study conducted on 16 Type 1 diabetic patients and 16 healthy children, the combination of intestinal bacteria was studied by quantitative Real-time PCR. Similar to our study, the beneficial bacteria such as *Bifidobacterium* and *Lactobacillus* spp were observed. In diabetes patients the level was significantly lower than in healthy children [9]. In a study conducted by Le et al., 50 patients with T2DM and 30 healthy controls were selected from south China. *Lactobacillus* spp. levels in diabetic patients were significantly more than in the control group. In contrast, in type 2 diabetic patients, total count of *Bifidobacterium* genus was 7%, and *B. adolescentis* was less than 12% of the control individuals [8]. Although, in comparing the two groups the reduced level of *Bifidobacterium* spp. in both studies [8, 9] was shown, in some species of *Lactobacillus*, there was a significant difference. As in our study, unlike the Le et al study [8] (except *L. casei* which was decreased), the reduction of *Lactobacillus* spp. can be seen. The administration of *L. casei* in obese mice has reduced tolerance to glucose, however exact *Lactobacillus* spp. role in metabolic diseases still remains unknown [17].

Increased blood sugar in people with diabetes is normally associated with insulin resistance and it is as one of the risk factors in the pathophysiology of T2DM. Several animal

Table: 2. Comparison of bacteria count between controls and diabetic patients. CFU, colony forming unit; gr, gram; SD, standard deviation; T2DM, type 2 diabetes mellitus

Bacterial counts	Control cfu/gr \pm SD	T2DM cfu/gr \pm SD	P-value
<i>L. acidophilus</i> $\times 10^{10}$	22 \pm 8.1	0.54 \pm 0.33	0.000
<i>L. salivarius</i> $\times 10^{10}$	3.3 \pm 1.8	0.15 \pm 0.09	0.001
<i>L. fermentum</i> $\times 10^{10}$	3.9 \pm 1.5	0.07 \pm 0.05	0.000
<i>L. reuteri</i> $\times 10^9$	1.8 \pm 1.1	0	0.001
<i>B. longum</i> $\times 10^{11}$	22 \pm 8.1	0.61 \pm 0.33	0.000
<i>B. bifidum</i> $\times 10^{10}$	4.2 \pm 2.6	1.0 \pm 0.74	0.036
<i>B. adolescentis</i> $\times 10^8$	15 \pm 1.0	2.0 \pm 1.9	0.58
Total <i>Lactobacillus</i> spp. $\times 10^{10}$	29 \pm 10	0.76 \pm 0.45	0.000
Total <i>Bifidobacterium</i> spp. $\times 10^{11}$	22 \pm 8.2	0.72 \pm 0.40	0.000
Total <i>Lactobacillus</i> and <i>Bifidobacterium</i> spp. $\times 10^{11}$	25 \pm 8.8	0.79 \pm 0.41	0.000

studies on the effect of probiotics for reducing insulin resistance have had conflicting results [18-21]. In human studies, the results were not satisfactory after administration of probiotics in patients with insulin resistance [22-24], but in some studies it was satisfactory [6, 25]. This difference in results may be due to using the different species of probiotics, as well as the duration and amount of probiotic administration. It would seem that researchers who have reduced the normal intestinal flora and have used different species of probiotics have achieved a better result. These studies also suggest that pro-inflammatory factors play an important role in regulating insulin resistance, which is influenced by probiotics [25, 26].

Since the importance of T2DM is increasing in the world, T2DM management is one of the main problems of human health. It seems that appropriate use of probiotics, significantly reduces the inflammatory effects of metabolic diseases like T2DM, and can be used as a convenient and inexpensive therapeutic strategy. Also, it can be used as a prophylactic agent in metabolic diseases by adding it to the diet of healthy people.

Here, solely *Bifidobacterium* and *Lactobacillus* spp. were studied, but the gut has several different microbiota. Thus, it would be extremely advisable that other normal flora should be studied in order to determine the effect of normal flora on T2DM. We also suggest the use of more

accurate methods such as molecular assays, because some microbiota are fastidious or non-cultivable. We recommend performing more study particularly on the mechanisms, more in vivo and randomized clinical trial searches, may help to identify the pathogenesis and design a program to control T2DM.

Conclusion

In the present study, *Lactobacillus* and *Bifidobacterium* spp. were predominant in the healthy group, and the number of probiotic bacteria in the gut had a significant reduction in type 2 diabetic patients. The reduction was the same in the most of *Lactobacillus* and *Bifidobacterium* species. These results point towards a potential role for *Lactobacillus* and *Bifidobacterium* spp. in the pathophysiology of diabetes.

Acknowledgment

This article was written based on a dataset of an M.Sc thesis, registered at Tabriz University of Medical Sciences, Tabriz, Iran. The authors gratefully acknowledge Dr. Farajollahi A. for providing organizational help and Dr. Bannazadeh Baghi for English editing.

References

1. Shrivastava, S.R., P.S. Shrivastava, and J. Ramasamy, Role of self-care in management of diabetes mellitus. *Journal of Diabetes & Metabolic Disorders*, 2013. 12(1): p. 1.
2. Wild, S., et al., Global prevalence of diabetes estimates for the year 2000 and projections for 2030. *Diabetes care*, 2004. 27(5): p. 1047-1053.
3. Barengolts, E., Vitamin D and prebiotics may benefit the intestinal microbacteria and improve glucose homeostasis in prediabetes and type 2 diabetes. *Endocrine Practice*, 2013. 19(3): p. 497-510.
4. Burcelin, R., et al., Gut microbiota and diabetes: from pathogenesis to therapeutic perspective. *Acta diabetologica*, 2011. 48(4): p. 257-273.
5. Guarner, F. and J.-R. Malagelada, Gut flora in health and disease. *The Lancet*, 2003. 361(9356): p. 512-519.
6. Alokail, M.S., et al., Effects of probiotics in patients with diabetes mellitus type 2: study protocol for a randomized, double-blind, placebo-controlled trial. *Trials*, 2013. 14(1): p. 1.
7. Farnworth, E., et al., Growth of probiotic bacteria and bifidobacteria in a soy yogurt formulation. *International journal of food microbiology*, 2007. 116(1): p. 174-181.
8. Lê, K.-A., et al., Alterations in fecal *Lactobacillus* and *Bifidobacterium* species in type 2 diabetic patients in Southern China population. *Frontiers in physiology*, 2013. 3: p. 496.
9. Murri, M., et al., Gut microbiota in children with type 1 diabetes differs from that in healthy children: a case-control study. *BMC medicine*, 2013. 11(1): p. 1.
10. Zeuthen, L.H., H.R. Christensen, and H. Frøkiær, Lactic acid bacteria inducing a weak interleukin-12 and tumor necrosis factor alpha response in human dendritic cells inhibit strongly stimulating lactic acid bacteria but act synergistically with gram-negative bacteria. *Clinical and Vaccine Immunology*, 2006. 13(3): p. 365-375.
11. Hoque, M., et al., Isolation, identification and analysis of probiotic properties of *Lactobacillus* spp. from selective regional yoghurts. *World Journal of Dairy & Food Sciences*, 2010. 5(1): p. 39-46.
12. Mitsuoka, T., Taxonomy and ecology of bifidobacteria. *Bifidobacteria and Microflora*, 1984. 3(1): p. 11-28.
13. Turrone, F., et al., Global genome transcription profiling of *Bifidobacterium bifidum* PRL2010 under in vitro conditions and identification of reference genes for quantitative real-time PCR. *Applied and environmental microbiology*, 2011: p. AEM. 06352-11.
14. Scardovi, V., Genus *bifidobacterium*. *Bergey's manual of systematic bacteriology*, 1986. 2: p. 1418-1434.
15. Cani, P.D., et al., Selective increases of bifidobacteria in gut microflora improve high-fat-diet-induced diabetes in mice through a mechanism associated with endotoxaemia. *Diabetologia*, 2007. 50(11): p. 2374-2383.
16. Wallace, T.C., et al., Human gut microbiota and its relationship to health and disease. *Nutrition Reviews*, 2011. 69(7): p. 392-403.
17. Naito, E., et al., Beneficial effect of oral administration of *Lactobacillus casei* strain Shirota on insulin resistance in diet-induced obesity mice. *Journal of applied microbiology*, 2011. 110(3): p. 650-657.
18. Hsieh, F.-C., et al., Oral administration of *Lactobacillus reuteri* GMNL-263 improves insulin resistance and ameliorates hepatic steatosis in high fructose-fed rats. *Nutrition & metabolism*, 2013. 10(1): p. 1.
19. Huang, H.-Y., et al., Supplementation of *Lactobacillus plantarum* K68 and fruit-vegetable ferment along with high fat-fructose diet attenuates metabolic syndrome in rats with insulin resistance. *Evidence-Based Complementary and Alternative Medicine*, 2013. 2013.
20. Tanida, M., et al., Injection of *Lactobacillus casei* strain Shirota affects autonomic nerve activities in a tissue-specific manner, and regulates glucose and lipid metabolism in rats. *Journal of diabetes investigation*, 2014. 5(2): p. 153-161.
21. Tomaro-Duchesneau, C., et al., Effect of orally administered *L. fermentum* NCIMB 5221 on markers of metabolic syndrome: an in vivo analysis using ZDF rats. *Applied microbiology and biotechnology*, 2014. 98(1): p. 115-126.
22. Asemi, Z., et al., Effect of multispecies probiotic supplements on metabolic profiles, hs-CRP, and oxidative stress in patients with type 2 diabetes. *Annals of Nutrition and Metabolism*, 2013. 63(1-2): p. 1-9.
23. Ejtahed, H., et al., Effect of probiotic yogurt containing *Lactobacillus acidophilus* and *Bifidobacterium lactis* on lipid profile in individuals with type 2 diabetes mellitus. *Journal of dairy science*, 2011. 94(7): p. 3288-3294.
24. Yousefinejad, A., Z. Mazloom, and M.H. Dabbaghmanesh, Effect of probiotics on lipid profile, glycemic control, insulin action, oxidative stress, and inflammatory markers in patients with type 2 diabetes: a clinical trial. *Iranian journal of medical sciences*, 2013. 38(1): p. 38-43.
25. Matsuzaki, T., et al., Antidiabetic effects of an oral administration of *Lactobacillus casei* in a non-insulin-dependent diabetes mellitus (NIDDM) model using KK-Ay mice. *Endocrine journal*, 1997. 44(3): p. 357-365.
26. Yadav, H., S. Jain, and P. Sinha, Effect of skim milk and dahi (yogurt) on blood glucose, insulin, and lipid profile in rats fed with high fructose diet. *Journal of medicinal food*, 2006. 9(3): p. 328-335.

Epidemiologic characteristics and outcomes of renal transplantation in hospitals affiliated to Kermanshah University of Medical Sciences, Kermanshah, Iran: 1989-2015

Sakineh Ghorbani (1)
 Afshin Goodarzi (2)
 Afshin Almasi (3)
 Ali Soroush (4)
 Bahram Samadzadeh (5)
 Mehrdad payandeh (6)
 Azadeh Foroughinia (2)

1-Medical bone marrow research center, Kermanshah University of Medical Sciences, Kermanshah, Iran

2-Department of Emergency Medicine, School of Paramedicine, Kermanshah University of Medical Sciences, Kermanshah, Iran.

3-Department of Biostatistics, School of Public Health, Kermanshah University of Medical Sciences, Kermanshah, Iran

4- Department of Sports Medicine and Rehabilitation, Kermanshah University of Medical Sciences, Kermanshah, Iran

5-Department of Urology, Kermanshah University of Medical Sciences, Kermanshah, Iran

6- Department of Hematology and Medical Oncology, Kermanshah University of Medical Sciences, Kermanshah, Iran

Corresponding author:

Afshin Goodarzi,
 Department of Emergency Medicine, School of Paramedicine,
 Kermanshah University of Medical Sciences,
 Kermanshah, Iran

Email: afshingoodarzy@yahoo.com

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Ghorbani S. et al. Epidemiologic characteristics and outcomes of renal transplantation in hospitals affiliated to Kermanshah University of Medical Sciences, Kermanshah, Iran: 1989-2015. *World Family Medicine*. 2018; 16(3):107-112.
 DOI: 10.5742/MEWFM.2018.93317

Abstract

Background and Objective: Renal transplantation outcomes are affected by variables including age and gender of recipient and donor, tissue matching, background conditions, health status before transplantation, comorbidities of recipients, surgeon's experience and expertise, and nature and extensiveness of immunosuppressive therapy. The objective of this study was to investigate the effective factors and outcomes of renal transplantation in patients who received this therapy in Kermanshah University affiliated hospitals from 1989 to 2015.

Methods: This multi-center study included medical records of all patients who received renal transplantation during the study period. The data were analyzed using SPSS software (ver. 19.0). Central and dispersion indices were used to express continuous variables. The categorical data were reported using frequency and percentage. The chi-squared test and independent t test were used to analyze data.

Results: The most common cause of chronic kidney disease was glomerulonephritis (42.1%). About 0.2% was due to Sport Supplemental Products. The highest number of kidney rejection was documented in the first 6 months after transplantation (10.06%). There was no significant difference between age groups ($P= 0.15$) and gender ($P= 0.12$) regarding survival of the recipients.

Conclusion: Despite improvement regarding irreversible transplanted kidney rejection compared to previous studies in the studied centers, the outcomes in particular at the first 6-month period is not satisfactory. Also, mortality rate was higher in comparison to other reports.

Key words: Epidemiology; renal transplantation; chronic kidney disease

Introduction

End-stage renal disease (ESRD) is the most severe form of chronic kidney disease (CKD). ESRD is defined as irreversible decline in renal function (1).

Diabetes mellitus, hypertension and chronic glomerular diseases are common causes of ESRD (2). The incidence of this disease is different in different parts of the world, but in general its incidence has been reported to be more than 200 cases per million people a year (3). In the United States, the unadjusted prevalence of CKD with stages of 1 to 5 (except ESRD) between 2011 and 2014 has been reported as 14.8%. Stage 3 CKD had the highest prevalence. The United States Renal Data System (USRDS) shows that 117,162 patients had ESRD at the end of 2013. The prevalence of ESRD is 363 persons per 1 million subjects. This increased to 120,688 persons (1.1% increase) in 2014. Also, the overall population of ESRD patients (678,383 subjects) at the end of 2014 (3.5% higher than 2013) is the result of a reduction in mortality among these patients (4). In Europe, the average incidence of ESRD is 171 patients per 1 million persons (2), and in England it is 100 persons per million (5). At present, more than one million and nine hundred patients are affected by ESRD globally (6). According to a previous study from 1997 to 2006, a 130% growth in ESRD rate has been observed in Iran, which poses a need for more attention to this condition (7). According to available statistics, just in 2008, there were more than 24,000 new cases of ESRD in Iran and this is growing (8).

Treatment options for CKD patients include hemodialysis, peritoneal dialysis, and kidney transplantation (9, 10). The first organ transplantation was performed in Germany in 1954 from a living relative donor, and the first renal transplantation was performed in Iran in 1967 in Shiraz (9). Currently, the rate of kidney transplantation in Iran is 24 transplants per 1 million persons (11). Despite the growth in the number of deceased donors in the United States since 2003, reaching 8,021 donors in 2013, the kidney transplant waiting list in December faced a 3% increase compared to the preceding year (4). Despite the widespread use of kidney transplantation in the treatment of advanced renal disease in Western countries over the past 30 years, Asian countries are still at the beginning of the path due to cultural and religious conditions (12). While over the past few years, the number of transplantations including non-relative living donors has increased in comparison with relative and deceased donors (13), at the end of 2014, the number of patients awaiting kidney transplantation in the United States was 88,231 cases, of whom 83% were on the transplant list for the first time. The statistics also indicate that mortality rate in patients with ESRD (dialysis, kidney transplant) has been declining in recent years, with a net decline of 30% (28% dialysis, 40% kidney transplantation) from 1996 to 2013. However, with more than 18,000 kidney transplants performed in 2014, the active waiting list for transplantation is 2.8 times higher than kidney donors (4). However, various studies indicate that the population of patients who require dialysis

due to unsuccessful kidney transplants is increasing (14, 15). Despite the progression in renal transplantation procedures, which has had a significant effect on the reduction of acute kidney rejection, its effect on the long-term survival of transplanted kidney has been disappointing (16, 17). Late failure of this treatment is still a major clinical problem (16).

Renal transplantation outcome is affected by several factors including gender, age, donor and recipient tissue matching, primary disease, general health status of recipients before surgery, comorbid conditions, experience and expertise of the surgeon, and nature and extensiveness of immunosuppressive therapies. Understanding the factors that affect the quality of renal transplantation and its outcomes such as increasing life expectancy and reducing complications and the number of hospital admissions and costs imposed on the health system is of paramount importance. The aim of this study was to investigate the effective factors and outcomes of renal transplantation in hospitals affiliated to our medical university from 1989 to 2015.

Materials and Methods

This multi center historical cohort study was performed on medical records of all renal transplantation recipients (1,571 patients). These patients had received renal transplantation from 1989 to 2015 at Imam Reza and Chaharom Shahid Mehrab hospitals.

The exact time of the transplant was considered as the initial event and irreversible rejection during surgery, during the first 6-month period postoperatively, and one year later which resulted in requirement for dialysis treatment or death of the recipient were regarded as the end point. Also survival time of the patients from surgery time to the last follow-up time in this study was determined.

Data were collected using meticulous review of the medical records at the above mentioned hospitals, records at nephrology clinics and in case of defective data by directly calling the recipients. The gathered data were age, gender, blood type, transplanted kidney status, residential place of recipient, background disease leading to ESRD, the number of renal transplantations, kidney rejection, and survival.

Statistical analyses

The collected data were analyzed using SPSS software (ver. 19.0). Data collected using SPSS version 19 software was analyzed. Central and dispersion indices were used to express continuous variables. The categorical data were reported using frequency and percentage. The chi-squared test and independent t test were used to analyze data. A P value of less than 0.05 was considered significant.

Results

In this study, 1,571 medical records with census method who had received kidney transplantation from 1989 to 2015 were included. About 61.9% of the sample were residents of Kermanshah province, 35.1% were residents of other provinces, and 3% were residents of Iraq. There were 829 males and 742 females. Of these, 823 patients were younger than 35 years of age and 748 were older than 35 years. Mean (SD) age of the sample was 36.1 (12.4) years. About 66.9% (1,051 patients) had left-sided renal transplantation. Diabetes mellitus and hypertension were respectively documented in 209 patients (13.30%) and 378 patients (24.06%). Forty-three patients (2.74%) had received renal transplantation for the second time. No statistically significant association existed between gender and second renal transplantation ($P=0.056$). However, a significant association was observed between age group and the requirement for repeated renal transplantation ($P=0.007$). The repeated renal transplantation was more common in age group younger than 35 years. Also, no significant association was seen between repeated renal transplantation and survival ($P=0.37$).

Table 1: Frequency distribution of kidney transplantation recipients based on the studied variables

		No. (%)	P value
Gender	Male	829 (52.8%)	0.459
	Female	742 (47.2%)	
Age	< 35 years	823 (52.39%)	0.342
	> 35 years	748 (47.61%)	
Side of transplant	Right	520 (33.09%)	0.028
	Left	1051 (66.90%)	
Diabetes mellitus	Yes	209 (13.30%)	0.001
	No	1362 (86.7%)	
Hypertension	Yes	378 (24.06%)	0.012
	No	1193 (75.94%)	
Number of transplants	First time	1528 (97.26%)	0.001
	Second time	43 (2.74%)	
Nephrectomy before hospital discharge	Yes	60 (3.82%)	0.001
	No	1511 (96.18%)	

Table 2: Frequency distribution of surviving and patients who died based on gender and age group in 1571 recipients of kidney transplantation in Kermanshah province from 1989 to 2015

		Survived		Died		P value
		No.	%	No.	%	
Gender	Female	536	72.2%	206	27.8%	0.12
	Male	627	75.6%	202	24.4%	
Age group	> 35 years	551	73.66%	197	26.34%	0.15
	< 35 years	612	74.36%	211	25.64%	

Sixty patients (3.82%) required nephrectomy (transplanted kidney) before hospital discharge. About 85.04% of the patients (1,336 subjects) had satisfactory renal function without pharmacologic interventions. No significant association was observed between gender and transplanted kidney function ($P=0.2$). On the other hand, a significant association was observed between age group and transplanted kidney function ($P<0.001$). Rejection was more common in those younger than 35 years.

About 74.36% of the patients were younger than 35 years. About 74.02% of the patients survived. After 1 year, 94.3% of the patients survived and after 5 years, 84.5% survived. There was no significant difference regarding gender and mortality ($P=0.12$). Likewise, no significant association was found between age group and survival ($P=0.15$) and between kidney function and survival ($P=0.68$).

Table 3 (next page) shows the frequency of etiologies of ESRD. As observed, the most frequent cause was glomerulonephritis (42.1%). The cumulative incidence rate of irreversible rejection of the transplanted kidney during surgery, during hospitalization after surgery, the first six-month post-operatively, the whole 6-month period after surgery, the second 6-month period after discharge and the first 1 year period was respectively 0.45%, 3.37%, 6.24%, 10.06%, 2.35%, and 12.41% (Table 4).

Table 3: Frequency distribution of the etiology of chronic kidney disease in recipients of kidney transplantation in Kermanshah province

Etiology	Absolute frequency	Relative frequency
Glomerulonephritis	661	42.1
Hypertension	378	24.1
Diabetes mellitus	209	13.3
Nephrotic syndrome	120	7.6
Polycystic kidney disease	114	7.3
Nephrolithiasis	65	4.1
Urologic conditions	19	1.2
Supplemental products	3	0.2
Hemolytic anemia	1	0.1
Kidney trauma	1	0.1
Total	1571	100

Table 4: Frequency distribution of transplanted kidney rejection among 1571 kidney recipients

Time of rejection	Absolute frequency	Relative frequency
During surgery	7	0.45
During hospitalization after surgery	53	3.37
The first 6 months after discharge	98	6.24
Whole 6 months after surgery	158	10.06
The second 6 month period after discharge	37	2.35
The whole one year	195	12.41

Discussion

With the application of modern surgical techniques and the use of new immunosuppressive therapies, renal transplant rejection rates have significantly decreased compared with the past. The cumulative incidence rate of irreversible rejection of the transplanted kidney during surgery, during hospitalization after surgery, the first six-month post-operatively, the whole 6-month period after surgery, the second 6-month period after discharge and the first 1 year period was respectively 0.45%, 3.37%, 6.24%, 10.06%, 2.35%, and 12.41%. In McCaughan et al's study in Northern Ireland, the prevalence of acute (6 months) kidney transplantation rejection (cadaver donor) was reported as 19% (18) which is higher than what we observed here. This could be attributed to cadaver donor in the mentioned study. In comparison to a former study from Kermanshah city which reported 6-month kidney rejection as 11% and 6-month survival of 89% (19), our results indicate that the rate of acute kidney rejection is decreasing.

According to the report by the Iranian Network for Transplant Organ Procurement, the probability of kidney rejection in one year is 3.5% (one-year survival of 94.7%) (20). Compared to the current results, average kidney rejection in one year is lower than the obtained findings. In a study in Kermanshah studying survival of 712 patients (received kidney transplantation from 1979 to 2001), one-year survival in non-relative patients was 85.6% (irreversible kidney rejection of 14.4%) (21). Another study which

addressed five-year survival rate of kidney transplantation in Kermanshah from 2001 to 2012, one-year survival of transplanted kidney was 87.4% and irreversible kidney rejection was 12.6% (19). Our results show that one-year survival of transplanted kidney has improved.

In a study by El-Husseini et al in Egypt, one-year survival of kidney recipients was 93% and irreversible rejection was 7% (22). In some studies, this rate has been reported as 1.7% (23), which indicates that one-year survival is higher than our study results. The observed differences in various studies may be due to different reasons such as the lack of coincidence of the studies, differences in experience of kidney transplantation centers, surgical procedures, post-operative care, and the process of selecting kidney donors.

Although long-term survival of patients after kidney transplantation is still lower than the general population, mortality rates are significantly lower than that of dialysis patients. The results of the studies show that, over the past three decades, the survival of patients undergoing kidney transplant has clearly increased. The analysis of the United States Renal Data System information reveals that out of a total of 50,000 dialysis patients who were on the kidney transplant list, the risk of death among kidney recipients was 68% lower than those on the waiting list. At present, the expectation of a one-year survival rate after renal transplantation is estimated at 95% and for 3-5-year survival is about 90% (24).

The results of this study showed that one year after renal transplantation, 94.9% of the patients survived. Following 5 years, survival rate was 84.5%. At present, the expectation of one-year survival rate after renal transplantation is estimated at 95% and for 3-5-year expectation is 90% (24). Also, McMillan et al., in a study in an educational hospital in Glasgow, reported overall one-year, 3-year, and 5-year survival of diabetics who received kidney transplantation as 83%, 59% and 50%, respectively (25). The lower 5-year survival rate in this study compared to international figures can be due to low awareness of patients about self-care principles or non-compliance with therapeutic guidelines. This requires further investigation. The better survival rate we observed in comparison with findings by McMillan et al. could be attributed to the fact that the mentioned study included diabetic patients only and time difference between our study and that study and better therapeutic approaches in our study.

In the mid-1970s, one-year survival in patients over 35 years old was only about 60%, and in patients younger than 35 was about 80%. Age of the patients was a major contributor to post-transplantation survival. But in the 1990s, this difference became less prominent. In patients older than 35 years, one-year survival rate increased to 90%. In younger patients, this rate increased to 95% (24). The results of this study also show that survival rate did not differ between patients younger and older than 35 years ($P=0.15$). This indicates that the role of age in survival of patients is becoming less important.

The most common cause of renal failure and the requirement for kidney transplantation was glomerulonephritis, followed by hypertension and diabetes mellitus. In a previous study in China, the most common causes of ESRD were glomerulonephritis, hypertension and diabetes mellitus, respectively (26). In a study from Guilan province, Iran on hemodialysis, hypertension, glomerulonephritis, and urolithiasis were reported as most common causes of CKD (27). In another study in Lorestan, Iran the most common causes of kidney failure were described as hypertension, diabetes mellitus and kidney stones, and glomerulonephritis was regarded as the fourth most common cause (28). The results of this study regarding the common causes of kidney failure are compatible with most international and domestic results. The difference in the rate of glomerulonephritis, hypertension, diabetes mellitus, and kidney stones and what was reported in neighboring Lorestan province can be related to the prevalence of high blood pressure, diet, and drinking water.

Conclusion

Despite the decreasing rate of renal transplantation rejection, the observed rate of rejection was higher in comparison with other studies. Also, one- and five-year mortality rates that we observed were higher than international rates. Implementation of arrangements for updating surgical, therapeutic, and pharmacologic protocols as well as training self-care principles and highlighting the role of community health nurses in this field can be helpful. At the end, it is recommended that, given the increasing

prevalence of ESRD, and the high costs of managing this medical problem and high rate of hypertension and diabetes mellitus, screening procedures can diagnose these patients earlier and therefore the rate of ESRD can be reduced. Improving the collaboration of health-care teams, increasing the number of specialized diabetes and blood pressure clinics in the province of Kermanshah will be helpful in addressing early diagnosis of hypertension and diabetes mellitus. Also, the implementation of the plan for monitoring CKD patients in the early stages and training through social media, especially public media, in raising awareness about early diagnosis of diabetes and hypertension, as well as recognizing the early signs of kidney diseases, can reduce the incidence of ESRD and its consequences (dialysis and kidney transplantation) are helpful.

Acknowledgment

This article is the result of research project No. 95157 approved by the Research Deputy of Kermanshah University of Medical Sciences (ethics code # ums.rec.1395.137). We acknowledge the staff of renal transplantation center at Imam Reza hospital, the archive unit, and nephrologists who helped us in this project.

References

1. Bond M, Pitt M, Akoh J, Moxham T, Hoyle M, Anderson R. The effectiveness and cost-effectiveness of methods of storing donated kidneys from deceased donors: a systematic review and economic model. *Health Technol Assess*. 2009; 13(38):iii-iv, xi-xiv, 1-156
2. El Nahas AM, Bello AK. Chronic kidney disease: the global challenge. *The Lancet*. 2005;365(9456):331-40.
3. Levey A, Atkins R, Coresh J, Cohen E, Collins A, Eckardt K-U, et al. Chronic kidney disease as a global public health problem: approaches and initiatives—a position statement from Kidney Disease Improving Global Outcomes. *Kidney international*. 2007;72(3):247-59.
4. Saran R, Robinson B, Abbott KC, Agodoa LY, Albertus P, Ayanian J, et al. US renal data system 2016 annual data report: epidemiology of kidney disease in the United States. *American Journal of Kidney Diseases*. 2017;69(3):A7-A8.
5. Hamer RA, El Nahas AM. The burden of chronic kidney disease: is rising rapidly worldwide. *BMJ: British Medical Journal*. 2006;332(7541):563.
6. Jürgensen JS, Arns W, Haß B. Cost-effectiveness of immunosuppressive regimens in renal transplant recipients in Germany: a model approach. *The European Journal of Health Economics*. 2010;11(1):15-25.
7. Aghighi M, Mahdavi-Mazdeh M, Zamyadi M, Heidary Rouchi A, Rajolani H, Nourozi S. Changing epidemiology of end-stage renal disease in last 10 years in Iran. *Iran J Kidney Dis*. 2009;3(4):192-6.
8. Nafar M, Mousavi SM, Mahdavi M, Pour-Reza-Gholi F, Firoozan A, Einollahi B, et al. Burden of chronic kidney disease in Iran. *Iran J Kidney Dis*. 2008;2(4):183-92.
9. Mahdavi-Mazdeh M, Heidary Rouchi A, Norouzi S, Aghighi M, Rajolani H, Ahrabi S. Renal replacement therapy in Iran. *Urology Journal*. 2009;4(2):66-70.

10. Mahdavi-Mazdeh M, Heidary-Rouchi A, Aghighi M, Rajolani H. Organ and tissue transplantation in Iran. *Saudi Journal of Kidney Diseases and Transplantation*. 2008;19(1):127.
11. Ghods AJ. Renal transplantation in Iran. *Nephrology Dialysis Transplantation*. 2002;17(2):222-8.
12. Hawkins BR, Chan P, Chan Y, Cheng I, Cheung K, Fenn J, et al. Highly successful long-term outcome of kidney transplantation in Chinese recipients: an enhancing race effect? *Clinical transplantation*. 1997;11(3):178-84.
13. Mehrabi A, Wiesel M, Zeier M, Kashfi A, Schemmer P, Kraus T, et al. Results of renal transplantation using kidneys harvested from living donors at the University of Heidelberg. *Nephrology Dialysis Transplantation*. 2004;19(suppl 4):iv48-iv54.
14. System URD: USRDS 2010 Annual Data Report: Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States 2010. Bethesda: National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health; 2010.
15. USRDS: USRDS 2009 Annual Data Report: Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States 2007. Bethesda: National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health; 2009.
16. Lamb K, Lodhi S, Meier-Kriesche HU. Long-term renal allograft survival in the United States: A critical reappraisal. *American journal of transplantation*. 2011;11(3):450-62.
17. Meier-Kriesche HU, Schold JD, Kaplan B. Long-Term Renal Allograft Survival: Have we Made Significant Progress or is it Time to Rethink our Analytic and Therapeutic Strategies? *American Journal of Transplantation*. 2004;4(8):1289-95.
18. McCaughan JA, Patterson CC, Maxwell AP, Courtney AE. Factors influencing survival after kidney transplant failure. *Transplantation research*. 2014;3(1):18.
19. Hashemian AH, Beiranvand B, Rezaei M, Bardideh A, Zand-Karimi E. Comparison of artificial neural networks and Cox regression models in prediction of kidney transplant survival. *International Journal of Advanced Biological and Biomedical Research*. 2013;1(10):1204-12.
20. Iranian network for Organ Procurement [Online]. [cited 2007]; Available from: URL: www.irantransplant.org.ipaddress.com[In Persian].
21. Rezaei M, Kazemnejad A, Raeisi D. Survival analysis of renal transplant recipients in Kermanshah province (1989–2001). *Journal of Kermanshah University of Medical Sciences (J Kermanshah Univ Med Sci)*. 2003;7(3).
22. El-Husseini AA, Foda MA, Shokeir AA, El-Din S, Ahmed B, Sobh MA, et al. Determinants of graft survival in pediatric and adolescent live donor kidney transplant recipients: a single center experience. *Pediatric transplantation*. 2005;9(6):763-9.
23. Hasanzadeh J, Salahi H, Rajaeifar A, Zeighami B, Almasi A. 10-year graft survival analysis of renal transplantation and factors affecting it in patients transplanted from live donor in Shiraz transplant research center during 1999-2009. *Journal of Kerman University of Medical Sciences*. 2010;17(1):28-39.
24. Briggs JD. Causes of death after renal transplantation. *Nephrology Dialysis Transplantation*. 2001;16(8):1545-9.
25. McMillan MA, Briggs JD, Junor B. Outcome of renal replacement treatment in patients with diabetes mellitus. *BMj*. 1990;301(6751):540-4.
26. Zhang A-H, Cheng L-T, Zhu N, Sun L-H, Wang T. Comparison of quality of life and causes of hospitalization between hemodialysis and peritoneal dialysis patients in China. *Health and quality of life outcomes*. 2007;5(1):49.
27. Monfared A, Khosravi M, Aghajani Nargesi D. Reasons of Chronic Renal Failure in Hemodialysis Patients in Guilan Province. *Journal of Guilan University of Medical Sciences*. 2003;12(46):76-83.
28. Hadian B, Anbari K, Heidari R. Epidemiologic Study Of End Stage Renal Disease And Related Risk Factors In Patients Under Hemodialysis In Lorestan Province.. 2014.

Comparison of the effect of pethidine, ketamin and ondansetron on shivering after surgery in elective laparoscopic cholecystectomy under general anesthesia

Mehdi Ebtehaj (1)

Nasim Zarin (1)

Mahmood Aghaziyarati (2)

(1) Assistant Professor of Anesthesiology, Medical Sciences University of Qazvin

(2) Anesthesiologist, University of Medical Sciences of Tehran

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Mehdi Ebtehaj, Nasim Zarin, Mahmood Aghaziyarati. Comparison of the effect of pethidine, ketamin and ondansetron on shivering after surgery in elective laparoscopic cholecystectomy under general anesthesia. World Family Medicine. 2018; 16(3):113-117. DOI: 10.5742/MEWFM.2018.93318

Abstract

Background: Shivering after surgery is one of the common problems following general anesthesia and may lead to multiple complications. This study was performed to find out a suitable alternative for pethidine in prevention of post-anesthetic shivering.

Methods: In this randomized Triple-blind prospective study, 160 patients with the age of 20-50 years and ASA class I- II for elective laparoscopic cholecystectomy were classified into five equal groups. Anesthesia was induced equivalently for all. Patients were observed in terms of vital signs, side effects and shivering.

Results: The four groups were not different regarding age, gender, weight and the physical status class based on the American Society of Anesthesiologists score. Shivering after surgery was observed in 37.5% of patients in the pethidine group, 42.5% of patients in the ketamin group and 40% of patients in the ondansetron group that was significantly lower than the controls 57.5%. Changes in systolic and diastolic blood pressure, heart rate and temperature were similar in all four groups. Also the incidence of nausea and vomiting in the ondansetron group was significantly less than other groups (P value <0.05).

Discussion: Due to the significant decrease in shivering in the treatment group compared to the control group, and the stability of hemodynamic changes in all groups, with regard to a significant reduction in nausea and vomiting using ondansetron, this drug can be a good alternative to reduce shivering after general anesthesia.

Key words: General anesthesia, postoperative shivering, pethidine, ketamin, ondansetron, nausea and vomiting after surgery

Introduction

Shivering after surgery is the most common postoperative complications after surgery and is seen in between 5-65 % of patients, and includes involuntary movements of one or several groups of muscles that causes many side effects such as increased oxygen consumption, production of carbon dioxide, increase in heart rate and blood pressure and as result the intensification of ischemic heart disease, also increase in intracranial pressure, increase in intraocular pressure, increasing pain in surgical site and discomfort in the patient (1).

General anesthesia facilitates the redistribution of temperature from the central tissues to peripheral tissues. The central temperature regulation responses such as vasoconstriction threshold are inhibited by anesthesia and most anesthetic drugs cause vasodilatation of peripheral vessels (2). Recovery from general anesthesia has two phases. In the first phase temperature regulation responses have been restrained due to the residual effects of anesthesia, but in the second phase return of activities for regulation of core body temperature occurs by reducing the concentration of anesthetic drugs in the body; in this phase, if degree of body temperature is under temperature regulation threshold it leads to shivering after surgery (3).

Shivering can be the result of hypothermia during surgery and resetting center of body temperature or is due to secondary ague due to activation of the inflammatory response and releasing cytokines. There are two pharmacological methods to reduce shivering. Non-pharmacological methods include preventing hypothermia with the help of heating blankets and warm and moist oxygen inhalation. Pharmacological methods mainly effect on reducing shivering temperature threshold (5-4). Some drugs such as meperidine (pethidine) at all doses have been known to be effective for the treatment of shivering after surgery, but due to the likelihood of incidence of complications such as respiratory depression, is always considered following the use of pethidine, and to finding alternative drugs to prevent and treat shivering after surgery. But still there is some debate regarding choosing the most appropriate drug for patients after surgery (6).

The drugs that are used for the treatment of shivering after surgery are as follows: meperidine (most effective shivering treatment), clonidine, Ketanserin, tramadol, Physostigmine, nefopam, dexmedetomidine and magnesium sulfate (7).

Although the standard treatment for shivering after surgery has not been introduced it is currently most widely used among drugs in this field. Using opioids imposes enormous and unfavorable complications on patients and avoiding these complications is more important at the time immediately after anesthesia. Respiratory depression, creating nausea, vomiting, drowsiness and prolongation of time and lack of awareness of recovery time, confusion, particularly in elderly patients, disorientation, itching and constipation can prolong duration of hospitalization and impose heavy costs to the patient and the community, among these complications.

The other drugs that have been used to reduce shivering after surgery in similar studies are also not without complications (8). Clonidine, despite the decline in the incidence of shivering after surgery is significantly associated with drop in blood pressure and sleepiness. Tramadol as a non-opioid analgesic drug, in spite of inhibition of shivering after surgery can decrease sweating, vasoconstriction and shivering threshold. DOXAPRAM HCL as a brain stimulant can decrease shivering after surgery, but has significant hemodynamic effects on patients (10-9).

Ketamine is an NMDA receptor antagonist, with analgesic and anesthetic properties and in under anesthetic limit doses, relieves pain and temperature in a few steps and prevents shivering after surgery (3). Ondansetron is a well-known drug for the treatment of nausea, vomiting and a serotonin receptor antagonist that has anti shivering properties and its mechanism effect of anti-shivering is through inhibition of serotonin reuptake on an area of the anterior hypothalamic that has no opioid complications and it also has very rare complications more so than other anti-shivering drugs (11). Research has shown that the use of Ondansetron is effective in relieving shivering. Given the importance of shivering after anesthesia and with the aim of finding effective treatment with fewer side complications, this study compared the effect of analgesic therapy between the two drugs of Ondansetron and meperidine in the treatment of shivering after anesthesia.

Methodology

This triple-blind randomized clinical trial study was done on 160 patients who were under anesthesia for elective cholecystectomy in surgery in level of ASA I and II at Shahid Rajai Hospital in Qazvin in 2015. This study was approved by ethic code of 281.29 and in addition to taking written consent letter from eligible patients to enter the study they were assured of their right to opt out at any time and were assured that all information would remain confidential. Inclusion criteria to study included patients was age range between 20 and 50 years old and exclusion criteria included a history of seizures, allergies to drugs used, hypertension, cardiovascular disease, need for blood transfusion or its products, history of Parkinsons, history of chronic use of non steroidal anti-inflammatory drugs and narcotic drugs. The sample size required was calculated based on previous studies by determining sample size formula in analytical studies for each group of 40. For all patients for premedication 0.02 mg / kg midazolam and 1.5 mg / kg fentanyl was used and for induction of anesthesia 2 mg / kg protocol and 0.5 mg / kg Atracurium was injected intravenously. Propofol at a dose of 100 mcg / kg / min and alfentanil with a dose of 1 mcg / kg / min and 100% oxygen was used for maintenance of anesthesia in all patients. Normal volumes were used in all patients. Patients were randomly divided into 4 groups, by using colored cards. Three pethidine drugs at a dose of 0.4 mg / kg, 0.25 mg ketamine dose and Ondansetron with dose of 0.1 mg / kg were used for 3 intervention groups and 2 cc of normal saline was used for the control group, 15 minutes before ending surgery. It should be noted that peak of pethidine effect is 5-7 minutes and Ondansetron 10-15 minutes

and ketamine 1-4 minutes after injection of the drug. The 0.04 mg / kg neostigmine and 0.02 mg / kg atropine was used to reverse the patients in all groups. The following criteria were measured in 4 groups: blood pressure mean of systolic, diastolic, heart rate and body temperature (with the tympanic thermometer) were measured and recorded at the time of the injection before drug injection, 5 minutes after drug injection and after stabilizing in the recovery and the shivering rate and nausea and vomiting after surgery was recorded by the recovery nurse who did not know the type of each of the groups. Recovery room temperature was similar for all patients. Patients were treated alike in case of shivering in recovery.

Data were collected on the basis of check list prepared and were entered into SPSS software and analysis of qualitative values with chi-square test and Quantitative values were evaluated by ANOVA and T-Test. Repeated measure ANOVA was used to assess the changes of the parameters before and after injection of drug in the intervention and control groups. Significance level was considered equal to 5% (0.05).

Findings

In this study, 160 patients who participated were under elective cholecystectomy surgery. Samples of all four groups according to age, gender and weight were similar within each other and there was no significant difference between them.

Table 1: Comparison of mean and standard deviation of samples based on the hemodynamic and body temperature at the time before and 5 minutes after injection of the drug and after stabilizing in the four groups of study

Group	Time	Systolic blood pressure	Diastolic blood pressure	heart beat	Body temperature
Pethidine	Before injection of drug	124.2	79	75	36.6
	5 minutes after injection	125.2	78	75	36.2
	After being stable	126	75	76	36.1
Ondansetron	Before injection of drug	124.1	79	79	36
	5 minutes after injection	127.4	78	79	36.3
	After being stable	130	80	79	36.5
Ketamine	Before injection of drug	130	85	75	36.5
	5 minutes after injection	132.1	82	75	36.7
	After being stable	130	85	79	36.8
Control	Before injection of drug	124.4	79	72	36.5
	5 minutes after injection	129	77	76	36.6
	After being stable	132	80	79	36.4
		0.09	0.5	0.24	0.17

The results in Table 1 that have compared the hemodynamic changes and the mean temperature in all groups under study showed that the mean systolic and diastolic blood pressure, and heart beat rate before and after injection of drug were similar in all four groups. Mean systolic and diastolic blood pressure 5 minutes after surgery in the pethidine group did not show a significant decrease compared to the control group. We also witnessed increase in systolic and diastolic blood pressure levels in 5 minutes after injection in the Ketamine group. This difference was not significant compared to the other groups. After the being stable also hemodynamic changes were similar in all four groups. Body temperature changes in the four groups were similar in all samples, with no statistically significant difference.

Table 2: Comparison of samples' frequency based on the incidence of intensity of shivering and nausea - vomiting in four groups of research

group	Having shivering	Not having shivering	Having nausea	Not Having nausea
Pethidine	15 (37%)	25(62.5%)	16(40%)	24(60%)
Ondansetron	16 (40%)	24(60%)	1(2.5%)	39(97.5%)
Ketamine	17 (43%)	23(57.5%)	15(37.5%)	25(62.5%)
Control	23 (57.5%)	17 (42.5%)	21(52.5%)	19(47.5%)
p-value	0.02		0.01	

Table 2 shows that the incidence of shivering in the three treatment groups had lower rates compared to the control group and this difference was significant (0.02), but there was no significant difference among the three groups and the frequency of shivering was similar in the three groups. The control group had the highest nausea rate in terms of frequency of nausea and vomiting and the Ondansetron group had the lowest nausea after surgery, so that in this group there was only one person with the condition. So among the three treatment groups and also among the three treatment groups compared to the control group, showed significant differences ($P < 0.05$).

Discussion

Our results showed that all three drugs had a positive effect in reducing the shivering after surgery compared with the placebo group, but there was no significant difference among the three groups. All three drugs also had a positive effect on reducing nausea after surgery compared to placebo group and in the Ondansetron group fewer patients had nausea and vomiting after surgery compared to the placebo group and this difference was statistically significant. There was no statistical difference among the groups in terms of systolic blood pressure, diastolic blood pressure and heart beat rate although these values had a higher rate in the ketamine group. Intravenous pethidine is one of the most common drugs used in the treatment of shivering after surgery but has complications such as respiratory depression, creating nausea and vomiting, sleepiness and prolongs the confusion and recovery time. These effects are of great importance, especially in elderly patients (12). Many studies have proven the better impact of pethidine in reducing shivering after surgery compared to other drugs, but research is being performed in order to find some drugs that have analgesic effect, but that do not have ongoing effects.

Ketamine is among the anesthetic drugs that can influence the temperature regulation organ to prevent shivering after surgery by blocking NMDA receptors. In recent years there has been much attention on the effects of low-dose ketamine of anesthesia limit for treatment of chronic pain and persistent neuropathies, resistant depression, control of pain after surgery and prevention of shivering after surgery (13). In the study of Pazuki, two doses of 0.3 and 0.5 mg / kg of ketamine were compared with pethidine in reducing shivering after surgery. Results showed that although the dose of 0.5 mg / kg of ketamine

has a significant effect in reducing shivering after surgery, pethidine had a more favorable effect. Also the frequency of complications was similar in both groups and only 0.5 group significant difference was observed in the incidence of nystagmus compared to the other two groups. Another study in 2008 on 90 patients with shivering of 3rd or 4th degree was performed on patients under general anesthesia. Patients were divided into 3 groups of Meperidine, with 25 mg / kg of ketamine and with a value of 0.5 and 0.75 mg / kg. In this study, unlike the present study, the rate of shivering had been controlled just for 4 minutes after entering the recovery. Although meperidine was used as a standard treatment for controlling shivering, the two amounts of ketamine were preferred compared to meperidine to control the shivering 4 minutes after administration. (15) The study is in line with Rahim's study that showed there is no difference between ketamine and pethidine in the reduction of shivering after anesthesia (16). Ondansetron is a well-known drug for the treatment of nausea-vomiting and antagonist 5 - hydroxy tryptamine. Many studies have shown that none of them have effects of opioids. In addition, no adverse effects of analgesic drugs are commonly used (extrapyramidal symptoms). Drug-sensitivity has no other known complications except for rare cases, so pharmaceutical drugs are safe to use (19-17). So in the principle study with equal number of samples in each group, the number of patients who were affected by shivering after anesthesia was lower than pethidine in the Ondansetron group, although this difference was not significantly statistical, but hemodynamic changes were similar in both groups. The number of cases of nausea in the pethidine group was more than in the other groups (20). Results of our study are also in line with this study so that Ondansetron has similarly reduced incidence of shivering compared to pethidine but significantly compared to pethidine has less decreased nausea and vomiting after

surgery. But in the study of Ranjbar the results showed that pethidine significantly reduced shivering compared with Ondansetron, but in the Ondansetron group the cases has less nausea and vomiting (21).

Conclusion

Since injection of Ondansetron and ketamine before anesthesia has reduced the shivering after surgery in comparison to pethidine, and due to the lack of hemodynamic complications in the three groups and given the significant reduction of nausea and vomiting after surgery in using Ondansetron compared to the other two groups, intravenous injection of Ondansetron can be used before anesthesia as an alternative to the administration of pethidine (as a common method of prevention and treatment of shivering after surgery) especially in patients with hemodynamic instability, and also in cases that prohibit the use of meperidine, such as high risk of respiratory depression or loss caused by creating nausea and vomiting.

Acknowledgments

The researchers express gratitude for the help of all those who cooperated in performing this study.

References

- 1- Buggy DJ, Crossley AW. Thermoregulation, mild perioperative hypothermia and postoperative shivering. *Br J Anesth.* 2000; 84(5): 615-28.
- 2- Kiekkas P, Pouloupoulou M, Papahatzi A, Souleles P. Effects of hypothermia and shivering on standard PACU monitoring of patients. *AANA J.* 2005; 73(1): 47-53.
- 3- Miller RD (eds). *Anesthesia*, 5th ed. Philadelphia: Churchill Livingstone; 2005.
- 4- Modarres MF, Arjmand M. *Dorland's new medicine dictionary*. 1st ed. Rahnama; 2006: 1377.
- 5- Dal D, Kose A, Honca M, Akinci SB, Basgul E, Aypar U. Efficacy of prophylactic ketamine in preventing postoperative shivering. *B J of Anaesth*; 20058(5): 1-4.
- 6- Bock M, Bauer M, Rösler L, Sinner B, Motsch J. Dolasetron and shivering. A prospective randomized placebo –controlled pharmacoeconomic evaluation. *Anaesthesist.* 2007; 56(1): 63-6.
- 7- Pawar MS, Suri N, Kaul N, Lad S, Khan RM. Hydrocortisone reduces shivering after surgery following day care knee arthroscopy.
- 8- Macario A, Weinger M, Carney S, Kim A. Which clinical anesthesia outcomes are important to avoid? The perspective of patients. *Anesth Analg.* 1999; 89(3): 625-8.
- 9- Dabir SH, Radpey BAZ, Parsa T. Evaluation of the incidence of post-anesthesia shivering. *Journal of Iranian Society Anaesthesiology and Intensive Care.* 2006; 28(1): 60-9.
- 10- Shoar S, Esmaeili S, Khorgami Z, Naderan M, Shoar N. Efficacy of acupuncture in prevention of postoperative anaesthesia-related shivering. *Acupunct Med.* 2013; 31(1): 120-1.
- 11- Asl ME, Isazadefar K, Mohammadian A, Khoshbaten M. Ondansetron and meperidine prevent shivering after surgery after general anesthesia. *Middle East J Anesthesiol.* 2011; 21(1): 67-70.
- 12- Kelsaka E, Baris S, karakoya D, Sarihasan B. Comparison of ondansetron and meperidine for prevention of shivering in patients undergoing spinal anesthesia. *Reg Anesth Pain Med.* 2006;31:40–5
- 13- Ferianto I, Pandit S, Bambang Suryono S. The efficacy of ondansetron in comparison with pethidine for prevention of shivering in pregnant patients undergoing a cesarean section with spinal anesthesia. *J Med* 2013; 45(3): 127-138.
- 14- Pazoki Sh, Noroozi A, Shadman AH. Comparison effect of different doses of Ketamine with Pethidine in reducing shivering after surgery after cesarean section. *Arak Medical University Journal.* 2009; 12(2): 9-16.
- 15- Sunder RA, Dureja GP, Toshniwal GR. role of ketamine in vicarious pain. *Acta Anaesthesiol Scand.* 2008 Apr;52(4):571
- 16- Rahimi M, Golparvar M, Naghibi Kh, Ghomi A. Comparing Alfentanil, Sufentanil, Ketamine and Pethidine for Prevention of Postanesthetic Shivering: A Randomized Placebo-Controlled Clinical Trial. *J Isfahan Med Sch* 2015; 33(324): 212-20
- 17- Alfonsi P. Postanesthetic shivering. *Epidemiology, pathophysiology and approaches to prevention and management.* *Minerva Anestesiolo* 2003; 69: 438-41
- 18- Barash PG, Cullen BF, Stoelting RK. *Clinical Anesthesia*, 5th ed. Connecticut: Lippincott Williams & Wilkins, 2006.
- 19- Díaz M. Becker DE. Thermoregulation: physiological and clinical considerations during sedation and general anesthesia. *Anesth Prog* 2010; 57:25- 33.
- 20- Entezari Asl M, Isazadehfar Kh, Akhavanakbari G, Khoshbaten M. The effect of ondansetron in prevention of shivering after surgery after general anesthesia in gynecological surgery. *Iran Red Crescent Med J.* 2012; 14(5): 316-7.
- 21- Sabermoghaddam Ranjbar M, Soltani Gh, Akaberi A, Alavinia SM. Comparison of Ondansetron and Meperidine in treatment of post anesthesia shivering- A randomized placebo controlled triple blind clinical trial. *Spring* 2013;5(1):114

Comparison of Phototherapy with light-emitting diodes (LED) and Conventional Phototherapy (fluorescent lamps) in Reducing Jaundice in Term and Preterm Newborns

Majid Hamidi (1)
Fateme Aliakbari (2)

(1) Assistant Professor, Department of Pediatrics, Shahrekord University of Medical Sciences, Shahrekord, Iran

(2) Assistant Professor, Department of Medical-surgical Nursing, Shahrekord University of Medical Sciences, Shahrekord, Iran

Corresponding author:

Fateme Aliakbari

Department of Nursing, Shahrekord University of Medical Sciences, Rahmatiyeh, Shahrekord, Iran

Email: aliakbarifa@gmail.com

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Majid Hamidi, Fateme Aliakbari. Comparison of Phototherapy with light-emitting diodes (LED) and Conventional Phototherapy (fluorescent lamps) in Reducing Jaundice in Term and Preterm Newborns. World Family Medicine. 2018; 16(3):118-123. DOI: 10.5742/MEWFM.2018.93319

Abstract

Background: Jaundice is a common problem in neonates and the most common cause of hospitalization in Iran. The aim of this study was to compare safety and efficacy of LED and conventional phototherapy to treat hyperbilirubinemia.

Materials and methods: A randomized clinical trial was conducted on 130 term and near term infants over 35 weeks, hospitalized in a neonatal care unit and who needed conventional phototherapy. Samples were randomly divided into two groups: LED and conventional phototherapy. Outcomes included the rate of fall of total serum bilirubin (TSB, mg/dL/hour) and measured duration of phototherapy. Data were analyzed by SPSS software with descriptive statistics, t-test, and analysis of variance (ANOVA).

Results: TSB level was not different in the two groups before the intervention ($P=0.187$). LED phototherapy was more effective in reduction of the level of TSB at 6, 12, and 24 hours. ($P<0.05$). Of the reduction from 12 hours to 24 hours, the highest and the lowest decrease in TSB occurred between 6 and 12 hours. Treatment duration was 50.18 ± 6.7 in LED and 65 ± 13.7 hours in the conventional group ($P<0.05$).

Conclusion: LED phototherapy is as effective as conventional phototherapy and reduces the treatment time and a further reduction of the relative change in TSB. The LED phototherapy has less frequent side effects and lower costs.

Key words: Phototherapy, Hyperbilirubinemia, TSB, LED

Introduction

Jaundice is a common condition in newborns. In total 60% of term babies and 80% of preterm babies are affected in the first week after birth (1, 2). Indirect bilirubin levels exceed 20 mg/dl and increase the risk of neurologic system disorder and bilirubin bonding with basal nuclei and brainstem nuclei (1).

Disregarding the cause, treatment of hyperbilirubinemia is focused on prevention of neurotoxicity (3). Phototherapy is still a major treatment for preserving serum total bilirubin levels below pathogenic level (4). Yet in case of failure, exchange transfusion is the last option (3).

Considering abundant complications of exchange transfusion in newborns such as hypoglycemia, hypocalcaemia and sepsis risk, thrombocytopenia, and even death, phototherapy is the first choice in hyperbilirubinemia treatment in newborns (5). Phototherapy is the commonest interventional procedure for severe hyperbilirubinemia prevention and treatment. This procedure has been greatly effective in reducing hyperbilirubinemia complications and transfusion in millions of newborns all over the world (6). Bilirubin absorbs blue light with a wavelength of 420-470 nanometers better. Bilirubin in skin absorbs light energy and causes a large number of photochemical reactions (5).

The light source used in conventional phototherapy is made up of four lamps placed 40 centimeters away from the body. The effect depends on factors such as bilirubin levels, type of phototherapy used, exposure area, use of aluminum foil and white cloth for better reflection, and use of fiber optic blankets (7,8). In a study conducted by Maisels et al in 2007, a randomized controlled trial, the study mentions a number of advantages for the light-emitting diodes (LED) technique including: lower energy consumption, longer endurance time of the lamps, infrared-free and ultraviolet-free radiation, and higher cost efficiency (9). To the best of our knowledge on LED phototherapy, more randomized controlled trials on the issue seem necessary (10) since neonatal jaundice is a common cause for newborn hospitalization in our country (8) and a large number of beds host these babies in our country every year. Also, since various techniques are being applied in different parts of the world as an attempt to treat the condition through reducing phototherapy complications (11), lowering hospitalization period (12), and decreasing bilirubin levels in a shorter time (13), this study was conducted to investigate the efficiency of LED and conventional phototherapy regarding hospitalization period, bilirubin reduction, and easing the complications.

Materials and methods

This randomized controlled trial was conducted on all term and preterm newborns hospitalized for more than 35 weeks in Hajar Hospital affiliated with Shahrekord Medical University in 2012- 2013. Using two-stage sampling test, out of 130 babies admitted to the hospital, 130 newborns were selected randomly.

Subjects were divided into two groups of similar size. Sixty five newborns with Total Serum Bilirubin (TSB) >220 mm/dl (D12.9 mg/dl) were assigned to LED phototherapy group and 65 newborns with TSB above 300 mm/dl (17.6 mg/dl) during phototherapy were excluded from the study and received intensive phototherapy. Any subject with the following criteria were excluded: TSB more than 17.6 mg/dl, received phototherapy prior to hospital admittance, mother and the newborn took phenobarbital, Jaundice was due to hemolytic diseases, ABO discrepancy, and RH disorders, a subject which needed to be taken care of in The Neonatal Intensive Care Unit (NICU), Owing to change in general health conditions, subjects underwent sepsis workup.

After developing a special questionnaire and applying it, history taking, interviewing parents, and precise clinical examination, data were collected and recorded. These included weight, sex, delivery type, age in hours, and nutrition through breast feeding, history of phototherapy of siblings, phototherapy prior to admittance, RH and ABO disorders, and glucose-6-phosphate dehydrogenase (G6PD) enzyme. Upon dividing the subjects into the two groups, TSB was measured at admittance, and 6, 12, 24 hours after admission and was recorded. Also TSB level and phototherapy duration were also recorded at hospital discharge time.

Reliability and validity of the questionnaire were set based on guidelines of the American Pediatric Society designed according to Butani monogram and were confirmed by determining TSB levels in the danger zone (15).

Demographic data and the necessary background variables including weight, sex, delivery type, age, feeding type, were recorded after simple sampling. Then, TSB levels at admission, six, twelve, and twenty-four hours after phototherapy, the last TSB levels, and phototherapy duration, were recorded. In the control group, 69 newborns were first studied; and three for ABO discrepancy and one for G6PD enzyme deficiency were excluded. In the intervention group, 71 newborns were studied initially; four for ABO discrepancy and two for G6PD deficiency due to TSB levels exceeding 17.6 and needing intensive phototherapy, were excluded. Data were analyzed with the use of SPSS 18.

Results

Findings indicated that mothers' pregnancy mean age was 38.05-0.94 weeks. Cesarean type of childbirth was commoner than natural birth. Fifty-eight subjects (44.6%) were female and 72 (55.4%) were male. Mean and Standard Deviation (SD) for weight were 3.58- 0.323.

Mean and SD of weight for newborns with jaundice were 89.51-17.06. To achieve two identical groups, chi-square and independent t-tests were applied ($p < 0.05$). The results of paired t-test on TSB (mg/dl) reduction before and after conventional phototherapy revealed that in all three measurements, conventional phototherapy had reduced neonatal jaundice. The greatest reduction occurred in the last measurement (between 12-24 hours) and the least between 6-12 hours (Table 1).

Table 1: Demographic characteristics of samples in different therapeutic groups

Variable		LED N(percentage) MEAN±SD	Routine N(percentage) MEAN±SD	p-value
Habitat	village	27(41.5)	22(33.8)	0.469
	city	38(58.5)	43(66.2)	
Delivery type	natural	29(44.6)	31(47.7)	0.860
	Cesarean	36(55.4)	34(52.3)	
Sex	girl	32(49.2)	26(40.0)	0.378
	Boy	33(50.8)	39(60.0)	
Mother blood group	A	21(32.3)	20(32.8)	0.557
	B	17(26.2)	13(21.3)	
	AB	3(4.6)	7(11.5)	
	O	24(36.9)	21(34.4)	
Infant blood group	A	16(24.6)	12(19.7)	0.018*
	B	7(10.8)	20(32.8)	
	AB	3(4.6)	1(1.6)	
	O	39(60.0)	28(45.9)	
Weight (gr)		3032.31±331.01	3085.08±315.69	0.354
Gestational age (week)		38.08±1.00	38.03±0.88	0.781
Age (hours)		86.09±15.02	92.94±18.37	0.022*
1 min. Apgar		8.66±0.51	8.77±0.42	0.192
5 min. Apgar		9.68±0.50	9.77±0.42	0.261
Start of jaundice		62.00±11.14	69.75±13.81	0.001**

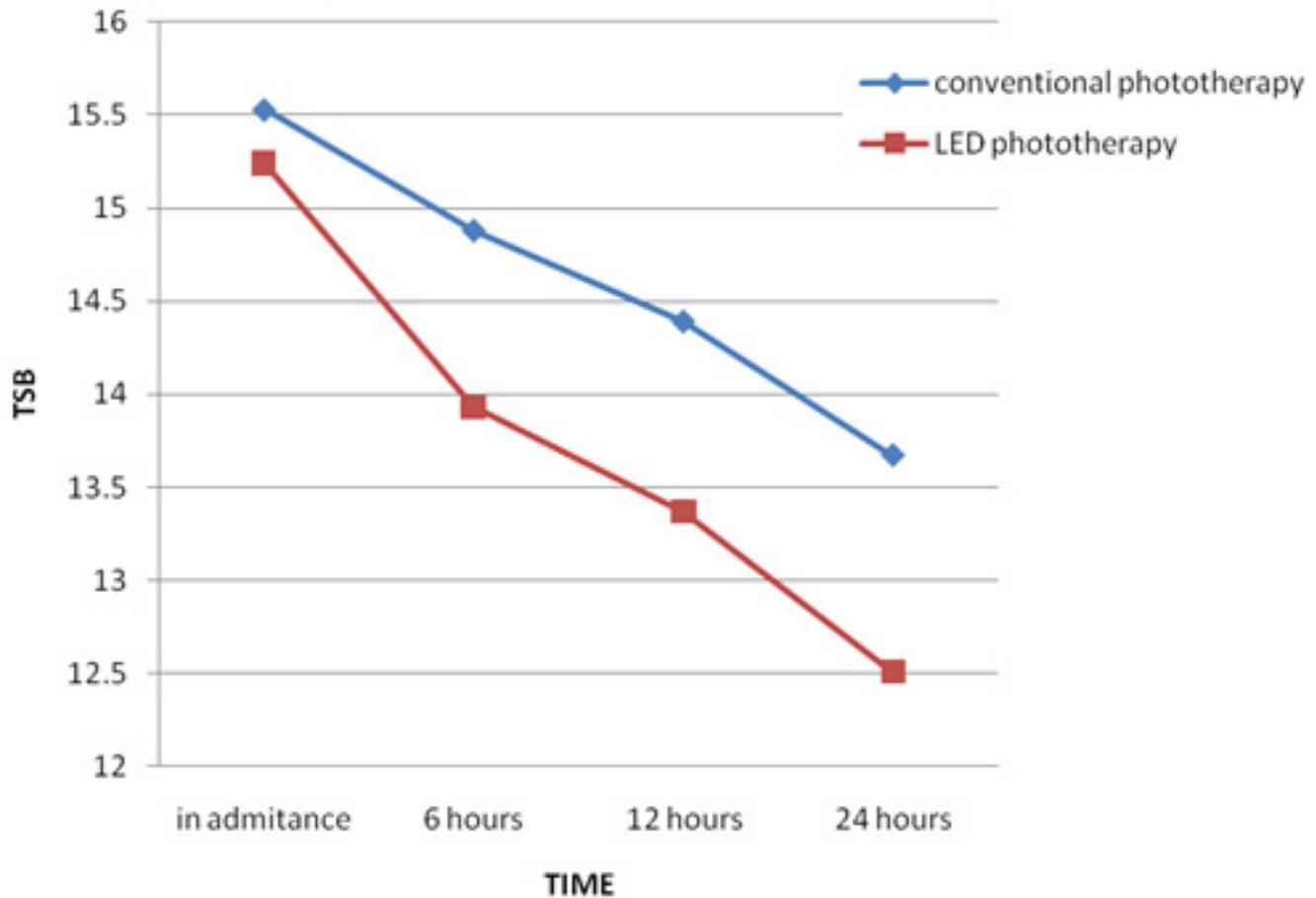
*P<0.05; **P<0.01

Results of repeat measurement show significant differences in TSB at different times and that was descending. (F= 360.591 df=1.473 P-value=0.000). Also TSB was significantly lower in the LED phototherapy group. (F= 19.240 df=1 P-value=0.000). TSB was significantly lower in the LED group at all times and with a more descending rate in this group. (F= 14.603 df=1.473 P-value=0.000). (Table 2, Chart 1)

Table 2: Results of TSB in LED and Routine phototherapy

TSB	LED MEAN±SD	Routine MEAN±SD	P-value
Admission time	15.24±1.17	15.53±1.32	p>0.05
At 6 hours	13.93±1.86	14.88±1.17	P<0.05
At 12 hours	13.37±0.92	14.39±1.12	P<0.05
At 24 hours	12.51±0.82	13.67±1.08	P<0.05

Chart 1: Mean TSB in two groups in different times



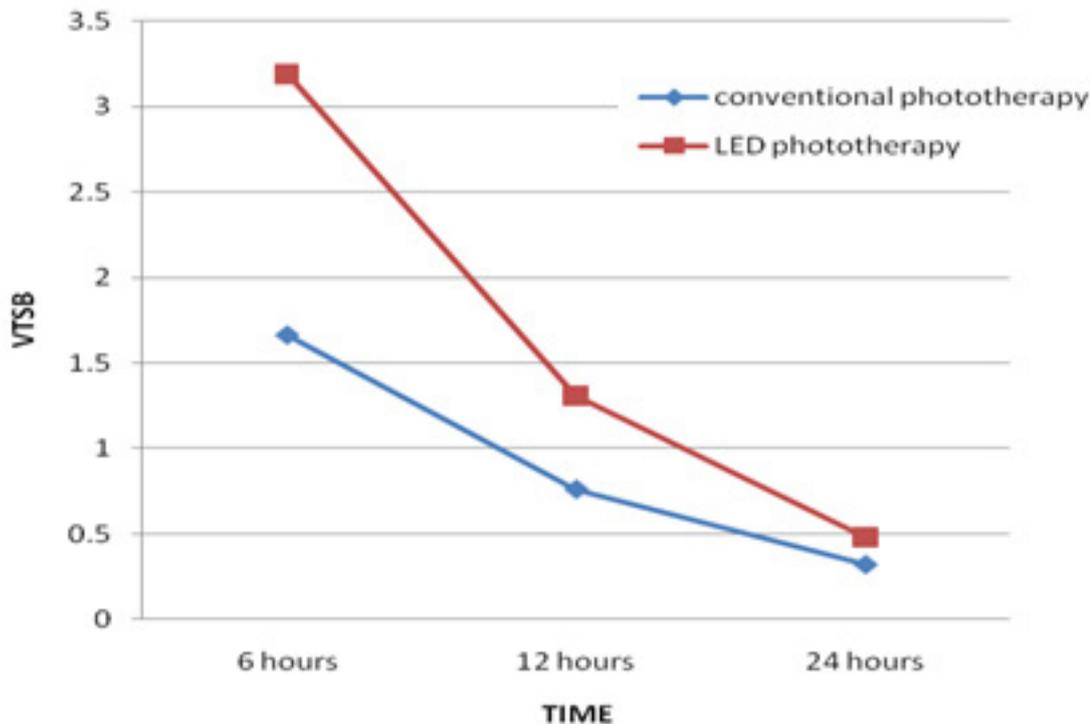
Results of repeated measure test at different times:

TSB has a descending rate and significantly different rate in all times ($F= 114.892$ $df=1.050$

$P\text{-value}=0.000$). TSB was significantly different in the two groups and was higher in the LED phototherapy group. ($F= 137.382$ $df=1$ $P\text{-value}=0.000$). TSB changes were more in the LED group and had a greater descending rate in the LED group ($F= 14.603$ $df=1.473$ $P\text{-value}=0.000$) (Table 3, Chart 2).

Table 3: Results of TSB changes in two groups

TSB	LED MEAN±SD	Routine MEAN±SD	Total
At 6 hours	3.19±0.96	1.66±0.54	$P<0.05$
At 12 hours	1.31±0.38	0.76±0.19	$P<0.05$
At 24 hours	0.48±0.10	0.32±0.06	$P<0.05$

Chart 2: Mean VTSB in two groups in different times

Discussion

In order to investigate TSB levels before and after interventions, paired t-test was applied. The findings showed that in all three measurements, LED phototherapy had effectively reduced TSB levels. The highest reduction occurred in the last measurement (between 12 and 24 hours) and the lowest occurred in the measurement between 6 and 12 hours. The conventional phototherapy also reduced TSB levels in all three measurements. The highest reduction happened in the first measurement (between 0 and 6 hours) and the lowest in the measurement between 6 and 12 hours. In the randomized controlled trial by Martins et al. on preterm neonates, comparing indium gallium nitrate LEDs with halogen phototherapy, results showed greater decrease in TSB levels and shorter duration of phototherapy in the LEDs group. These results could be attributed to the lesser irradiance of halogen lamps and broad spectrum of light emitted by them in comparison to LEDs. [16]

Independent t-test was applied for the comparison of neonatal jaundice at hospital admission, six, twelve, twenty-four hours later, at discharge time, TSB levels changes at those times, and finally time spent on phototherapy.

Findings showed there was no significant difference in TSB at hospital admittance time ($p=0.05$), but 6, 12, and 24 hours after the invention, there was a significant difference in TSB levels in the two groups. In fact, LED phototherapy reduced TSB levels more than the conventional method. The results of Mohammadzadeh study showed that LED light source is as effective as fluorescent tubes for the phototherapy of preterm infants with indirect hyperbilirubinemia (17).

Regarding time spent on phototherapy, findings showed in LED phototherapy less time had been spent. As for TSB levels at particular times after the invention, findings indicated there was a significant difference between the two interventions ($p < 0.05$). It was also noticed that TSB reduction slowed down with the passage of time and the reduction was more when LED phototherapy was used. Bertini and colleagues showed that conventional phototherapy units result in a significant increase of trans-epidermal water loss in preterm infants, and this side effect was not observed with LED units. [18]

The findings are similar to those of a study by Maisels et al. conducted in 2007 in Turkey, and Sheng in 2012 (7, 11). These studies suggest that there is a significant difference in phototherapy duration and efficiency between LED and conventional phototherapy. However, in a study by Kurmar P et al. in 2010 in India and also another study by Kurmar P et al. in 2011 in India it was shown that there was no significant difference in neither TSB reduction speed nor phototherapy, which is not similar to the findings of the present study (12, 19). The dissimilarity could be due to different sample size, different races of the subjects, and application of first generation LED phototherapy devices rather than the newer super LED lamps in those studies. Also, one difference between the present study and those conducted by Karago et al. in Turkey (20) and Maisels MJ et al. in America (6) was that TSB levels were measured 6, 12, and 24 hours after hospital admittance, and therefore could provide a more precise judgment about TSB reduction speed TSB changes in different time periods.

Conclusion

LED phototherapy produces less heat, is free from infrared and ultraviolet rays, consumes less wattage, is less bulky, has longer lamp life, and is easier to use. The benefits make the technique qualified as a recommended phototherapy method. However, the high cost of the devices is a big disadvantage that should also be considered.

References

1. Kliegman RM, Stanton B, Richard E, Behrman R. Nelson textbook of pediatrics. 19th ed. USA: Saunders Elsevier; 2012.
2. Rodrigues DL. Phototherapy for neonatal jaundice treatment, Compendium of new and emerging technologies that address global health concerns 2011 Brazil: World Health Organization; 2016 [cited 2016 11 Jan]. Available from: http://www.who.int/medical_devices/innovation/new_emerging_tech_33.pdf.
3. Bhutani VK, Wong RJ. Bilirubin Neurotoxicity in Preterm Infants: Risk and Prevention. *Journal of Clinical Neonatology*. 2013;2(2):61-9.
4. Hansen TW. Prevention of neurodevelopmental sequelae of jaundice in the newborn. *Dev Med Child Neurol*. 2011;53 Suppl 4:24-8.
5. Cloherty JP, Eichenwald EC, Stark AR. Manual of neonatal care. 17th ed. USA: Lippincott Williams & Wilkins; 2011.
6. Maisels MJ, McDonagh AF. Phototherapy for neonatal jaundice. *New England Journal of Medicine*. 2008;358(9):920-8.
7. Maisels MJ, Kring EA, DeRidder J. Randomized controlled trial of light-emitting diode phototherapy. *J Perinatol*. 2007;27(9):565-7.
8. Ebrahimim S, Ashkani-Esfahani S, Poormahmudibs A. Investigating the Efficacy of Zizyphus Jujuba on Neonatal Jaundice. *Iranian Journal of Pediatrics*. 2011;21(3):320-4.
9. Najib KS, Saki F, Hemmati F, Inaloo S. Incidence, Risk Factors and Causes of Severe Neonatal Hyperbilirubinemia in the South of Iran (Fars Province). *Iranian Red Crescent Medical Journal*. 2013;15(3):260-3.
10. Ip S CM, Trikalinos T, et al. Screening for Bilirubin Encephalopathy [Internet]. Rockville (MD): Agency for Healthcare Research and Quality (US); 2009 Oct. (Evidence Syntheses, No. 72.) Appendix C., Combined Evidence Tables. USA: NCBI; 2016.
11. Sheng Wu Yi Xue, Gong Cheng Xue Za Zhi. Development of a portable high-power light-emitting diode phototherapy system for neonatal jaundice. *Journal of Biomedical Engineering*. 2012; 29(1):89-92
12. Kumar P, et al. Light-emitting diodes versus compact fluorescent tubes for phototherapy in neonatal jaundice. *Indian Pediatrics*. 2010; 47:131-7.
13. Yun Sil Chang, Jong Hee Hwang, et al. In vitro and in vivo efficacy of new blue light emitting diode phototherapy compared to conventional halogen quartz phototherapy for neonatal jaundice. *Journal of Korean medical science*. 2005; 20(1):61-64
14. Bianca M.R Martins, M de carvalho, et al. Efficacy of new micro-processed phototherapy system with five high intensity light emitting diodes (super LED). *Journal de pediatic*. 2007, 83(3): 253-258.
15. Viau Colindres J, Rountree C, et al. Prospective randomized controlled study comparing low-cost LED and conventional phototherapy for treatment of neonatal hyperbilirubinemia. *Journal Trop pediatria*. 2012; 58(3):178-83.
16. Martins BM, de Carvalho M, Moreira ME, Lopes JM. Efficacy of new microprocessed phototherapy system with five high intensity light emitting diodes (Super LED) *J Pediatr (Rio J)* 2007;83:253–8.
17. Mohammadzadeh M, Kadkhodaei F and Badiei Z. Is the light-emitting diode a better light source than fluorescent tube for phototherapy of neonatal jaundice in preterm infants? *Adv Biomed Res*. 2012; 1: 51.
18. Bertini G, Perugi S, Elia S, Pratesi S, Dani C, Rubaltelli FF. Transepidermal water loss and cerebral hemodynamics in preterm infants: Conventional versus LED phototherapy. *Eur J Pediatr*. 2008; 167:37–42.
19. Kumar P, Murki S, Malik GK, Chawla D, Deorari AK, Karthi N, et al. Light emitting diodes versus compact fluorescent tubes for phototherapy in neonatal jaundice: a multi-center randomized controlled trial. *Indian Pediatrics* 2010;47(2):131-7.
20. Karagol B S, Erdeve O, Atasay B, Arsan S. Efficacy of light emitting diode phototherapy in comparison to conventional phototherapy in neonatal jaundice. *Ankara university faculty of medicine* 2007; 60(1):31-34.

Ethical Challenges Experiences by Faculty Members: A Qualitative Research with a Phenomenological Approach

Samireh Abedini (1)

Elham Imani (2)

Abbas Fazli (3)

(1) PhD in Curriculum and Instruction, Assistant Professor, Education Development Center, Hormozgan University of Medical Sciences, Bandar Abbas, Iran

(2) PhD in Nursing, Assistant Professor, Department of Nursing, Faculty of Nursing and Midwifery, Hormozgan University of Medical Sciences, Bandar Abbas, Iran

(3) PhD in Philosophy, Assistant Professor, Department of Sciences, Faculty of Medicine, Hormozgan University of Medical Sciences, Bandar Abbas, Iran

Corresponding Author:

Dr. Elham Imani

South Golshahr, South Resalat BLV, Nursing and Midwifery Faculty,
Hormozgan University of Medical Sciences,

Bandar Abbas, Iran.

Postal Code: 7916839319;

Phone numbers: 07633666367-8;

Email: eimani@hums.ac.ir

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Samireh Abedini, Elham Imani, Abbas Fazli. Ethical Challenges Experiences by Faculty Members: A Qualitative Research with a Phenomenological Approach. *World Family Medicine*. 2018; 16(3):124-131. DOI: 10.5742/MEWFM.2018.93320

Abstract

Introduction: Ethics in fulfilling one's duties are a necessity in every occupation. The educational systems are formed to a great extent, by managers' and teachers' ethical values. The purpose of this study is to elucidate the ethical challenges experienced by faculty members in Hormozgan University of Medical Sciences.

Materials and Methods: This study has been carried out based on a purposive method taking a phenomenological approach that emphasizes on the perspectives held by Mandlebaum (1955). All faculty members of the University were the participants of the present research paper. The method of choice for gathering the required information was deep, face to face and semi-structured interview carried out individually, each taking approximately 60 to 120 minutes. Qualitative data analysis method used herein was the ethical phenomenology proposed by Mandlebaum (1969).

Results: After interviewing 20 professors, the information reached a state of saturation. 55% of the professors were men and 45% were women. The men and women professors' age averages were 44 ± 5.08 and 42 ± 3 respectively. Then, the interview text was analyzed resulting finally in obtaining three topics, namely educational ethics challenges, research ethics challenges and social ethics challenges, which were classified into ten categories.

Conclusion: Professors believe that we are confronted with serious ethical challenges regarding the educational ethics, research ethics and social ethics and there is felt a need for changing the attitudes in organizational behaviours and strictly dealing with the violation cases in order to be able to enweave such challenges.

Key words: Experience, Ethical issues, Faculty, Qualitative research

Introduction

Nowadays, higher education systems are faced with numerous challenges that are required to be improved and guaranteed in their quality. Academic teaching and learning processes' effectiveness in universities, as an important professional area, depends on an array of individual, occupational and organizational factors [1]. In the meantime, according to the faculty members' roles and responsibilities, ethics is a considerable issue in higher education [2]. In such a manner the ethical indicators of the faculty members can be determinants of the increase in the effectiveness and quality in the higher education system [1]. The education system is a critical section that is largely formed by the managers' and teachers' ethical values [3]. Ethics is the most genuine branch of philosophy incorporating values and remarkable features and it encompasses our daily-life deeds and experiences [4]. Therefore, university personnel including the faculty members, chancellors and their employees require topics on professional ethics to be explicated for them [5]. That is because ethics embrace human beings' internal temperaments and features out of which the human behaviours are derived and they exert the most subtle influence and effect on mankind's behaviour [6].

The existence of ethics in accomplishing the assigned tasks is among the necessities in every occupation and profession as well as in every work environment and the utilization of ethics in the work environment has been transformed into a serious need. Thus, it is necessary to pay sufficient attention to the ethical issues in higher education [7]. Although higher education institutions have taken measures to control their faculty members' behaviours, there are acts done by faculty members which do not fit ethical behaviours. Such unethical activities include cases like plagiarism, weak teaching methodologies, exchanging test questions for money and similar [8]. In a project that deals with the status survey of the faculty members' adherence to educational ethics, it was found that the professors respect their affiliated educational institution and their peers and the ethical teaching indicators overlapped with the effective teaching methodologies in the majority of cases [9]. Nine principles have been outlined for the educational ethics that include the following:

1. **Content Effectiveness:** the instructor's topical knowledge should be at a high level and it has to be ensured that the current content is accurate and appropriate for the students' curriculum.
2. **Teaching Effectiveness:** effective teacher is aware of various teaching strategies and takes advantage of the research results to reach the students' educational objectives.
3. **Handling Sensitive Subject Matters:** the topics, the voicing of which is deemed difficult by the students; the instructor, deals with them overtly, honestly and positively.
4. **Students Development:** the instructors should allow the students to develop in their specialty fields and

they should avoid inappropriate behaviors that lead to a reduction in students' development and growth.

5. **Mutual Relationships with the Students:** to avoid interest conflicts, the instructors should not get engaged in mutual relationships with the students because it results in a reduction in the students' development.
6. **Confidentiality:** things private to the students like marks, presence and absence and the other cases should be released only under legal cases and/or if it is allowed or informed by the student.
7. **Respecting Peers:** a university professor should respect his or her colleagues and work in teams to pave the way for the students' development.
8. **Correct Evaluation of the Students:** according to the importance that is given to correct evaluation, the instructor should credibly and accurately evaluate based on the lesson objectives.
9. **Respecting the Educational Institution:** Parallel to student development, the professors should respect the rules and the policies exercised in an educational institution [10].

Based on the evaluations performed in line with the relationship between the professional ethics and the performance of the professors in Payam-e-Noor University (PNU), it was made clear that the professors observe the above mentioned nine-fold principle. Also, there was found a positive and significant relationship between the educational effectiveness and the professors' performance in PNU. In other words, the study findings were affirmative of the idea that adhering to such principles by these professors causes an increase in teaching effectiveness [11]. It was made evident in the same research that the lesson content effectiveness is of a particular importance to the professors because it brings about an augmentation in the class efficiency and higher and more effective learning in the students; furthermore, these principles are directly associated with the professors' scientific competencies. The reported cases of unfulfilled content effectiveness incorporated issues like the professors' insufficient knowledge regarding the instructional material, incorrect interpretation of research evidence and leaving part of the lessons untaught and teaching the lesson topics in which the professors were more interested [10].

One of the ethical challenges with which the professors are faced is the existence of contradictory educational policies in the educational institutions that causes the professors' performance and satisfaction to be influenced in respect to their ethical commitments. One such case is the lesson plans and traditional teaching methods while the teachers want innovative methods [3]. However, the use of teaching methods or evaluation methods not conforming to the education objectives is a case counteracting the education effectiveness which has to be considered as a constituent of the teaching ethical principles [10].

Professional ethics guidelines for the professors proposed in Finland place particular emphasis on the ethics as sensitive issues [12]. Ethical sensitivity is defined as the individual's ability to perceive the ethical values in various conditions [13, 14]. The results of the study carried out

by Mousavi et al [15] on ethical sensitivity indicated that ethical sensitivity has been in a rate higher than medium in both university students and nurses. It has been expressed in the study that enhancing ethical sensitivity influences the awareness of the various aspects of a situation and the selection of the appropriate solution [15].

Among the various aspects of ethics in higher education, educational ethics and the challenges pertaining thereto are important topics in the area of ethics and the observation of the educational ethics causes an increase in psychological security, growth and sublimit, productivity and it also brings about a reduction in the costs in the universities [9]. Nowadays, faculty members are confronted with numerous educational challenges which are connected to teaching methods, the way the instructional material is presented, technological adequacy, observation of justice and ethics in teaching, evaluation and so forth, all of which can in a way or another obsess the minds of the professors [16]. According to the idea that the existence of ethics in carrying out the assignments is among the necessities within a certain profession, occupation and work environment and the utilization of the ethics in the work environment has been turned into a serious need [7], and because the ethics and their relevant challenges are more of a subjective nature, it is necessary to fully investigate these issues in depth from the perspective of the professors and there is felt a need for undertaking a qualitative research with a phenomenological approach to the matter. Thus, the present qualitative research aims at the elaboration of the ethical challenges experiences by the faculty members in Hormozgan University of Medical Sciences.

Methodology

In the present study, ethical phenomenology with an emphasis on the perspectives held by Mandelbaum (1955) [17] was applied for gathering the data. Phenomenological method can be adopted for the survey of the features and structures of such various types of experiences as sensory, religious, aesthetic and ethical experiences [17]. The phenomenon and the context in which it takes place serve as interpretational factors for us to gain understanding of the participants' worlds and/or the studied events and incidents. In a speech, a qualitative researcher associates the applied cases with the individual's live experiences through getting logically engaged and entered into the unique and exclusive worlds of the individual participants in their own tongue [18]. The goal is study of the individuals, events, incidents and services, indeed, gaining insight into our worlds and those of the others. The interpreter is in a constant back and forth movement between the foreground and background in the participants' real situations and worlds. The goal that is pursued by the qualitative scholar is reaching an agreement on the essence of the studied phenomenon. The objective is gaining a deep understanding and capturing the extract and the quintessence of a phenomenon and acquiring knowledge regarding given events and incidents [19].

The ethical challenge as a phenomenon is yet to be

accurately elucidated in our country. There is a scarcity of the research in this regard. Ethical challenge experience cannot be studied in quantitative research since it is a completely subjective phenomenon. Therefore, phenomenology is envisaged as more appropriate an interpretation for the recognition of the structure and the essence of ethical challenges experience. Thus, the authors adopted the above mentioned approach to the study of ethical challenge experience. Quantitative research does not offer the required flexibility and subtlety for exploring a live experience of the phenomena that is somehow connected to the way human beings interact and the rest of the qualitative research is devoid of the necessary effect in this area; hence, the most appropriate method for gaining an insight into the depth of such phenomena's experience and meaning is phenomenology [20].

The main assumptions governing the current research paper correspond to the naturalism paradigm. The study is carried out in an environment of the university's and hospital's faculty members. All faculty members in Hormozgan University of Medical Sciences were selected as the study participants and were diversely appointed from the men and women teaching and working in various fields of study in different departments. Sampling was based on a goal-oriented method and the faculty members willing to take part in the study were interviewed.

To gather the data, deep, face-to-face, and semi-structured individual interviews were performed after the official permits had been acquired. To perform interviews, firstly, a list of the various study fields and departments in Hormozgan University of Medical Sciences was procured. Interview guides were applied so as not lose track of the interview. Interview guide is a collection of the codified open questions designed and based on the study objectives and the research team notions and they were revised repeatedly after each interview if it was deemed necessary. Simultaneous data collection and data analyses greatly contributed to the interview guide's revision and correction. Of course, there were cases that appeared in the course of interview where questions outside the interview guide were raised and asked as made necessary by the expediency of the conversation trend. But, the existence of the guide helped the researcher have more control over the interview content and length. Every interview took 60 to 120 minutes.

Interviews continued up to a certain saturation point at which time it was thought that the interviews did not contribute any novel idea requiring a new code and the data had become reiterative. The researcher was forced to refer to the interviewee for a second time in five cases to perform another interview. The participants were asked to arbitrarily specify interview time and place. Regarding the study objectives, before the outset of the interview the interviewees were provided with the explanations on why the interview has to be recorded, their voluntary participation, interviewee information and identity confidentiality, then they were asked to arbitrarily specify the time and the place of the interviews and finally a written letter of agreement was acquired from each of

them. At the beginning of every interview, the participants were asked to introduce themselves in brief and questions were asked regarding their age, field of study and the place of education. Then, the questions pertaining to the phenomenon of concern were asked and investigations on the participants' experiences of ethical challenges continued. The discussions, having a consideration of time framework continued to the extent that the interviewer made sure that they well understood the offered concepts. The interview form contained two sets of questions. One set comprised the major questions of the interview and the second set was considered as the follow-up questions. The questions were designed based on the study objectives and the extant subjective knowledge and changes were made in case it was deemed necessary during the course of interview. The main questions were: What are your experiences regarding the ethical challenges? What are your memories of the ethics and the challenges related thereto?

The researcher tried to exactly reveal the participants' answers to each of the aforementioned questions by using follow-up questions and sentences such as "could you explain more?" or "... what do you mean?". Follow-up questions were raised based on the information offered by the participant so as to clarify the questioned concept. Interviews continued until detailed and sufficient information had been obtained and they were recorded by asking for its permissibility from the participants and then each interview was exactly transcribed onto paper documents immediately after several rounds of listening on the same day so as to get the required feedback for the upcoming interviews and/or for data adequacy purposes. The transcribed interviews were again matched with the recorded information. The keywords or the intended codes were extracted from the text and then analyses followed.

Participants' demographic information was analyzed by the use of descriptive statistics. To prevent personal thoughts and beliefs interfering with and influencing the study, the author identified and discarded them before starting the interview and also during the data collection and data analysis phases. The method applied for qualitative data analysis herein was ethical phenomenology as put forth by Mandlebaum (1969) [17]. In analyzing the ethical experiences, Mandlebaum's phenomenological approach follows the thoughts and notions held by Husserl, the founder of phenomenology. Through pondering over Husserl's phenomenology, Spiegelberg defined this approach in several steps:

The first step initiates with the survey of trivial phenomena. The raw perception or the preliminary intuition of the phenomenon matters a lot. In the next step after the preliminary intuition of the phenomenon is analyzing the results. Of course, phenomena analysis does not mean that we divide results into separate components rather it means isolating the constituent element of the phenomena and clarifying its relationships with similar phenomena. Through putting phenomena in certain sets, we can describe its features as well as its interrelationships. In the third step, those sets of such phenomena that revolve

around a single point are segregated. In the fourth step, we deal with the survey of the way such phenomena has come into existence. The fifth step incorporates the analysis and the description of the way the phenomena has been shaped into our awareness. The sixth step is suspension in which we solely rely on what resides only in our awareness and knowledge. This stage is called phenomenological reduction [17]. With an abstraction of the concepts for the purpose of describing the studied phenomenon, a comprehensive definition of "the ethical challenge experiences by faculty members in Hormozgan University of Medical Sciences" was presented and then evidence was quoted from the data texts for each concept.

To confirm the validity and the accuracy of the present research, the four criteria offered by Lincoln and Goba, namely credibility, dependability, confirmability and data transferability, were investigated. The increase in the number of the interviews was the first step that was devised by the author to augment the data accuracy. The researcher endeavoured to develop his relationship with the participants. After the interviews were written down, the participants were provided with the study findings and they offered their ideas regarding the findings' in accordance with their experiences and evaluated the findings' accuracy and credibility.

To insure dependability, additional to the researchers, a peer group, and specialist in qualitative research, was also asked to investigate the texts in order for the analysis process to be verified. Other activities that were carried out in parallel to verify the research authenticity were: guiding the research based on the study plan, recording the participants' interviews and transcribing them.

By preserving the written interviews as documents during the whole course of the research, the author guaranteed the research confirmability. The researcher's interest in the studied phenomenon, constant involvement in data collection and analysis, peers' revisions and qualitative research experts' reviews, searching for evidence and contradicting articles and also making efforts to acquire others' opinions in this regard, were among the other factors contributing to the research confirmability.

Results

In the present qualitative phenomenological study, the information reached a point of saturation after interviewing 20 faculty members from Hormozgan University of Medical Sciences. The professors were from medicine, nursing and midwifery, Paramedics, hygiene, dentistry and pharmacy departments of the university. 55% of the participants were men and 45% were women. The men and women's average age was in the range of 44 ± 5.08 and 42 ± 3 , respectively, and their average work record was 16 ± 6 for men and 14 ± 6.03 for women. Table 1 presents the demographic characteristics of the participants as separated by gender. After the interview contexts had been analyzed, three topics and ten categories were obtained and, the obtained topics were titled educational ethics

Table 1: Demographic characteristics of the participants as separated by gender

Variable	male		female		total	
	frequency	percent	frequency	percent	frequency	percent
Faculty						
Medicine	2	50%	2	50%	4	20%
Nursing and Midwifery	1	75%	3	25%	4	20%
Paramedics	2	50%	2	50%	4	20%
Hygiene	2	50%	2	50%	4	20%
Dentistry	2	100%	-	-	2	10%
Pharmacy	2	100%	-	-	2	10%
total	11	55%	9	45%	20	100%
Age (year)	44±5.08		42±3		43±4	
Work record (year)	16±6		14±6.03		15±6	

challenges, research ethics challenges and social ethics challenges. The ethical challenges of faculty members of Hormozgan University of Medical Sciences were defined as stated in the following words based on the extracted content and categories: "faculty members confront the ethical challenges in their work environment and these include a combination of ethical ethics challenges, research ethics challenges, research ethics challenges and social ethics challenges. Educational ethics challenges are derived from scientific under performance, paying less attention to scientific enhancement, inappropriate evaluation and management of the educational system. Research ethics challenges are also experienced due to improper evaluation systems and frauds and violations in research affairs and social ethics challenges are revealed in the form of ethical sensitivities, understating the professional ethics value and sense of duty as well as improper social interactions".

1. Educational Ethics Challenges:

From the faculty members' point of view, educational ethics are important topics that are needed to be taken into consideration by all of the professors in their entire stages of teaching. Examples of ethical challenges posed by the faculty members are: down-performances in transferring knowledge, less attention to scientific enhancement, evaluations being nonstandard and educational mismanagement.

1.1. Scientific down-performances:

From the perspective of the faculty members, paying less attention to what a professor is obliged to offer to the students is one of the important educational ethics challenges. Such an issue in a Medical Sciences University can lead to imperfect and incorrect learning in the students which would eventually cause endangering the care-receivers' health and, consequently, irreparable outcomes.

"Some of the professors are indifferent. They do not take their jobs seriously. Or, they might have other responsibilities and these, all in all, exemplify instances of down-performances in transferring knowledge to the

students. As an example, the professors sometimes become so engaged in patients' treatment in clinics that they prefer to devote all their time to curing of the patients and therefore they would not have much time to spend for the students" (Participant No.7, medicine department professor).

1.2. Paying Less Attention to Scientific Enhancement:

Some professors do not have sufficient motivation for updating their knowledge for various reasons and they are not looking for enhancing themselves scientifically and educationally. The faculty members participating in the present research do not pay much attention to this topic and consider it as a challenge in educational ethics.

"Some professors do not have enough time to gather new topics and correct their lesson plans. Unfortunately, it is a prevalent vision in managerial ranks that the professors are naturally interested in teaching and even if their salaries are cut they would continue their teaching. Of course, this is a simplistic analysis. Even those professors who teach in the universities for one or two years for the sake of achieving higher K-coefficients prefer their obligation to end rapidly, so they do not spend much time teaching the university students" (Participant No.9, dentistry department).

1.3. Evaluations Being Nonstandard:

The lack of appropriate scales and indices for the evaluation of the faculty members' performance can play a role in the emergence of the various and unexpected scientific, educational and ethical issues which can, altogether, cause a reduction or suppression of the motivations or even becoming inclined towards unethical issues.

"Evaluation is outcome-oriented. Evaluations are seeking to reach a goal. It is not important by what means or by what mechanism the objective is accomplished. One should not always concentrate on the students and the results. If the professors' output is only to be evaluated by the articles or the high marks it makes the individuals only think of ways to attain higher marks in the tests and evaluations" (Participant NO. 3, professor in nursing and midwifery department).

1.4. Educational Mismanagement:

Educational managers play a considerable role in the university department for elevating the professors' satisfaction and the creation of motivation in them so as to enhance their scientific and ethical levels. If the method of management causes pressure and tension, tendencies towards unethical cases rise up.

"Feedback is not positive. You are not asked about the quality of what you do. It does not matter how you accomplish an assignment. It does not matter if you are satisfied or not. Nobody asks about the facilities. The important ideas here are that one should finish the class on time, apprenticeships should go on and in the end a test should be carried out" (Participant No. 4, nursing and midwifery professor).

2. Research Ethics Challenges:

According to the idea that the university, inter alia, expects the faculty members to participate in the studies and research and offer research accomplishment, therefore, there would come about the possibility of professors faced with the ethical challenges regarding research-related issues, as well. In professors' ideas, cases like fraudulent activities and changes in organizational values are among the research ethics challenges with which they are confronted.

2.1. Fraud in Research:

Due to the compulsoriness of publishing articles in faculty members promotion plans, unfortunately, inclinations towards unethical behaviors and occasionally perpetrating counterfeits in research activities are observed, although the Committee of Ethics in Research exerts serious controls in this regard and tries to prevent such fraudulent activities from taking place.

"Unethical issues have become frequent in research and there are cases of fraudulent activities reported. Even, a research work is sometimes divided into sections and articles are extracted and published from them; even worse than that happens when some professors publish the students' works bearing their own names and they do not even mention the name of the student" (Participant No.12, Hygiene Department Professor).

2.2. Changing the Organizational Values:

Although faculty members doing research is of great importance, paying no attention to the individuals' tendencies and expecting the professors to carry out activities beyond their capacities can cause the appearance of discontent. These expectations should be in one single form in all of the departments associated to a university and there should not be seen any injustice by the professors by any means.

"They do not consider the individuals' interests at all. They only expect you to carry out educational tasks. All your time is spent with the class and in learning activities; there would remain no time for research. The other departments supervise their apprenticeship activities and it is considered as a curriculum unit so the professors can spend the rest of their time on research activities" (Participant No.19,

Nursing and Midwifery Department Professor"

3. Social Ethics Challenges:

University is a small community and if the social life principles are not observed therein, the individuals are faced with challenges. In this small community, the professors predominantly play as positive role-models for the students and they can be the students' pacemaker in every single part of their behaviors and speeches. But, changes are sometimes created in the social atmosphere of the university which would be followed by unpleasant outcomes. In professors' opinions, there are cases like feeling no sense of duty, understating the professional ethics value, ethical sensitivities drop-downs and improper interactions which are deemed as social ethics challenges and problems.

3.1. Absence of Sense of Duty:

Sometimes, paying attention to individual and organizational issues causes the individuals to forget what a critical responsibility they have and that they are responsible for the students they are teaching and besides teaching them with the knowledge and correct scientific ways of conduct, they should be an appropriate ethical role-model for the students.

"Some faculty members only think of getting their own jobs accomplished. They only want to write articles to promote. They ask for help from the students in carrying out their research tasks. But, they do not think they are, as well, responsible scientifically and ethically for what they offer to their students" (Participant No.8, Dentistry Department Professor)

3.2. Understating the Professional Ethics:

Professors' ethical features and their adherence to the ethical principles are very important and it highly influences the students' social growth and professional upbringing. Any sort of unfair judgment and treatment by the professors is scrutinized by the students.

"Professors should have professional ethics. In treating the students, colleagues and patients, their ethical patterns are highly concentrated by the students. If they fail to behave correctly or if they exercise discrimination, students learn. Sometimes, it is seen that the professors treat care-receivers as their research specimen and this is highly effective on the students' perspectives" (Participant No.6, Medicine Department Professor)

3.3. Ethical Sensitivity Drop:

If anti-ethics become prevalent and common in a society, the individuals gradually adapt themselves to such anti-ethics and their moral values would be forgotten and they would be considered as ordinary and repetitive issues that can impose irreversible harm on the society's ethical values depending on the degree to which they are heinous.

"Some improper deeds are repeated to the extent that the others become indifferent to them. Things like speaking with insulting words, violating the patients' privacy, research fraud and reducing the education time have become ordinary because they have been repeated many

times and everyone has lost their sensitivity to such things” (Participant No.15, Paramedics Department Professor).

3.4. *Incorrect Interactions:*

Establishing correct relationships and interactions in the universities is one of the preliminary principles of creating a healthy educational atmosphere for the university students and any sort of unhealthy social relations can lead to the creation of widespread social corruptions.

“Illegitimate relationships are big problems. The student has obtained a low mark, say 2 or 3, and all of a sudden s/he is given a pass mark in his or her report card or a student might be caught doing violations on a test but everything is considered unseen and ignored and issues like disrespecting one another and even bribery can cause corruption in the universities” (Participant No.11, Pharmacy Department Professor).

Discussion

Since phenomenological approaches to ethics cause transparency in the individuals’ behavioural examples (21), the respectable professors were asked to express their major concerns with no consideration and conservatism based on the same approach. Therefore, the results obtained from the interviews can be taken into consideration in making efforts to mitigate the ethical harm in the atmosphere governing Hormozgan University of Medical Sciences and copying and dispersing this to the other universities.

The results obtained based on the demographic features of the participants who were from all of the departments and had a high work record were summarized into three main axes and ten secondary topics all of which indicated that reviewing and revising measures regarding some cases are necessary and should be taken immediately.

The first section pertaining to the educational ethics challenges regarding the four variables pointed out in the interviews implies that the professors are faced with a motivation dropping trend and educational mismanagement manifested in not paying attention to the professors’ educational functions and the evaluation systems being nonstandard as well as the lack of attention that was paid by the faculty members to their own scientific enhancement especially in clinics, all leading to scientific down-performance by the professors in transferring knowledge to the students which would eventually result in students’ decline of learning. Therefore, with a constant supervision on the educational trends and functions of the professors and also by holding conferences and scientific meetings in areas like educational epistemology the necessary steps should be taken in line with developing and fertilizing the faculty members’ motivation because the studies have shown that in spite of various methods devised in professionally developing the students, teaching by the professors is still an effective method for students’ learning [9].

In the second section, the researchers dealt with the research ethics challenges which are in fact yielded from

the feedback professors received from their studies for elevating their teaching skills and it will finally cause their scientific vigour to be strengthened; and the obtained results are suggestive of faculty members’ low concern in this regard. Of course, the most important ethical harm in the present research paper is violation and the universities are faced with different kinds of it and it has unfortunately caused serious harm to the research procedures and trends [22]. Plagiarism is the product of abnormalities resulting from getting non-academic regulations entered into Iran’s academic areas. When the scientific life regulations and educational institutions’ rules are imbalanced and the scientific spaces are not allowed to freely expand and reach maturity based on their independent professional regulations, the result would be norms and values’ weakening and the effects of such a weakness would be observed in scientific socialization and scientific ethics weakening and plagiarism which is a heinous sign thereof [23].

And, the third section deals with the social ethics challenges for which the interviewees pointed to four harms, the same as the educational ethics challenges. These are: feeling no sense of duty, understating the value of professional ethics, ethical sensitivity decline and improper interactions all of which are results of the university management paying less or no attention to coordinating the professors. On the other hand, disregarding the professional ethics principles leads to the behavioural discrimination in respect to the students and colleagues. Unfortunately, there is no fascination in the universities and some of the professors do not exhibit good behaviours. Furthermore, the universities do not treat students very well [1].

Conclusion

Paying attention to all three proposed aspects in terms of the ethics causes an elevation in the ethics in the educational environments and increases the faculty members’ motivation for becoming inclined towards truthfulness and righteousness. Among the limitations that the authors were faced with in getting the present research activity done was the participants’ possible engagement in daily and educational activities and this made the researchers face temporal constraints for performing the interviews. To overcome this limitation, the researchers tried to take most advantage out of their leisure times, meanwhile making prior coordination with the professors in regard to the interview sessions.

Based on the study findings, professors in Hormozgan University of Medical Sciences believe that we are confronted with serious ethical harm in terms of educational, research and social ethics and finding a way out of this mess depends on the change that is needed to be made in the attitudes in terms of organizational behaviour and treating appropriately the cases of the primary study principles violations. Moreover, the necessity to hold specialized classes on professional ethics in line with stabilizing the occupational ethics and moderation in behaviour for the purpose of decreasing the ethical harm among the faculty members is a fundamental issue and there is a need, as

well, for avoiding ethical bottlenecks by breaching the ethical principles and social norms. Therefore, a favourable and exhilarating atmosphere can be made to govern the academic community through observing the ethical and professional ethics thereby barring the anti-ethics takeover of the education trends.

Acknowledgments

The study is a result of a research proposal funded by the financial sponsorship of Hormozgan University of Medical Sciences. Researchers are grateful and appreciate faculty members who participated.

References

- Ghanbari S, Ardalan M, Beheshtirad R, Soltanzade V. University staff members' ethics and relationship with quality in high education. *The Journal of Ethics in Science and Technology*. 2015;10(2):40-50.
- Reybold LE. Faculty ethics: Ideal principles with practical applications. *Journal of veterinary medical education*. 2009;36(4):375-81.
- Waqas HP. Impact of ethical dilemmas on job satisfaction and performance of university teachers in Pakistan. *Journal of Basic and Applied Scientific Research*. 2014;4(3):92-7.
- Gülcan NY. Discussing the importance of teaching ethics in education. *Procedia-Social and Behavioral Sciences*. 2015;174:2622-5.
- Keenan FJ. (The lack of) professional ethics in the academy. *Louvain studies* 2011;35(1):98-116.
- Larijani B, Ghafarian A, Kazemian A, Sadr Hoseini S. Health care professional and ethical issues. Tehran: Baraye Farda. 2004.
- Khayatmoghadam S, Tabababaeinasab M. Components of professional ethics in management. *The Journal of Ethics in Science and Technology*. 2016;11(1):127-36.
- Namagembe S, Ntayi JM. Ethical sensitivity, academic dishonesty and career growth of academic staff in institutions of higher learning in Uganda *International Journal of Economics and Management Sciences*. 2012;1(8):56-63.
- Arasteh H, NaveEbrahim A, Motalebifard A. Assessment of the educational ethic situation of faculty member in Tehran. *Rahborde Farhang*. 2010(9):203-19.
- Murray H, Gillese E, Lennon M, Mercer P, Robinson M. Ethical principles for college and university teaching. *New directions for teaching and learning*. 1996; 1996(66):57-63.
- Salajegheh A, Safari S. Relationship between professional ethics and function of professors *The Journal of Ethics in Science and Technology*. 2016; 10(3):103-10.
- Kuusisto E, Tirri K, Rissanen I. Finnish teachers' ethical sensitivity. *Education Research International*. 2012.
- Buyuk ET, Rizal S, Güdek E. Ethical sensitivity, job satisfaction and related factors of the nurses working in different areas. *Progress in Health Sciences*. 2015; 5(1):138.
- Izadi A, Imani E, AsadiNoughabi F, Hajizadeh N, Naghizadeh F. Moral sensitivity of critical care nurses in clinical decision making and its correlation with their caring behavior in teaching hospitals of Bandar Abbas in 2012. *Iranian journal of medical ethics and history of medicine*. 2013;6(2):43-56.
- Mousavi S, Mohsenpour M, Borhani F, Ebadi M. Ethical sensitivity of nurses and nursing students working in Aja university of medical sciences. *Medical Ethics Journal*. 2015; 9(31):127-43.
- Quayle J. Teaching ethics to future psychologists: Challenges and the model of an experience of a college psychology professor in a developing country. *Counselling Psychology Quarterly*. 2009; 22(1):97-104.
- Mandelbaum M. *The phenomenology of moral experience*. Baltimore: Johns Hopkins Press 1969.
- Benner PE. *Interpretive phenomenology: embodiment, caring, and ethics in health and illness*. 1st edition ed. United States of America: Sage Publications Inc; 1994.
- Jensen LA, Allen MN. Meta-Synthesis of qualitative findings. *Qualitative Health Research*. 1996;6(4):553-60.
- Burns N, Grove SK. *Understanding nursing research, Building an Evidence-Based Practice*. 5th edition ed. United States of America: Elsevier Sanders Inc; 2011.
- Rashidian A. *Husserl in the texture of his creations*. 1st ed. Tehran: Nashr-e Ney; 2005.
- Imani E, Abedsaeidi Z. Review the types of scientific misconduct in nursing research and strategies to deal with it. *Iranian Journal of Nursing Research*. 2015; 10(1):76-85.
- Moghtaderi A, Dehmardeh M. Fraud and misconduct in medical research *Zahedan Journal of Research in Medical Sciences*. 2012; 14(1):1-7.

Prevalence of Structural Brain Damage Without Skull Fracture in Autopsy of Head Trauma Victims

Esmail Farzaneh (1)
Babak Mostafazadeh (2)
Fatemeh Tarjoman (3)
Aziz Kamran (4)

(1) Department of Forensic Medicine and Toxicology, School of Medicine, Ardabil University of Medical Sciences, Ardabil, Iran

(2) Department of Forensic Medicine and Toxicology, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

(3) School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

(4) Department of Public Health, Khalkhal Faculty of Medical Science, Ardabil University of Medical Sciences, Ardabil, Iran

Corresponding Author:

Babak Mostafazadeh

Department of Forensic Medicine and Toxicology, School of Medicine,
 Shahid Beheshti University of Medical Sciences,
 Tehran, Iran

Email: mstzbmd@sbm.ac.ir

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Esmail Farzaneh, Babak Mostafazadeh, Fatemeh Tarjoman, Aziz Kamran. Prevalence of Structural Brain Damage Without Skull Fracture in Autopsy of Head Trauma Victims. *World Family Medicine*. 2018; 16(3):132-138. DOI: 10.5742/MEWFM.2018.93321

Abstract

Background: Head trauma is one of the most important causes of death in people under 40 years of age. Fatal brain injury can often occur with a healthy skull, too. The aim of this study is to investigate the epidemiology of brain damage without skull fracture.

Methods: In this cross-sectional study, the records of all of the victims of head trauma who were referred to the Legal Medicine Organization (LMO) of Tehran province and were reported without skull fracture in the autopsy and whose pathological samples were dispatched for the analysis of their soft tissue, were investigated. Data were analyzed using SPSS 16.0. software. The results were considered significant at $P < 0.05$.

Results: In this study, from among the 400 deceased persons, 86 cases did not have skull fracture and therefore were selected to be investigated. Their mean age was 27 ± 4.2 . Sixty-five of them (75.6%) were male and 21 (24.4%) were females and most of them were pedestrians (45.3%). Most of the hemorrhage and damage (37.2%) occurred in the temporal lobe of the brain. In all of the age groups and in both males and females, subarachnoid hemorrhage had the highest prevalence and there was a significant relationship between that and age groups ($p = 0.022$). Simultaneous analysis

of the injuries to the brain lobes and the victims' age indicated that temporal lobe damage is the most prevalent type of brain damage, especially for the age group of 19-36.

Conclusions: Since head trauma is the most prevalent cause of death and fatal brain damage can often take place with a healthy skull too, it is required that more attention be paid to those injured people without skull fracture in the emergency ward of the hospitals.

Key words: head trauma, brain, hemorrhage, contusion

Introduction

Head trauma is one of the most important causes of death in the ages under 40 and constitutes a considerable portion of deaths resulting from trauma (1). Each year in the US, 52,000 people die of head trauma and 80,000 to 90,000 people incur severe complications and become disabled (2). It has been estimated that 5.3 million people in the world live with debilitating complications of head trauma (3). Traffic collisions, disputes, and falling from heights are the three main causes of head trauma all over the world (4). The incidence rate of head trauma is different in different societies; its prevalence has been reported from 83 to 400 per 100,000 people (5,6). Since the majority of those who are injured with such trauma are in their early ages, the amount of lifetime loss would be enormously high.

On the other hand, the most prevalent and important forms of lesions in LMO are head and spine injuries. Investigations have revealed that although the skull plates are considered as the index of injury in people, a fatal brain injury can happen with a healthy skull, too. In emergency wards, having skull fracture causes the increase of initial investigations while lack of obvious skull fractures in initial examinations and radiological investigations in emergency situations might lead to inadequate attention in diagnosing fatal brain lesions (7,8). Regarding the availability of the bodies of head trauma victims, especially in big cities like Tehran, the present study was designed so as to investigate the epidemiology of the brain damage without skull fracture.

Methods

In this cross-sectional study, the records of all of the victims of head trauma who were referred to Tehran's LMO and were reported without skull fracture in the autopsy and whose pathological samples were dispatched for the analysis of their soft tissue, were investigated. The victims who had skull fracture, those who lacked in their record a full description of the incident leading to the injury, those whose relatives were impossible to find to get more information, and those whose pathological samples were not sent for autopsy, were all excluded from the study.

In order to select the cases to be studied, convenience sampling method was used and until reaching a desirable level of sample size, all of the details about the cases were recorded. Based on similar studies conducted worldwide and also considering $\beta=0.20$ and $\alpha=0.05$, the sample size was estimated to be 86 cases.

After making the necessary arrangements with the officials of Tehran's LMO, the needed information was extracted from the records of the victims of head trauma and put together in a questionnaire. For those victims whose preliminary information was incomplete, the phone numbers written in their record were used to call their relatives and obtain the complementary information.

The questionnaire consisted of two parts: 1) demographic information of the victims which included their name, age,

gender, education level, occupation, and their status, when the incident happened to them; whether they were driver, pedestrian, motorcyclist, or injured when falling from a height or having a dispute with others, and 2) their pathological information which included the type of the injury as well as the structural brain damage; whether they had cortical contusion, epidural hematoma, subdural hematoma, subarachnoid hemorrhage, intracranial hemorrhage, cerebral concussion, or diffuse axonal injuries.

Data were analyzed using SPSS 16.0 software (SPSS, Inc., Chicago, IL, USA). The two statistical tests of T-student and Chi-square were employed in this regard. The results were considered significant at $P<0.05$.

Results

In this study, from among the 400 victims of head trauma in the LMO of Tehran during 2014, 86 cases who had head trauma without skull fracture were entered into the study. The mean age of the cases was 27 ± 4.2 and in age-based grouping, most of them fell in the age group of 19-36. Moreover, 65 cases (75.6%) were male and 21 cases (24.4%) were female.

Simultaneous analysis of the age groups of the cases and their gender indicated that most of the males were in the age group of 19-36 while most of the females were in the age group of 55-72. It was also found that there is a significant difference between the age groups and the gender of the victims ($p=0.03$) (Table 1 - next page).

The analysis of the status of the victims when the incident leading to trauma happened to them indicated that most of them (45.3%) were pedestrians and the least number of them were vehicle occupants (1.1%) (Table 2).

In the analysis of the pathological results obtained from the autopsy of the injured, most of the hemorrhages and damage (37.2%) were observed in the temporal lobe of the brain. Furthermore, in 22% of them, there was cerebellar damage (Figure 1).

According to the pathology reports in the autopsy of the injured, the most prevalent type of brain injury was subarachnoid hemorrhage (57%). Simultaneous analysis of the age groups and the type of brain hemorrhage in the victims of trauma demonstrated that in all of the age groups, subarachnoid hemorrhage had the highest prevalence. Also, the statistical test of Chi-square showed that the relationship between age groups and the type of hemorrhage is significant ($p=0.022$).

In all of the forms in which the incident happened for the victims (whether they were pedestrians, drivers, vehicle occupants, or fell from heights or had a dispute with others), subarachnoid hemorrhage had the highest prevalence. However, statistical analysis showed no significant relationship between them ($p=0.21$). Similarly, in males and females, subarachnoid hemorrhage was more prevalent but again the relationship did not appear to be statistically significant ($p=0.4$) (Table 3).

Table 1: Age groups distribution in head trauma victims by sex

Gender	Age groups (year)					Total
	1 - 18	19 - 36	37 - 54	55 - 72	73 - 90	
Male	4(4.6%)	26(30.2%)	17(19.8%)	10(11.7%)	8(9.3%)	65(75.6%)
Female	2(2.3%)	3(3.5%)	4(4.6%)	9(10.5)	3(3.5%)	21(24.4%)
p*	0/03					

Significant difference between age groups and gender*

Table 2: Distribution of the victims in head trauma by sex

Gender	position					
	Pedestrian	Motorcyclist	Driver	Vehicle occupants	Accidental falls	Dispute
Male	27(41.6%)	12(18.5%)	11(16.9%)	0(0%)	11(16.9%)	4(6.1%)
Female	12(57.1%)	0(0%)	5(23.8%)	1(4.8%)	2(9.5%)	1(4.8%)
Total	39(45.4%)	12(13.9%)	16(18.6%)	1(1.2%)	13(15.1%)	5(5.8%)
P-value	0.08					

Figure 1: Distribution of damage in brain in head trauma victims

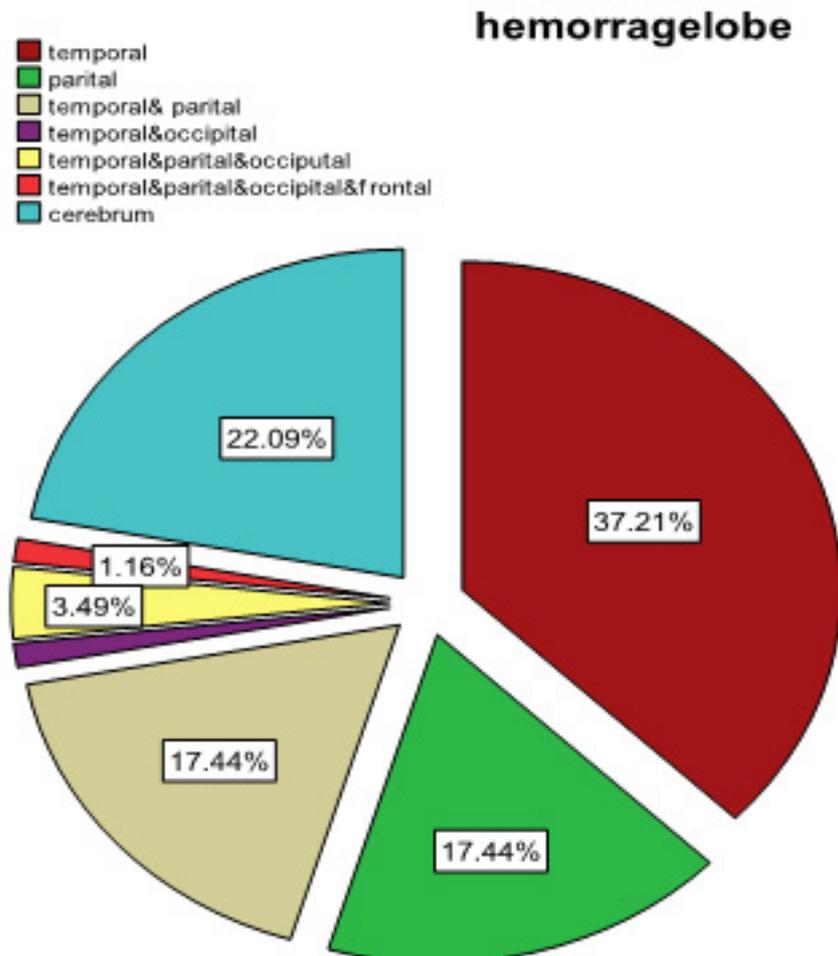


Table 3: Type of hemorrhage in brain by sex, age groups and position in head trauma victims

Variables		Subarachnoid hemorrhage	Subdural hemorrhage	Epidural hemorrhage	Brain contusion & subarachnoid hemorrhage	P value
		n (%)	n (%)	n (%)	n (%)	
Gender	Male	37(75.2%)	21(80.7%)	4(57.1%)	3(75%)	0.4
	Female	12(24.48)	5(19.3%)	3(42.9%)	1(25%)	
Age groups (year)	1 - 18	3(6.1%)	3(11.6%)	0 (0%)	0 (0%)	0.022
	19 - 36	17(34.7%)	9(34.6%)	1(14.3%)	2(50%)	
	37 - 54	15(30.6%)	5(19.2%)	1(14.3%)	0 (0%)	
	55 - 72	8(16.4%)	5(19.2%)	4(57.1%)	2(50%)	
	73 - 90	6(12.2%)	4(15.4%)	1(14.3%)	0	
position	Pedestrian	21(42.9%)	12(46.1%)	5(71.4%)	1(25%)	0.21
	Motorcyclist	7(14.3%)	2(7.7%)	1(14.3%)	2(50%)	
	Driver	10(20.4%)	5(19.2%)	1(14.3%)	0 (0%)	
	Vehicle occupants	1(2%)	0 (0%)	0 (0%)	0 (0%)	
	Accidental falls	6(12.2%)	6(23.1%)	0 (0%)	1(25%)	
	Dispute	4(8.2%)	1(3.9%)	0 (0%)	0 (0%)	
Total		49(57%)	26(30.2%)	7(8.1%)	4(4.7%)	

Significant difference between age groups and gender*

Simultaneous analysis of the damage to brain lobes and the age of the injured revealed that temporal lobe is the most common lobe of the brain receiving damage especially in the age group of 18-36. Furthermore, in all of the age groups, some cases of cerebellar damage were observed. The results of simultaneous analysis of gender and the type of damage to brain lobes indicated that temporal lobe damage is more prevalent than other types of damage in males (Table 4 - next page). Moreover, the statistical analysis of the status of the victims while receiving trauma and the type of damage to brain lobes demonstrated that the temporal lobe is the most common part of the brain being damaged in drivers, pedestrians, motorcyclists, those who fall from heights, and those who were injured while having disputes. As regards vehicle occupants, however, cerebellar damage was more prevalent. However, statistical analysis showed that this difference is not significant ($p=0.054$) (Table 4).

In the analysis of cerebral contusion in the victims of head trauma, 64 cases (76.41%) were without cerebral contusion and 22 cases (25.59%) were damaged in different brain lobes, the details of which are shown in Table 5.

In the simultaneous analysis of cerebral contusion and gender, no cerebral contusion was detected in the pathology reports of most of the males and females and no statistically significant relationship was observed between these two variables.

The statistical analysis of cerebral contusion and age groups revealed that the lowest prevalence of cerebral contusion belonged to the age group of 18-36. The results of Chi-square test indicated that this difference is significant and the prevalence of cerebral contusion in the cases under 18 and over 36 years of age is higher ($p=0.03$) (Table 5).

Discussion

In this study, in order to investigate the structural brain damage without skull fracture in the victims of head trauma, the clinical records and autopsy results of 86 victims who met the criteria to be included in the study were investigated. The results revealed that the highest mortality in head trauma incidents belonged to young people; the mean age of the victims was 26.6 ± 4.2 and the age group of 18-36 had the highest number of deaths from this kind of trauma.

As regards the status of the injured in the trauma incidents, pedestrians and drivers had the highest number of incidents leading to death. Furthermore, the structural brain damage following head trauma was more prevalent in males than females.

The pathological analysis of the brain of the injured showed that the temporal lobe was the most involved brain lobe in head trauma incidents. It also revealed that the hemorrhage type with the highest prevalence was the subarachnoid hemorrhage. Moreover, in the age group of 18-36, cerebral contusion was less prevalent compared to the other age groups.

The finding of our study regarding the higher mortality of head trauma and structural brain damage at young ages is consistent with the findings of similar studies (9,10,11,12,13,14,15,16).

The mortality as the result of structural brain damage was more prevalent among males than females which can be explained with reference to the cultural and social context in our country that favors more presence of men in society. This finding is also in line with the findings of the similar

Table 4: Type of damage to brain lobes by sex, age groups and position in head trauma victims

		Temporal N(%)	Parietal N(%)	Temporal & parietal N(%)	Temporal & occipital N(%)	Temporal & parietal & occipital N(%)	Temporal & parietal & occipital & frontal N(%)	Cerebrum N(%)	p- value
Gender	Male	27(84.4%)	11(73.3%)	11(73.3%)	1(100%)	3(100%)	0 (0%)	12(63.1%)	0.23
	Female	5(15.6%)	4(26.7%)	4(26.7%)	0 (0%)	0 (0%)	1(100%)	7(36.9%)	
Age groups (year)	1 – 18	0(0%)	0(0%)	3(20%)	0 (0%)	0 (0%)	0 (0%)	3(15.8%)	0.14
	19 – 36	13(40.6%)	5(33.3%)	3(20%)	0 (0%)	3(100%)	0 (0%)	5(26.3%)	
	37 – 54	8(25%)	4(26.7%)	2(13.3%)	1(100%)	0 (0%)	0 (0%)	6(31.6%)	
	55 – 72	8(25%)	2(13.3%)	5(33.3%)	0 (0%)	0 (0%)	1(100%)	3(15.8%)	
	73 - 90	3(9.4%)	4(26.7%)	2(13.3%)	0 (0%)	0 (0%)	0 (0%)	2(10.5%)	
Position	Pedestrian	12(37.5%)	6(40%)	6(40%)	1(100%)	2(66.7%)	1(100%)	11(57.9%)	0.054
	Motorcyclist	5(15.6%)	2(13.3%)	3(20%)	0 (0%)	0 (0%)	0 (0%)	2(10.5%)	
	Driver	5(15.6%)	4(26.7%)	2(13.3%)	0 (0%)	1(33.3%)	0 (0%)	4(21%)	
	Vehicle occupants	1(3.1%)	0(0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
	Accidental falls	7(21.9%)	3(20%)	2(13.3%)	0 (0%)	0 (0%)	0 (0%)	1(5.3%)	
	Dispute	2(6.3%)	0(0%)	2(13.3%)	0 (0%)	0 (0%)	0 (0%)	1(5.3%)	
Total		32(37.2%)	15(17.4%)	15(17.4%)	1(1.2%)	3(3.5%)	1(1.2%)	19(22.1%)	

Table 5: Prevalence of cerebral contusion in head trauma victims without skull fracture by sex and age groups

		Temporal n (%)	Parietal n (%)	Occipital n (%)	frontal n (%)	Temporo frontal n (%)	No damage n (%)
Gender	Male	5(71.4%)	3(75%)	1(100%)	3(60%)	5(100%)	47(73.4)
	Female	2(28.6%)	1(25%)	0(0%)	2(40%)	0(0%)	17(26.6)
Age groups (year)	1 – 18	0(0%)	0(0%)	0(0%)	1(20%)	0(0%)	5(7.9%)
	19 – 36	3(42.9%)	0(0%)	0(0%)	0(0%)	2(40%)	24(37.5%)
	37 – 54	1(14.2%)	3(75%)	0(0%)	1(20%)	1(20%)	15(23.4%)
	55 – 72	3(42.9%)	0(0%)	1(100%)	1(20%)	2(40%)	12(18.7%)
	73 – 90	0(0%)	1(25%)	0(0%)	2(40%)	0(0%)	8(12.5%)
Total		7(8.1%)	4(4.7%)	1(1.2%)	5(5.8%)	5(5.8%)	64(76.4%)

studies conducted in the other provinces of Iran as well as those conducted in the other parts of the world (9,10,11,12,13,14,17,18).

The analysis of the records of the victims demonstrated that pedestrians and drivers of the vehicles have the highest mortality and after them, motorcyclists. This finding is a bit different from the finding of a study conducted in the US in which falling from heights was found to be the main cause of traumatic brain injury especially among elderly people over the age of 75 (7).

In a retrospective review study which was conducted on 529 injured people from 1991 through to 2000 in Abadan, Iran, the cause of mortality in 83.8% of the cases was found to be structural brain damage resulting from traffic collisions. Moreover, subdural hemorrhage was reported to be the most common cause of death (in 62.4% of the cases) (9).

In another retrospective study which was conducted on 251 victims of traffic collisions during 2006 and 2007 in Yazd, Iran, the most prevalent cause of trauma was found to be the collision between pedestrians and vehicles (39.8%) and the most common cause of death was found to be central nervous system damage (58.1%) both of which findings are similar to the findings of our study (7).

In a study which investigated 2,495 traffic collisions leading to death from 2000 to 2006 in Mashhad, Iran, the highest number of mortality was reported in pedestrians. In that study, the mortality was remarkably high among the elderly pedestrians. The findings of that study are also in line with our finding which showed higher mortality in pedestrians (11).

Styrke et al. conducted a study on 449 cases in order to investigate the epidemiological and medical aspects of traumatic brain injuries. They found that falling from heights (55%) and vehicle-related incidents (30%) were respectively the most common causes of injuries. The percentage of falling from heights was higher among children and the elderly, while among adults, the vehicle-related incidents were also highly prevalent which is not consistent with the findings of our study (19).

The differences in the kind of incidents leading to injuries in different parts of the world can be explained with reference to the cultural, economic, and social status of the societies as well as the level of public awareness and the kind of training people receive.

Wider use of footbridges, helmet, and seatbelt by the people as well as the high quality of vehicles in the developed countries result in the decrease in mortality due to vehicle-related incidents. However, in the developing countries including Iran, the mortality resulting from structural brain damage caused by head trauma continues to be a big problem (9,10,13).

According to the findings of this study, among those who were injured with head trauma and did not have skull fracture, the most commonly involved part of the brain

was the temporal lobe and the most prevalent type of hemorrhage was the subarachnoid hemorrhage.

The results of a study which was conducted by Tseng et al. in Taiwan to investigate the involvement of skull fracture in patients with traumatic brain injuries indicated that from among 197 patients, 92 patients had skull fracture, of which 59 cases (64.1%) died. Moreover, from the 105 cases who were without skull fracture, 33 cases (31.4%) died. The autopsy revealed that the most prevalent type of brain injury in both groups was subarachnoid hemorrhage which was consistent with the finding of our study (14).

In Cepeda et al.'s study which was conducted retrospectively by investigating the records of 408 patients with mild or severe traumatic brain injury, the most prevalent type of structural brain damage was found to be intracranial hemorrhage which was most commonly observed in the frontal lobe rather than the other parts of the brain (15). This finding was inconsistent with the findings of our study.

In a study which was conducted by Agrawal et al. from 2007 to 2009 in India, from among 113 patients with head trauma, 42 patients (37.2%) died of traumatic brain injuries. 21.4% of the injured did not have skull fracture. The most prevalent types of brain injuries were acute subdural hematoma and subarachnoid hemorrhage with diffuse cerebral edema, respectively (13). These findings were also not consistent with our findings.

Conclusion

Considering the fact that head injuries are the most common cause of death especially in motor vehicle collisions, falling from heights, and disputes and also the fact that fatal brain injuries can occur with a healthy skull too, it is required that more attention be paid to the injured people without skull fracture in the emergency ward of the hospitals.

Acknowledgments

This project was carried out with the financial support of the research department of Shahid Beheshti University of Medical sciences. The authors hereby express their gratitude to the officials of that department. We also wish to thank all of the people who helped us in the implementation of this study.

References

1. Sosin DM, Sacks JJ, Smith SM. Head injury-associated deaths in the United States from 1979 to 1986. *JAMA*. 1989; 262:2251-2255.
2. Thurman DJ, Alverson C, Dunn KA, Guerrero J, Sniezek JE. Traumatic brain injury in the United States: A public health perspective. *J Head Trauma Rehabil*. 1999; 14:602-615.
3. Centers for disease control and prevention (US), national center for injury prevention and control. Traumatic brain injury in the United States: A report to congress. Atlanta: CDC:1999.

4. Wu X, Hu J, Zhuo L, Fu C, Hui G, Wang Y, et al. Epidemiology of traumatic brain injury in eastern China, 2004: A prospective large case study. *J Trauma*. 2008; 64: 1313-1319.
5. Chiu WT, Huang SJ, Tsai SH, Lin JW, Tsai MD, Lin TJ, et al. The impact of time, legislation, and geography on the epidemiology of traumatic brain injury. *J Clin Neurosci*. 2007;14:930-935.
6. Andelic N, Sigurdardottir S, Brunborg C, Roe C. Incidence of hospital-treated traumatic brain injury in the Oslo population. *Neuroepidemiology*. 2008; 30:120-128.
7. Moharamzad Y, Taghipour H, Firoozabadi NH, Firoozabadi AH, Hashemzadeh M, Mirjalili M, Namavari A. Mortality pattern according to autopsy findings among traffic accident victims in Yazd, Iran. *Chinese J Traumatol (English Edition)*. 2008; 11(6): 329-334.
8. Asha'Ari ZA, Ahmad R, Rahman J, Kamarudin N, Ishlah LW. Contrecoup injury in patients with traumatic temporal bone fracture. *J LARYNGOL OTOL*. 2011;125(08):781-5.
9. Akang EE, Kuti MA, Osunkoya AO, Komolafe EO, Malomo AO, Shokunbi MT, Amutta SB. Pattern of fatal head injuries in Ibadan—a 10 year review. *Med Sci Law*. 2002; 42(2):160-6.
10. Corrigan JD, SelassieAW, Orman JA. The epidemiology of traumatic brain injury. *J Head Trauma Rehabil*. 2010; 25(2):72-80.
11. Zangoeei Dovom H, Shafahi Y, Zangoeei Dovom M. Fatal accident distribution by age, gender and head injury, and death probability at accident scene in Mashhad, Iran, 2006–2009. *Int J Inj Contr Saf Promot*. 2013;20(2):121-133.
12. Paulson JA. The epidemiology of injuries in adolescents. *Pediatric annals*. 1988; 17(2):84-96.
13. Agrawal A, Coronado VG, Bell JM, Baisakhiya N, Kakani A, Galwankar S, Dwivedi S. Characteristics of patients who died from traumatic brain injury in two rural hospital emergency departments in Maharashtra, India, 2007-2009. *IJCIIIS*. 2014;4(4):293-297
14. Tseng WC, Shih HM, Su YC, Chen HW, Hsiao KY, Chen IC. The association between skull bone fractures and outcomes in patients with severe traumatic brain injury. *J Trauma Acute Care Surg*. 2011;71(6):1611-1614.
15. Cepeda S, Gómez PA, Castaño-Leon AM, Munarriz PM, Paredes I, Lagares A. Contrecoup Traumatic Intracerebral Hemorrhage: A Geometric Study of the Impact Site and Association with Hemorrhagic Progression. *J Neurotrauma*. 2016 Jun 1;33(11):1034-46.
16. Mostafazadeh B, Farzaneh E, Afsharian-Shishvan T, Nasl Seraj F, Salmasian H. The incidence of berry aneurysm in the Iranian population: an autopsy study. *Turk Neurosurg*. 2008;18(3):228-231.
17. Hussain K, Wijetunge DB, Grubnic S, Jackson IT. A comprehensive analysis of craniofacial trauma. *J Trauma Acute Care Surg*. 1994;36(1):34-47.
18. Seleye-Fubara D, Etebu EN. Pathology of death from severe head injuries in Rivers State: a study of sixty eight consecutive cases in five years. *Nigerian journal of medicine: Niger J Med*. 2010;20(4):470-4.
19. Styrke J, Stålnacke BM, Sojka P, Björnstig U. Traumatic brain injuries in a well-defined population: epidemiological aspects and severity. *J Neurotrauma*. 2007; 24(9):1425-36.

An introduction to determination of mean Uterine Artery Doppler Pulsatility Index during pregnancy for Predicting Adverse Pregnancy Outcome

Sima Gitia (1)

Vajiheh Marsoosi (2)

Maryam Moshfeghi (3)

(1) Department of Obstetrics and Gynecology, Perinatology Division, Shariati Hospital, Tehran University of Medical Sciences, Tehran, Iran

(2) Department of Obstetrics and Gynecology, Perinatology Division, Shariati Hospital, Tehran University of Medical Sciences, Tehran, Iran .

(3) Department of Obstetrics and Gynecology, Perinatology Division, Shariati Hospital, Tehran University of Medical Sciences, Tehran, Iran

Corresponding Author:

Sima Gitia

Shariati Hospital, Tehran University of Medical Sciences, Tehran, Iran

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Sima Gitia, ajiheh Marsoosi, Maryam Moshfeghi. An introduction to determination of mean Uterine Artery Doppler Pulsatility Index during pregnancy for Predicting Adverse Pregnancy Outcome. World Family Medicine. 2018; 16(3):139-144.

DOI: 10.5742/MEWFM.2018.93323

Abstract

Objective: Preeclampsia and IUGR are known as the main causes of two adverse complications of pregnancies. Recently, uterine artery Doppler evaluation in first and second trimester has been used for screening of the above pregnancy-related complications.

Study design: The goal of this study was to determine the most effective reference range value of mean PI in first, second and third trimesters in order to predict the adverse outcomes. This study was conducted in "Shariati" Hospital; Tehran medical University in the course of January 2014 and November 2017. Participants underwent ultrasound Doppler scans by a perinatologist and were followed up until delivery. Mean PI (as compared between preeclampsia and IUGR groups) and the reference range value of PI (Pulsatility Index) for predicting adverse outcomes were determined. Three hundred and fifty pregnant women were included in this study.

Result: Preeclampsia was detected in 132 (37.7%) and IUGR was seen in 134 (38.2%). Mean PI was significantly higher in preeclampsia and IUGR groups.

Conclusion: The reference range for mean PI for predicting IUGR was found to be 1.82 with sensitivity and specificity of 53.4% and 87.5% (AUC=0.804 P<0.0001). The reference range for mean PI for predicting Preeclampsia was found to be 1.77 with sensitivity and specificity of 61.1% and 87.6% (AUC=0.761 P<0.0001). Application of uterine artery Doppler could be helpful in prediction of adverse pregnancy outcome.

Key words: Mean PI, IUGR, preeclampsia, Doppler.

Introduction

One of the main causes of maternal and neonatal mortality and morbidity is pre-eclampsia which affects 5-10% of all pregnancies [1]. Preeclampsia and IUGR are two pregnancy related complications. Impaired placentation is considered as an important cause of developing such complications. Abnormal invasion of trophoblasts causes increased impedance in spiral arteries which are the main branches of uterine arteries. Loss of the musculo-elastic properties during the formation of utero-placental arteries causes physiologic changes. These changes result in an increased blood flow to the placenta and the fetus [12]. A disturbance in this physiologic process leads to an increase in vascular resistance and impedance to blood flow [12]. Doppler evaluation of uterine arteries provide a valid means of assessing utero-placental resistance to blood flow[13].

Impaired placentation is considered as the main cause of preeclampsia [2]. Failure or inadequate trophoblastic invasion into the spiral arteries result in impaired placentation which may lead to an increase of impedance in spiral arteries [2]. Intrauterine growth restriction (IUGR) is an obstetric problem which affects 10-15% of all pregnancies[3].

On the other hand high resistant circulation has been considered to be associated with pregnancy related adverse effects such as preeclampsia and IUGR (Intrauterine growth restriction) [4].

Uterine artery (UtA) Doppler ultrasound is considered as a non-invasive modality which shows utero-placental perfusion [5]. The most common Doppler index currently in use widely is PI (Pulsatility Index).

Recently, uterine artery Doppler evaluation in first and second trimester has been used for screening of pregnancy related complications [5, 6] while the results show wide range of sensitivity and specificity [7, 8]. The goal of this study was to determine the reference range of mean PI during pregnancy for predicting adverse outcomes.

Results

Three hundred and fifty pregnant women were included. Demographic characteristics are summarized in Table 1. One woman had history of smoking.

Table 1: Demographic characteristics of patients.

Variable	Value
Maternal age (year)	31.16 ± 7.18
Maternal weight (kg)	78.97±12.75
Systolic blood pressure (mmhg)	112.38±7.80
Diastolic blood pressure (mmhg)	71.65±7.10
Gravidity (median)	2.71±1.26
Parity (median)	0.77±0.82
Abortion (median)	0.83±0.90
Ectopic pregnancy	0.09±0.29
Birth weight	2698±780

Material and method

We conducted this cohort study in “Shariati” Hospital (affiliated to Tehran University of Medical Sciences) between January 2014 and August 2017. The women were followed up until delivery. Women with singleton pregnancies with gestational age between 11 to 40 weeks were enrolled.

Exclusion criteria were: gestational diabetes, immune disease, renal disease, treatment with aspirin or heparin, chromosomal or structural fetal abnormalities. We asked participants to fill out informed consent forms. Data regarding maternal age, weight, blood pressure, history of smoking, medical history, drug history, neonatal birth weight, maternal preeclampsia during pregnancy and IUGR were recorded.

Participants underwent ultrasound Doppler scans by a perinatologist using Accuvix XQ (Medison, Korea), Acuson Sequoia 512, Mountain View, (Siemens Medical Solutions CA and Philips IU 22) by means of trans-abdominal transducer. By placing the transducer on the lower quadrant of the abdomen, the performer conducted uterine artery Doppler examination. The angle of insonation was kept less than 30 degrees.

To obtain waveforms, the pulsed-wave Doppler was applied. After obtaining three consecutive waveforms on each examination, then PI was recorded for both right and left uterine arteries and the mean PI was calculated. Mean PI was compared with preeclampsia and IUGR groups and the reference range value of PI for predicting adverse outcomes was determined.

All data were analyzed using SPSS software version 20 (SPSS Inc., Chicago, IL, USA). Data were presented as Mean± SD . Independent sample t test was used for comparison of continuous variables. ROC curve was used to determine optimal reference range of mean PI. Area under the Curve (AUC) was calculated. P value less than 0.05 was considered as significant.

Table 2 shows the calculated reference intervals for mean uterine PI from 11w to 40w+6d:

Table 2

GA(Weeks)	5th centile	50 centile	95 centile
11	1.46	2.59	3.58
12	1.24	2.78	3.73
13	1.18	2.69	3.76
14	0.94	2.71	3.23
15	0.96	2.46	2.98
16	0.94	1.82	3.17
17	1.06	1.92	2.56
18	0.80	1.61	1.99
19	0.91	1.23	2.60
20	0.95	2.03	2.62
21	0.83	1.65	2.16
22	0.86	1.57	2.86
23	0.65	1.46	1.99
24	0.58	1.34	1.77
25	0.63	1.00	1.48
26	0.56	0.85	0.99
27	0.92	1.70	2.36
28	0.69	1.47	2.14
29	0.72	1.21	1.91
30	0.60	0.98	1.73
31	0.51	0.82	0.94
32	0.47	0.66	0.91
33	0.54	0.94	1.13
34	0.49	0.83	1.02
35	0.55	0.81	1.25
36	0.62	0.77	1.34
37	0.55	1.05	1.44
38	0.50	0.67	1.00
39	0.50	0.65	1.00
40	0.48	0.61	0.98
41	0.50	0.62	1.04

Mean PI was significantly higher in preeclampsia group (Table 4).

Table 3: Mean PI in preeclampsia and normal group

	Preeclampsia	Normal	P value
Mean PI	1.77±0.81	1.07±0.62	<0.001

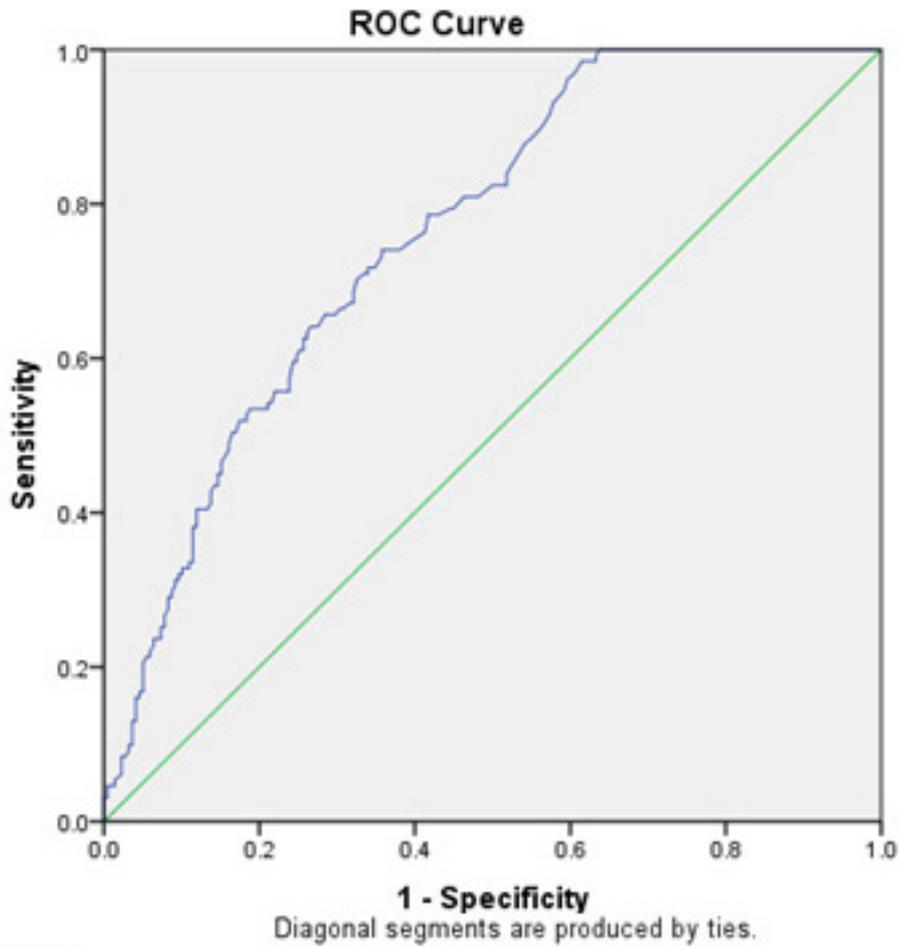
Mean PI was significantly higher in IUGR group (Table 4).

Table 4. Mean PI in IUGR and normal group

	IUGR	Normal	P value
Mean PI	1.82±0.76	1.05±0.62	<0.001

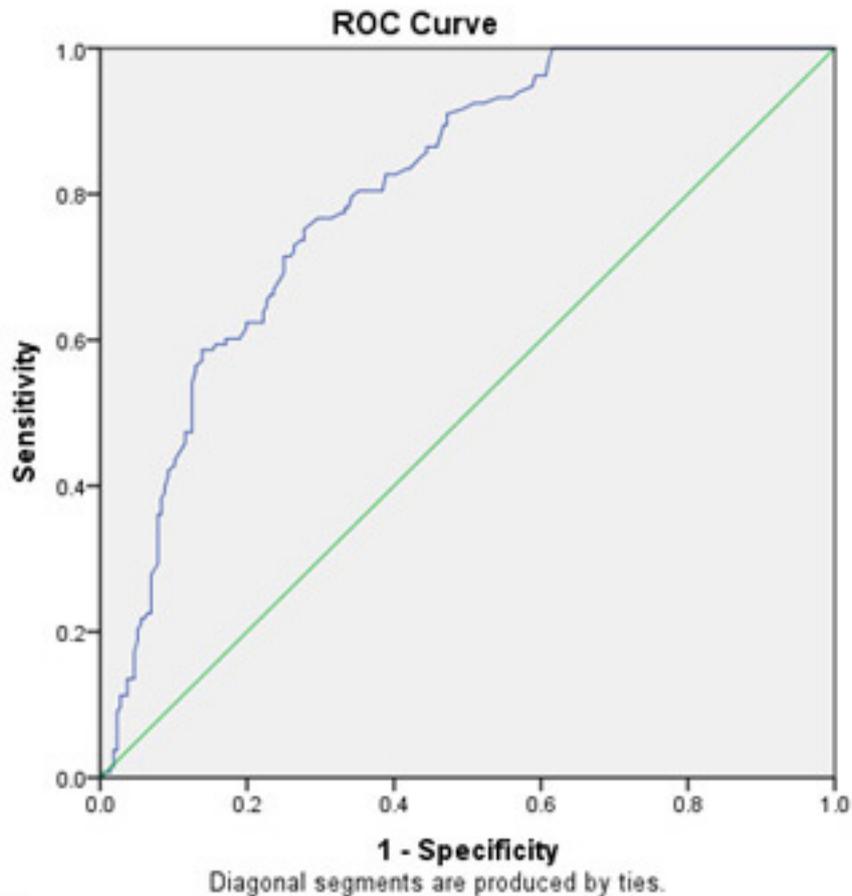
We concluded that the best reference range value for mean PI for predicting Preeclampsia is 1.77 with sensitivity and specificity of 61.1% and 87.6% (AUC=0.761 P<0.0001) (Figure 1 - next page).

Figure 1



We also concluded that the best reference range value for mean PI for predicting IUGR is 1.82 with sensitivity and specificity of 53.4% and 87.5% (AUC=0.804 P<0.0001) (Figure 2).

Figure 2



Discussion

The result of this study showed that mean PI of uterine arteries is significantly higher in pregnancies complicated with IUGR and preeclampsia.

In a former study in 2013, authors had evaluated mean PI of uterine arteries in 435 normal pregnant women at 18-24 and 30-34 weeks of gestation and had reached results very close to those of our study [2]. In the mentioned study the mean of uterine arteries in pregnancy with adverse outcomes was 1.27 compared with 0.99 in normal pregnancies ($p < 0.001$) [2]. Another study, by Saloni et al reported mean PI in normal pregnancies as 0.7 and 0.8 in women with adverse pregnancy outcome (preeclampsia, SGA, gestational hypertension)[9].

Barati et al evaluated Doppler index of uterine artery in 379 pregnant women with gestational age between 16 and 22 weeks and found that 17 cases (4.5%) had abnormal uterine artery Doppler index. They followed those cases and observed that Pre-eclampsia occurred more significantly in groups with abnormal Doppler index than normal indexes. They considered the reference range value of 1.45 as the best value for mean PI for predicting adverse pregnancy outcome with a sensitivity of 79% and specificity of 95.5%[10].

In that study, the best value for mean PI for predicting preeclampsia is 1.45 with sensitivity and specificity of 93% and 91% in the first trimester while the best value for mean PI for predicting preeclampsia is 1.43 with sensitivity and specificity of 100% and 82% in the second trimester.

Becker et al evaluated uterine artery Doppler indexes in 7,508 pregnant women between 20 and 23 weeks of gestation and reported a significant relationship between the increase of impedance and the increase of adverse pregnancy outcomes such as pre-eclampsia, IUGR, intrauterine/neonatal deaths, and preterm delivery[11].

In the above study, mean PI of uterine arteries was significantly higher in the IUGR group than the normal group. The best value for mean PI for predicting IUGR was 1.62 with sensitivity and specificity of 96% and 83% in the first trimester and the best value for mean PI for predicting IUGR was 1.14 with sensitivity and specificity of 100% and 62% in the second trimester.

In a different study conducted by Oloyede, 430 pregnant women with gestational age between 22nd and 23rd weeks underwent uterine artery ultrasound evaluation. They reported mean PI of 0.9 in normal pregnancies and 1.2 in pregnancies complicated by adverse outcomes (impaired placentation, mainly IUGR and preterm birth). The difference was not statistically significant.[12].

Our study mainly focused on comparing the uterine artery Doppler indexes in first, second and third trimesters simultaneously. We conducted this study in a tertiary hospital with a single perinatologist in charge. With regard to the results of the afore cited studies, the small difference

in uterine artery PI seen in our study may be attributed to a degree of demographic features in the limited number of women in our study.

The mean PI obtained from our study for predicting IUGR was 1.82 with sensitivity and specificity of 53.4% and 87.5% (AUC=0.804 $P < 0.0001$). The mean PI for predicting Preeclampsia was found to be 1.77 with sensitivity and specificity of 61.1% and 87.6% (AUC=0.761 $P < 0.0001$).

Conclusion

Application of uterine artery Doppler as an easy and available diagnostic method can be helpful in the prediction of adverse pregnancy outcome that potentially causes catastrophic maternal or neonatal morbidities and mortalities. Upon identifying the high risk pregnant women, we would be able to reduce the possible catastrophies by using proper medication and known therapies.

Recommendation

Regarding the importance of maternal morbidity and mortalities in women afflicted with pre-eclampsia and also regarding neonatal health and their quality of future life in IUGR cases, we have found it wise and of cost benefit to measure mean uterine artery PI during screening tests in pregnancy in an effort to find high risk cases. We must note that our PI findings relate to a small group and cannot be generalized to the whole Iranian population. This issue can be the subject of further academic work.

References

- [1]. Lopez-Mendez, Maria A., Victoria Martinez-Gaytan, Raul Cortes-Flores, Rene M. Ramos-Gonzalez, Mauro A. Ochoa-Torres, Idalia Garza-Veloz, Monica I. Martinez-Acuña, Jose I. Badillo-Almaraz, and Margarita L. Martinez-Fierro, Doppler ultrasound evaluation in preeclampsia. *BMC research notes*. 2013; 6(1):477.
- [2]. Jamal A, Abbasalizadeh F, Vafaei H, Marsoosi V, Eslamian L. Multicenter screening for adverse pregnancy outcomes by uterine artery Doppler in the second and third trimester of pregnancy. *Medical ultrasonography*. 2013; 15(2):95.
- [3]. Suhag A, Berghella V. Intrauterine growth restriction (IUGR): etiology and diagnosis. *Current Obstetrics and Gynecology Reports*. 2013; 2(2):102-11.
- [4]. Valensise H, Bezzeccheri V, Rizzo G, Tranquilli AL, Garzetti G, Romanini C. Doppler velocimetry of the uterine artery as a screening test for gestational hypertension. *Ultrasound in obstetrics & gynecology*. 1993; 3(1):18-22.
- [5]. Gomez O, Martinez J, Figueras F, Del Rio M, Borobio V, Puerto B, et al. Uterine artery Doppler at 11–14 weeks of gestation to screen for hypertensive disorders and associated complications in an unselected population. *Ultrasound in obstetrics & gynecology*. 2005; 26(5):490-4.
- [6]. Campbell S. First-trimester screening for preeclampsia. *Ultrasound in obstetrics & gynecology*. 2005; 26(5):487-9.
- [7]. Albaiges G, Missfelder-Lobos H, Lees C, Parra M, Nicolaidis KH. One-stage screening for pregnancy

complications by color Doppler assessment of the uterine arteries at 23 weeks' gestation. *Obstetrics & Gynecology*. 2000; 96(4):559-64.

[8]. North R, Ferrier C, Long D, Townend K, Kincaid-Smith P. Uterine artery Doppler flow velocity waveforms in the second trimester for the prediction of preeclampsia and fetal growth retardation. *Obstetrics & Gynecology*. 1994; 83(3):378-86.

[9]. Prajapati SR, Maitra N. Prediction of pre-eclampsia by a combination of maternal history, uterine artery Doppler, and mean arterial pressure (a prospective study of 200 cases). *J Obstet Gynaecol India*. 2013; 63(1):32-6.

[10]. Barati M, Shahbazian N, Ahmadi L, Masihi S. Diagnostic evaluation of uterine artery Doppler sonography for the prediction of adverse pregnancy outcomes. *J Res Med Sci*. 2014; 19(6):515-9.

[11]. Becker R, Vonk R, Vollert W, Entezami M. Doppler Sonography of uterine arteries at 20–23 weeks: risk assessment of adverse pregnancy outcome by quantification of impedance and notch. *Journal of perinatal medicine*. 2002; 30(5):388-94.

[12]. Oloyede OA, Iketubosin F. Uterine artery Doppler study in second trimester of pregnancy. *Pan Afr Med J*. 2013; 15(87).

[13]. Aardema M, Saro M, Lander M, De Wolf B, Oosterhof H, Aarnoudse J. Second trimester Doppler ultrasound screening of the uterine arteries differentiates between subsequent normal and poor outcomes of hypertensive pregnancy: two different pathophysiological entities? *Clinical Science*. 2004; 106(4):377-82.

Syrian Mesquite Extract Improves Serum Lipids and Liver Tissue in NFALD modelled Rabbits

Samira Keshavarzi (1)
Gholamreza Bahrami (1,2)
Bahareh Mohammadi (1)
Razieh Hatami (1)
Shahram Miraghaee (1)

(1) Medical Biology Research Center, Kermanshah University of Medical Sciences, Kermanshah, Iran

(2) Pharmaceutical Sciences Research Center, Kermanshah University of Medical Sciences, Kermanshah, Iran

Corresponding author:

S. Sh. Miraghaee

Medical Biology Research Center, P. O. Box 67155-1616, Kermanshah University of Medical Sciences, Parastar St., Daneshghah Blvd., Kermanshah, Iran

Tel: +98 833 427 4673

Mobile: +98 918 333 1385

Fax: +98 833 427 4671

Email: Shahram.miraghaee@yahoo.com

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Keshavarzi S. et al. Syrian Mesquite Extract Improves Serum Lipids and Liver Tissue in NFALD modeled Rabbits. World Family Medicine. 2018; 16(3):145-152. DOI: 10.5742/MEWFM.2018.93324

Abstract

Background: *Prosopis farcta* root has been proposed as an efficacious natural drug in traditional medicine for alleviation of chest pain.

Objectives: The present study evaluates the efficacy of aqueous extract of *Prosopis farcta* root on high cholesterol diet-induced NAFLD in rabbits as experimental model.

Methods: Male rabbits were randomly divided into 4 groups. The first group as control were fed by standard pellet and other groups were received 2% cholesterol amounts daily. Rabbits were fed with high cholesterol diet till the serum cholesterol level reached 1800 mg/dl, then, they were treated daily with distilled water, and 0.6 mg/kg Simvastatin, or 500 mg/kg/day *Prosopis farcta* root extracts orally by gavage for 30 days. Finally, the groups were compared considering serum lipid profile, serum enzymes and liver histopathological changes. **Results:** Serum lipid parameters and enzymes were significantly increased in the high cholesterol diet groups in comparison with the normal control group. Histopathological findings revealed that large lipid vacuoles were formed in hepatocytes. Treatment with *Prosopis farcta* root significantly improved rabbit lipid profile and decreased liver injury.

Conclusion: According to previously determined ingredients of *Prosopis farcta* root extract, it seems that phytosterols, Saponins and Flavonoids may play an important role in its hepatoprotective effect.

Key words: cholesterol; herbal medicine; hypercholesterolemia; non-alcoholic fatty liver disease; *Prosopis farcta*.

Summary: *Prosopis farcta* root has been proposed as an efficacious natural drug in traditional medicine. The present study shows the aqueous extract of *Prosopis farcta* root significantly improves rabbit lipid profile and decreases liver injury in rabbits fed a high cholesterol diet.

Abbreviations Used: NAFLD: Non-Alcoholic Fatty Liver Disease. NASH: Non-alcoholic Steato Hepatitis. CVD: Cardio Vascular Disease. TG: Triglyceride. LDL: Low-Density Lipoprotein. HDL: High-Density Lipoprotein. ALT: Alanine Amino Transferase. AST: Aspartate amino Transferase CPK: Creatinine Phospho Kinase. LDH: Lactate Dehydrogenase. CRP: C - reactive protein.



Introduction

Non-alcoholic fatty liver disease (NAFLD) is defined as storage of triglycerides in hepatocytes more than 5% of liver weight, less than 20 g/d of alcohol consumption and with exclusion of any other causes of chronic liver diseases(1, 2). In recent years, NAFLD has been suggested to be the most common cause of chronic liver disease throughout the world, with a suggested incidence of 10–24% in the general population in the USA and similar figures in Europe and Japan(2, 3). The prevalence of NAFLD and non-alcoholic steato hepatitis (NASH) in Iranians varies from 2.9% to 7.1% in the general population and 55.8% in patients with type 2 diabetes mellitus(4).

No effective pharmacological therapy is currently available for patients with NAFLD(5). There is a strong association between NAFLD and conditions related to the metabolic syndromes. Hence, drugs that have been used in hyperlipidaemia (such as simvastatin), and type II diabetes mellitus and some antioxidants now are receiving great attention in prevention of NAFLD. However, some of the drugs have been found to be potentially hepatotoxic in clinical trials(6). Moreover, some patients are resistant or intolerant to conventional pharmacotherapy. Therefore, alternative approaches are eagerly needed; plant-based therapies attract much interest as they are effective in reducing lipid levels (7, 8). In this line, the Syrian Mesquite (*Prosopis farcta*) root extract showed anti-hyperlipidemic effect that improved CVD risks (9). *Prosopis* is a genus of flowering plants in the Fabaceae family. Species of *Prosopis* are often spiny trees, 2 to 3 m or taller or small shrubs, well adapted to warm weather and drought. *Prosopis farcta*, commonly known as Syrian mesquite, is native to Asia and distributed from India to Iran(9). Species of this genus have several functions. They have been utilized for gum, paint, cordage, as dietary supplements for feeding ruminants, as well as medicinal purposes (10, 11). Beans and leaves of *Prosopis farcta* have been used for treatment of some diseases and disorders in traditional medicine including diabetes, inflammatory diseases, wounds and skin disorder, prostate disorders, measles, urinary diseases, diarrhea, and colds(12-14). Also, *Prosopis farcta* can be used to reduce cardiac or chest pain and for the management of cardiovascular disorders (15). However, to our knowledge, no report of its effect on liver health has been published. The objective of this study was to evaluate the hypolipidemic action of Syrian Mesquite root extract and its action on liver tissue and metabolic parameters of hypercholesterolemic rabbits.

Materials and Methods

1. Plant Material and Extract Preparation

Roots of *Prosopis farcta* were collected from Kermanshah province, west of Iran, and kept in standard conditions. The root parts of *Prosopis farcta* were powdered after drying. A total of 100 g of plant powder was added to 1000 ml boiling water and mixed for 15 minutes. The whole content of the mixture was first filtered through an ordinary filter paper, and the filtrate was then passed through a No.1 Whatman

filtering paper. The solution was transferred into a rotary evaporator for removing surplus water and about 80% of water was removed. The final solution was kept in a water bath at 30°C.

2. Animals and Experimental Design

Thirty-two young male New Zealand White (NZW) rabbits obtained from Pasteur Institute of Tehran and weighing about 180 - 200 g were utilized. After arrival in the laboratory, they were kept under standard conditions of temperature ($23\pm 1^\circ\text{C}$), relative humidity ($55\pm 10\%$), 12-hour dark and 12-hour light cycle, and were fed with ground laboratory Chow 5321 (Ralston Purina Co, St Louis, MO). Ethical rules of the investigation on animals were considered carefully, and the ethic committee's for animal study accepted the protocol of the present study. They were then randomly divided into 4 groups. The first group as control was fed by standard pellet (group I) and the other groups received 2% cholesterol amounts daily (9, 16). NZW rabbits were fed with high cholesterol diet till the serum cholesterol level reached 1800 mg/dl, then, they were treated daily by distilled water (group II), 0.6 mg/kg simvastatin (group III)(17), or 500 mg/kg/day *Prosopis farcta* root extracts (group IV) orally by gavage for 30 days.

3. Biochemical Analysis

Blood samples were taken from the marginal ear vein of un-anesthetized overnight fasted animals after the adaptation period (day 0) and at the end of treatment (day 30) with the simvastatin and plant extracts. Total cholesterol, triglyceride (TG), low-density lipoprotein (LDL), high-density lipoprotein (HDL), alanine aminotransferase (ALT), aspartate aminotransferase (AST) and creatinine phosphokinase (CPK), lactate dehydrogenase (LDH) and C-reactive protein (CRP) of serum were measured using a quantification kit (Roche Diagnostics, Mannheim, Germany) in automatic clinical chemistry analyzer. The formula $\text{VLDL} = \text{TGs}/5$ was utilized for VLDL measurement (18).

4. Histopathological Analysis of the Liver

In order to perform microscopic evaluation, rabbits were killed by chloroform (overdose) at the end of the investigation and the liver tissues were quickly removed and cut into small pieces. The fixed segments in 10% aqueous formalin were embedded in paraffin and stained with hematoxylin and eosin (9). The histopathological assessment was performed by one person who was blinded to the treated groups. All sections were evaluated microscopically for the extent of fat accumulation, steatosis, inflammation and necrosis.

5. Statistical Analysis

Statistical analysis was performed using the SPSS statistical package version 16.0. The analysis of the variance appropriate for the design was carried out to detect the significance of the differences ($P < 0.05$) between the treatment and control groups. Duncan's multiple range test was also performed to compare the significant difference between groups. Difference from the control was considered significant. All the values presented in this article are expressed as the means \pm standard deviation.

Results

1. Serum Lipid Parameters Profile

This study showed the changes on the serum level of total cholesterol, triglycerides, high density lipoprotein and low density lipoprotein; due to the effect of *Prosopis farcta* root extract. Simvastatin was used as a standard drug for improving the lipid profile (positive control). Table 1 shows the serum levels of triglycerides, cholesterol, HDL, LDL and VLDL in control and experimental groups of rabbits. The obtained results demonstrated that feeding the rabbits with high cholesterol diet for 30 days (group II) resulted in a remarkable increase in serum lipid parameters including triglycerides, total cholesterol, LDL, and VLDL when compared to normal controls, that is, rabbits receiving the normal feed ($P < 0.01$). This indicates the successful establishment of the NAFLD model in rabbits. Both the simvastatin and *Prosopis farcta* root extract treated groups (group III-IV) produced significant decrease in the serum triglycerides and VLDL levels as compared to the rabbits fed with high cholesterol diet group ($P < 0.05$). Interestingly, group IV rabbits had more significant decrease in the serum cholesterol and LDL levels than group III animals as compared to the high cholesterol diet group (Table 1). Although, the HDL level decreased in the group III and IV rabbits as compared to the high cholesterol diet group animals, but not statistically significant.

Table 1: Serum lipid profiles in normal and high cholesterol diet-fed rabbits treated with simvastatin and *Prosopis farcta* root extract for 30 days

Parameters	Group I	Group II	Group III	Group IV
Chol(mg/dl)				
Day 0	63±24	2050±671	2340±767	1920±628
Day 15	39±10	2282±601	1059±765	1149±1047
Day 30	32±10	2240±622	806±645*	530±365**
TG(mg/dl)				
Day 0	72±16	112±26	107±31	114±22
Day 15	55±10	161±21	108±27	107±36
Day 30	77±11	134±22	53±19*	57±17*
HDL(mg/dl)				
Day 0	28±12	443±60	463±12	434±71
Day 15	13±4	315±41	196±90	214±157
Day 30	22±10	106±20	144±98	123±37
LDL(mg/dl)				
Day 0	31±18	1790±484	1843±402	1767±538
Day 15	21±8	1938±524	1043±798	991±804
Day 30	18±3	2141±499	829±688*	512±239**
VLDL(mg/dl)				
Day 0	14±3	22±5	21±6	23±5
Day 15	11±2	32±4	22±5	36±7
Day 30	15±2	27±4	11±4*	11±3*

* $P < 0.05$ between group II and groups III or IV; ** $P < 0.01$ between group II and groups III or IV

2. Serum Enzyme Determination

The serum levels of CPK, LDH, ALT and AST were significantly increased in the rabbits fed with high cholesterol diet group as compared to control group receiving the normal feed (Table 2; $P < 0.05$). The serum CPK and LDH levels were decreased in group III and IV rabbits as compared to high cholesterol diet group, although they were not statistically significant. The ALT and AST enzyme activity in control, simvastatin and *Prosopis farcta* root extract treated groups revealed no statistical difference (values close to normal levels) whereas these groups showed statistically significant difference as compared to high cholesterol diet group animals ($P < 0.05$).

Table 2: Serum enzyme levels in normal and high cholesterol diet-fed rabbits treated with simvastatin and Prosopis farcta root extract for 30 days

Parameters	Group I	Group II	Group III	Group IV
CPK				
Day 0	582±175	861±329	676±250	943±338
Day 15	952±196	1980±520	1523±174	1663±962
Day 30	1087±306	2469±694	1577±153	1982±752
LDH				
Day 0	347±148	344±121	254±130	384±99
Day 15	484±173	1025±219	546±193	847±445
Day 30	872±93	1224±411	546±283	849±514
AST				
Day 0	44±19	55±15	43±26	45±9
Day 15	45±10	87±13	45±18	36±15*
Day 30	50±21	117±16	56±27*	54±21*
ALT				
Day 0	50±11	58±18	55±21	52±27
Day 15	45±11	93±23	44±4*	41±13*
Day 30	42±4	128±27	57±28*	42±20**
CRP				
Day 0	-	3	3	3
Day 15	-	3	2	2
Day 30	-	3	1	2

* P< 0.05 between group II and groups III or IV

**P< 0.01 between group II and groups III or IV

3. Histopathological observations of livers

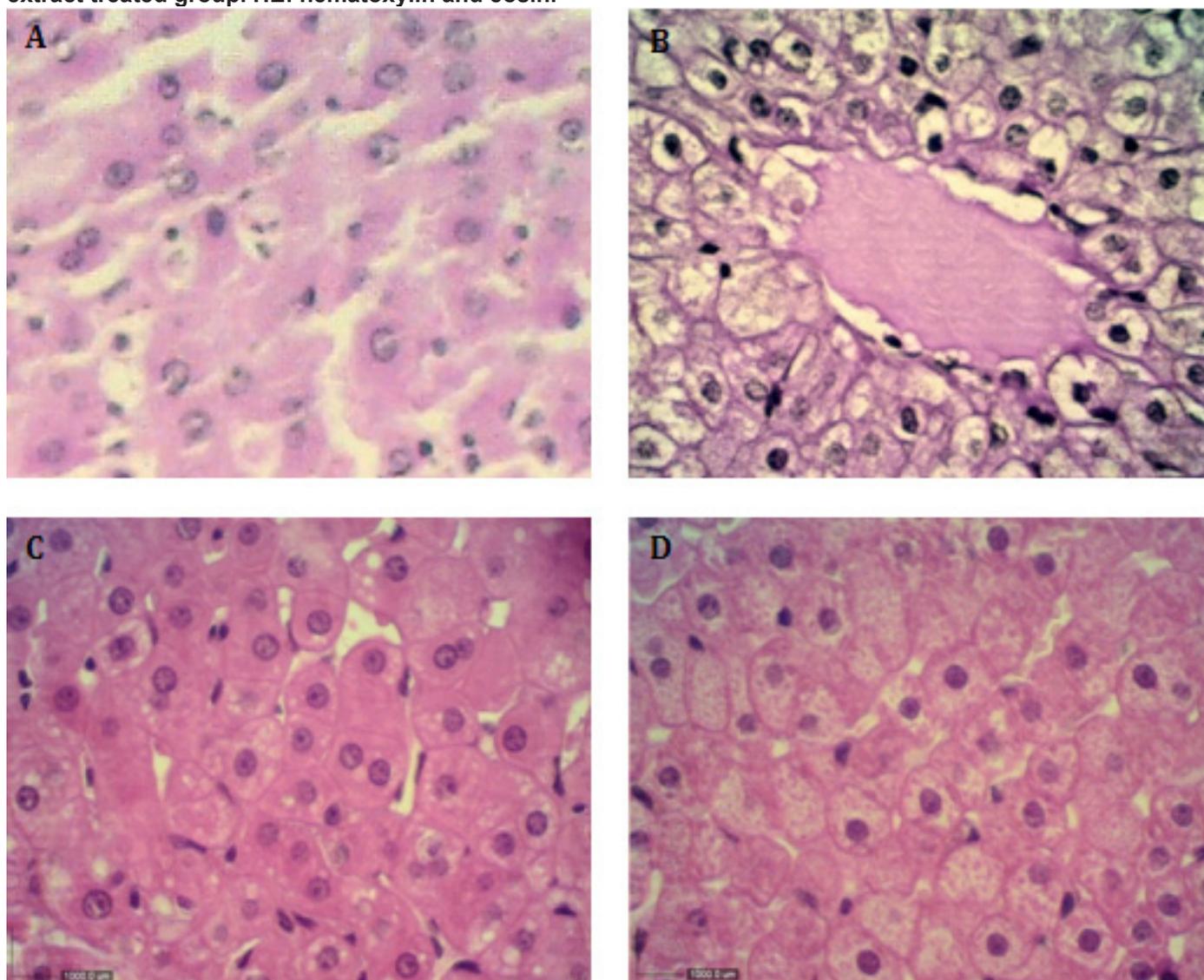
The histopathological change of the hepatic tissue was examined by light microscope. As shown in Figure 1A, liver sections of normal rabbits showed distinct hepatic cells with abundant cytoplasm, prominent nucleus, and distinct nucleolus. However, the sections of hepatic tissues in the model group showed some degree of necrosis, inflammation and massive fat droplets in the cytoplasm of hepatocytes and centrilobular area, indicating fatty degeneration of the liver (Figure 1B). Although the small lipid globules were still observed in the simvastatin group, in both simvastatin and Prosopis farcta root extract treated groups, lipid degeneration and inflammatory response were significantly alleviated compared with the model group. The decrement of inflammation was confirmed by diminished serum CRP level (Table 2). Also, liver cell volume became smaller and the fat droplets were reduced (Figure 1C and D).

Discussion

NAFLD is a condition closely related to insulin resistance and metabolic syndrome, and associated with genetic susceptibility. NAFLD can start from non-alcoholic simple fatty liver (NAFL) to non-alcoholic steatohepatitis (NASH), and then cause cirrhosis in the liver, and even hepatocellular carcinoma (19). The literature review revealed that high fat diet-induced obesity and abnormal lipid metabolism all collectively are associated with inflammation, congestion, and nonalcoholic fatty liver disease (NAFLD) leading to hepatic failure causing a boost in ALT, AST, and total bilirubin level in the serum (20). Currently the most appropriate and clinically validated methods to minimize and control the progression of this disease are acquisition of healthy life styles and proper food habits (21, 22). Nowadays, different types of therapeutic methods are being used in the treatment of NAFLD and its related disorders. Despite the current therapeutic developments more attention has been shifted towards plant origin therapy as a possible means of alleviating the NAFLD and its associated symptoms (7-9, 16, 21, 23, 24), which are easily available, cost effective,

convenient and have limited side effects as compared to the synthetic drugs (22, 25). In Iran, Prosopis farcta has long been used as a therapeutic agent in order to reduce cardiac or chest pain and for managing cardiovascular disorder (9). Some reports showed dose-dependent and endothelium-dependent relaxation effects of Prosopis farcta on thoracic aorta of mice (15). Alcoholic extract of Prosopis farcta leaves reduced blood pressure in vivo and augmented contraction of heart in in vitro experiments (15). Prosopis farcta beans extract has demonstrated protective effects against acetaminophen-induced hepatotoxicity in an animal model (26). Also, according to the study of Mollashahi et al, Prosopis farcta's pod aqueous and ethanol extracts possess neuroprotective effect on rats (27). The findings of Narasimhacharya et al showed that Prosopis juliflora leaves have anti hyperlipidemic effect and reverse the hypercholesterolemic conditions in hypercholesterolemic male Albino rats (28). So, this study explored the Prosopis farcta root extract ameliorating effect in minimizing the progression of NAFLD in animals fed with high cholesterol diet. Also, simvastatin, a standard drug for treatment of lipid disorder, was used as a positive control (9, 29). Simvastatin, a 3-hydroxy-3-methylglutaryl

Figure 1. HE staining of the hepatic tissue in all groups ($\times 1000$). **A:** the control group, was fed with normal diet; **B:** the model group, were induced by high cholesterol feed; **C:** simvastatin treated group; **D:** Prosopis farcta root extract treated group. HE: hematoxylin and eosin.



coenzyme A (HMG-CoA) reductase inhibitor, belongs to the class of drugs known as statins. Statins inhibit the synthesis of mevalonate, a rate-limiting enzyme in cholesterol biosynthesis (30). This results in the reduction of the plasma LDL levels with an increase in the hepatic uptake, thereby reducing the risk of CVDs (31).

To investigate the effect Prosopis farcta root extract on reducing blood fat, we reproduced a rabbit model with high cholesterol diet. In the model group, it is demonstrated that the liver index was significantly increased, serum total cholesterol, triglycerides level were increased; serum LDL level and ALT and AST activities were markedly increased. The pathological changes of fat degeneration and inflammatory cell infiltration in hepatic tissue suggested that high cholesterol diet could induce NAFLD pathological changes in the rabbits.

The current investigation demonstrated that treatment with Prosopis farcta root extract can significantly reduce serum levels of total cholesterol, triglycerides, HDL cholesterol, and LDL cholesterol ($P < 0.05$; Table 1). Moreover, the results obtained in the present study established that

high-fat diet causes hepatocellular damage, as clearly seen by the marked elevation of serum enzymes (ALT, AST, CRP) activities and histopathological studies of liver exaggerated with hepatic steatosis. The microscopic studies of liver tissue demonstrated that consumption of the plant root extract in hypercholesterolemic rabbits has significant effects on decreasing the size and abundance of lipid vacuoles. These results are in total agreement with the report of Asadollahi et al and Dashtban et al (26, 32). Asadollahi et al showed that Prosopis farcta bean extract decreased serum total cholesterol, triglycerides, LDL, ALT and AST levels in acetaminophen-induced hepatotoxicity in male Wistar albino rats (26), whereas Dashtban et al indicated that Prosopis farcta bean extract only reduced the serum lipid content (TG, TC and LDL) in streptozotocin-induced diabetic male Wistar albino rats and had no effect on ALT and AST (32).

The medicinal herbs exert their pharmacological effects through a multi-component and multi-target way (33). Preliminary phytochemical studies of the extracts of Prosopis farcta showed the presence of alkaloids, tannins, flavonoids, saponins, glycosides, phenols, resins and

sterols (34-36). Hence, according to the previous studies, *Prosopis farcta* extract components and our results, we review and summarize the probable mechanisms of *Prosopis farcta* root extract in the treatment/improving of serum lipid content and NAFLD as follows.

First, It is known that phytosterols with analogue structure to cholesterol may decrease cholesterol absorption displacing it from bile salt micelles and competing for intestinal absorption (37). Intestinal absorption plays a main role in the regulation of cholesterol homeostasis. It has been suggested that transporters can affect its intestinal absorption (38, 39). Silva et al observed a reduction of hepatic cholesterol after β -carotene supplementation to rats with a cholesterol-rich diet, an effect attributed to increased cholesterol fecal excretion(40). In the case of *Prosopis farcta* root extract, this could be the mechanism for serum cholesterol improvement. On the other hand, when phytosterols were given to hypercholesterolemic patients a significant reduction of LDL was produced (41). On the other hand, because after administration of plant extract the serum HDL level was decreased accompanying with LDL, it is likely that the biosynthesis or absorption/transport of cholesterol has been impaired.

Secondly , the main ingredient of *Prosopis farcta* root extract is saponin, which plays the liver-protecting effects in a multi-target way which could well be related to increases in the expression of LDLR of liver, so as to decrease the serum level of LDL, TC and TG(29).

Thirdly, one of the *Prosopis farcta* extract main component is resins. Currently therapy-induced reduction in serum cholesterol and fatty liver are mainly ascribed to bile salt sequestrants such as the resin – cholestyramine. Resin bound bile salts do not enter the enterohepatic circulation, and this assists further biliary excretion of bile salts, the breakdown products of cholesterol (42). Also, the plant's anti-inflammatory effects may be an additional benefit when steatosis evolves into steatohepatitis (43).

Lastly, various extracts obtained from *Prosopis farcta* have demonstrated remarkable antioxidant properties which are attributed to flavonoid (especially quercetin) and phenolic components (9, 34, 35). The antioxidant activity may protect the liver from the high-cholesterol toxicity via diminishing of free-radicals production (44, 45). Pan et al have demonstrated that high fat diet can induce oxidative stress (due to increased lipid peroxidation and formation of free radicals (46)) with extensive liver steatosis in animals (47). On the other hand, the flavonoid and phenolic compounds of *Prosopis farcta* have an important role in improving serum lipid parameters in hypercholesterolemic rabbits through enzyme inhibition/activation. Flavonoids/quercetin inhibit acetyl-CoA carboxylase, diglyceride acyltransferase and HMG CoA reductase are the key enzyme involved in biosynthesis of fatty acids, triglycerides and cholesterol, respectively (48-50). Also, the lipid lowering effect of the flavonoids are due to activation of cytochrome p450 dependent 7 α -hydroxylase which results in increased metabolism of cholesterol (51). Accumulating a body of evidence has confirmed the remarkable anti hyperlipidemic

and hepato-protective potential of flavonoids; thus, it is suggested that these components are the principal agents responsible for the therapeutic effects of *Prosopis farcta* in hepatic disorders (29). However, the correct and definitive mechanisms of lipid-lowering and hepato-protective effects of *Prosopis farcta* root extract need to be further explored.

Conclusion

Overall, administration of *Prosopis farcta* root extract improved dyslipidaemia and lessened hepatic steatosis in high cholesterol diet-induced NAFLD rabbits. However, the mechanisms of these effects are unclear, and maybe the *Prosopis farcta* root extract not only regulates lipid intestinal absorption and transport between the peripheral adipose tissue and the liver, but also regulates the lipid metabolism and oxidative stress in the liver, and these were shown to be hepato-protective. This study can serve as a basis for future investigations on the other effects of this plant on human health. Also, phytochemical studies are suggested in order to identify active components of this plant responsible for its therapeutic effect in hepatic diseases. However, well-designed randomized clinical trials evaluating the efficacy and safety profile of these natural drug in patients are required.

References

1. Angulo P. GI epidemiology: nonalcoholic fatty liver disease. *Aliment Pharmacol Ther.* 2007;25(8):883-9.
2. Clark JM, Brancati FL, Diehl AM. Nonalcoholic fatty liver disease. *Gastroenterology.* 2002;122(6):1649-57.
3. Jimba S, Nakagami T, Takahashi M, Wakamatsu T, Hirota Y, Iwamoto Y, et al. Prevalence of non-alcoholic fatty liver disease and its association with impaired glucose metabolism in Japanese adults. *Diabet Med.* 2005;22(9):1141-5.
4. Bagheri Lankarani K, Ghaffarpasand F, Mahmoodi M, Lotfi M, Zamiri N, Heydari ST, et al. Non alcoholic fatty liver disease in southern Iran: a population based study. *Hepat Mon.* 2013;13(5):e9248.
5. Adams LA, Angulo P, Lindor KD. Nonalcoholic fatty liver disease. *Can Med Assoc J.* 2005;172(7):899-905.
6. Marchesini G, Brizi M, Bianchi G, Tomassetti S, Bugianesi E, Lenzi M, et al. Nonalcoholic fatty liver disease a feature of the metabolic syndrome. *Diabetes.* 2001;50(8):1844-50.
7. Zhang X, Wu C, Wu H, Sheng L, Su Y, Zhang X, et al. Anti-hyperlipidemic effects and potential mechanisms of action of the caffeoylquinic acid-rich *Pandanus tectorius* fruit extract in hamsters fed a high fat-diet. *PLoS One.* 2013;8(4):e61922.
8. Mohajeri D, Monadi A. Effects of tomato pulp on hepatic steatosis in the rats fed with high fat diet *Bratisl Med J.* 2015 116(11):689-94.
9. Saidi MR, Farzaei MH, Miraghaee S, Babaei A, Mohammadi B, Bahrami MT, et al. Antihyperlipidemic Effect of Syrian Mesquite (*Prosopis farcta*) Root in High Cholesterol Diet-Fed Rabbits. *J Evid Based Complementary Altern Med.* 2016;21(4):62-6.

10. Andrade-Montemayor H, Cordova-Torres A, García-Gasca T, Kawas J. Alternative foods for small ruminants in semiarid zones, the case of Mesquite (*Prosopis laevigata* spp.) and Nopal (*Opuntia* spp.). *Small Rumin Res.* 2011;98(1):83-92.
11. Orozco-Villafuerte J, Cruz-Sosa F, Ponce-Alquicira E, Vernon-Carter E. Mesquite gum: fractionation and characterization of the gum exuded from *Prosopis laevigata* obtained from plant tissue culture and from wild trees. *Carbohydr Polym.* 2003;54(3):327-33.
12. Ali-Shtayeh MS, Jamous RM, Al-Shafie JH, Elgharabah WA, Kherfan FA, Qarariah KH, et al. Traditional knowledge of wild edible plants used in Palestine (Northern West Bank): a comparative study. *J Ethnobiol Ethnomed.* 2008;4(1):13.
13. Ezike A, Akah P, Okoli C, Udegbumam S, Okwume N, Okeke C, et al. Medicinal plants used in wound care: a study of *Prosopis africana* (Fabaceae) stem bark. *Indian J Pharm Sci.* 2010;72(3):334.
14. George C, Lochner A, Huisamen B. The efficacy of *Prosopis glandulosa* as antidiabetic treatment in rat models of diabetes and insulin resistance. *J Ethnopharmacol.* 2011;137(1):298-304.
15. Asadollahi K, Abassi N, Afshar N, Alipour M, Asadollahi P. Investigation of the effects of *Prosopis farcta* plant extract on rats aorta. *J Med Plants Res.* 2010;4(2):142-7.
16. Huseini HF, Anvari MS, Rabbani S, Sharifi F, Arzaghi SM, Fakhrzadeh H. Anti-hyperlipidemic and anti-atherosclerotic effects of *Pinus eldarica* Medw. nut in hypercholesterolemic rabbits. *DARU.* 2015;23(1):1.
17. Hu X, Shu X, Guo Y, Ma Y. Effect of an *Ilex asprella* root decoction on the related genes of lipid metabolism from chronic stress and hyperlipidemic fatty liver in rats. *Chin Med J.* 2012;125(19):3539-42.
18. Friedewald WT, Levy RI, Fredrickson DS. Estimation of the concentration of low-density lipoprotein cholesterol in plasma, without use of the preparative ultracentrifuge. *Clin Chem.* 1972;18(6):499-502.
19. Gentile CL, Frye MA, Pagliassotti MJ. Fatty acids and the endoplasmic reticulum in nonalcoholic fatty liver disease. *BioFactors.* 2011;37(1):8-16.
20. Čonková E, Laciaková A, Pástorová B, Seidel H, Kováč G. The effect of zearalenone on some enzymatic parameters in rabbits. *Toxicol Lett.* 2001;121(3):145-9.
21. Xiao J, Guo R, Fung ML, Liang EC, Tipoe GL. Therapeutic approaches to non-alcoholic fatty liver disease: past achievements and future challenges. *Hepatobiliary Pancreat Dis Int.* 2013;12(2):125-35.
22. Thoma C, Day CP, Trenell MI. Lifestyle interventions for the treatment of non-alcoholic fatty liver disease in adults: a systematic review. *J Hepatol.* 2012;56(1):255-66.
23. Tan Y, Lao W, Xiao L, Wang Z, Xiao W, Kamal MA, et al. Managing the combination of nonalcoholic fatty liver disease and metabolic syndrome with chinese herbal extracts in high-fat-diet fed rats. *Evid Based Complement Alternat Med.* 2013;2013.
24. Wani FA, Albahrawy AZ, Rahiman S. Hypolipidemic activity of olive oil (*olea europaea*) against high fat diet-induced nonalcoholic fatty liver disease (NAFLD) in mice. *Open J Pathol.* 2015;5(03):73.
25. Adams L, Angulo P. Treatment of non-alcoholic fatty liver disease. *Postgrad Med J.* 2006;82(967):315-22.
26. Asadollahi A, Sarir H, Omidi A, Montazar-Torbati MB. Hepatoprotective potential of *Prosopis farcta* beans extracts against acetaminophen induced hepatotoxicity in Wistar Rats. *Int J Prev Med.* 2014;5(10):1281-5.
27. Mollashahi M, Tehranipour M, Khayyatzade J, Moosavi BZJ. The neuroprotective effects of *Prosopis farcta* pod aqueous and ethanol extracts on spinal cord α -motoneurons neuronal density after sciatic nerve injury in rats. *Life Sci J.* 2013;10:293-7.
28. Narasimhacharya A, Nitesh K, Desai T. *Prosopis juliflora* as an antihypercholesterolemic agent. *J Herb Med Toxicol.* 2010;4(1):31-4.
29. Peng Q, Zhang Q, Xiao W, Shao M, Fan Q, Zhang H, et al. Protective effects of *Sapindus mukorossi* Gaertn against fatty liver disease induced by high fat diet in rats. *Biochem Biophys Res Commun.* 2014;450(1):685-91.
30. Pruefer D, Scalia R, Lefer AM. Simvastatin inhibits leukocyte-endothelial cell interactions and protects against inflammatory processes in normocholesterolemic rats. *Arterio Thromb Vasc Biol.* 1999;19(12):2894-900.
31. Bertolini S, Bon GB, Campbell LM, Farnier M, Langan J, Mahla G, et al. Efficacy and safety of atorvastatin compared to pravastatin in patients with hypercholesterolemia. *Atherosclerosis.* 1997;130(1):191-7.
32. Dashtban M, Sarir H, Omidi A. The effect of *Prosopis farcta* beans extract on blood biochemical parameters in streptozotocin-induced diabetic male rats. *Adv Biomed Res.* 2016;5:116.
33. Li X, Wu L, Liu W, Jin Y, Chen Q, Wang L, et al. A network pharmacology study of Chinese medicine QiShenYiQi to reveal its underlying multi-compound, multi-target, multi-pathway mode of action. *PLoS One.* 2014;9(5):e95004.
34. Sharifi-Rad J, Hoseini-Alfatemi SM, Sharifi-Rad M, Miri A, Sharifi-Rad M. Phytochemical screening and antibacterial activity of *Prosopis farcta* different parts extracts against methicillin-resistant *Staphylococcus aureus* (MRSA). *Minerva Biotechnol.* 2014;26(4):287-93.
35. Direkvand-Moghadam F, Ghasemi-Seyed V, Abdali-Mashhadi A-R, Lotfi A, Direkvand-Moghadam A, Delpisheh A. Extraction and measurement of the Quercetin flavonoid of *Prosopis farcta* in Khouzestan climatic condition. *Adv Herb Med.* 2015;1(1):29-35.
36. Jafarpour A, ElhamiRad A, Mirsaeedghazi H. Evaluation of physicochemical characteristic of Persian mesquite grain (*Prosopis farcta*) oil. *Int J Biosci.* 2014;5(1):308-14.
37. Zetina-Esquivel AM, Tovilla-Zárate CA, Guzmán-García C, Rodríguez-Hernández A, Castell-Rodríguez AE, Ble-Castillo JL, et al. Effect of *Carica papaya* Leaf Extract on Serum Lipids and Liver Metabolic Parameters of Rats Fed a High Cholesterol Diet. *Health (N Y).* 2015;7(09):1196.
38. Anandhi R, Annadurai T, Anitha TS, Muralidharan AR, Najmunnisha K, Nachiappan V, et al. Antihypercholesterolemic and antioxidative effects of an extract of the oyster mushroom, *Pleurotus ostreatus*, and its major constituent, chrysin, in Triton WR-1339-induced hypercholesterolemic rats. *J Physiol Biochem.* 2013;69(2):313-23.
39. Pronin AV, Danilov LL, Narovlyansky AN, Sanin AV. Plant polyisoprenoids and control of cholesterol level. *Arch Immunol Ther Exp (Warsz).* 2014;62(1):31-9.

40. De Silva LS, de Miranda AM, de Brito Magalhães CL, dos Santos RC, Pedrosa ML, Silva ME. Diet supplementation with beta-carotene improves the serum lipid profile in rats fed a cholesterol-enriched diet. *J Physiol Biochem.* 2013;69(4):811-20.
41. Suanarunsawat T, Devakul Na Ayutthaya W, Songsak T, Thirawarapan S, Pongshompoo S. Lipid-lowering and antioxidative activities of aqueous extracts of *Ocimum sanctum* L. leaves in rats fed with a high-cholesterol diet. *Oxid Med Cell Longev.* 2011;2011.
42. Shetty S, Mengi S, Vaidya R, Vaidya A. A study of standardized extracts of *Picrorhiza kurroa* Royle ex Benth in experimental nonalcoholic fatty liver disease. *J Ayurveda Integr Med.* 2010;1(3):203.
43. Alsheikh-Ali AA, Lin J-L, Abourjaily P, Ahearn D, Kuvin JT, Karas RH. Extent to which accepted serum lipid goals are achieved in a contemporary general medical population with coronary heart disease risk equivalents. *Am J Cardiol.* 2006;98(9):1231-3.
44. Konan K, N'dah Kouamé Justin BL, Souleymane M, Francis YA. Hepatoprotective and in vivo antioxidant activity of *Olex subscorpioidea* Oliv.(Olacaceae) and *Distemonathus benthamianus* Baill.(Caesalpinaceae). *Pharmacogn Mag.* 2015;11(41):111-6.
45. Senanayake GV, Fukuda N, Nshizono S, Wang Y-M, Nagao K, Yanagita T, et al. Mechanisms underlying decreased hepatic triacylglycerol and cholesterol by dietary bitter melon extract in the rat. *Lipids.* 2012;47(5):495-503.
46. Ozturk B, Ozer O, Durak ZE, Billur D, Kizil S, Durak I, et al. High cholesterol diet leads to oxidant load and peroxidation in the rabbit kidney tissue. *Bratisl Med J.* 2016;116(4):235-41.
47. Pan M, Song YL, Xu JM, Gan HZ. Melatonin ameliorates nonalcoholic fatty liver induced by high-fat diet in rats. *J Pineal Res.* 2006;41(1):79-84.
48. Singh DK, Banerjee S, Porter TD. Green and black tea extracts inhibit HMG-CoA reductase and activate AMP kinase to decrease cholesterol synthesis in hepatoma cells. *J Nutr Biochem.* 2009;20(10):816-22.
49. Ademosun AO, Oboh G, Passamonti S, Tramer F, Ziberna L, Boligon AA, et al. Phenolics from grapefruit peels inhibit HMG-CoA reductase and angiotensin-I converting enzyme and show antioxidative properties in endothelial EA. Hy 926 cells. *Food Science and Human Wellness.* 2015;4(2):80-5.
50. Gnoni G, Paglialonga G, Siculella L. Quercetin inhibits fatty acid and triacylglycerol synthesis in rat-liver cells. *Eur J Clin Invest.* 2009;39(9):761-8.
51. Bilal R, Zakaria M, Usman A, Aftab S, Zia A. Antihyperlipidaemic effects of *Eugenia jambolana* fruit in diet induced hyperlipidaemic rats. *J Pakistan Med Assoc.* 2011;61(5):433-7.

Preparation of the edible supplement product of calcium-D in form of tablet from powder of sepia skeleton (cuttlebone) and investigation of its physic-chemical properties

Ali Asghar Hemmatti (3)
Azar Mostoufi (1, 2)
Nader Shakiba (4)
Zahra Nazari Khrosgani (4)
Shahrzad Memarzade (2)

(1) Marine Pharmaceutical Science Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

(2) Student Research Committee, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

(3) Department of Pharmacology, School of Pharmacy, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

(4) Nanotechnology Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

Corresponding author:

Azar Mostoufi
Ahvaz Jundishapur University of Medical Sciences,
Ahvaz, Iran
Tel.: +98 9166118216;
Email: mostoufi-a@ajums.ac.ir

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: Hemmatti A.A. et al. Preparation of the edible supplement product of calcium-D in form of tablet from powder of sepia skeleton (cuttlebone) and investigation of its physic-chemical properties. *World Family Medicine*. 2018; 16(3):153-160. DOI: 10.5742/MEWFM.2018.93325

Abstract

In vitamin D deficiency, calcium absorption from the intestines occurs, which increases the production of osteoclasts, which causes destruction of bones and ultimately osteoporosis. In this study, a tablet was made by use of cuttlebone spp., calcium and vitamin D, and its physicochemical properties such as powder flow ability, weight uniformity, friability, solubility and hardness were examined. The resultant outcomes showed that the prepared formulations have high level of potential, and after more accurate studies, it is possible to use the sepia skeleton to make tablets for the treatment of calcium and vitamin D deficiency related disorders.

Key words: osteoporosis, Cuttlebone, Tablet

Introduction

Osteoporosis is one of the most important metabolic diseases, especially in the elderly (1). Bone fractures are the most important side effects of the disease which causes great financial losses imposed on families and societies, in addition to illness and death in older people (2, 3).

Osteoporosis, a multifactorial pathology has been reviewed extensively; a review by Gaby about osteoporosis nutritional and hormonal management is an excellent and well referred source (4). Osteoporosis etiology evaluation in a special population can involve hormonal aspects, exercise patterns, nutrient intake, digestion and nutrient absorption (5).

The balance between the resorption and evolution is related with age and sex. Bone turnover takes place by a multitude of nutrients such as calcium, vitamin D and vitamin K. Adequate calcium intake is considered as one of the important nutritional factors to establish peak bone mass (6). Vitamin D which is necessary for optimal dietary Ca absorption should be sufficient as well (7).

Evidence supports the use of calcium, or calcium in combination with vitamin D supplementation, in the preventive treatment of osteoporosis in people aged 50 years or older. For best therapeutic effect, we suggest minimum doses of 1200 mg of calcium, and 800 IU

of vitamin D (for combined calcium plus vitamin D supplementation)(8).

The *Sepia pharaonis* is one of the enormous cuttlefish species, growing to 42 cm in mantle length and 5 kg in weight(9). The maximum recorded size for those males that have been raised in the laboratory is 16.2 cm, and for females 15.5 cm(10). It seems that *Sepia pharaonis*, at least, is a complex of three species, *Sepia pharaonis* I, commonly located in the Red Sea and Persian Gulf, *S. pharaonis* II, which lives in Japan to the Thailand Gulf and northern Australia; and *S. pharaonis* III, which lives in the Indian Ocean to the Andaman Sea (11).

However, natural compounds such as natural dietary fibre (12), herbal extracts (13), natural clinoptilolite (14) and medicinal plants, spices, vegetables and crude drugs (15, 16) have been used as antacid drugs.

Since cuttlebone (CB) is a natural compound with a high percentage of CaCO₃, it can be used and formulated by different fillers as a marine natural anti-Osteoporosis drug.

The purpose of this study was to evaluate the dietary supplement of calcium-D in the form of tablets from the cuttlebone of the *Sepia* skeletal system, in order to help absorb calcium better.

Material and methods

Cuttlebone was gathered from Bushehr coast, then was washed and dried in free air in order to lose its smell. After drying, the clean cuttlebone was powdered and completely mixed to 60-100 mesh size. Then CaCO₃ components were measured and the metal elemental analysis was determined by mechanical methods. Tablets were then prepared using a single-tube. A tablet with a direct injection of 500 mg CB of vitamin D (200 units) and magnesium stearate lubricant produced, and its properties such as powder flow ability, friability, strength, and disintegration time were studied and compared.

Analysis of elements and compounds of CB were characterized by means of CHN, XRF, XRD and FTIR techniques. Data of XRD and XRF techniques was from a previous study (GP-94160) (17, 18).

Powder flow ability, friability, weight uniformity, hardness, disintegration time and dissolution test for the formulated drug and marketed dosage forms were measured according to USP.

Flow ability of CB Powder

Flow ability of CB Powder with fillers was measured by flow meter apparatus in g/sec. For all of the formulations, the corresponding powders were poured into the funnel of apparatus and flow ability of powders was calculated by apparatus.

Friability test

Friability Tests were evaluated with friability apparatus for 10 weighted tablets of formulated drugs, with 25 rpm for 4 minutes. Friability percent was calculated via the following formula:

$$\text{Friability (\%)} = (W1-W2)/W1 \times 100$$

None of the tablets should not be beaked or capped. Friability percent should be less from 0.5-1 %.

Weight uniformity

10 tablets from each formulation were selected accidentally and weighed by digital balance.

Hardness Test

Hardness of formulated drugs was measured by hardness apparatus in Kg. In this method 10 drugs were selected accidentally from each formulated drugs and hardness of them was determined by apparatus. The favoured hardness should be obtained between 4-6 Kg.

Disintegration Test

Disintegration time for formulated drugs was measured by related apparatus in distilled water environment. For this purpose, 6 tablets from formulated drugs were selected and placed into the tubes of the apparatus in water bath 37°C with regular movements.

Disintegration time of the first and last tablets were determined.

Dissolution

Three tablets of *sepia* and three standard tablets were selected randomly and each tablet was placed into a beaker containing 50 ml of phosphate buffer (pH= 7.4), and three drops of ethanol were added to beaker in order to obtain better dissolution of the tablets. The beaker was placed on a heater stirrer at 37 ° C. At time intervals of 5, 10, 20, 30 and 45 minutes (determined by the calibration curve of Vit. D3), 2 ml sample from each beaker was separated, and in order to keep the content invariable, 2ml buffer was added to the solution. According to data of USP, the spectrophotometer was adjusted at a wavelength of 284 nm for measuring the concentration of vitamin D3 and then absorption of samples were measured at this wavelength for determination of vitamin D3 concentration. Vitamin D3 was used as a standard solution in dissolution test.

Results

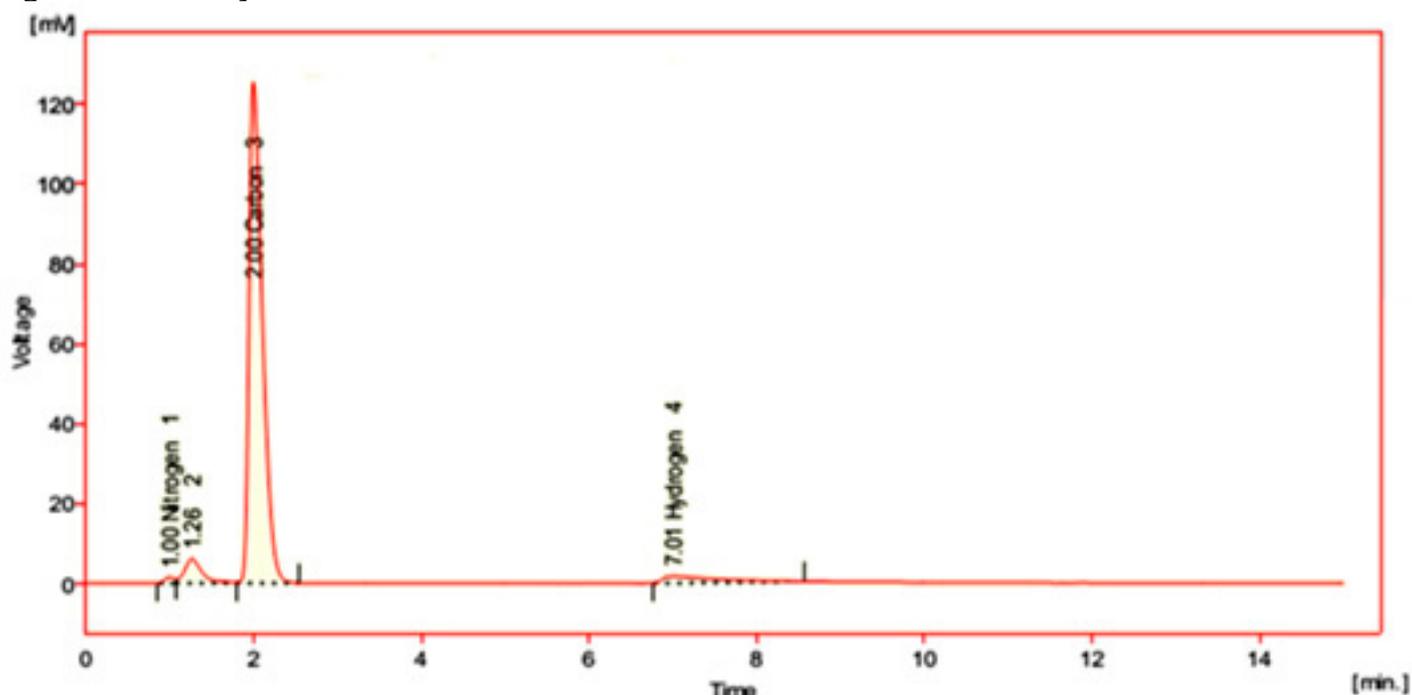
A. Elemental and chemical analysis of Crude CB

CHN analysis of CB is shown in Figure 1 and Table 1.

Table 1: CHN analysis of Crude CB

	Reten. Time [min]	Response	Weight [mg]	Weight [%]	Peak Type	Element Name
1	0.997	10.732	0.007	0.37	Refer	Nitrogen
3	1.997	1372.977	0.231	12.29	Refer	Carbon
4	7.007	75.378	0.025	1.34	Refer	Hydrogen
	Total		1.879	14		

Figure 1: CHN analysis of crude CB



	Reten. Time [min]	Response	Weight [mg]	Weight [%]	Peak Type	Element Name
1	0.997	11.031	0.007	0.37	Refer	Nitrogen
3	1.997	1372.977	0.231	12.29	Refer	Carbon
4	7.007	75.378	0.025	1.34	Refer	Hydrogen
	Total		1.879	14.00		

CHN analysis of CB showed the amount of C 12.29%, N 0.37% and H 1.34%. The amount of C is more than two other elements (Figure 1), because CB is composed mainly of CaCO₃ and 12.29% of C is comparable to 12% of C in CaCO₃. According to average of measured CaCO₃ that was obtained 92.08%, from 1.879 mg of CB for CHN analysis, 1.73 mg CaCO₃ is calculated whereby 12% of it is 0.2076 mg C or 11.05% C. This amount is well comparable to 0.231 mg C or 12.29% C in Table 1. The higher amount of C is related to C of chitin and chitosan of CB.

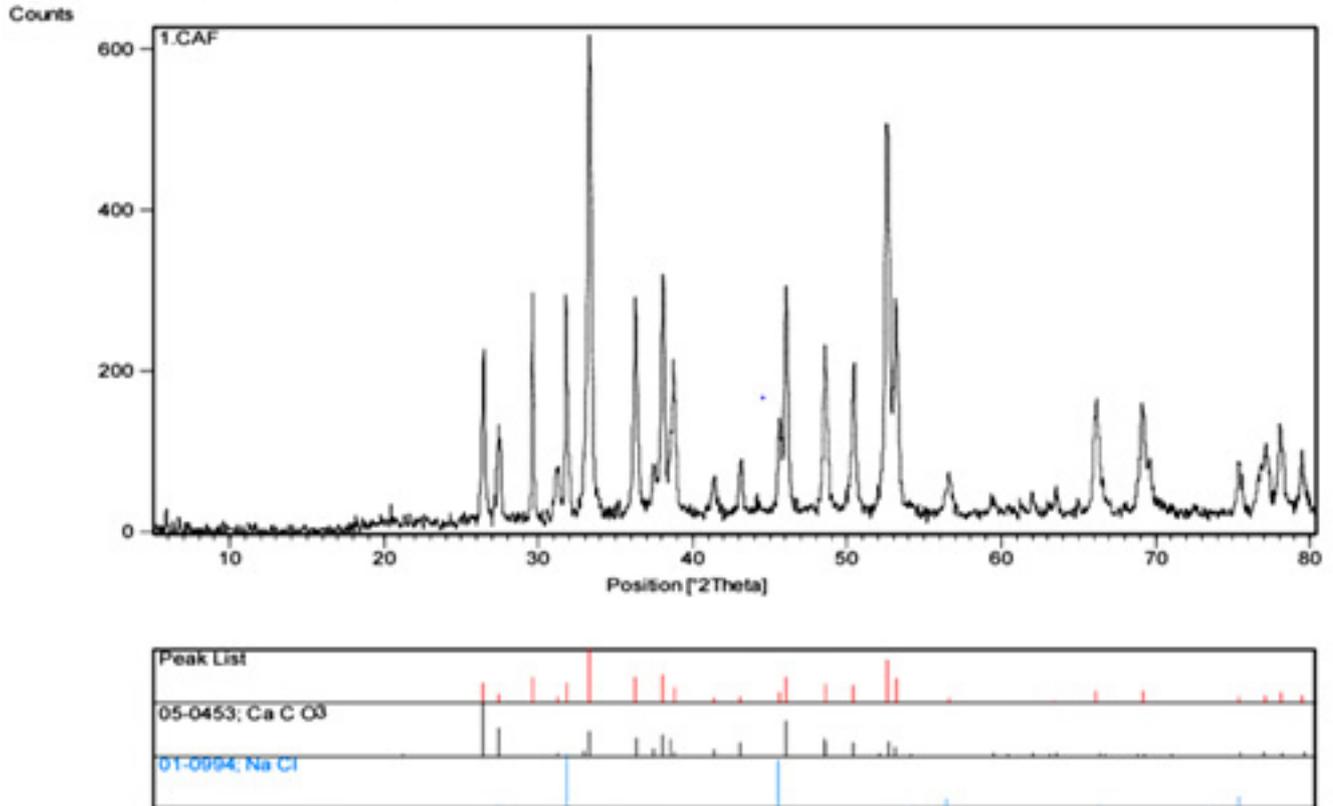
XRF analysis of CB showed existence of the following elements such as Na, Mg, K, Si, S, P, Cl and specially Ca.

XRF analysis of CB is shown as 44.71% CaO (or 31.93% Ca). In comparison to the average of carbonate based on Ca (92.08%) that measured in CB (or 36.83% Ca), so the amount of Ca is well determined (Table 2).

Table 2: XRF analysis of crude CB

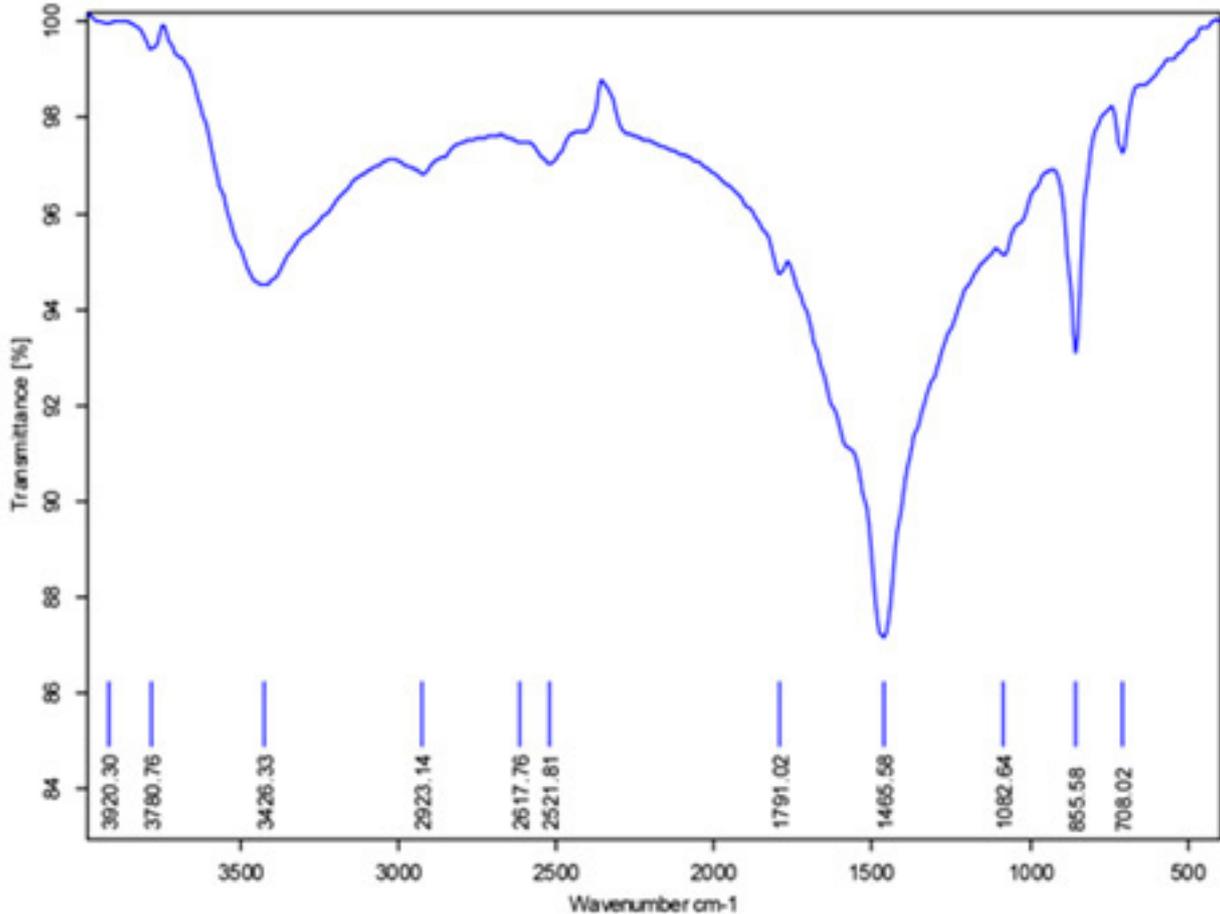
MgO (%)	K₂O (%)	Na₂O (%)	CaO (%)	Fe₂O₃ (%)	Al₂O₃ (%)	SiO₂ (%)
0.36	0.07	2.25	44.71	0.03	0.04	0.12
Sr (ppm)	Cl (ppm)	L.O.I (%)	SO₃ (%)	P₂O₅ (%)	MnO (%)	TiO₂ (%)
1756	24500	53.96	0.255	0.102	0.006	0.012

Figure 2. XRD spectrum of CB powder



XRD spectrum of CB confirmed the presence of CaCO₃ (Figure 2).

Figure 3. FTIR spectrum of CB



FTIR spectrum of CB showed the following absorption areas.

Peak at 3426 cm⁻¹ is related to OH and NH₂ bonds in chitin. Peaks at 1465, 855 and 708 cm⁻¹ are attributed to C-O bond in carbonate ion. Absorptions at 2521 cm⁻¹ and 2923 cm⁻¹ are related to HCO₃⁻ ion and C-H bonds, respectively (Figure 3).

B. Review the properties of the tablet

The average weight of the tablets in the laboratory and commercial tablets available in the market was in normal range, and the average of the tablets prepared in the laboratory were lighter than the tablet samples in the market.

The results of friability testing of CB prepared tablets in the laboratory and standard tablets in the market are shown in Table 3.

In Table 3, W₁ (10 pounds before friability testing) and W₂ (weight of tablets after friability testing) are also included.

Table 3: Friability percentage of tablets in the market and tablets in the laboratory

friability	W ₂	W ₁	Tablet
0.19	6.516	6.529	Tablet prepared in the laboratory
0.37	13.49	13.54	Tablet prepared from those available in the market place.

According to the results, the friability percentage of all prepared tablets was less than 1, so the result of the friability test was desirable.

The results show that the hardness of the formulation prepared in the laboratory is 7.78 pounds. Also, the hardness of the tablets in the market is calculated to be 13.68 pounds. consequently, the hardness of the sepia tablets was less than standard tablets in the market. (Table 4).

Table 4: Hardness and strength of tablets prepared from CB and tablets available on the market

Hardness (kp)	Tablet prepared from the market	Hardness (kp)	Tablet prepared in the laboratory
13.5	1	5.6	1
13.2	2	9	2
14.8	3	7	3
15	4	7.9	4
13	5	6.7	5
15	6	8.2	6
12.1	7	6.3	7
12.5	8	8	8
13.9	9	7.7	9
13.5	10	11.4	10

The results of the disintegration test for tablets prepared from CB in formulations and standard tablets in the market are shown in Table 5. The disintegration time for the first and the last tablet is presented in Table 5.

Between the tablets provided in the laboratory and standard tablets, the first and the least disintegration time was for the tablets in the market; and the last disintegration was for the tablets prepared in the laboratory.

The disintegration time of the sepia tablet is short, so it is desirable to test its disintegration.

Table 5: Disintegration time of the tablets in the laboratory and in the market

Disintegration time (seconds)	tablets in the market	Disintegration time (seconds)	tablets in the lab	
18.3	1	24.11	1	The first disintegration
19.11	2	25.25	2	
21	3	25.48	3	
22.38	4	26.02	4	
24.14	5	27.01	5	
24.5	6	27.37	6	The last disintegration

The results of the dissolution test for CB-prepared tablets in the formulation and tablets in the market are shown in Table 6 and Table 7, respectively.

The results show that the dissolution rate of CB tablets is higher than the standard tablets in the market; and according to the table and sepia tablet read absorptions, it is determined that about 85% of the drug is released in 45 minutes (Q = 85%).

Table 6: Results of the dissolution test for standard tablets in the market

Number 3 absorption	Number 2 absorption	Number 1 absorption	tablets in the market Time (min)
0.198	0.207	0.135	5
0.237	0.247	0.205	10
0.268	0.270	0.261	20
0.360	0.324	0.307	30
0.390	0.346	0.406	45

Table 7: Results of the dissolution test of CB prepared tablets

Number 3 absorption	Number 2 absorption	Number 1 absorption	CB tablet Time (min)
0.182	0.183	0.190	5
0.225	0.231	0.210	10
0.264	0.270	0.284	20
0.335	0.319	0.317	30
0.367	0.375	0.337	45

Absorption of various concentrations of Vitamin D3, which was measured by the spectrophotometer, is given in Table 8 and Figure 4. As the results indicate, ascending absorption increases.

Table 8: Absorption of various concentrations of Vitamin D3

5 mg/ml	4 mg/ml	3 mg/ml	2 mg/ml	Different concentrations of Vitamin D3
0.44	0.357	0.253	0.182	Absorb

Figure 4: Diagram of absorption/ concentration of vitamin D3

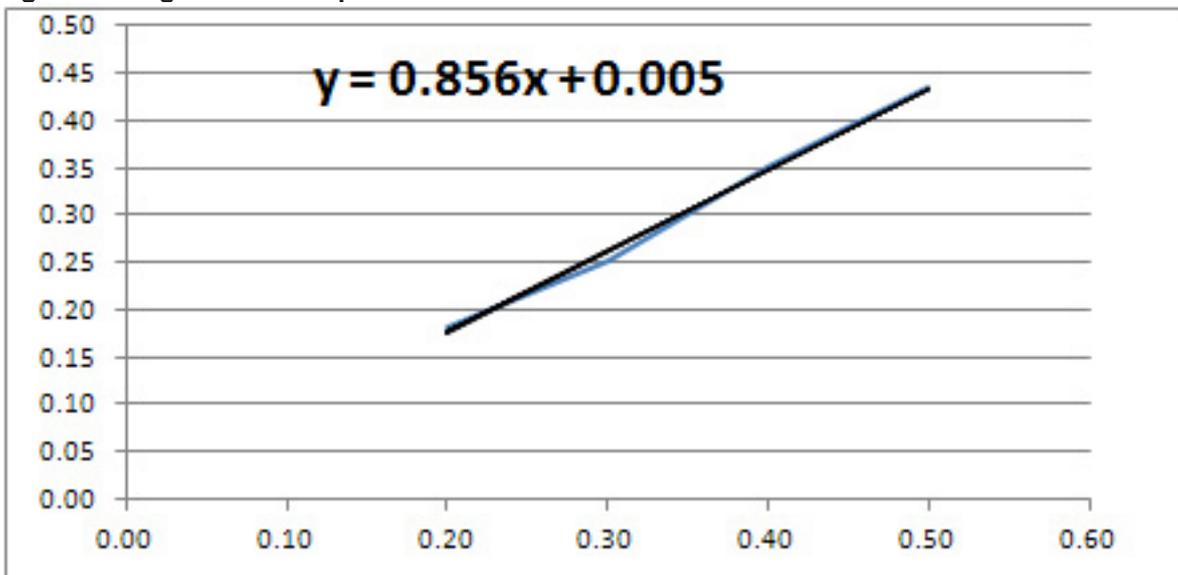


Figure 5: Diagram of concentration/ time of standard tablet

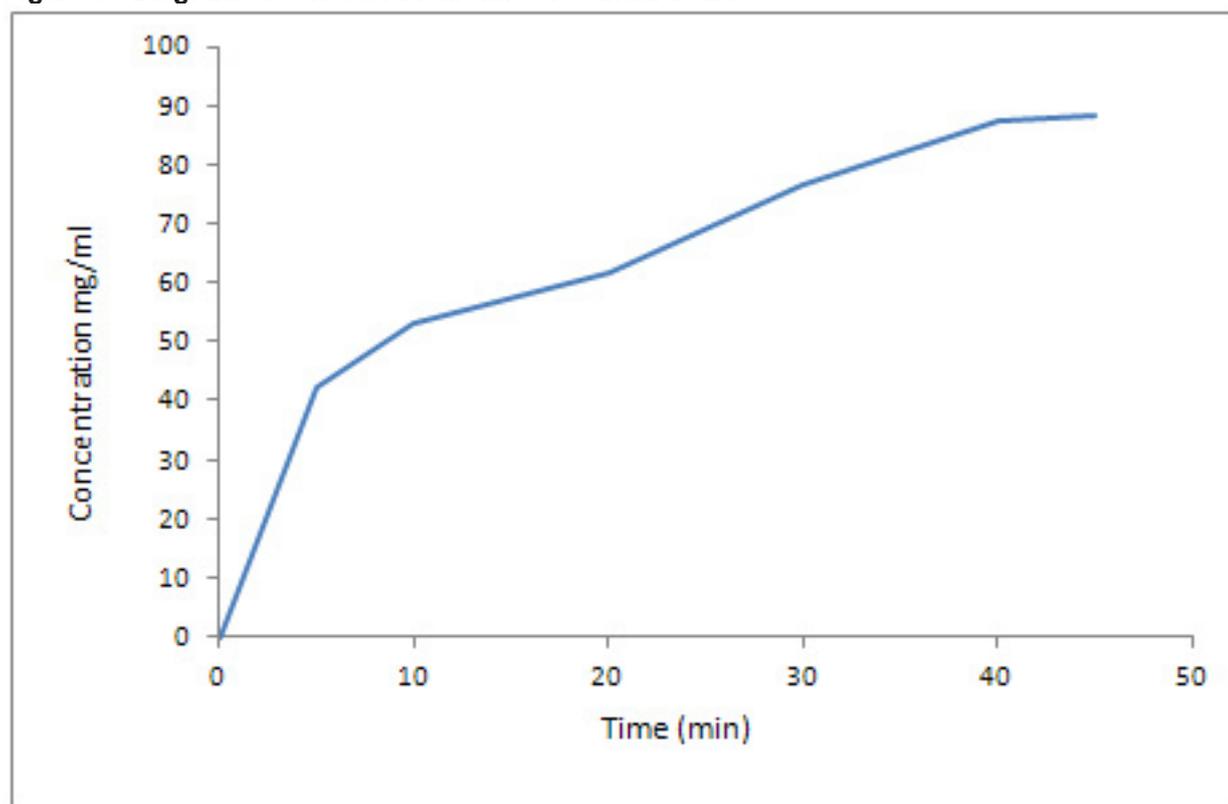
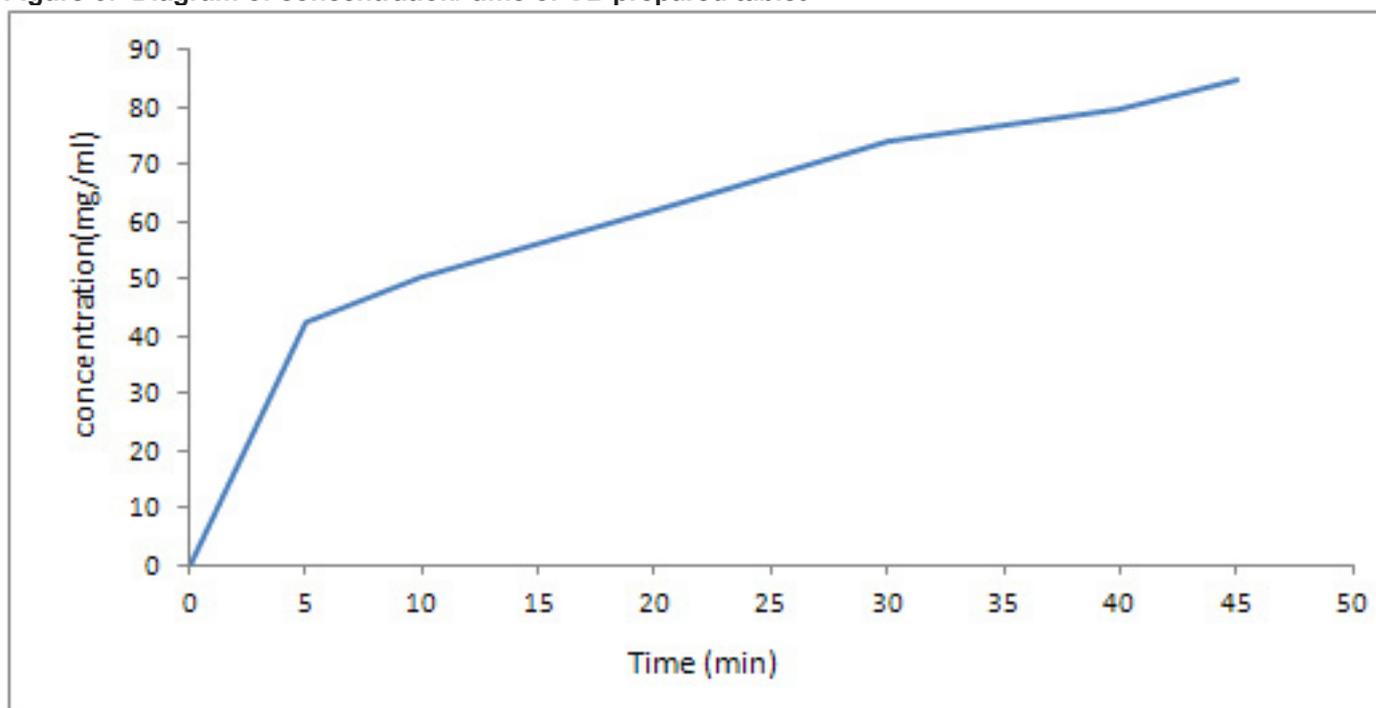


Figure 6: Diagram of concentration/ time of CB prepared tablet



Discussion

Nowadays, side effects, drug interaction and other problems of chemical drugs have caused increase in use of natural or herbal drugs in treatment of disease. Moreover, one of the important considerations is the cost. One of the natural marine compounds that has Osteoporosis property is cuttlebone (CB).

In this research, we collected sepia fish and tried to produce a dietary supplement of calcium-D. This dietary

supplement shows a better result in osteoporosis treatment and, in addition, reduces the side effects of the drug.

The importance of disintegration time of tablets is well known in the bioavailability of drugs and drug release. In fact, in order to be able to absorb the drug from the tablet form, first the tablet should be disintegrated and then the drug will be released. Therefore, proper disintegration of the tablet is important. The formulation of a product has a significant effect on the rate of disintegration and dissolution. Dissolvents open the tablets with different

mechanisms. These mechanisms include the effect of conjugation, swelling, hydration, change in volume or position and release of gas (19)

In this investigation, the weight of all formulations was uniform and also had a good degree of hardness and low friability percentage. As mentioned in various studies, the changes in formulation weights are less than $\pm 5\%$, the friability rate is less than 1% and the hardness is between 4 and 6 within the standard pharmaceutical range (20, 21).

Some researchers have reported that the lower hardness in direct compression is due to increased friability of prepared tablets (22, 23). However, in the present study, due to appropriate CB structure and prepared formulation, all formulations had a good hardness and friability.

Finally, according to the obtained results in this study and the desirable properties of the prepared formulations such as hardness, dissolution, friability, weight uniformity and disintegration time of the tablet, the prepared formulation has a high potential and can be studied more precisely. The Septal Skeleton was used to make tablets to treat calcium and vitamin D deficiency. Also, due to the nature of the marine environment and much less side effects, CBs, if confirmed by the results of the study, can be used to replace tablets in the market due to their high performance.

Acknowledgement: This article is issued from Pharm D thesis of Shahrzad Memarzade. This work was supported by deputy of Research, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

References

- Lewiecki EM, Bilezikian JP, Bukata SV, Camacho P, Clarke BL, McClung MR, et al. Proceedings of the 2016 Santa Fe Bone Symposium: New Concepts in the Management of Osteoporosis and Metabolic Bone Diseases. *Journal of Clinical Densitometry*. 2017.
- Balasubramanian A, Tosi LL, Lane JM, Dirschl DR, Ho P-R, O'Malley CD. Declining rates of osteoporosis management following fragility fractures in the US, 2000 through 2009. *JBJS*. 2014;96(7):e52.
- Drake MT, Clarke BL, Oursler MJ, Khosla S. Cathepsin K Inhibitors for Osteoporosis: Biology, Potential Clinical Utility, and Lessons Learned. *Endocrine Reviews*. 2017;38(4):325-50.
- Vladimirov S, Eliseev M, Zhelyabina O, Smirnov A, Glukhova S. AB0895 Osteoporosis risk factors in patients with calcium pyrophosphate crystal deposition disease (CPPD). *BMJ Publishing Group Ltd*; 2017.
- Verma V, Hemlata V, Kusum G. A comparative study of efficacy of calcium+ vitamin D3 and calcium+ vitamin D3+ vitamin K2 in prevention of osteoporosis in postmenopausal osteopenic women who are adopting a sedentary pattern of life style. *Journal of Evolution of Medical and Dental Sciences*. 2013;2(20):3620-7.
- Weaver C, Alexander D, Boushey C, Dawson-Hughes B, Lappe J, LeBoff M, et al. Calcium plus vitamin D supplementation and risk of fractures: an updated meta-analysis from the National Osteoporosis Foundation. *Osteoporosis International*. 2016;27(1):367-76.
- Kanchiku T, Imajo Y, Suzuki H, Yoshida Y, Nishida N, Funaba M, et al. Operative methods for delayed paralysis after osteoporotic vertebral fracture. *Journal of Orthopaedic Surgery*. 2017;25(2):2309499017717194.
- Tang BM, Eslick GD, Nowson C, Smith C, Bensoussan A. Use of calcium or calcium in combination with vitamin D supplementation to prevent fractures and bone loss in people aged 50 years and older: a meta-analysis. *The Lancet*. 2007;370(9588):657-66.
- Jereb P, Roper C, Norman M, Finn J. *Cephalopods of the World. An Annotated and Illustrated Catalogue of Species Known to Date. Volume 3. Octopods and Vampire Squids. FAO Species Catalogue for Fishery Purposes*. 2014(4).
- Riad R, Atta M, Halim Y, Elebiary N. Taxonomical and morphometric studies on *Sepia pharaonis* Ehrenberg, 1831 (Cephalopoda: Sepioidea) from the Suez Gulf (Red Sea), Egypt. *international-journal*. 2016;7:11-22.
- Wen J, Zhong H, Xiao J, Zhou Y, Chen Z, Zeng L, et al. A transcriptome resource for pharaoh cuttlefish (*Sepia pharaonis*) after ink ejection by brief pressing. *Marine genomics*. 2016;28:53-6.
- Linares CF, Sa'ñchez S, Navarro CU, Rodrí'guez K, Goldwasser MR. Study Of Cancrinite-Type Zeolites As Possible Antacid Agents. *Microporous and Mesoporous Materials* 2005;77:215-21.
- Sandhya S, VenkataRamana K, Vinod KR, Chaitanyar S. Assessment Of In Vitro Antacid Activity Of Different Root Extracts Of *Tephrosiapurpurea*(L) Pers By Modified Artificial Stomach Model. *Asian Pacific Journal of Tropical Biomedicine*. 2012;s1487-S92.
- Rodrí'guez-Fuentes G, Denis AR, Mari'a A, A'lvarez B, IraizozColarte A. Antacid Drug Based On Purified Natural Clinoptilolite. *Microporous and Mesoporous Materials* 2006;94:200-7.
- Awaad AS, El-Meligy RM, Soliman GA. Natural Products In Treatment Of Ulcerative Colitis And Peptic Ulcer. *Journal of Saudi Chemical Society*. 2013;17:101-24.
- Linares CF, Palencia A, Goldwasser MR, Rodrí'guez K. Study Of Activated Carbon Modified With Sodium Carbonate As A Possible Antacid Drug. *Materials Letters* 2006;60:439-41.
- Shushizadeh MR, Moghimi Pour E, Zare A, LashKari Z. Persian Gulf B-Chitin Extraction From *Sepia Pharaonis* Sp. Cuttlebone And Preparation Of Its Derivatives. *Bioactive Carbohydrates and Dietary Fibre*. 2015;6:133-42.
- Ghodsinia SSE, Akhlaghinia B. A Rapid Metal Free Synthesis Of 5-Substituted-1h-Tetrazoles Using Cuttlebone As A Natural High Effective And Low Cost Heterogeneous Catalyst. *RSC Advances*. 2015;5(62):49849-60.
- Davis SS. Formulation strategies for absorption windows. *Drug discovery today*. 2005;10(4):249-57.
- Basavaiah K, Nagegowda P, Ramakrishna V. Determination of drug content of pharmaceuticals containing ranitidine by titrimetry and spectrophotometry in non-aqueous medium. *Sci Asia*. 2005;31:207-14.
- Aulton ME, Taylor KM. *Aulton's Pharmaceutics E-Book: The Design and Manufacture of Medicines*: Elsevier Health Sciences; 2017.
- Aslani A, Jahangiri H. Formulation, characterization and physicochemical evaluation of ranitidine effervescent tablets. *Advanced pharmaceutical bulletin*. 2013;3(2):315.
- Bhardwaj V, Bansal M, Sharma P. Formulation and evaluation of fast dissolving tablets of amlodipine besylate using different super disintegrants and camphor as sublimating agent. *American-Eurasian Journal of Scientific Research*. 2010;5(4):264-9.

Determination of the frequency of *bla*CTX-M, *bla*SHV and *bla*TEM genes in *Escherichia coli* isolated from Burns patients in Tehran Shahid Motahari Hospital

Mona RohamRad (1)
Nahid Rahimifard (2)
GholamReza Javadi (3)
Babak PourAkbari (4)

(1) Department of Biology, Science and Research Branch, Islamic Azad University, Tehran, Iran

(2) Department of Microbiology, Food and Drug Control Laboratories (FDCL), Food and Drug Laboratories Research Center (FDLRC), Ministry of Health and Medical Education (MOH), Tehran, Iran. Educational and Medical Diagnostic Sarv Saadat Laboratory, Tehran, Iran.

(3) Department of Genetics, Science and Research Branch, Islamic Azad University, Tehran, Iran

(4) Pediatric Infectious Disease Research Center, Tehran University of Medical Sciences, Tehran, Iran

Corresponding author:

Nahid Rahimifard

Associate Professor in Microbiology;

Food and Drug Control Laboratories(FDCL); Food And Drug Laboratories Research Centre(FDLRC); Ministry of Health and Medical Education(MOH);

No 408 Emam Khomeini Ave.11136-15911;

Tehran, IRAN

Telephone:+98 21 66400081fax:+98 21 22079028, Mobile:+98 912 1032806

Email: n.rahimifard@fda.gov.ir, rahimif@sina.tums.ac.ir, nahidrahimifard@gmail.com

Received: December 25, 2017; Accepted: December 30, 2017; Published: March 1, 2018. Citation: RohamRad M. et al. Determination of the frequency of *bla*CTX-M, *bla*SHV and *bla*TEM genes in *Escherichia coli* isolated from Burns patients in Tehran Shahid Motahari Hospital. World Family Medicine. 2018; 16(3):161-166.

DOI: 10.5742/MEWFM.2018.93326

Abstract

The genes *bla*SHV, *bla*TEM, *bla*CTX-M of the beta-lactamase enzymes are located on transportable elements. The aim of this study was to determine the abundance of *Escherichia coli* producing ESBL, lactamase genes of *bla*SHV, *bla*TEM, *bla*CTX-M by Multiplex PCR and their relationships by creating antibiotic resistance in strains of *E. Coli*. Clinical samples were collected from burns patients hospitalized at Motahari hospital of Tehran in the last quarter of 2015. Bacteria were identified by standard biochemical methods. Antibiotic sensitivity of *E. Coli* against common antibiotics in the pharmaceutical market of Iran, was determined by Kirby – Bauer method. DNA was then isolated from the bacteria and presence of antibiotic resistant genes was determined by PCR and multiplex PCR. Antibiotic resistance and presence of *bla*TEM, *bla*SHV, *bla*CTX-M genes were determined in 100 clinical strains of *Escherichia coli* and standard strain ATCC 25922.

Findings: In total, 167 urine samples were investigated and after biochemical testing 100 *E. Coli* were isolated from the samples. Antibiotic suscep-

tibility test results indicated that the highest and the lowest resistances were related to Ampicillin (97%) and Nitrofurantoin (11%), Imipenem (0%) respectively. It means none of the isolates was found to be resistant to Imipenem. 63 samples of ESBL were positive, analysis of extension of *bla*SHV, *bla*TEM and *bla*CTX-M genes were 44.4%, 61.90% and 71.42% respectively.

The results indicate that the process of antibiotic resistance is on the rise. Development of strains resistant to several antibiotics (MDR) is a significant health threat. Resistance patterns in each region can vary; therefore, accurate identification of resistant strains of each region, providing antibiogram, education of laboratory staff on the correct interpretation of the results of antibiogram and providing detailed reports to physicians can reduce mortality, reduce treatment costs, prevent failures and reduce the spread of resistance.

Key words: ESBL, Multiplex PCR, *bla*SHV, *bla*TEM, *bla*CTX-M

Introduction

Escherichia coli is one of the most common etiologic agents in nosocomial infections. *E. Coli* is a gram-negative bacillus, optional anaerobic or aerobic, and a member of the family of Enterobacteriaceae which causes diseases such as gastroenteritis, sepsis, meningitis, respiratory system infections, wound infections and especially urinary infection (1,2). Unfortunately, treatment of these infections nowadays is facing many problems and is one of the reasons for the acquisition of encoding plasmids of Extended Spectrum Beta Lactamases or ESBL by bacteria (2,3). Different strategies are used by bacteria to be immune against dangerous effects of antibiotics one of which is production of Beta-Lactamases-enzymes by gram-negative bacteria against beta-lactam antibiotics (4). ESBL-producing bacteria are dispersed all over the world and in addition to causing nosocomial infections, are easily spread in the community and cause one of the most important health problems. The frequency of these bacteria is different in various regions. The responsible gene for resistance to Extended Spectrum Beta Lactamases (ESBLs) is most often located in the plasmid and therefore can spread more rapidly among bacteria (5). There may be genes for resistance to other antibiotics in these plasmids at the same time (e.g. amino glycosides), which leads to simultaneous resistance of bacteria to several antibiotics, thus appropriate medications should be targeted toward these bacteria which in turn will lead to spread of ESBL strains(6). Beta- Lactamases are a class of antibiotics that because of their shared central structure, are in this category (7). Beta-lactam antibiotics operate by preventing and deterring. This causes a breakdown of the cell wall biosynthesis and cell function and as a result causes gelatinous deformation of the cell (8). Micro-organisms produce enzymes that destroy the active drug such as produced beta-lactamase by Gram-negative bacteria (8). Beta-Lactamases are members of hydrolytic enzyme families that by hydrolyzing beta-lactam antibiotics make them become derivatives without antibacterial activity (9). In Gram-negative bacteria, production of beta-lactamase enzymes are widely reported in *Enterobacteriaceae*, *Haemophilus influenzae*, *Moraxella*, *Neisseria gonorrhoeae* A, *Vibrio cholerae* and *Pseudomonas aeruginosa* (10). These enzymes were first recognized in the 1980s and most of them were of TEM, SHV which have been developed as a result of point-mutations in the main enzymes without extended-spectrum activity. CTX-M family of ESBL were first reported in 1989 in Germany, and then spread around the world. Often these enzymes are reported to be in *Escherichia coli*, *Klebsiella* but are also seen in other *Enterobacteriaceae* (11). Identifying producing strains of ESBL can provide useful epidemiological information about resistance patterns of microorganisms that cause nosocomial infections and guide us in making the right choice of antibiotic(12). By 1999, most of ESBL strains which were isolated from patients consisted of blaTEM and blaSHV but more recently blaCTX-M ESBL has often been isolated from patients, and around the world, members of the *Enterobacteriaceae* containing blaCTX-M gene are being separated (13). Transmission and rapid spread of

organisms that are capable of producing these enzymes have led to a higher rate of nosocomial infections around the world (14). Therefore, determination of the frequency of blaTEM, blaSHV and blaCTX-M genes in strains of *E. Coli* blaTEM which are isolated from burns patients to help them in the treatment process and improve the quality and effectiveness of treatment in these patients and detection of resistance pattern of *E. Coli* strains isolated from urine of burns patients for effective treatment and shortening duration of patients, hospitalization are considered as aims of the present investigation.

Methods

During a 3 months period, 167 urine samples from burns patients with urinary infection were transferred from Motahari Hospital of Tehran to Saadat Abad laboratory. In order to reach the 100 *E. Coli* sample, the samples were on a cultured selective environment of eosin methylene blue (EMB) and plates were incubated at 37°C for 24 hours and through performing biochemical tests such as TSI, SIM, MR / VP, lysine Iron agar, Simon citrate, phenylalanine agar and urea agar, nitrate agar were tested. By use of diagnostic kits of GNA and GNB 100 of *E. Coli* isolates were identified. The related colonies of Positive *E. Coli* isolates were stored in TSA ambient temperature of 4°C to be used in the next stage of isolation. Determination of sensitivity and antibiotic susceptibility were tested by antibiogram test through spreading diffusion disc (Kirby-Baur) based on the guidelines of the National Committee for Clinical Laboratory Standards (CLSI).(15,16) About 10 various antibiotics discs including gentamicin(10 µg), Ciprofloxacin(5 µg), Tetracycline(30 µg), Ampicillin (10 µg), Nalidixic acid (30 µg), Co-trimoxazole (1.25/23.75 µg), Nitrofurantoin (300 µg), Cephalexin (30 µg), Cefotaxime (30 µg), Ceftazidime (30 µg), Imipenem (10µg) manufactured ROSCO diagnostica A/S, taastrupgaardssvej 30, DK-2630 Taastrup, Denmark, were used. Hybrid drive tests were provided to identify phenotype of ESBL producing bacteria. In this method mixed discs of ceftazidime-clavulanic acid and cefotaxime-clavulanic acid and cefotaxime and ceftazidime of the Rosco company were prepared. After incubation for 24 hours at 37 ° C the increasing diameter of inhibition zone around cefotaxime-clavulanic acid and ceftazidime-clavulanic acid combination disc were determined to be 5 mm more than the diameter of inhibition zone of cefotaxime and ceftazidime around each disc. DNA was extracted by boiling method and for this purpose from each colony, a loop was dissolved in 500 ml of distilled water into each micro tube, then it was put in the Thermo mixer for 15 minutes at 99°C then put on Micro centrifugation around 13000 rpm for 6 minutes. The supernatant containing the DNA was removed and after qualitative and quantitative analyses DNA was used as template for PCR reaction. ESBL-producing gene identification was performed in presence of three genes that produce beta-lactamase CTX-M and TEM and SHV enzymes by PCR and Multiplex PCR experiments. Reaction mixture was 50 µL, constituents of which are shown in Table 1.

Table 1: Reaction parameters

Rank	Substance	Density	volume μL
1	Buffer	1X	5
2	MgCl ₂	2mM	1
3	dNTP	0.2mM- 10Mm-stock from	1
4	Primer Forward	0.2mM	1
5	Primer Reverse	0.2mM	1
6	Taq DNA polymerase	1.25 U/ μL	0.4
7	Pattern of DNA		1
8	Sterilized distilled water		39.6

Reaction was run in a thermo cycler under conditions shown in table (2).

Table 2: Conditions of reaction temperature and time in thermo cycler

Rank	stages	($^{\circ}\text{C}$) temperature			Time (min)		
		SHV	CTX-M	TEM	SHV	CTX-M	TEM
1	Initial denaturation	94	94	94	5	4	5
2	Denaturation	94	94	94	1	1	1
3	Annealing	61	60	58	1	0.5	1
4	Extension	72	72	72	1	1	1
5	Final extension	72	72	72	5	5	5
6	Cycle number	35 cycles					

Table 3: Nucleotide sequence of primers.

Gene	Nucleotide sequences of used primers	length
<i>bla</i> _{CTX-M} -F <i>bla</i> _{CTX-M} -R	5'-TTTGCATGTGCAGTACCAGTAA-3' 5'-CGATATCGTTGGTGGCATA-3'	(bp) 214
<i>bla</i> _{SHV} -F <i>bla</i> _{SHV} -R	5'-GATGAACGCTTTCCCATGATG-3' 5'-CGCTGTTATCGCTCATGGTAA-3'	(bp) 590
<i>bla</i> _{TEM} -F <i>bla</i> _{TEM} -R	5'-ATGAGTATTCAACATTTCCG-3' 5'-GTCACAGTTACCAATGCTTA-3'	(bp) 847

The product of PCR was electrophoresis for the presence of the desired gene in agarose gel (1%). For this purpose 10 λ of each sample was mixed with 1 λ loading buffer and was cast in gel wells. Power source was set on 120 volts and after 45 minutes, when the color approached almost to the end of the length of gel, the power was turned off, and the Gel, was extracted from the tank and studied and analyzed in the Gel Doc by using UV radiation.

Results

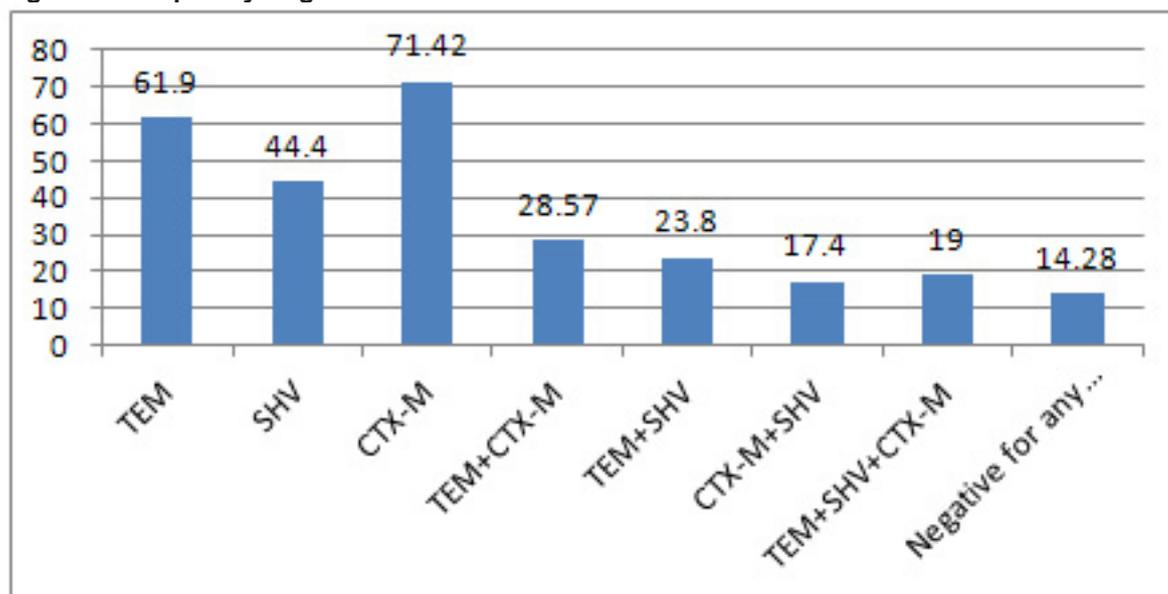
From a total 167 samples and 100 samples of E. Coli isolated from urine of burns patients, with an average age of 16-69 years, 33% of them were men and 67% women. The percentage of sensitivity and resistance of all strains to antibiotics is shown in Table 4 (next page).

Table 4: Sensitivity and resistance to antibiotics

TYPES OF ANTIBIOTICS	NUMBER (%) OF SUSCEPTIBLE STRAINS <i>SENSITIVE (S)</i>	NUMBER (%) OF STRAINS WITH INTERMEDIATE SENSITIVITY <i>INTERMEDIATE (I)</i>	NUMBER (%) OF RESISTANT STRAINS <i>RESISTANCE (R)</i>
Cephalexin	(%5) 5	(%0) 0	(%95) 95
Cotrimoxazole	(%32) 32	(%2) 2	(%66) 66
Ampicillin	(%0) 0	(%3) 3	(%97) 97
Nitrofurantoin	(%86) 86	(%3) 3	(%11) 11
Nalidixic acid	(%42) 42	(%12) 12	(%46) 46
Tetracycline	(%33) 33	(%0) 0	(%67) 67
Gentamicin	(%16) 16	(%52) 52	(%32) 32
Ciprofloxacin	(%62) 62	(%20) 20	(%18) 18
Cefotaxime	(% 50) 50	(%8) 8	(%42) 42
Ceftazidime	(%42) 42	(%19) 19	(%39) 39
Imipenem	(%100) 100	(%0) 0	(%0) 0

The results of analysis of phenotypic ESBL-producing bacteria showed that 63 samples were positive. After PCR for three beta-lactamase genes, blaTEM, blaSHV and blaCTX-M, the frequency of genes was obtained as in Figure 1:

Figure 1: Frequency of genes



Discussion

Lactamase genes in bacteria, particularly genes of ESBLs, are one of the major factors that increase resistance to beta-lactam antibiotics including extensive-spectrum cephalosporin. Organisms that carry these genes cause increasing morbidity and mortality among patients, thus continuous increase in resistance of these, is a major threat to community health (15 and 16).

In the present study a hundred *E. Coli* strains of 167 urine samples were obtained from Motahhari hospital, Tehran. More than half of all cases of urinary infection were positive for *E.coli*.

In order to evaluate the antibiotic resistance of the strains, antibiogram was performed by Kirby-Bauer method and the percentage of susceptibility and resistance of all strains to antibiotics was evaluated. Results indicate that the greatest reported resistance was against antibiotic ampicillin (97%) and Cephalexin (95%) resistance is noteworthy and reflects use of antibiotics. Such a high percentage of our results is consistent with some of the previous studies but contradicts others. Contradiction could be the result of difference sources of samples, geographical distance, differences in health status of patients and differences in the pattern and antibiotics use table in the different areas (18, 17).

Fujino et al showed that therapeutic regimen with FRPM for patients with acute pyelonephritis caused by ESBL-producing *E. Coli* bacteria is promising (19). In Tamberkar's research resistance to ampicillin (87%) was observed (20) which is consistent with our report. The highest sensitivity to antibiotics nitrofurantoin and ciprofloxacin, have been reported to be 86% and 62% respectively, which is nearly consistent with the results of Moses and his colleagues who reported sensitivity to nitrofurantoin to be 66% (21). In our country the choice of antibiotics for urinary infections are nitrofurantoin and ciprofloxacin.

In this study 3 pairs of oligonucleotide primers for blaSHV, blaTEM and blaCTX-M were used, in which of 100 samples, the presence of *E. Coli* was shown as 63 samples of ESBL were positive. Using Multiplex PCR it was shown that CTX-M gene has the highest prevalence (71.42%) consistent with a previous report that is 70% (21) but different from another report that showed 45.2% (23).

The frequency of TEM reported here 61.9%, is close to a previous report 77.6% (24), but different from 8.4% (23) and 32.5% (25,26).

We found SHV gene frequency to be 44.4% which is similar to 34% (21), our results were different from the previous reports (23) and (22), they found no SHV gene. The above differences could be due to origin of samples, presence of other lactamase genes, potency and amount of antibiotics used, country where research was done and different antibiotic resistance mechanisms.

Conclusion

1. Considering the increasing resistance against some antibiotics and differences in effectiveness of antibiotics, implementation of drug susceptibility testing deems appropriate.
2. The high prevalence of antibiotic-resistant *E. Coli* and high frequency of resistant genes can be proof of indiscriminate use of antibiotics.
3. Use of molecular techniques to accelerate the detection of disease-causing pathogens, especially in urine samples can accurately identify the type of bacteria and thus increase suitability of prescribed antibiotic.
4. Appropriate training of hospital staff and proper use of antibiotics by physicians will decrease appearance of drug resistant bacterial strains.

It is recommended that antibiotics only be used when absolutely needed.

Acknowledgements

The authors sincerely thanks the Sarv Saadat Laboratory complexes in West sarv, Saadatabad, Tehran for their kind assistant, and hard efforts.

References

1. Colom K, Pérez J, Alonso R, et al. Simple and reliable multiplex PCR assay for detection of blaTEM, blaSHV and blaOXA-1 genes in Enterobacteriaceae. FEMS microbiology letters, 2003;223(2):147-51.
2. Arana D. M, Rubio M, & Alós J. I. Evolution of antibiotic multiresistance in *Escherichia coli* and *Klebsiella pneumoniae* isolates from urinary tract infections: A 12-year analysis (2003–2014). Enfermedades infecciosas y microbiología clinica. 2017;35(5): 293-8.
3. Olesen I, Hasman H, & Møller Aarestrup F. Prevalence of β -lactamases among ampicillin-resistant *Escherichia coli* and *Salmonella* isolated from food animals in Denmark. Microbial drug resistance.2004;10(4): 334-40.
4. Li Q, Lee J. Y, Castillo R, et al. NB2001, a novel antibacterial agent with broad-spectrum activity and enhanced potency against β -lactamase-producing strains. Antimicrobial agents and chemotherapy.2002; 46(5): 1262-8.
5. Chong Y, Ito Y, & Kamimura T. Genetic evolution and clinical impact in extended-spectrum β -lactamase-producing *Escherichia coli* and *Klebsiella pneumoniae*. Infection, Genetics and Evolution.2011;11(7): 1499-1504.
6. Emery C. L, & Weymouth L. A. Detection and clinical significance of extended-spectrum beta-lactamases in a tertiary-care medical center. Journal of clinical microbiology.1997; 35(8): 2061-7.
7. Kong K. F, Schnepfer L, & Mathee K. Beta-lactam antibiotics: from antibiosis to resistance and bacteriology. Apmis.2010; 118(1):1-36.
8. Lausova A, Bujdakova H, & Kettner M. Epidemiologie, mikrobiologie, imunologie: casopis Spolecnosti pro epidemiologii a mikrobiologii Ceske lekarske spolecnosti JE Purkyne.1997; 46(2): 73-80.

9. Jacoby GA, Munoz-Price LS. The new beta-lactamases. *N Engl J Med.*2005; 352(4):380-91
10. Jacoby GA. AmpC beta-lactamases. *Clin Microbiol Rev.* 2009;22(1):161-82
11. Bush K, & Jacoby G. A. Updated functional classification of β -lactamases. *Antimicrobial agents and chemotherapy.*2010; 54(3): 969-76.
12. Chaudhary U, & Aggarwal R. Extended spectrum-lactamases (ESBL) - an emerging threat to clinical therapeutics. *Indian Journal of Medical Microbiology.*2004; 22(2): 75-90.
13. Canton R, Coque TM. The CTX-M β -lactamase pandemic. *Curr Opin Microbiol.*2006; 9(5) :466-75
14. Paterson D. L, & Bonomo R. A. Extended-spectrum β -lactamases: a clinical update. *Clinical microbiology reviews.*2005;18(4): 657-86.
15. Cavalieri SJ, Rankin ID, Harbeck RJ et al, *Manual of antimicrobial susceptibility testing.* American Society of Microbiology;2005.
16. CLSI. *Performance Standards for Antimicrobial Susceptibility Testing.* 26th ed. CLSI supplement. M100S. Wayne, PA: Clinical and Laboratory Standards Institute; 2016.
17. Poirel L, Weldhagen G. F, Naas T, et al. GES-2, a Class A β -Lactamase from *Pseudomonas aeruginosa* with increased Hydrolysis of Imipenem. *Antimicrobial agents and chemotherapy.* 2001; 45(9): 2598-2603.
18. Branger C, Zamfir O, Geoffroy S, et al. Genetic background of *Escherichia coli* and extended-spectrum beta-lactamase type. *Emerg Infect Dis.*2005; 11(1): 54-61.
19. Sadat Seyedjavadi S, Goudarzi M, Sabzehali F, Relation between blaTEM, blaSHV and blaCTX-M genes and acute urinary tract infections. *Journal of Acute Disease.*2016; 5(1): 71-6.
20. Samuel KH, Kathleen L, Leong MM, Felecia C. Distribution and prevalence of chloramphenicol-resistance gene in *Escherichia coli* isolated from aquaculture and other environmental waters. *International Food Research Journal.*2014;21(4): 1321-25.
21. Fujino K, Hiyama Y, Uehara T, et al. The efficacy of faropenem for patients with acute cystitis caused by extended spectrum β -lactamase producing *Escherichia coli*. *Journal of Infection and Chemotherapy, In Press.*2016.
22. Tambekar D. H, Dhanorkar D. V, Gulhane S. R, et al. Antibacterial susceptibility of some urinary tract pathogens to commonly used antibiotics. *African Journal of Biotechnology.*2006; 5(17): 102-10
23. Moses A, Bwanga F, Boum Y, et al. Prevalence and Genotypic Characterization of Extended-Spectrum Beta-Lactamases Produced by Gram Negative Bacilli at a Tertiary Care Hospital in Rural South Western Uganda. *British microbiology research journal.*2014; 4(12):423-441.
24. Bora A, Hazarika N. K, Shukla S. K, et al. Prevalence of blaTEM, blaSHV and blaCTX-M genes in clinical isolates of *Escherichia coli* and *Klebsiella pneumoniae* from Northeast India. *Indian journal of Pathology and Microbiology.*2014; 57(2): 249.
25. Ogutu J. O, Zhang Q, Huang Y, et al. Development of a multiplex PCR system and its application in detection of blaSHV, blaTEM, blaCTX-M-1, blaCTX-M-9 and blaOXA-1 group genes in clinical *Klebsiella pneumoniae* and *Escherichia coli* strains. *The Journal of antibiotics.* 2015;68 (12): 725-33.
26. Brouwer M.C, Van de Beek D. Management of bacterial central nervous system infections. *Handbook of Clinical Neurology.*2017; 140: 349-64.
27. Freitag C, Geovana B, Kadlec K, et al. Detection of plasmid-borne extended-spectrum β -lactamase (ESBL) genes in *Escherichia coli* isolates from bovine mastitis. *Veterinary Microbiology.*2017; 200: 151-6.
28. Zhu M, Yang G, Li A et al. Identification and molecular characterization of *Escherichia coli* blaSHV genes in a Chinese teaching hospital. *Gene.*2017; 600: 29-35.

A clinical debate concerning Aminoglycoside resistance genes among *Pseudomonas aeruginosa* strains

Morteza Pourahmad (1)

Abassali Javadi (1)

Asghar Kamran (2)

Behrooz Ataei (3)

Majid Yaran (3)

Abdolreza Sotoodeh Jharomi (4)

(1) Nosocomial Infection Research Center, Isfahan University of Medical Sciences, Isfahan, Iran

(2) Department of Infectious Diseases, Isfahan University of Medical Sciences, Isfahan, Iran

(3) Infectious Diseases and Tropical Medicine Research Center, Isfahan University of Medical Sciences, Isfahan, Iran

(4) Zoonoses Research Center, Jahrom University of Medical Sciences, Jahrom, Iran

Corresponding author:

Abdolreza Sotoodeh Jharomi,

Zoonoses Research Center, Jahrom University of Medical Sciences,
Jahrom, Iran

Email: sotoodehj2002@yahoo.com

Received: December 25, 2017; Accepted: January 28, 2018; Published: March 1, 2018. Citation: Pourahmad M. et al. A clinical debate concerning Aminoglycoside resistance genes among *Pseudomonas aeruginosa* strains. *World Family Medicine*. 2018; 16(3):167-171. DOI: 10.5742/MEWFM.2018.93327

Abstract

Introduction: *Pseudomonas aeruginosa* is a world-wide nosocomial infection that disrupts hospitalized patient's recovery. Use of the proper anti-pseudomonas antibiotic therapy is an expected challenge among health care providers.

Methods: This is a cross-sectional in-vitro study which was conducted in Isfahan in 2016-2017. After selection of the patients with *P. aeruginosa* infection and isolation of bacteria, the presence of AME coding genes such as *aac(6')-II* and *ant(2'')-I* was surveyed by PCR method. Result: From 350 patients with *P.aeruginosa* infection, 100 samples were obtained. About half of the strains were taken from urine samples and respiratory tract swap. 93% of *Pseudomonas aeruginosa* strains were resistant to at least one antibiotic. The highest antibiotic resistance was dedicated to Tobramycin and Meropenem. However, all strains were sensitive to Colistin. In regard to AME genome, 13 specimens had *ant(2'')-I* and 4 strains had *aac(6')-II* genes. *aac(6')-II* gene caused 75% resistance to Amikacin, Tobramycin, and Gentamycin while *ant(2'')-I* gene posed Tobramycin and Gentamycin resistance.

Conclusion: Overall, there was a high resistance ratio to various aminoglycosides, B-lactams, and fluoroquinolones isolated from infected patients. Less than 20% of strains demonstrated AME genes of *aac(6')-II* and *ant(2'')-I*.

Key words: *Pseudomonas aeruginosa*; Aminoglycoside; antibiotic resistance; nosocomial infection

Introduction

Nosocomial infection is a trending worldwide concern, which interrupts hospitalized patients' recovering process while posing higher mortality risk (1, 2). Microbiological studies done in both developed and developing countries claim that *Pseudomonas aeruginosa* is the most prevalent nosocomial strain (1, 3, 4). *Pseudomonas aeruginosa* is an opportunistic gram-negative bacillus which infects mostly ICU patients, burn victims, VAP (ventilator associated pneumonia), and chronic pulmonary disease patients such as those with cystic fibrosis (1, 5). Actually, it is a hospital-acquired infection, which mostly presents itself as a urinary tract infection, endocarditis, bacteremia, and sepsis (2, 4).

The real worrisome issue regarding *Pseudomonas aeruginosa* infection is antibiotic resistance as MDR (multi-drug resistance) increases hospitalization duration, antibiotic treatment failure, mortality, and medical expenses (6, 7). In one study in Iran, MDR *Pseudomonas* strains were mostly gathered from OB/GYN and ICU departments that were vulnerable to Colistin besides being resistant to β -lactam antibiotics like Piperacillin (5). Aminoglycosides are the worldwide approved treatment of choice for nosocomial *Pseudomonas aeruginosa* infection. However, due to chromosomal and acquired aminoglycoside resistance, β -lactam combination therapy is a wise recommendation (1, 8).

Genetic coded modifying enzymes like acetyltransferase (AAC), nucleotidyltransferase (ANT) and phosphotransferase (APH) are the most found methods that *Pseudomonas aeruginosa* strains are equipped with against aminoglycosides (4, 6). By reviewing previous studies, it is understood that various *Pseudomonas aeruginosa* MDR patterns exist based on their unique geographical location. Regular AME genome investigation is advised in order to administer proper antibiotics for *P.aeruginosa* infection (6, 8-10).

Hereby, this study attempts to investigate the prevalence of genetic coding of *aac* (6')-II and *ant* (2'')-I in a hospital sample of *Pseudomonas aeruginosa* strains and its relation to aminoglycosides' resistance.

Materials and methods

This cross-sectional in-vitro study was conducted from January 2016 to January 2017. *Pseudomonas aeruginosa* strains were obtained from Alzahra hospital lab, Isfahan. Patients with confirmed *Pseudomonas aeruginosa* culture were included in the total sample and were clinically examined.

They were from ICU, internal medicine, general surgery, infectious diseases, and orthopedic departments. We gathered information regarding gender, age, hospital department, hospitalization duration, and clinical presentation. In correlation with our inclusion criteria, all patients who had been hospitalized for more than 5 days participated in this survey. However, if the patients

were previously hospitalized, had a drug history of antibiotic consumption, and low *P.aeruginosa* DNA purity, their samples were excluded from the final result. In order to prevent any accidental culture contamination with *Pseudomonas aeruginosa*, if the patients showed no clinical presentation of infectious disease such as leukocytosis, fever, and chills, their culture was removed from the final sample.

After reviewing the aforementioned inclusion and exclusion criteria, patients with clinical presentation of infectious diseases were chosen. Based on their primary diagnosis, samples of blood, CSF, IV catheter, urine, abdominal cavity fluid, sputum, wound discharge, and tracheal swab were sent for microbiological evaluation in both blood and EMB (eosin methylene blue) agars. As a matter of fact, just one sample was sent to the lab. If *Pseudomonas aeruginosa* strains were responsible for the clinical presentation, they produced green-pigmented colonies on EMB culture. Moreover, oxidase and movement tests were positive for *Pseudomonas aeruginosa*. Isolated bacilli of *Pseudomonas aeruginosa* were grown on a Luria Bertani (LB) agar and delivered to our Molecular Genetics Laboratory.

First, antibiotic resistance was evaluated in *pseudomonas* strains by disc diffusion method according to Clinical and Laboratory Standards Institute (CLSI) guidelines (11), using Amikacin (30 μ g), Tobramycin (30 μ g), Gentamycin (10 μ g), Imipenem (10 μ g), Meropenem (10 μ g), Ciprofloxacin (5 μ g), Ceftazidime (30 μ g), Cefepime (30 μ g), Colistin (10 μ g), Piperacillin (30 μ g), and Piperacillin/tazobactam (100/10 μ g).

As well as disc diffusion stray testing, all strains were investigated in regard to *aac*(6')-II and *ant*(2'')-I genes presence by PCR (polymerase chain reaction) method. Gram-negative bacterial genomic DNA was obtained using the Kit Wizard Genomic (Promega).

The total template DNA for the PCR amplification was taken from the supernatant of a mixture of *P. aeruginosa* cells produced by the boiling method. PCR amplification was done using 2.5 mL of the template DNA, 1 mL of each primer, 19.5 mL master mix, and 1 mL of Taq DNA polymerase (CinnaGen) in a total volume of 25 mL.

Then, 5 ml of each PCR product was analyzed by electrophoresis on a 1% (w/v) TAE agarose gel (Fermentas UAB, Vilnius, Lithuania) containing 0.1 ml/ml ethidium bromide. The amplicons were visualized on a UV trans-illuminator and photographed. In the end, data of bacteriological antibiotic resistance, molecular-genetic identification, gender, age, hospitalized department, and hospitalization duration were gathered and analyzed by SPSS v22.

Ethics approval: This project was approved by the Ethics Committee, Deputy of Research, Isfahan University of Medical Sciences.

Results

According to our data, out of a total 350 patients only 100 *Pseudomonas aeruginosa* strains were obtained from patients who had clinical presentation of infectious disease during 1 year in Alzahra hospital, Isfahan. Candidates were from 13 to 83 years old while the mean age of the patients was 53 ± 3.1 years. Out of the whole group population, 57% were male and 33% were female. The mean duration of hospitalization among patients was 63 ± 2.7 days. Related to hospitalization, 45% of patients were admitted to surgical ward, 9% to ICU, 16% to internal medicine and infectious departments. The source of the specimens was taken from one sample: urine sample (37%), sputum and tracheal swap (21%), IV catheter (13%), blood culture (10%), CSF (7%), and tapped abdominal fluid (2%). In fact, patients admitted to ICU had *P.aeruginosa* infection based on strains from tracheal and IV line swap (90%). On the other hand, urinary tract infection and sepsis (83%) were highly responsible for *P.aeruginosa* contamination in the surgical ward.

According to the microbiological analysis, 93% of *Pseudomonas aeruginosa* strains were resistant to at least one antibiotic. However, 7% demonstrated no findings of disc diffusion resistance. Four patients without resistant strains were hospitalized for less than 30 days on average. All collected strains were sensitive to Colistin and 52% were susceptible to both Amikacin and Colistin.

On the other hand, 46% of strains were resistant to at least 4 antibiotics in regard to their disc diffusion findings. Furthermore, the highest resistance was detected as 76% Tobramycin followed by 73% Meropenem, 66% Imipenem, 64% Cefepime, 62% Ceftazidime, 49% Piperacillin, 33% Piperacillin/tazobactam, 31% Ciprofloxacin, 29% Amikacin, and 15% Gentamycin. Overall, aminoglycoside resistance was 63% among our samples (Table 1).

Table 1: Antibiotic resistance pattern among collected *Pseudomonas aeruginosa* strains

Antibiotic	Resistant%	Intermediate%	Sensitive%
Tobramycin	76	3	21
Meropenem	73	0	27
Imipenem	66	2	32
Ceftazidime	62	0	38
Cefepime	64	1	36
Ciprofloxacin	31	0	69
Piperacillin	49	0	51
Piperacillin/ tazobactam	33	1	67
Gentamycin	15	0	85
Colistin	0	0	100
Amikacin	29	3	68

Regarding our molecular genetic evaluation, 13 strains of *Pseudomonas aeruginosa* had modifying enzyme genes of ant(2'')-I and 4 strains had aac(6')-II genes. The mean age of patients with these genes was 40.5 years and 9 patients were female and 8 were male. 41.1% of the strains had been taken from a urine sample, a respiratory tract sample at 23.5%, burn wound pus 29.4%, and blood culture 7%. More than half of these patients were hospitalized in the ICU. In fact, all these specimens were completely resistant to Ciprofloxacin, Meropenem, and Imipenem and more than 90% resistant to Ceftazidime and Cefepime.

However, almost half (52.9%) were susceptible to Piperacillin/tazobactam. Strains with aac(6')-II gene showed 75% resistance to Amikacin, Gentamycin, and Tobramycin. On the other hand, *Pseudomonas aeruginosa* with ant(2'')-I gene revealed 100% resistance to Tobramycin and Gentamycin. Moreover, 38.4% of ant(2'')-I strains were vulnerable to Amikacin (Table 2).

Table 2: *Pseudomonas aeruginosa* strains with aac(6')-II and ant(2'')-I and aminoglycoside resistance

Antibiotic	Amikacin%	Tobramycin%	Gentamycin%
Resistance Gene			
aac (6')-II	75	75	75
ant (2'')-I	61.6	100	100

Discussion

Submitting the appropriate treatment for MDR *P.aeruginosa* is a breath taking and challenging assignment in the medical field. Aminoglycosides play a major role in *P.aeruginosa* treatment. Although combination anti-pseudomonas therapy is advised, resistance to B-lactam happens mostly through chromosomal pathway (9, 10, 12).

P.aeruginosa interrupts aminoglycosides antimicrobial effect by modifying enzymes, ceasing drug permeability, activating (MexXY-OprM) pump, activating Phop-PhoQ system, creating biofilm, and 16s rRNA methylase (5). The most common defensive mechanism among *P.aeruginosa* is aminoglycoside modifying enzymes (AME). Some of these enzymes are aminoglycoside phosphoryl transferase (apt), aminoglycoside nucleotidyl transferase (ant), and aminoglycoside acetyltransferase (aac) (1, 3, 4).

A study on 94 burn wounds samples found 88.3% MDR strains of *P.aeruginosa* which were more than 80% resistant to Ciprofloxacin and Cefepime in contrast to being vulnerable to Colistin (3). Similar to another study on 111 *P.aeruginosa* strains extracted of wound secretions (5), our samples of burn wounds pus were completely resistant to aminoglycosides as well as having either aac(6')-II and ant(2'')-I genes. Although all these strains were resistant against Cefepime, Ciprofloxacin, and Piperacillin/tazobactam, they were all sensitive to Colistin.

Some AME genes include aph(3')-VI, ant(2'')-I, aac(6')-II, aac(6')-I, and aac(3)-II (3, 4). Various studies claim that aac(6')-I gene causes resistance to Amikacin and Tobramycin, while aac(6')-II and ant(2'')-I interfere with Tobramycin and Gentamycin anti-pseudomonas role (1, 3, 4, 8).

Other study proves that aac(3')-I and aac(3')-II is highly responsible for resistance against Gentamycin in *P.aeruginosa* (6). According to another study result, aac(6')-II mostly develops resistance to Gentamycin and Tobramycin (8).

In 2011, one study has been done on 250 *P.aeruginosa* samples from various geographical areas in Iran in which 135 strains were resistant to aminoglycosides. The prevalence of resistant genes among their specimens were described as following: 35% aac(6')-II, 28% ant(2'')-I, and 7% aac(6')-I. Obviously, aac(6')-II and ant(2'')-I genes were the most common genome in *P.aeruginosa* with AME (6). Similar to the study done on MDR *P.aeruginosa* in Venezuela and Japan, the most common genes responsible for AME were aac(6')-II and ant(2'')-I. Also, gene aac(6')-II was known for resistance against Gentamycin (1, 4).

In regard to geographical distribution of AME genes, aac(6'')-I gene was more prevalent in Greece, France, and India and was recognized to be responsible for resistance to Amikacin. Nevertheless, aph(3')-VI and aac(6')-II genes were highly discovered in America, Korea, and Iran (1, 4). So, we focused on aac(6')-II and ant(2'')-I genes in genetic evaluation of our *P.aeruginosa* strains. In association to

our results, only 17 strains (18.2%) had either AME genes. These specimens were collected mostly from urine samples and respiratory tract swabs. Nonetheless, ant(2'')-I gene was more prevalent among them (76.4%). *P.aeruginosa* strains carrying ant(2'')-I gene had full resistance to Tobramycin and Gentamycin and 61.6% resistance to Amikacin. Nonetheless, strains with acc(6')-II gene showed 75% resistance to Tobramycin, Amikacin, and Gentamycin. All strains with acc(6')-II and ant(2'')-I genes were sensitive to Colistin in contrast to being resistant to Ciprofloxacin, Cefepime, Ceftazidime, Imipenem, and Meropenem.

Conclusion

To sum up, our result indicates overall high resistance range to various aminoglycosides, B-lactams, and fluoroquinolones isolated from infected patients. In fact, less than 20% of strains demonstrated AME genes while being susceptible to Colistin. Based on our genetic evaluation, acc(6')-II gene caused equal resistance to Tobramycin, Amikacin, and Gentamycin. However, ant(2'')-I gene provided resistance to Tobramycin and Gentamycin. Therefore, we advise using accurate antibiogram and regular AME genome determination in breaking the *P.aeruginosa* aminoglycoside resistance vicious cycle.

Acknowledgements: This research work was financed by Isfahan University of Medical Sciences, Isfahan, Iran. This article has been from the results of the thesis of the infectious diseases specialist which is funded by Isfahan university of medical sciences.

References

1. Teixeira B, Rodulfo H, Carreno N, Guzman M, Salazar E, DONATO MD. Aminoglycoside resistance genes in *Pseudomonas aeruginosa* isolates from Cumana, Venezuela. *Revista do Instituto de Medicina Tropical de São Paulo*. 2016;58.
2. Michalska AD, Sacha PT, Ojdana D, Wieczorek A, Tryniszewska E. Prevalence of resistance to aminoglycosides and fluoroquinolones among *Pseudomonas aeruginosa* strains in a University Hospital in Northeastern Poland. *Brazilian Journal of Microbiology*. 2014;45(4):1455-8.
3. Adabi M, Talebi Taher M, Arbabi L, Afshar M, Fathizadeh S, Minaeian S, et al. Determination of antibiotic resistance pattern of *Pseudomonas aeruginosa* strains isolated from patients with burn wounds. *Journal of Ardabil University of Medical Sciences*. 2015;15(1):66-74.
4. Odumosu BT, Adeniyi BA, Chandra R. Occurrence of aminoglycoside-modifying enzymes genes (aac (6')-I and ant (2'')-I) in clinical isolates of *Pseudomonas aeruginosa* from Southwest Nigeria. *African health sciences*. 2015;15(4):1277-81.
5. Mardaneh J, Ahmadi K, Jahan Sepas A. Determination antimicrobial resistance profile of *Pseudomonas aeruginosa* strains isolated from hospitalized patients in Taleghani Hospital (Ahvaz, Iran) from 2011-2012. *Journal of Fasa University of Medical Sciences*. 2013;3(3):188-93.

6. Vaziri F, Peerayeh SN, Nejad QB, Farhadian A. The prevalence of aminoglycoside-modifying enzyme genes (aac(6')-I, aac(6')-II, ant(2'')-I, aph(3')-VI) in *Pseudomonas aeruginosa*. *Clinics*. 2011;66(9):1519-22.
7. Poole K, Gilmour C, Farha MA, Mullen E, Lau CH-F, Brown ED. Potentiation of aminoglycoside activity in *Pseudomonas aeruginosa* by targeting the AmgRS envelope stress-responsive two-component system. *Antimicrobial agents and chemotherapy*. 2016;60(6):3509-18.
8. Tada T, Miyoshi-Akiyama T, Shimada K, Shimojima M, Kirikae T. Novel 6'-N-aminoglycoside acetyltransferase AAC(6')-Iaj from a clinical isolate of *Pseudomonas aeruginosa*. *Antimicrobial agents and chemotherapy*. 2013;57(1):96-100.
9. Poole K. Aminoglycoside resistance in *Pseudomonas aeruginosa*. *Antimicrobial agents and Chemotherapy*. 2005;49(2):479-87.
10. Doss VA, Parvathi S, Raju BA, Devi NA. Evaluation on the use of β -lactamase and Aminoglycoside modifying enzyme gene sequences as markers for the early detection of antibiotic resistance profile of *Pseudomonas aeruginosa*. *Disease markers*. 2004;20(6):317-23.
11. Zebouh M, Thomas C, Honderlick P, Lemee L, Segonds C, Wallet F, et al. Evaluation of a new E-test method for antimicrobial sensitivity testing of *Pseudomonas aeruginosa* isolates from cystic fibrosis. *Pathologie-biologie*. 2005;53(8-9):490-4.
12. Dassner AM, Sutherland C, Giroto J, Nicolau DP. In vitro activity of ceftolozane/tazobactam alone or with an aminoglycoside against multi-drug-resistant *Pseudomonas aeruginosa* from pediatric cystic fibrosis patients. *Infectious diseases and therapy*. 2017;6(1):129-36.

The pattern of antibiotic resistance of common bacteria causing nosocomial infections

Mojtaba Hedayat Yaghoobi (1)
 Mohammad Reza Arabestani (2)
 Pezhman Karami (2)
 Azad Khaledi (3)
 Mohamad Ali Seifrabie (4)
 Omid Khiabanchian (5)
 Farshid Rahimi-Bashar (6)

(1) Department of Infectious Disease, School of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran.

(2) Department of Microbiology, School of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran.

(3) Department of Microbiology and Immunology, School of Medicine, Kashan University of Medical Sciences, Kashan, Iran.

(4) Department of Social Medicine, School of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran.

(5) MSc in Parasitology, Besat Hospital, Hamadan University of Medical Sciences, Hamadan, Iran.

(6) Department of Anesthesiology and critical care, School of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran.

Corresponding Author:

Farshid Rahimi-Bashar.

Department of Anesthesiology and critical care, School of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran

Email: fr_rahimibashar@yahoo.com

Received: January 30, 2018; Accepted: February 10, 2018; Published: March 1, 2018. Citation: Fatemeh Bameri et al. The Effects of a Hypothermia Prevention Program on the Body Temperature and Shivering in Women Undergoing Cesarean Section. *World Family Medicine*. 2018; 16(3):172-178. DOI: 10.5742/MEWFM.2018.93342

Abstract

Background: Nosocomial infection is one of the most important health problems across the world. Nosocomial infection causes 99,000 deaths and patients spend over 30 million dollars per year in America. The current study aimed to determine the pattern of antibiotic resistance of common bacteria causing nosocomial infections in Besat Hospital, Hamedan, Iran.

Methods: This cross sectional prospective study was conducted in Besat hospital for four months. Each of the non-pediatric patients in different wards of the hospital with various types of nosocomial infections in accordance with CDC guidelines were enrolled, and cultured chip samples, urine, blood and wound specimens for culture and susceptibility were sent to a laboratory. All micro-organisms isolated from cultures were considered in antimicrobial resistance patterns. Antimicrobial resistance pattern (Kirby-Bauer method) of bacterial isolates was determined according to the report/ test table of CLSI M100-S23 instructions.

Results: Of 10,332 hospitalized patients we reported 266 (2.6%) with nosocomial infections and the VAP was the most common nosocomial infection.

Among 266 bacterial isolates, the highest prevalent bacterium belonged to the *E. coli* with prevalence 61(22.9%) followed by *Klebsiella*, *Acinetobacter* and *S. aureus* with prevalence of 42(15.8%), 36(13.5%) and 26(9.8%), respectively.

In Gram-negative bacteria maximum resistance to ciprofloxacin and minimum resistance to Colistin and Imipenem was observed. The prevalence of MRSA in VAP, CLA-BSI and SSI was 3.3, 22.2 and 54.5 %. Resistance to Vancomycin in Staphylococci was not observed, but in Enterococci resistance to Vancomycin was 42.9%.

Conclusion: The main problem in this hospital is MDR Gram-negative infections rather than Staphylococcus aureus.

Knowing the pattern of antimicrobial resistance can prevent prescribing inappropriate antibiotics and effective steps can be taken towards reducing microbial resistance.

Key words: antibiotic resistance, nosocomial, infection, drug resistance.

Background

Nosocomial infection is one of the most important health problems of health across the world. Based on estimation, in 2002 only 7.1 million Nosocomial infection occurred in America. HAI causes 99,000 deaths and patients spend over 30 million dollars per year in America(1). Also in other continents of the world there is a high prevalence of these infections(2). In America, more than 30% of hospital infections are caused by Gram-negative bacilli in intensive care units (ICU), and 70% of hospital infections are caused by these microbes. Between Gram-negative bacilli that cause hospital infections, Enterobacteriaceae are the most common family. Unfortunately, resistant Gram-negative bacilli, including *Pseudomonas aeruginosa*, *Acinetobacter baumannii* and Enterobacteriaceae producing beta-lactamase (ESBL) or Carbapenemases are growing in all parts of the world (1) and the frequency of ESBL-producing Enterobacteriaceae family can reach up to 60% (3). In addition Gram-negative bacilli, has increased the prevalence of nosocomial infections with resistant gram-positive cocci such as *Staphylococcus aureus* and *Enterococcus* with a rate of about 50-60%(4) for *Staphylococcus aureus* and 30% for *Enterococcus*. Since, proper knowledge of the patterns of microbial resistance and its trend in every hospital is needed, so describing antibiotic treatment empirically to finalize the culture results and antibiotic sensitivity tests(5), can be effective in reducing the mortality rate and operative measures should be taken to prevent the development of microbial resistance in different wards of hospitals. Therefore, this study aimed to determine the pattern of antibiotic resistance of common bacteria causing nosocomial infections in the hospital.

Methods

This cross sectional prospective study was conducted in Besat hospital, Hamedan, Iran in 2016. The hospitalized non-pediatric patients in different wards of hospital with various types of nosocomial infections such as; Ventilator Associated Pneumonia (VAP), Catheter Acquired Urinary Tract Infection (CA-UTI), Surgical Wound Infection (SC) and Central Line Associated-Blood Stream Infection (CLA-BSI) were involved in the study. At first, the necessary coordination with hospital microbiology laboratory was done for use of proper differentiation media and antibiotics disks (Mast Company). In order to unify the definitions of the four mentioned nosocomial infections we used definitions of the Center for Disease Control and Prevention (CDC). Tracheal, urine, blood, surgical wound samples were sent to the laboratory for culture and antibiotic susceptibility test. The identification of bacteria, especially Gram-negative bacilli was used for the same set of diagnostic tests. Antimicrobial resistance pattern (Kirby-Bauer method) of bacterial isolates was determined according to the report/test table of CLSI M100-S23 instructions(6). For patients resistant to meropenem, vancomycin and colistin, E-test was used. Finally, data were analyzed by SPSS (Version 15) software.

Results

Of 10,332 hospitalized patients we reported 266 (2.6%) of nosocomial infections and the VAP was the most common nosocomial infection with a prevalence of 110 (41.6%) cases. Among 266 bacterial isolates, the highest prevalent bacterium belonged to the *E. coli* with prevalence 61(22.9%) followed by *Klebsiella*, *Acinetobacter* and *S. aureus* with prevalence of 42(15.8%), 36(13.5%) and 26(9.8%), respectively (Table 1). 60.9% of *Staphylococcus aureus* isolated were resistant to cefoxitin (MRSA) but none of them were resistant to vancomycin. *Acinetobacter* had the highest resistance to ciprofloxacin (74.3%) and the lowest resistance to colistin (8.3 %). For *Pseudomonas*, *Klebsiella* and *E. coli*, the most effective and the most resistant was to colistin and ciprofloxacin, respectively. In patients who suffered from VAP, only 4 out of 110 cases were related to the *S. aureus* which among those 3 cases were reported MRSA, so MRSA prevalence in the VAP was 3.3%. As well, MRSA prevalence in SSI was 54.4% and CLA-BSI accounted for 22.2%. In the *Enterococcus* isolates, the resistance to ampicillin and vancomycin were 57.1% and 42.9%, respectively. The resistance rate to colistin in the *Acinetobacter* was 8.3%, followed by imipenem with prevalence 42.9%. Also in *Pseudomonas* and *Klebsiella*, after colistin the minimum of the resistance was observed to imipenem, but regarding *E. coli*, followed by colistin, the least resistance was seen to aminoglycoside (Table 2). As shown in Table 3 pattern of resistance in the *E. coli* isolated of urinary tract infection (UPEC), all were susceptible to the carbapenems and only 25% were resistant to the ciprofloxacin. In VAP caused by 101 gram negative isolates, antibacterial resistance pattern showed that the least resistance was related to colistin (19.8%) and the highest was linked to t ciprofloxacin(56.9%),(Table 4). Of 20 cases which were resistant to colistin in VAP, 17, 2 and 1 of those respectively were associated with *Proteus*, *Acinetobacter* and *E.coli*. Pattern of bacterial resistance in Gram negative organisms caused Central line associated blood stream infection (CLA-BSI) and showed that the highest and lowest resistance was attributed to the Ceftriaxone and Colistin with frequency 77.8% and 11.5%, respectively (Table 5). In CLA-BSI, after colistin, the lowest resistance was observed to imipenem (38.5%), but in SSI, after colistin, the minimum of resistance was reported to piperacillin-tazobactam. Among 3 isolates of Gram negative organisms caused Central line associated blood stream infection (CLA-BSI) which were resistant to colistin, 1, 1 and 1 cases of those belonged to the *Proteus*, *Acinetobacter* and *Serratia*, respectively. Also as shown in Table 6 among 3 isolates of Gram negative organisms causing surgical site infection (SSI) which were resistant to colistin, 2 and 1 cases of those belonged to the *Proteus*, *Serratia*, respectively.

Table 1: Types of clinical samples and common bacteria in nosocomial infections

Samples types	Frequency (%)	Bacterial types	Frequency (%)
BC	46(17.6%)	E.coli	61(22.9%)
UC	23(8.8%)	Klebsiella	42(15.8%)
SC	82(31.4%)	Acinetobacter	36(13.5%)
Tc	110(41.6%)	Staphylococcus aureus	26(9.8%)

Note: BC; Blood culture, UC; Urine culture, SC; Surgical wound culture, TC; Tracheal culture

(Table 2: Pattern of resistance in isolated bacteria - is on the next page)

Table 3. Pattern of resistance in the E. coli isolated of urinary tract infection (UPEC)

Antibiotics types	Susceptibility (%)	Resistance (%)
Ciprofloxacin	75	25
Imipenem	100	0
Meropenem	100	0
Aminoglycoside	50	50

Table 4. Pattern of bacterial resistance in Gram negative organisms caused Ventilator associated pneumonia (VAP)

Antibiotics types	Susceptibility (%)	Resistance (%)
Cefipime	45.9	54.1
Aminoglycoside	67.6	32.4
Ciprofloxacin	43.1	56.9
Tazocin	68.6	31.4
Imipenem	79.4	20.6
Meropenem	63.7	36.3
Colistin	80.2	19.8
Ampisulbactam	64	36

Table 5. Pattern of bacterial resistance in Gram negative organisms caused by Central line associated blood stream infection (CLA-BSI)

Antibiotic	Susceptibility (%)	Resistance (%)
Cefipime	37	63
Aminoglycoside	44.4	55.6
Ciprofloxacin	29.1	70.9
Tazocin	51.9	48.1
Imipenem	61.5	38.5
Meropenem	57.7	42.3
Colistin	88.5	11.5
Ampicilin/sulbactam	44.4	55.6
Ceftriaxone	22.2	77.8

Table 6. Pattern of bacterial resistance in Gram negative organisms caused by SSI

Antibiotic	Susceptibility (%)	Resistance (%)
Cefipime	65.3	34.7
Aminoglycoside	71.4	28.6%
Ciprofloxacin	42.9	57.1%
Tazocin	87.6	18.4%
Imipenem	79.2	20.8%
Meropenem	67.3	32.7%
Colistin	93.9	6.1%
Ampicilin/sulbactam	67.3	32.7%
Ceftriaxone	40.8	59.2%

Table 2: Pattern of resistance in isolated bacteria

Gram (-)	Tazocin		Aminoglycoside		Cefepime		Colistin		Ampicillin/ Sulbactam	
	S	R	S	R	S	R	S	R	S	R
	<i>E. coli</i>	69.6	30.4	78.6	21.4	50	50	98.4	1.6	64.3
<i>Klebsiella</i>	73.2	26.8	53.7	46.3	53.7	46.3	100	0	56.1	43.9
<i>Acinetobacter</i>	-	-	42.9	57.1	37.1	25.7	25.7	8.3	38.9	61.1
<i>Pseudomonas</i>	73.2	26.8	46.3	53.7-	86.6	13.4	100	0	76.5	23.5

Gram (-)	Ciprofloxacin		Imipenem		Meropenem		ESBL- positive
	S	R	S	R	S	R	
	<i>E. coli</i>	25	75	76.4	23.6	53.6	
<i>Klebsiella</i>	34.1	65.9	92.6	7.4	80.5	19.5	46.3
<i>Acinetobacter</i>	25.4	74.3	57.1	42.9	51.4	48.6	-
<i>Pseudomonas</i>	57.9	42.1	92.7	7.3	80.5	19.5	46.3

Gram (+)	Ciprofloxacin		Co-trimoxazole		Vancomycin		Cefoxitine		Ampicillin		Penicillin G		A G	
	S	R	S	R	S	R	S	R	S	R	S	R	S	R
	<i>S. aureus</i>	60.9	39.1	78.3	21.7	1000	0	60.9	39.1	-	-	-	-	-
<i>Enterococcus</i>	-	-	-	-	57.1	42.9	-	-	42.9	57.1	57.1	42.9	42.9	57.1

Discussion

Based on the reports, around 75% of the burden of nosocomial infections is present in developing countries(7). Since Iran as a part of these developing countries is faced with this problem properly strategies should be developed to deal with it. In the present study the most common organism in nosocomial infection was *E.coli*, and similarly, Edrinc et al reported the most isolated organism was *E.coli* (8). But some studies have reported *Acinetobacter baumannii* as the most prevalent organism (9). Rate of resistance to antibiotics among hospital and community bacteria have augmented significantly during the previous decade(10). Some studies have revealed that antibiotic-resistant infections are related with increased morbidity and mortality in comparison with antibiotic-susceptible infections(11). In the study conducted by Cucu et al in 2014 in Hungary, resistance to ciprofloxacin was 52.2%; similarly, in our study the resistance rate in *E. coli* was 75%. In the same study resistance rate to aminoglycoside was 76.1%, but in our study, the resistance to the mentioned antibiotic was about 21%(12). In our study, the resistance rate to third generation cephalosporins was high; this finding is similar to the study carried out by Movahedian et al which indicated that *K. pneumoniae* showed the highest resistance to routine third generation Cephalosporins(13). Additionally, a study conducted by Mansury et al also showed the most resistance of *K. pneumoniae* bacteria to third generation Cephalosporins(14). Through the three past decades, ESBLs producing gram-negative Enterobacteriaceae particularly, *E. coli* and *K. pneumoniae* have created severe problems both in hospital and community acquired infections worldwide and ESBLs producing bacteria had significantly greater fatality than those with non-ESBL isolates(15). Accordingly the different studies from many part of Iran have stated that the prevalence of ESBL producing clinical isolates of *E. coli* varied between 45.2 to 67.2%(16), which confirmed our study, because the prevalence of ESBL producing *E. coli* isolates was 50% and the rate in both *Pseudomonas* and *Klebsiella* was about 46%. ESBL infections cause heavy burden on patients including; increased hospital costs, length of stay, and rate of mortality(17). Another study conducted in Qazvin showed the high prevalence of ESBL producing *E. coli* isolates, also. In *A. baumannii*, the most resistance was observed against ciprofloxacin and the most effective antibiotic was colistin. Colistin is effective against gram-negative bacilli (including *P. aeruginosa*, *E. coli*, *Klebsiella pneumoniae*) and colistin was used as therapy for nosocomial infections caused by multidrug-resistant *P. aeruginosa* and *A. baumannii* (18). The notable exception of gram-negative bacilli is the high level inherent resistance of *Proteus* species to the colistin that often are highly resistant. *Providencia* species, *Serratia*, and *Moraxella catarrhalis*, *Burkholderia* also have a similar situation. In this study, one of the reasons for higher resistance to Colistin in the VAP, is high prevalence of *Proteus* species in the VAP.(19). In *Pseudomonas*, the most effective antibiotic was colistin with susceptibility 100% and the most resistance was observed in ciprofloxacin with prevalence 53.7%. As seen in the results section, the

resistance to colistin in *Pseudomonas* was 0%, but in *A. baumannii* was 8.3%. Similar to our study no resistance was observed to *Pseudomonas* in Denmark and UK(20). A notable point in this study was the high resistance of gram-negative bacteria to ciprofloxacin, possibly because of excess prescription of antibiotics in outpatients and inpatients. While the antibiotic resistance of *S. aureus* to the same antibiotic and ceftazidime was 39.1%. In this study, gram-negative susceptibility to imipenem was more than meropenem which was indicative of lack of cross-resistance between the two antibiotics and likely because of the high consumption of meropenem in this hospital. According to a study of European countries, ICUs pneumonia was the highest nosocomial infection(21). In hospitalized patients, nosocomial pneumonia is the leading cause of morbidity and mortality. The important risk factor for the development of nosocomial pneumonia is the use of ventilator(19). Obtaining VAP might be not only be via ventilator. Health workers especially nurses have an important role in inhibiting colonization of bacteria by mechanical ventilation(22). In the present study, 3 out of 4 *S. aureus* isolates were Methicillin-resistant *S. aureus* (MRSA). Methicillin-resistant *S. aureus* isolates are seen in hospital/community acquired infections(20). Interestingly, the prevalence of MRSA in SSI was 54.6%, in fact it is a high rate. Generally, aerobic gram-positive cocci including *Staphylococcus* are predominant, and resistant organisms such as methicillin-resistant *S. aureus* (MRSA) indicates a growing percentage of these infections(23). Several studies reported *S. aureus* as the most prevalent organism (24) followed by *Pseudomonas aeruginosa*, *E. coli*, and *K. pneumoniae*(25) which results are in contrast with our results. The susceptibility pattern of SSI strains is varying owing to the increasing emergence of antibacterial resistant bacteria isolates such as MRSA causing difficulties in selecting the empirical treatment(26). In selecting the empirical regimens of VAP two points should be considered: First, the overall prevalence of MRSA in VAP related to this hospital was 3.3%, so, according to the IDSA guidelines, given that the prevalence of MRSA is less than 10 to 20 %, it is not needed to describe vancomycin or linezolid in the empirical regime, unless the patient has the risk of antimicrobial resistance(21). Secondly, to cover gram negatives, two antibiotics with anti-pseudomonas in the empirical regime for VAP should be considered. For this reason, in regard to the acquired resistance pattern, the best regime includes imipenem and colistin or aminoglycosides, and for those critically ill with VAP diagnosis, colistin should be a part of the empirical regime until determining time of antimicrobial pattern, however, in regard to the high resistance of gram negative organisms to ciprofloxacin in the VAP, in the empirical regime its use is not recommended. In the SSI, the empirical regime can include piperacillin-tazobactam for covering gram negative bacteria, although regarding the MRSA prevalence in SSI which is about 54.5%, depending on the culture and antibiogram, vancomycin should be a part of empirical regime. However, regarding *S. aureus*, no case of vancomycin resistance was seen in this study, but 42.9% of *Enterococcus* cases were resistant to vancomycin and 57.1% were resistant to Ampicillin.

So, use of linezolid appears necessary in *Enterococcus* resistant to vancomycin. Although antimicrobial resistance to imipenem and meropenem in *E. coli* were 23.6% and 46.4%, respectively, in *E. coli* isolated of CA-UTI, no case of resistance to carbapenem was observed and resistance to ciprofloxacin in *E. coli* was not isolated; CA-UTI was reported at 75% contrary to the *E. coli* isolated of CA-UTI with prevalence of 25%. Therefore, the use of carbapenems in sepsis caused by CA-UTI is effective.

Conclusion

According to the results, the main problem in this hospital is MDR Gram-negative infections rather than the staphylococcus aureus. Knowing the pattern of antimicrobial resistance from prescribing inappropriate antibiotics can be prevented and an effective step taken towards reducing microbial resistance. Also prescribing appropriate empirical antibiotics until finalized culture results and antibiotic sensitivity test, to reduce mortality and hospital infections caused by the nosocomial infections should be undertaken. In future studies, the pattern of antimicrobial resistance of nosocomial infection surveillance system to reform the health care system and surveillance on hospital infections is essential.

Acknowledgements

We would like to thank from Clinical Research Development Unit of Besat Hospital

References

1. Peleg AY, Hooper DC. Hospital-acquired infections due to gram-negative bacteria. *New England Journal of Medicine*. 2010;362:1804-13.
2. Talaat M, El-Shokry M, El-Kholy J, Ismail G, Kotb S, Hafez S, et al. National surveillance of health care-associated infections in Egypt: Developing a sustainable program in a resource-limited country. *American Journal of Infection Control*. 2016;44:1299-304.
3. Falagas M, Karageorgopoulos DE. Extended-spectrum β -lactamase-producing organisms. *Journal of Hospital Infection*. 2009;73:345-54.
4. Minhas P, Perl TM, Carroll KC, Shepard JW, Shangraw KA, Fellerman D, et al. Risk factors for positive admission surveillance cultures for methicillin-resistant *Staphylococcus aureus* and vancomycin-resistant enterococci in a neurocritical care unit. *Critical care medicine*. 2011;39:2322-9.
5. Dellit TH, Owens RC, McGowan JE, Gerding DN, Weinstein RA, Burke JP, et al. Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America guidelines for developing an institutional program to enhance antimicrobial stewardship. *Clinical infectious diseases*. 2007;44:159-77.
6. Wikler MA. Performance standards for antimicrobial susceptibility testing: Seventeenth informational supplement: Clinical and Laboratory Standards Institute; 2007.
7. Khan HA, Ahmad A, Mehboob R. Nosocomial infections and their control strategies. *Asian pacific journal of tropical biomedicine*. 2015;5:509-14.
8. Erdinc FS, Yetkin MA, Ataman Hatipoglu C, Yucel M, Karakoc AE, Cevik MA, et al. Five-year surveillance of nosocomial infections in Ankara Training and Research Hospital. *J Hosp Infect*. 2006;64:391-6. doi: 10.1016/j.jhin.2006.06.020. PubMed PMID: 16979792.
9. Pradhan NP, Bhat SM, Ghadage DP. Nosocomial infections in the medical ICU: a retrospective study highlighting their prevalence, microbiological profile and impact on ICU stay and mortality. *J Assoc Physicians India*. 2014;62:18-21. PubMed PMID: 25906516.
10. Engemann JJ, Carmeli Y, Cosgrove SE, Fowler VG, Bronstein MZ, Trivette SL, et al. Adverse clinical and economic outcomes attributable to methicillin resistance among patients with *Staphylococcus aureus* surgical site infection. *Clinical infectious diseases*. 2003;36:592-8.
11. Eliopoulos GM, Cosgrove SE, Carmeli Y. The impact of antimicrobial resistance on health and economic outcomes. *Clinical Infectious Diseases*. 2003;36:1433-7.
12. Cucu A, Nica M, Ceaușu E, Cioran N. Antimicrobial resistance profile in infectious disease hospital intensive care unit. *FARMACIA*. 2014;62:767-76.
13. Movahedian A, Moniri R, Mosayebi Z. Bacterial culture of neonatal sepsis. *Iranian Journal of Public Health*. 2006;35:84-9.
14. Mansury D, Motamedifar M, Sarvari J, Shirazi B, Khaledi A. Antibiotic susceptibility pattern and identification of extended spectrum β -lactamases (ESBLs) in clinical isolates of *Klebsiella pneumoniae* from Shiraz, Iran. *Iranian Journal of Microbiology*. 2016;8:55-61.
15. Behroozzi A, Rahbar M, Jalil V. Frequency of extended spectrum beta-lactamase (ESBLs) producing *Escherichia coli* and *Klebsiella pneumoniae* isolated from urine in an Iranian 1000-bed tertiary care hospital. *African Journal of Microbiology Research*. 2010;4:881-4.
16. Aminzadeh Z, Kashi MS, Shabani M. Bacteriuria by extended-spectrum β -lactamase-producing *Escherichia coli* and *Klebsiella pneumoniae*. *Iran J Kidney Dis*. 2008;2:197-200.
17. Ramphal R, Ambrose PG. Extended-spectrum β -lactamases and clinical outcomes: current data. *Clinical infectious diseases*. 2006;42:S164-S72.
18. Falagas ME, Kasiakou SK, Saravolatz LD. Colistin: the revival of polymyxins for the management of multidrug-resistant gram-negative bacterial infections. *Clinical infectious diseases*. 2005;40:1333-41.
19. Zavascki AP, Goldani LZ, Li J, Nation RL. Polymyxin B for the treatment of multidrug-resistant pathogens: a critical review. *Journal of antimicrobial chemotherapy*. 2007;60:1206-15.
20. Hoiby N, Frederiksen B, Pressler T. Eradication of early *Pseudomonas aeruginosa* infection. *Journal of Cystic Fibrosis*. 2005;4:49-54.
21. Kalil AC, Metersky ML, Klompas M, Muscedere J, Sweeney DA, Palmer LB, et al. Management of adults with hospital-acquired and ventilator-associated pneumonia: 2016 clinical practice guidelines by the Infectious Diseases Society of America and the American Thoracic Society. *Clinical Infectious Diseases*. 2016:ciw353. *Interventional Medicine and Applied Science*. 2016;8:147-51.

22. Mogyoródi B, Dunai E, Gál J, Iványi Z. Ventilator-associated pneumonia and the importance of education of ICU nurses on prevention – Preliminary results. *Interventional Medicine and Applied Science*. 2016;8:147-51.
23. Schaberg DR, Culver DH, Gaynes RP. Major trends in the microbial etiology of nosocomial infection. *The American journal of medicine*. 1991;91:S72-S5.
24. Ussiri E, Mkony C, Aziz M. Surgical wound infection in clean-contaminated and contaminated laparotomy wounds at Muhimbili National Hospital. *East and Central African Journal of Surgery*. 2005;10:19-23.
25. Alyousef MA, Aloqiel SA, Aldallah SD, Al-Madani SO, Al-Mosilhi AH, Samhan AM, et al. Study of bacteria isolated post operative wound infection and their antibiogram in Hafr Albatin hospitals. *RA Journal of Applied Research*. 2015;3:130-5.
26. Anderson DJ, Sexton DJ, Kanafani ZA, Auten G, Kaye KS. Severe surgical site infection in community hospitals: epidemiology, key procedures, and the changing prevalence of methicillin-resistant *Staphylococcus aureus*. *infection control and hospital epidemiology*. 2007;28:1047-53.

The Evaluation of Compliance of The Records of Nursing Care after Surgery in the Intensive Care Unit of Cardiac Surgery with Clinical Care Classification system

Masoomeh Najafi (1)

Nasrin Rassoulzadeh (2)

Maryam Rassouli (3)

(1) Department of Nursing, School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, IR Iran.

(2) Department of Nursing, Faculty member at School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, IR Iran.

(3) Pediatric Nursing Department, Faculty member at School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, IR Iran.

Corresponding Author:

Nasrin Rassoulzadeh

Faculty Member at Department of Nursing, School of Nursing and Midwifery, Tehran University of Medical Sciences

Towhid square.

Tehran. IR Iran

Postal code: 1419733171

Tel: +98 (21) 66937120 Fax: +98(21)66927171

Received: January 30, 2018; Accepted: February 10, 2018; Published: March 1, 2018. Citation: Najfi M. et al. The Evaluation of Compliance of The Records of Nursing Care after Surgery in the Intensive Care Unit of Cardiac Surgery with Clinical Care Classification system. World Family Medicine. 2018; 16(3):179-185. DOI: 10.5742/MEWFM.2018.93328

Abstract

The quality of recording nursing care, highlights the quality of care provided to the patient. The use of electronic systems is considered a suitable approach for providing safe care and reducing healthcare errors.

Objective: The aim of this study was to determine the compliance of the recorded nursing care with clinical care's classification system in the intensive care units of cardiac surgery.

Materials and Methods: This descriptive study is a type of directed content analysis based on the Clinical Care Classification (CCC) system. The research community and sample was 291 cases available in the first six months of 1393 related to the Coronary artery bypass surgery patients in selected hospitals of Tehran University of Medical Sciences and 30 observed items of nursing care for these patients. The recorded nursing reports through directed content analysis based on the CCC were analyzed and the obtained statements were adapted with the diagnosis and coding system's intervention and CCC, and the validity of this adaptation was confirmed with the Delphi method.

Result: The content analysis of the recorded nursing care in the nursing reports showed that the most frequent nursing diagnosis (26.38%) was the diagnosis related to fluid volume and most of the interventions (25.95%) were the care related to the fluid volume and (13.96%) were related to physical health. Also the overall rate of compliance of this care with the clinical care classification system was 30.11 percent.

Conclusion: The results show that because of the lack of a system of documentation based on the nursing process and also not using the standard language and clinical care classification systems, recording of the care items are facing some problems. Due to the lack of nurses' familiarity with the nursing process and not using that in the documentation of the cares the use of the CCC system for recording the nursing reports is suggested.

Key words: Documentation, ICU, Classification systems

Introduction

Today the goal of hospitals and care centers, is to improve the quality of care and treatment and one of the basic requirements in order to improve the quality of care is the permanent connection between care providers in order to share and exchange the necessary information related to the patient(1). Recording the care and the patient's response to care provided, is one of the most effective ways of communication between caregivers(2). Quality nursing documentation promotes structured, consistent and effective communication between caregivers and facilitates continuity and individuality of care and safety of patients(3, 4). Since nurses are one of the largest service providers in the health system(5), recording and reporting the care by them is of high importance. Nothing but the full and standard record shows all the work done for the patients(6). The slightest negligence in data transfer causes professional problems for nurses and medical centers(2). Despite the wide recognition of the importance of nursing documentation and efforts made to enhance it, there are inconsistencies in the definition of good nursing documentation because of variations in nursing documentation practice based on different local requirements, and documentation systems and terminologies across countries and settings. Electronic documentation systems can improve health professionals' access to more complete, accurate, legible and up-to-date patient data(7, 8). With the widespread use of information technologies in nursing practice, standardized nursing language becomes essential because a uniform and controlled vocabulary enables electronic documentation systems to aggregate data(9, 10). It is necessary to convert nursing language used in documentation into computer structures in order to reflect the work of nurses and to evaluate evidence regarding the quality and quantity of nursing care(11).

The use of electronic systems is considered a suitable approach for providing safe care and reduce healthcare error(12). One of the requirements for electronic nursing records, is the use of standard classification systems, language and terminology. Standardized nursing terminology, not only facilitates communication between health subsets but will also be helpful in the documentation and recording of hospital information systems and electronic health records. Standardized nursing classification systems include NANDA, NIC, NOC ICNP and CCC(13). One of them is CCC. The system works by linking the diagnosis, intervention and evaluation of outcomes and is based on the nursing process(14). In Iran the adaptation and usability of the system is studied by Varzeshnejad et.al (2014) in NICU and the overall rate of compliance has shown that 42.7 percent of diagnoses and nursing interventions in the CCC are complied with the providing nursing care (15).

Coronary Artery Bypass Graft Surgery(CABG) is one of the most common surgeries, which in Iran, is the cause of more than 38 percent of deaths related to coronary artery disease particularly coronary artery diseases that

requires CABG(16). Following CABG, patients need close monitoring in special care units; therefore, standard and principled caring based on the nursing process and recording the care in these patients is necessary (17, 18). Hanifi et.al (2004), reported the documenting of the quality of nursing care in ICU as poor and one of the most important causes of these problems is the lack of a standardized recording system (19). The importance and the necessity of using a computer classification system of nursing care and the necessity of using such systems in various parts of the hospitals, including ICU, should be considered and it is necessary to use computerized record to measure and evaluate the care feedback from the patients, such as heart patients (18). To use the system to record correctly, the first step is to investigate the possibility of its implementation. So this study has been done to evaluate the compliance of nursing care records after the surgery in ICU, with the CCC.

Materials and methods

This descriptive study is a type of directed content analysis based on the CCC system. CCC is one of 12 standard classification systems, which has been recognized as official (20). This system defines nursing diagnoses based on the evaluation of symptoms and following the selection of nursing diagnosis by the nurse, introduces the nursing interventions related to the selected diagnoses, and finally assesses the outcome of the intervention (14). The Persian translation of the system is done by Rassouli et al (2014) and is available for Persian users on <http://www.sabacare.com/Translations>.

Research community and samples were the cases of CABG of patients at Imam Khomeini and Shariati hospitals affiliated to Tehran University, and also the observed nursing care for these patients. Due to the nature of the research, sampling has been done through the full range of nursing records of patients with coronary artery bypass grafting in the first six months of 1393 and the recorded nursing care was obtained. A total of 291 cases were studied, and a list of nursing care in the first 24 hours after surgery was prepared. Because of the possibility that some of the recorded nursing care in patient records, was not done or the care itself was done but not recorded for some reason; a check list of the recorded care in the cases was prepared and the caring done by the nurses was re-analyzed through 30 cases of observation and was added to the prepared list (Table 1).

All documents that were recorded by nurses as clinical care, were obtained from patient records and were analyzed by the directed content analysis method. The statements that resulted from the content analysis method was compiled with the diagnosis and intervention of coding system and classification for clinical care. The content analysis steps in this study included coding, classification, finding the main cores and integrating the data. In the coding stage all of the documents that nurses had recorded in the 24 hours after CABG, was reviewed and sentences and phrases that contained the important points were marked.

Then in the observation stage, words and phrases that nurses employed at the time of delivery of the patient to colleagues were noted, and then they were coded; here is an example: The patient is a 65 year old man who entered the ICU alongside the anesthesia technician at 15:20 on a stretcher after the CABG. Then he was immediately connected to the ventilator on SIMV mode with the coordinates of TV: 800, Fio2: 70%, PS: 15, RR:12. Monitoring, cardiac rhythm is NSR. CV line of right jugular is fixed and heparin is locked. According to the CVP and diuresis patient received serum volume. The dressing of the midline of the chest was replaced. Two drains in the area of operation were fixed and the drainage was charted. The left buttock is red. The left radial arterial line set is fixed and connected to the arterial set. ABG, Na, K were sent. Secretions were suctioned. Due to high BS and diabetes background, the patient's sugars were modified each time. Foley is fixed, diuresis is established. EKG and CXR were taken and the doctor has seen them. He has high blood pressure, TNG is running. At 6 pm it is set on spont. and extubated at 8 pm. He is receiving 6-8 liters of O2 with a mask. Coughing and deep breathing training was given to the patient. PO with the fluids and tolerated it. Potassium reduction was modified. He had no fever. The medical care was administered.

According to recorded reports, the nursing diagnoses were extracted as follows: disorders in clearing the airway, electrolyte imbalance, impaired endocrine function, impaired skin integrity, changes in blood pressure. Nursing interventions extracted from the report: transmission care, ventilator care, cardiac care, intravenous catheters care, arterial catheter care, nutritional care, contact with doctors, urinary catheter care, renal care, dressing change, oxygen therapy, drainage, pharmacotherapy, health care background, blood sampling care, monitoring vital signs, diabetes care, monitoring adsorption and desorption.

In the next step, the classification code, since the framework of the study was the CCC, classes were set based on its four main classifications: 1.health behavior, 2.functional behavior, 3.Physiological behavior, 4.Psychological behavior; and the CCC was used as the component of care. In the third stage, the researchers reviewed this coding and classification of clinical care and nursing process, and extracted two main cores including nursing diagnoses and nursing interventions. To verify the compliance between nursing care and clinical care classification system, the Delphi technique was used in one round.

To this end, a questionnaire, which consisted of 76 diagnoses and 97 nursing interventions was prepared and compiled with the CCC. This compliance was done in order to examine the capability of the CCC with the current nursing reports and the possibility of using it in giving the current nursing reports. In other words, higher compliance means higher compatibility with the reporting system and the higher possibility of using the system. Experts participating in the Delphi were 15 members of the Faculty of Nursing and Midwifery of Tehran University of Medical Sciences Shahid Beheshti University of Medical Sciences and also nurses working in ICU of heart surgery.

Results

The research findings on the demographic characteristics of patients undergoing CABG showed that 75 percent of patients were male, 32 percent of patients were 50-60 year old and the length of hospital stay for most of these patients (75%) was 4-10 days. The content analysis of the recorded nursing care in the reports showed that most of the nursing diagnoses (26.38%) are the diagnoses related to the fluid volume (Table 2 - next page). Regarding the frequency of nursing interventions in the intensive care units in the patients with coronary artery bypass, the findings of the study showed that most interventions are fluid volume interventions (25.95) and physical health (13.96) (Table 3). Between the 160 diagnosis phrases related to the coronary artery bypass patients in the CCC, 76 diagnoses were identified in the intensive care units of cardiac surgery of which the compliance of nursing diagnoses were estimated as 47.5%. Between the 762 CCC interventions related to the coronary artery bypass patients, 97 interventions were identified in the intensive care units of cardiac surgery; the compliance of nursing interventions was estimated as 12.72% and the overall compliance of diagnoses and interventions were estimated as 30.11% (Table 4).

In the case of care components in ICU in CABG patients based on CCC, the findings showed that the most components are physical health components (29.15%) and fluid volume (13.50%) (Table 5).

Conclusion

In this study which was done to examine the compliance of nursing care records after the surgery in the ICU of cardiac surgery with the CCC; the findings related to the nursing diagnosis 24 hours after the coronary artery bypass patients' surgery in the ICU of cardiac surgery in the selected hospitals of Tehran University of Medical Sciences in the first half of 1393, and showed that among 76 recorded nursing diagnoses in the nursing report of these patients; the most common nursing diagnoses are those related to the fluid volume disorders and the endocrine condition disorders and also heart condition disorders. Varzeshnejad et al (2012) in their study reported that the most common nursing diagnoses in NICU is related to the infant respiratory condition which due to the differences in the parts of study, different nursing diagnoses are justified (15).

In the study of Moss and et al (2005), the most common nursing diagnosis was reported as physical evaluation of the patient and fluid volume disorders which in parts is consistent with this study (18). In the study of Toolabi et al (1390), the most common nursing diagnoses in the adults in ICUs for cardiac patients were reported as the changes in vital signs and dysrhythmia; that, in terms of the diagnoses related to the heart condition disorders, is consistent with the present study (21). During heart surgery because of administering large volumes of fluids and blood products and also bleeding, significant movement of fluid in the body takes place. Also the blood circulation outside

Table 1: Observation checklist: a checklist of recorded care in the cases was provided and the care done by nurses was observed and reviewed through 30 cases; these cases were added to the list.

Monitoring vital signs	Oxygen therapy	Drainage tube care	Intravenous catheter care	Arterial catheter care	Pace wire care	NG tube care
Respiratory Care	Dressing change	Blood collection	Finding vein	Ventilation with Ambu Bag	Ventilation with nasal tube	Incision care
Oral care and mouthwash care	Sounding	Skin Care	Disconnecting from mechanical ventilator	Paraclinical follow-up actions	Care of pressure ulcers	Nausea care
Respiratory Physiotherapy	Chest tube removal	Intramuscular injection	Suction	Nutrition	Heart Care	Check the status of consciousness
Following up the tests	Chest bottle Care	Blood and blood products transfusion	Following up observations	Ventilator Care	Care of the drainage tube	Diabetes Care
Pain Control	Medical actions	Sugar and electrolytes control	Coordination of nursing cares	Contact with the doctor	Movement Therapy	Sampling Care
Dialysis Care	Care in the Blood pressure control	Care in temperature control	Taking urine samples	Control of disposal and diuresis	Intravenous infusion Care	Blood sampling
Urinary catheter care	Acidosis and alkalosis therapeutic actions	Fluid Therapy	Therapeutic actions of agitation	Taking culture of secretions	Wound care	Renal Care

Table 2: Frequency distribution of nursing diagnoses in the intensive care units of cardiac surgery in patients with coronary artery bypass at selected hospitals in 1393

Nursing Diagnosis	Number	Percent
Condition of fluid volume, such as risk of increase in fluid volume, low fluid volume, imbalance in the electrolytes	652	26.38
Condition of endocrine system such as changes in blood sugar levels and metabolic problems, etc.	515	20.85
Heart condition, such as changes in output, cardiovascular changes, change in blood pressure, the risk of bleeding, and cardiac arrhythmias, etc.	480	19.42
Respiratory conditions such as impaired airway clearance, impaired patient independence in mechanical ventilation, impaired gas exchange, etc.	372	15.05
Sensory conditions such as pain, changes in sensory perception, changes in vision, difficulty in moving, etc.	110	4.46
Self-concept, neurological, cognitive, and compliance such as anxiety, despair, weakness, dizziness, brain changes, and lack of awareness, etc.	80	3.23
Skin conditions such as changes in skin integrity, cutting skin, and impaired mucous membranes.	75	3.03
Physical compliance, such as increased body temperature, decreased body temperature, difficulty in regulating body temperature, risk of infection and infection.	70	2.84
Activities such as fatigue, impaired physical activity, the risk of activity intolerance, activity intolerance, sleep disorder, sleep deprivation, skeletal muscular changes.	65	2.63
Tissue and peripheral blood supply	30	1.23
Urinary system	12	0.48
Safety such as risk of injury, the risk of aspiration, risk of falls, risk of violence, the injury caused by body condition during surgery, etc.	10	0.40
Total	2471	100

Table 3: Frequency distribution of nursing interventions in the intensive care units in the coronary artery bypass patients in selected hospitals in 1393

Nursing interventions	Number	Percent
Fluid volume care such as fluid therapy, dehydration control, blood transfusions, modify electrolytes, fluids adsorption and desorption measurement, venous catheter care, arterial catheter care, etc.	2401	25.95
The care related to physical compliance, examination of health background, physical examination, clinical measurements, sampling care, blood sampling care, vital signs control.	1275	13.96
Pharmacotherapy interventions such as medical care, management of medication side effects, Pharmacotherapy in problems like the fluctuation of blood pressure and body temperature and Therapeutic actions in agitation.	1203	12.95
Respiratory care such as oxygen therapy care, suctioning secretions, breathing exercises, cough and deep breath training to drain the secretions, respiratory Physiotherapy, inhalation therapy, and ventilator care.	933	10.24
Skin care such as pressure ulcer care, oral and mucous membranes care, skin damage control, wound care, care of the drainage tubes, Dressing change, Surgical incision care, etc.	824	8.89
Heart care such as pacemaker and pacemaker wire care.	645	6.96
Endocrine care, Diabetes care, etc.	546	5.97
Components of health-related behavior such as health-related communication, coordination of nursing care, contact with doctors, Physiotherapy services, respiratory Physiotherapy, etc	479	5.25
Urinary tract care, urinary catheter care, dialysis care, renal care, etc.	425	4.57
Nutritional care	185	1.99
Care related to activities such as movement therapy, sleep patterns control, care of the transmission, and muscle strength control.	146	1.77
Senses such as control of acute and chronic pain, and eye care.	95	0.1
Care for gastrointestinal system, such as nausea and vomiting care.	65	0.70
Safety care	65	0.70
Total	9287	100

Table 4: Shows the compliance of nursing care in the intensive care units of coronary artery bypass patients in selected hospitals of Tehran University of Medical Sciences with the CCC system in 1393

	Number of nursing diagnoses	The compliance percentage of nursing diagnoses	Number of nursing interventions	The compliance percentage of nursing interventions	The overall compliance percentage (Nursing diagnoses and interventions)
Intensive care units for the patients with coronary artery bypass in selected Hospitals of Tehran University of Medical Sciences	76	47.5	97	12.72	30.11
Clinical care classification System in patients with coronary artery bypass	160		762		

Table 5: Frequency distribution of care components in intensive care units in coronary artery bypass patients based on CCC system in selected hospitals in 1393

Care components	Frequency	Percent
Action	476	4.08
Digestive	85	0.72
Cardiac	645	5.53
Cognitive	10	0.08
Adaptive	66	0.56
Fluid volume	1573	13.50
Healthcare-related behavior	375	3.21
Pharmacotherapy	1444	12.39
Metabolic	400	3.43
Nutritional	185	1.58
Physical adjustment/compliance	3396	29.15
Respiration	1017	8.83
Connection between the roles	0	0
Safety	65	0.55
Self-care	5	0.04
Self-concept	5	0.04
Sensitive	100	0.85
Skin health	828	7.10
Tissues blood supply	30	0.25
Urinary excretion	945	8.11
Life cycle	0	0
Total	11650	100

of the body, due to the thinning of the blood and reduction of oncotic pressure and the release of the inflammatory mediators, causes a significant movement in the water and electrolytes in different parts of the body. The changes of water or other liquids may cause various disorders like cardiovascular, respiratory, neurological and kidney disorders during surgery and after surgery in patients, The diagnosis of disorders in the volume of fluid in the period following the surgery has an important role in treatment of the patients and prevention of complications.

Among 97 nursing interventions which were extracted from the patients' cases through content analysis 24 hours after the surgery, the most common interventions were related to monitoring the fluid volume and the physical examination and the care related to physical compliance. In the study of Moss and et al, 111 nursing interventions were identified and the most common interventions were related to monitoring of the fluid volume, which is consistent with the results of this study (18). In the study of Varzeshnejad et al, among 103 nursing interventions in the NICU, the most common interventions were those which were done following the doctor's order and was not consistent with the result of this study(15).

It seems that due to the sensitive and emergency conditions of the patients in ICU of cardiac surgery, and also based on observance of policies and standards, nurses are permitted to do a lot of interventions without a doctor's immediate order. Performing interventions and the permission to do it by the nurses is that the doctors write and sign a protocol of the section and leave some authority to the nurses for their own responsibility. For example, fluid resuscitation,

correction of electrolytes, pharmacotherapy in acidosis and alkalosis, insulin injections and other care is done based on the patient's condition and nurse's diagnosis and there is no need for the patient to be visited by the doctor all the time.

In Toolabi et al study, the most common interventions that were recorded fully were changes in the vital systems, absorbed and extracted fluids and chest pain which is consistent with the present study(21).

In the case of care components, 11,650 phrases related to the care components recorded which are much less than 274,957 care component phrases in the Moss et.al study (18). Perhaps one of the most important reasons is that in Iran the reports are recorded routinely and nursing process is not used in the recording of the care. In the study of Varzeshnejad et.al, 33,588 phrases were recorded, that according to the differences in the parts of study and also the numerous but partial care in the NICU and investigation of the cases of infants with various medical diagnoses, the difference with this study can be justified.

The most common care components in CABG patients 24 hours after surgery are those related to the physical health and fluid volume which is consistent with the study of Moss et al (18). Patients who are undergoing open heart surgery, due to high volumes of fluids and blood products, and the extent of surgery, experience a significant movement in body fluids during surgery. Also because of the nature and extent of the surgery in terms of physical health and hemodynamic balance and control of vital signs, they must be constantly reviewed (22,23).

In the study of Varzeshnejad et al in the NICU, the most common care component was related to respiratory care and pharmacotherapy; this inconsistency is due to the differences in the parts of the research (15). In the study of Toolabi et al because of the differences in the purpose of the study, no division was made based on the care components.

To determine the agreement percentage of recorded nursing care with the CCC the Delphi technique was used. The experts 92.90% agreed on the compliance correctness of the nursing diagnoses and interventions with the CCC.

Among 160 nursing diagnoses of CABG patients in the CCC, 76 phrases were extracted through the content analysis of the diagnosis and the compliance percentage of the nursing diagnoses was 47.5%. The compliance percentage of nursing interventions among 762 interventions was 97 recorded interventions which is 12.72%. The overall percentage of compliance (diagnosis and intervention) is 11.30%. In the study of Moss 79.8% of care complied with the CCC(18). In the study of Varzeshnejad this amount was 42.07% (15). It seems that not using the nursing process in recording the nursing care and also lack of a standard recording system is the reason for the low compliance.

The results of several studies in Iran show that only 17.09% of nurses had favorable nursing reports and 35.81% of them had an incomplete report. Although it is possible that manual documentation causes some errors in nursing records that may go undetected, it may have a serious effect on the quality of care. Given the importance of the nursing reports and their role in education, research, legislation, health care cost estimates; monitoring the performance of the healthcare team and estimating the quality of its services and improving its quality and particularly the great communication role of reporting, which is one of the main and effective bases in the nursing care is of high importance. According to studies the poor quality of nursing reports in Iran can be improved by launching and using a standard recording system.

The results show that the lack of a system of documentation based on the nursing process as well as not using a standard language and the CCC for recording the care, in some cases causes difficulty in providing regular care. Due to the lack of familiarity of nurses with the nursing process and its application in the documentation of care, using the CCC is suggested to record the nursing reports.

Acknowledgment:

This article is the outcome of a master's dissertation in the nursery which is approved by Tehran University of Medical Sciences. We hereby thank and appreciate all the honorable members of the nursery department of the Nursery and Midwifery Faculties of Tehran and Shahid Beheshti Universities of Medical Sciences, and Medical Records Department of the selected hospitals of Tehran University of Medical Sciences, and all people who have assisted us in doing this research.

This article is the result of a research project supported by the Research Council of Tehran University of Medical Sciences and also a master's dissertation.

Self-Evaluation of Nurses Clinical Competency based on Benner Theory

Saeedeh Elhami (1)
Maryam Ban (2)
Sajedeh Mousaviasl (1)
Atefeh Zahedi (1)

(1) Abadan School of Medical Sciences, Abadan, Iran

(2) Student research committee, Abadan School of Medical Sciences, Abadan, Iran

Corresponding author:

Maryam Ban
Abadan School of Medical Sciences,
Abadan, Iran

Received: January 30, 2018; Accepted: February 10, 2018; Published: March 1, 2018. Citation: Elhami S. et al. Self-Evaluation of Nurses Clinical Competency based on Benner Theory. World Family Medicine. 2018; 16(3):186-192. DOI: 10.5742/MEWFM.2018.93329

Abstract

Introduction and Purposes: Nurses play important roles in terms of health care. Clinical competency is one of the significant merits of nursing and its evaluation can lead to recognition of fields requiring improvement. Hence, the present study was conducted with the purpose of self-evaluation of nurses' clinical competency based on Benner theory.

Implementation Method: This study is sectional-descriptive. By census method, the clinical competency of 83 nurses was reviewed as self-evaluation in 9 different wards of a selective hospital in Abadan City. The entrance criteria was to have at least 6-month's experience and satisfaction with participating in the study. The means to gather data was a questionnaire which investigated 73 skills in 7 various fields. For each skill, the nurse at first gave themselves a score from 0 to 100, and then, he/she determined the use rate of that skill using a four rating Likert scale. The data, descriptive and inferential statistics were analyzed by SPSS software.

Results: The average of total score of nurses' clinical competency was about $82/98 \pm 11/72$ percent. Overall, the maximum total average was $86/71 \pm 11/26$ related to field of management conditions and the least total average belonged to $78/33 \pm 15/29$ related to field of quality assurance. Moreover, the results showed that nurses use 94/5 percent of practical skills related to management conditions occasionally and frequently and this rate is much more in comparison to other fields and indicates more use of skills about which nurses have more qualification.

Discussion and Conclusions: The results demonstrated that totally the level of clinical competency and use of nursing skills are desirable in the studied population. By the results of such research, the skills needing more training can be recognized and holding re-education courses can help to not only improve these skills, but also to develop the nursing clinical competency and patients' satisfaction as a whole.

Key words: Clinical Competency, Nurse, Benner's Theory

Introduction

Without sufficient and high-qualified staff, the necessary health care cannot be performed adequately and meanwhile nurses exhibit an important role in sanitary teams. During the 21st century, the role of nurses has evolved considerably. Today, they act in vast numbers of clinical places including hospitals, schools, sanitary units in society, house health care, laboratories and even business units (1). Consequently, many countries have raised nurse training in order to supply the demands of health care in society (2).

The profession of nursing is operational and contains constant care measures. This care begins with simple affairs and gradually, moves towards complex care and ultimately, terminates with comprehensive decision-making in presenting care (3). In nursing, nurses show the clinical skill and additionally, their theoretical knowledge regularly according to an identified framework (4). In a nursing career, most research and study plans are concentrated on clinical affairs (5). Competency can be observed as a necessary requisite for nursing services with high quality in clinical environments (6). The nurses' competency is an effective factor on the guarantee of care measures' quality presented for patients and their satisfaction, and it has an important role in survival of hospitals (7).

Clinical competency is used as an index to evaluate and validate the hospitals (8), and this is a thoughtful use of technical and communicational skills, knowledge clinical deduction, feelings and values (9). The World Health Organization defines qualifications as the level of utilization of knowledge, skills, ability and judgment in performing functions (10).

Evaluation of nurses' clinical competency plays a considerable role in management of the process in presenting care measures and achieving its goals. In this way, the training needs of nurses and the field requiring improvement can be recognized and we can assure provision of desirable care of patients (11). The results obtained from different research conducted in this field show that constant evaluation of nurses' clinical competency is one of the most principal responsibilities of nursing managers (12). Moreover, preserving and improving the quality level of caring for the patient and increasing the capabilities and nurses' competency are among the significant programs of nursing managers (13). In the last decade, interest in evaluating nurses' merits have evidently risen (14).

Thus, using the criteria of competency review not only helps nurses and managers become more aware and informed regarding the quality of general competency of nurses, but it also leads to specify the shortages and skill and cognitive weaknesses in them. Different research conducted in various parts of the world until now indicates that numerous methods and tools have been used to review the level of competency and clinical skills of nurses (5).

Among these, self-evaluation method, i.e. evaluating the clinical competency by nurses themselves helps them to pay attention to their own clinical functions through raising their self-awareness and commitment to change, and to make efforts to improve it. By this method and using rethinking processes, nurses will gain a deeper recognition about their own functions, and they can identify their weakness and strong points, obstacles and fields requiring improvement in their function, and in their own constant training process, undertake more activities (9). Self-evaluation can be learnt during nursing studying and career (4).

Despite so many efforts, the results of researchers in America and the Netherlands represent that between 30 and 45 percent of patients receive some cares which is not based on scientific evidence and about 20 to 25 percent of presented care is unnecessary and potentially harmful (13).

"Salonen conducted a study concerning 235 newly graduated nurses who are employed in emergency and special care wards of a hospital in Finland; in this study, he has assessed their clinical competency level from average to good level. As well, he has referred to lack of some research which evaluated the nurses' clinical competency in various wards and clinical environments (9)."

Among the surveys carried out in this field in Iran, the results of a study by Bahreini et al in 5 hospitals in Bushehr province have reported the clinical competency of nurses as undesirable in some fields including the field of training and guidance, and field of quality assurance (5). The study done by Parsa Yekta et al has reported the clinical competency as poor and average (15) and the study by Komeili Sani et al has reported it as good (13).

Nevertheless, in Iran very few studies have been conducted regarding the review of clinical competency condition of nurses and not much information is available. Hence, regarding the importance of this issue and the results of this unawareness, the surveyor carried out this study with the purpose of self-evaluation of nurses' clinical competency in Abadan City in 2017 in order to find the weakness points of nurses' clinical competency and by presenting the results to relevant practitioners, to be able to improve the nursing skills and as well, raise the quality of services given to patients through necessary planning.

Method

The present study is sectional-descriptive research that was performed with the purpose of self-evaluation of nurses' clinical Competency in Abadan City in 2017. The research population was 83 nurses employed in 9 wards of one of the hospitals selected by the faculty of medical science in Abadan; this population was chosen by census method, and their clinical competency was investigated via self-evaluation method. The criteria to enter the study was to have an associate degree of nursing or higher degree, at least 6 month's work experience in hospital sections as a nurse, and satisfaction to participate in this plan. The means

used in this research was an assessment questionnaire of nurses' clinical competency that evaluated 73 general nursing skills in 7 different fields. The competency level was determined on the basis of a rating scale of 0-100 and rate of practical use of nursing skills in a clinical environment through a Likert four-rating scale. This means was provided on the basis of a theoretical framework from beginning to professional competency by Meretoja et al and that easy applicability and high stability and justifiability are among its merits. The investigating areas include "roles and duties of contribution" (7 skills), field of "training and guidance" (16 skills), field of "recognition activities" (7 skills), field of "managerial conditions" (8 skills), field of "therapeutic interventions" (10 skills), field of "quality assurance" (6 skills), and field of "occupational and organizational tasks" (19 skills).

Nurses completed the questionnaires by self-evaluating method, as such that each nurse at first gave points to themselves for each of the 73 skills (a point from 0-100), and then determined the use rate of that skill in the relevant section according to Likert scale. Accordingly, rank zero means lack of using skill, rank one means very low use (hardly), rank 2 means occasional use, and rank 3 means frequent use of that skill. Justifiability of the mentioned questionnaire has been confirmed in research by Bahreini

et al. and its stability has been computed according to Cronbach alpha between 0/70 to 0/85 percent, while the accuracy of means translation on the basis of translation in Persian and then inverse translation and supervision of two English language specialists have been confirmed in the stated research (9). As well, internal homology of seven skills has been reported studies by Meretoja et al between 0/79 and 0/91 (16).

After coordination with the medical faculty of Abadan and taking a license from the ethical committee, the researcher returned to the hospital, and after receiving the cooperation license from the Chairman of the hospital, presented it to head-nurses of different sections. To observe the ethical principles having received the named licenses, the researcher announced the necessary explanations for studying samples, and in addition to receiving oral satisfaction from them, assured all that gathered information would be kept confidential.

Ultimately, the gathered information was analyzed by SPSS software and using different descriptive statistical indexes including percentage of frequency, average and median, standard deviation and multiple-response and as well, analytical statistical test including ANOVA test and t test was carried out.

Results

Among 83 nurses participating in the survey, 79 people (95/2%) were women and 4 people (4/8%) were men. 46 people (55/4%) were married and the rest were single, 5 people (6%) were head-nurse and 78 people (94%) were nurses. The highest type of employment included 43 employees (51/8%) and the least type included 1 contract person (1/2%). The education of 2 people (2/4%) was Master's degree in nursing and the rest 81 people (97/6%) were bachelor's degree in nursing (Table 1).

Table 1: Demographic variables

Variable	average	Standard deviation	domain
Age (year)	32/71	6/56	(23-52)
Nursing experience (year)	8/3	7/1	(1-28)
Nursing experience in present ward (year)	4/9	5/6	(0/6-28)

The results of this study showed that overall the general average of nurses' clinical competency was $82/98 \pm 11/72$. The highest general average of clinical competency was $86/71 \pm 11/26$ related to field of "managerial conditions" and the least of general average of clinical competency was $78/33 \pm 15/29$ related to field of "quality assurance". Also, the highest rate of clinical competency announced by nurses was in the field of "occupational and organizational tasks" which was reported with $98/07 \pm 1/87$ average and standard deviation by nurses of "department of pediatrics". The lowest rate of clinical competency was related to field of "therapeutic interventions" which was announced by nurses of "CCU department" with $71/80 \pm 5/92$ average and standard deviation. Clinical competency of nurses in the department of pediatrics in most of the seven fields was higher with a significant difference in comparison to other sections. As well, the general clinical competency of nurses in this section with significant difference $P= 0/04$ was reported more than the other sections.

In comparison to the skills of seven fields, the results showed that the highest rate of qualification was related to skills of "preserving facilities and equipment of nursing care in conditions ready to work" with $91/33 \pm 10/85$ average and standard deviation from field of "managerial conditions" and then "making decision based on ethical values" with $89/15 \pm 11/49$ average and standard deviation from field of "contribution tasks". The least rate of qualification was related to skills of "presenting suggestions about doing clinical research" with $71/73 \pm 21/50$ average and standard deviation from

field of “quality assurance” and the skill of “using research findings to communicate with patients” with $74/61 \pm 19/06$ average and standard deviation from field of “contribution tasks” (Tables 2,3).

Regarding rate of applying the skills of seven fields, the results indicated that about 0/6 percent of skills have never been used and 8/3 percent of skills have been hardly used and totally, the highest rate of not using skills is related to field of quality assurance with 16/7 percent. Moreover, 91/1 percent of skills are applied by nurses occasionally or frequently and the most use has been reported about field of managerial conditions with 94/5 percent. (Table 4)

In comparing the use rate of different skills in various fields in nine sections, the nurses of the pediatrics department apply 89/7 percent of skills for adults frequently and this rate has been reported more than other sections (Table 5). There was no significant relation between demographic properties of nurses and rate of clinical Competency.

Table 2: Comparison of self-evaluation average of nurses' clinical competency in general wards of a hospital covered by Medical Science Faculty in Abadan

Scope of clinical competence	Surgical	Medical	Operation Room	Obstetrics and Gynecology	Pediatrics
Roles and duties of contribution	79/84±13/06	77/51±13/77	84/06±10/94	85/42±13/86	93/57±5/83
Training and guidance	80/29±13/05	75/87±16/91	73/48±18/36	86/50±9/30	95/00±6/74
Recognition activities	80/15±15/41	79/15±14/01	80/81±11/80	90/28±10/41	95/00±7/59
Managerial conditions	84/43±12/72	82/55±7/79	88/92±12/50	89/75±12/51	95/62±5/28
Therapeutic interventions	79/27±17/62	77/30±14/63	84/28±9/37	88/80±12/07	96/33±2/58
Quality assurance	75/27±21/54	75/00±17/38	75/71±8/81	86/33±8/11	93/61±5/41
Occupational and organizational tasks	84/43±12/63	79/80±12/28	87/29±11/21	89/78±14/45	98/07±1/87
Total clinical competence	80/53±14/54	78/17±12/38	82/08±10/58	88/12±11/07	95/31±4/18

Table 3: Comparison of self-evaluation average of nurses' clinical competency in intensive and critical care wards of a hospital covered by Medical Science Faculty in Abadan

Scope of clinical competence	ICU	CCU	Emergency	Dialysis	Average	P Value
Roles and duties of contribution	90/17±7/53	75/14±6/39	82/46±6/23	78/54±17/17	81/74±12/51	p=0.050
Training and guidance	92/79±6/38	74/81±4/95	85/35±4/42	82/17±14/71	82/14±13/28	p=0.004
Recognition activities	91/96±7/20	74/71±7/67	90/93±6/65	80/17±16/24	83/67±13/17	p=0.005
Managerial conditions	94/06±4/46	76/62±4/75	93/94±5/01	83/26±14/57	86/71±11/26	p=0.001
Therapeutic interventions	91/87±6/77	71/80±5/92	87/06±7/77	81/81±14/94	83/08±13/14	p=0.002
Quality assurance	88/33±6/48	73/16±4/47	75/81±13/37	75/22±20/07	87/33±15/29	p=0.073
Occupational and organizational tasks	92/30±7/86	73/84±2/27	78/09±3/27	84/31±14/93	85/18±11/85	p=0.002
Total clinical competence	91/64±5/82	74/30±3/69	86/09±4/69	80/78±14/89	82/98±11/72	p=0.004

• The P Value and Average is generally considered for all scopes and all wards.

Table 4: Comparison of frequency percentage for practical use of nursing competency skills in different seven fields

Scope of clinical competence	never	rarely	sometimes	frequently
Roles and duties of contribution	0/7	8/8	43/5	47
Training and guidance	0/8	7/7	46/3	45/2
Recognition activities	0/2	7/4	42/7	49/7
Managerial conditions	0/9	4/5	33/4	61/1
Therapeutic interventions	0/8	8	44/8	46/4
Quality assurance	0/6	16/1	46/4	36/9
Occupational and organizational tasks	0/5	5/6	44/4	49/5
Average	0/6	8/3	43/1	48

Table 5: Comparing the frequency percentage for practical use of nursing competency skills in different wards

Ward	never	rarely	sometimes	frequently
Surgical	0/6	10/8	53/6	35
Medical	0/2	9/6	36/6	53/5
ICU	1/7	1/4	38/2	56
CCU	0/1	8/2	66/7	24/9
Operation Room	1/4	6/8	46	45/8
Emergency	1	6/8	43/2	48/9
Dialysis	0/5	11/3	46/8	41/4
Obstetrics and Gynecology	0/5	0/8	31/2	67/4
Pediatrics	0	0/7	9/6	89/7
Average	0/7	6/6	41/3	51/4

Discussion

This study was done with the purpose of self-evaluation of Nurses' clinical competency in Abadan City, and in addition to evaluating the clinical competency, use rate of different skills was reviewed by studied nurses. To evaluate the results of research better, regarding similar conducted plans, 4 levels were announced for clinical competency of nurses on the basis of the average obtained from self-evaluation scores declared by nurses. The poor level of clinical competency was determined by self-evaluating score of 0 to 24, the average level by score from 25 to 49, the good level by score of 50 to 74 and the excellent level was specified by score from 75 to 100. (11,17).

According to this ranking, the clinical competency of nurses under study is in excellent level. Frequent holding of retraining classes related to nursing field, frequent visits from wards and authorities' attention to function of nurses and available facilities and equipment required in the clinic and as well, sense of responsibility by nurses, can all be the reasons concerning this result. In a study done by Bahreini et al (5,9), study by Habib Zadeh et al (8) and research by Komeili Sani et al (13), the clinical competency of nurses has been reported at good level. In a study by Numminen et al the nursing trainers have assessed the competency of nurses as generally good and nursing managers have evaluated them rather good (17). All these are favorable with the results of the present research, whereas in a survey by Soroush et al (7), the level of nurses' clinical competency has been reported average and can be related to means and facilities existing in the section, knowledge and work experience of nurses.

In the present study, the highest total average of competency announced by nurses was related to field of "managerial conditions". However, the highest rate of competency had been reported for skills of "preserving the facilities and means of nursing care in conditions ready to work" from this field and also, the skill of "making decision based on ethical values" from field of "contribution task". In a study by Bahreini et al (5,9), the highest nurses' clinical competency has been reported in the field of managerial conditions that is in the direction of the results of the present study. As well, high competency of sample under research in mentioned skills can indicate the sense of responsibility and adherence to their ethical and belief values. In a study by Bahreini et al the skill of decision making based on ethical values was the highest skill announced by nurses (9). And in a study conducted by Numminen et al this skill has been reported among the excellent skills in evaluating the trainers and nursing managers from novice nurses (17); these results are favorable to results of this research. In research by Komeili Sani et al the highest rate of clinical competency has been reported in the field of "training and guidance" (13), and this is opposite to the results of the present research, and this can show the capability of more nurses in that study is about training the nurse and it can be due to holding more effective and many more retraining classes in this field.

The least average of total competency announced by nurses in the present study was related to field of "quality assurance" regarding the existing skills in this field, the weakness of nurses studied in decision making, guidance and coordination about therapeutic care and nursing activities are shown, and it needs more training in this regard. Moreover, regarding seven different fields, the least rate of competency was related to skills of "presenting suggestions about doing clinical research" from the same field and "use of research findings to communicate with patients" from the field of "contribution tasks". In a study by Bahreini et al the nurses declared the least rate of their clinical competency as regarding the field of "quality assurance". Moreover, the skill of "research findings' use in nursing care" related to this field had been named as the least used skill (9). In research by Meretoja et al (16), the minimum rate of competency was reported regarding the field of quality assurance. In a study by Rodgers, the nurses' competency in using research findings has been reported low (18). All three studies are favorable with the present study. The low level of competency related to skills named in the present study shows the low rate of nurses' studying regarding the new research conducted in the field of medical and nursing and their weakness is in using the results of research conducted in the clinic; this can be due to unavailability of research findings in clinic in form of training booklets, pamphlet etc and also, lack of holding retraining classes in this field. Besides doing different clinical tasks, each nurse should upgrade their own knowledge about their field in order to improve services and take care of patients, and its requisite is studying different scientific resources and becoming familiar with new findings of research. But most nurses have less time for such things thanks to compressive shifts and high work hours.

In a study by Habib Zadeh et al (8), the least rate of nurses' clinical competency is related to the field of "managerial conditions" that is in contradiction to the results of the present study. These differences can be made for various reasons and we can name internal or individual factors like knowledge and skills, job conscience and responsibility and external or environmental factors like managerial and training factors (9).

From other results obtained from the present study, we can refer to high clinical competency of nurses in the pediatric ward and ICU in comparison to nurses of other wards, and regarding the sensitivity of these wards and the need to be conversant and experienced nurses and conducting specific affairs, this issue is justifiable.

In terms of using skills by nurses of pediatric ward and obstetrics and gynecology had better conditions in comparison to other wards and the nurses of dialysis ward used the skills less.

In reviewing the relation between the level of nursing clinical competency and practical use of skills in the clinical environment, the highest rate of not using skills with 16/7 percent was related to skills in field of "quality assurance" that nurses in this field had the least level of clinical

competency. In the study of Bahreini et al (5), the results in which the least competency with the least use of the skill has been related to the field of quality assurance, and the study by Bahreini et al (9), has observed this relation in the field of training and guidance, and the results of study are along with the results of Martooja et al (16) and Jinks et al (19), and this shows that when the competency of nurses increases in different clinical skills, the possibility of its use will increase, too (9).

Conclusion

The results of the present study showed the desirability of clinical competency and rate of practical use of skills in different fields in studied nurses. However reviewing the competency via self-evaluation method can be rather effective on the results of study, but regarding the accurate and complete explanation by researcher about researchable samples and this point that the results are kept confidential and are reviewed totally, it seems that this impact is very trivial. By the results of such research, the strength and weakness points of nursing clinical skills can be recognized. Managers can use the results of research to improve the competency of nurses in fields and skills with low competency scores, and then, do proper planning regarding theoretical and practical retraining classes and in addition to improve these skills, totally increase the quality of nursing cares and privilege of hospital. While besides these trainings, it is necessary to provide instruments and equipment required to improve the function and raise the interest and job motivation of nurses.

Gratitude:

The authors of the article consider necessary to thank greatly the educational assistant of Medical science faculty of Abadan, research committee of this faculty, supervisor of Shahid Beheshti hospital in Abadan, and dear nurses who honestly cooperated in this plan. This plan was conducted with ethic code of 1395.137 approved by research council of this faculty in February and March 2017.

References

1. Sawaengdee K, Kantamaturapoj K, Seneerattanaprayul P, Putthasri W, Suphanchaimat R. Self-assessment of nursing competency among final year nursing students in Thailand: a comparison between public and private nursing institutions. *Advances in Medical Education and Practice*. 2016; 7: 475–482.
2. Martinez-Gonzalez NA, Djalali S, Tandjung R, Huber-Geismann F, Markun S, Wensing M. et al. Substitution of physicians by nurses in primary care: a systematic review and meta-analysis. *BMC Health Serv Res*. 2014; 14(1):214.
3. Hakimzadeh R, Karamdost N, Memarian R, Ghodrati A, Mirmosavi J. Assessing nursing students' clinical competency: self-assessment. *Quarterly Journal of Nursing Vision*. 2012; 1(1): 17-25. [Persian]
4. Lakanmaa RL, Suominen T, Ritmala-Castrén M, Vahlberg T, Leino-Kilpi L. Basic Competence of Intensive Care Unit Nurses: Cross-Sectional Survey Study. *BioMed Research International*. 2015; 10.1155/2015/536724.

5. Bahreini M, Moattary M, Akaberian S, Mirzaie K. Determining nurses clinical competence in hospitals of Bushehr University of Medical Sciences by self assessment method. *Iran South Med J*. 2008; 11(1): 69-75. [Persian]
6. Slåtten K, Hatlevik O, Fagerström L. Validation of a New Instrument for Self-Assessment of Nurses' Core Competencies in Palliative Care. *Nursing Research and Practice*. 2014; 615498: 1-8.
7. Soroush F, Zargham-Boroujeni A, Namnabati M. The relationship between nurses' clinical competence and burnout in neonatal intensive care units. *Iran J Nurs Midwifery Res*. 2016; 21(4): 424–429. [Persian]
8. Habibzadeh H, Ghorbanzadeh K, Khalkhali H, Mohammadpour Y. The relationship between quality of work life and clinical competency in nurses. *Journal of Ormia Nursing and Midwifery Faculty*. 2012; 10(3): 332-339. [Persian]
9. Bahreini M, Moattari M, Kave MH, Ahmadi F. Self assessment of the clinical competency of nurses in a major educational hospital of Shiraz University of Medical Sciences. *Journal of Jahrom University of Medical Sciences*. 2010; 8(1): 28-36. [Persian]
10. Hossein Abadi R, Gholami M, Biranvand Sh, Tarvedian A, Anbari Kh. Effect of Multi Mentoring Educational Method on Clinical Competence of Nursing Students. *J Med Edu Dev* 2015; 10(2): 119-128. [Persian]
11. Bahreini M, Moattari M, Kave MH, Ahmadi F. A Comparison of Nurses' Clinical Competences in Two Hospitals Affiliated to Shiraz and Boushehr Universities of Medical Sciences: A Self-Assessment. *Iranian Journal of Medical Education* 2010; 10(2): 101-109. [Persian]
12. Klein CJ. Linking competency-based assessment to successful clinical practice. *The Journal of Nursing Education*. 2006; 45(9): 379-83.
13. Komeili Sani H, Etemadi A, Boustani H, Bahreini M, Hakim AS. The relationship between nurses' clinical competency and job stress in Ahvaz university hospital, 2013. *Journal of Clinical Nursing and Midwifery*. 2015; 4(1): 39-49. [Persian]
14. Finnbakk E, Wangensteen S, Skovdahl K, Fagerström L. The Professional Nurse Self-Assessment Scale: Psychometric testing in Norwegian long term and home care contexts. *BMC Nursing*. 2015; 14(59): 1-13.
15. Parsa Yekta Z, Ramezani Badr F, Khatoni A. Nursing students viewpoints about their clinical competencies and its achievement level. *IJNR*. 2007; 1(3): 7-14. [Persian]
16. Meretoja R, Leino-Kilpi H, Kaira AM. Comparison of nurse competence in different hospital work environments. *J Nurs Manag* 2004; 12: 329-36.
14. Rogers SE. The extent of nursing research utilization in general medical and surgical wards. *J Adv Nurs*. 2000; 32: 182-93
17. Numminen O, Laine T, Isoaho H, Hupli M, Leino-Kilpi H, Meretoja P. Do educational outcomes correspond with the requirements of nursing practice: educators' and managers' assessments of novice nurses' professional competence. *Scand J Caring Sci*; 2014; 28; 812–821.
18. Rogers SE. The extent of nursing research utilization in general medical and surgical wards. *J Adv Nurs*. 2000; 32: 182-93.
19. Jinks AM, Hope P. What do nurses do? An Observational survey of the activities of nurses on acute surgical and rehabilitation wards. *J Nurs Manag*. 2000; 8(5): 273-279.

Influencing factors on the occurrence of road accidents with a special emphasis on motorcyclists in national and global research; a review of the studies conducted in Iran and the world

Mazaheri M (1)

Keshavarz mohammadi N (2)

Soori H (3)

Ramezankhani A (4)

Sohrabi vafa M (5)

Sohrabi vafa F (6)

Moradi A (7)

(1) Ph.D in health education & promotion, Dezful University of Medical Sciences, Dezful, Iran.

(2) Ph.D in health promotion, Department of Public Health, School of Public health , ShahidBeheshti University of Medical Sciences, Tehran, Iran

(3) Professor of Epidemiology, Safety Promotion and Injury Prevention Research Center, School of Public Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

(4) Ph.D in health education , Department of Public Health, Faculty of Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

(5) MSc in health education, Dezful University of Medical Sciences, Dezful, Iran.

(6) Ph.D candidates in health education & promotion, Yazd University of Medical Sciences, Yazd, Iran.

(7) MSc in health education, Shoushtar faculty of Medical Sciences, Shoushtar, Iran.

Corresponding author:

Keshavarz mohammadi N

Department of Public Health, School of Public health ,
ShahidBeheshti University of Medical Sciences,
Tehran, Iran.

Tel: +98-2122432041, Fax: +98-2122432037,

Email: n_keshavars@yahoo.com

Received: January 30, 2018; Accepted: February 10, 2018; Published: March 1, 2018. Citation: Mazaheri M. et al. Influencing factors on the occurrence of road accidents with a special emphasis on motorcyclists in national and global research; a review of the studies conducted in Iran and the world. *World Family Medicine*. 2018; 16(3):193-215. DOI: 10.5742/MEWFM.2018.93330

Abstract

Objective: Road traffic injuries are one of the major causes of death among youth who are drivers of vehicles, such as motorcycles, all over the world. Road traffic injuries are a major public health problem in Iran. Half of road traffic injuries occur among motorcyclists and the risk of occurrence of death or severe injuries among motorcyclists is 10 times more than other vehicle users. Hence, identifying factors affecting the occurrence of accidents is vital. This study aims to explore these factors as the focus of national and international research.

Method: Data were extracted from English and Persian language published articles in Iran and the world. Articles were selected from PubMed, Scopus, Elsevier, ProQuest, databases of medical sciences and also reports related to accidents by using relevant keywords. Finally, 68 articles entered the review. Data were analyzed based on objectives of the study.

Results: The focus of most studies was on individual factors, while environmental factors have received least attention. Data analysis showed that four major groups of issues related to motorcycle traffic injuries were assessed. Factors related to vehicle was explored in 22.05% of studies, environmental factors in 17.64% of studies, human factors in all studies, and factors related to laws in 58.82% of studies.

Conclusion: Although human factors including risky behaviors play an important role in the occurrence of accidents, they have roots in environmental, managerial, legal and vehicle factors. Therefore, there is a great need to explore these factors in future research and programs aiming to reduce road accidents

Key words: Motorcyclist, High risk behaviors, Injuries, Systematic review

Context

Road accident is one of the main causes of mortality due to injuries which leads to 1.2 million deaths annually and 90% of these deaths are related to the developing countries (1). It is estimated that for each of these deaths at least 20 people, totally 20-50 million, will suffer annually from non-fatal injuries (2). Of course, since non-fatal injuries are less registered, this statistic is less than the actual amount. The total amount of road traffic fatalities is 18 per 100,000 population (3). The roads will be considerably more dangerous and the probability of injuries and death for the users will be increased with the rapid increasing number of cars and two-wheel vehicles in developing countries (5).

Evidence Acquisition

Traffic accidents other than death, injuries and disabilities lead to other social, psychological, and economic consequences at the individual, family and national levels (2, 9). Injuries caused by traffic accidents lead to a great demand for health care services in the form of financial resources, occupation of hospital beds and the need for health professionals (10). Also, this problem can put pressure on the health system of the country already struggling with the limitations of their resources (3). The cost of injuries caused by road accidents is estimated at approximately 1% of Gross National Product (GNP) in low-income countries, 1.5% in middle-income countries, and 2% in high-income countries (2). Thus, traffic accidents have a significant impact on the economy of the countries, especially low or middle income countries which are often faced with other growing needs as well (3, 11).

Iran had the highest transport-related deaths in the world in 2008 and about \$ 6 billion is spent due to traffic accidents annually in the United States [8]. By approving and implementing the new law on dealing with driving offences in 2010 and 2011, the trend of fatal traffic accidents has been decreased to about 20 thousand deaths in 2012 and 17 thousand deaths in 2015. Although this reduction is pleasing, these deaths are still very high either relative to the population, or relative to the number of vehicles especially compared to the high-income countries.

Although traffic accidents have been effective in all age groups (7), road traffic injuries are the major cause of mortality worldwide among young people who are the drivers of cars or two-wheel vehicles, so that almost 60% of road traffic deaths occur in the age group of 15-44 years old (4). According to the report of the World Health Organization (WHO) in 2015, the contribution of death in road accidents has been 31% for the vehicle occupants and the remaining 19% have been divided between the uncertain users of the road (1). 49 percent of the total road traffic deaths occurred among pedestrians (22%), cyclists and tricycles (5%) and motorcyclists (23%), showing that half of these deaths or in other words a quarter of all road deaths occur among motorcyclists (1,4). Of course, this pattern is not necessarily observed in all countries. The 2015 report of WHO also indicates that the ratio of deaths of motorcyclists has largely remained unchanged since

2010 (4). Pedestrians and motorcyclists suffer the most severe injuries in vehicle accidents compared to the other road users; their medical problems are more ongoing and they need more help (7, 8).

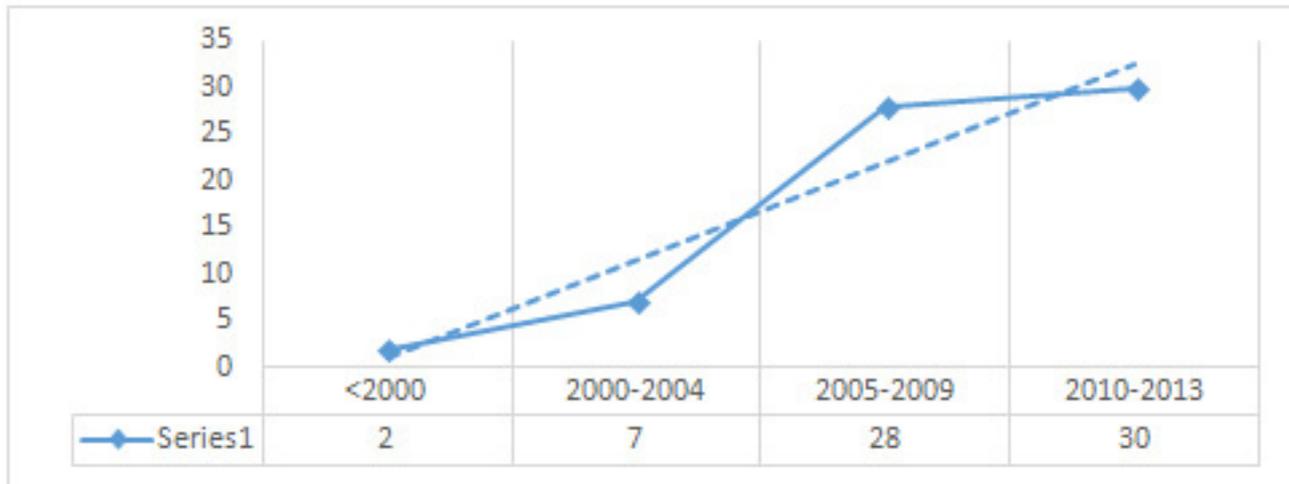
Today, the motorcycle has become a means of urban transportation and is responsible for a significant contribution of traffic movements (12). Considering the heavy traffic and slow transportation caused by the mass production of cars, motorcycle can easily pass through crowded streets or narrow passageways due to their high speed, low volume and high mobility power, and that is why, driving it is very popular among people, especially youth (12). Also they are cheaper than cars and this must be a contributing factor.

The number of and amount of use of motorcycles and bicycles for the goals of transportation and entertainment are increasing at the global level. Motorcyclists form a large part of the registered vehicles in Iran, for instance, they formed about 40% of vehicles in 2005 [8]. Motorcycle is considered the most vulnerable type of motor vehicle for several reasons. These reasons are: the shortage of protective cover, the low age of their drivers, minimum need for training, the limited conditions of driving tests and easy vehicle inspection. All of these factors may increase the rate of injuries caused by road accidents in the region (2). The studies show that the occupants of two-wheel motor vehicles are 20 times of cyclists, 8 times of pedestrians, and 9 times of vehicle occupants at risk of death (7). So it is necessary to identify the influencing factors on motorcyclists' road accidents and the severity of injuries to develop effective preventive measures (4).

In this review, only the studies published in two languages, English and Persian, were investigated. First, a wide and advanced search on all databases such as: EBSCO, Science direct, Medline, INLM, PMDR, Wiley, Cochrane, PubMed, ProQuest, Scopus, Consult, Biomed central, Elsevier, Springer, and search for the articles from internal scientific-research sites Random, SID, Magiran, IRANMEDEX, MEDLIB were conducted using the relevant keywords such as »Motorcyclist«, «Risk behavior», and «injury » in the studies of 1998 onwards. As a result of this search, 147 articles were identified and extracted. The articles which were not original research, or related, didn't have full text or valuable information and clear and adequate explanation and specific results, were excluded from the selection cycle. Finally 68 articles (14-43) on traffic accidents related to the motorcyclists' traffic accidents were separated to enter the study after excluding the repetitive articles and using the exclusion criteria. Information was extracted and entered into the pre-prepared tables. The data were then classified and analyzed quantitatively and qualitatively.

Results

Different studies have been conducted in various methods and different goals on traffic accidents of riding motorcycle which have attempted to identify the factors effective in the occurrence of accidents.

Chart 1: Timeline for conducting the studies from 1998 to 2013

Studies were categorized in 4 groups of review studies (14 studies), descriptive-analytical studies (41 Studies), qualitative and combined research (8 studies) and interventional studies (5 Studies). Summary information of these studies has been summarized in Tables 1, 2, 3 and 4.

Table 1: Classification of the reviewed studies based on the type of study

Row	Characteristic of studies	Iran studies	World studies	The total studies
1	The number of reviewed studies	3	11	14
2	The number of analytical descriptive studies	15	26	41
3	The number of qualitative and combined studies	7	1	8
4	The number of interventional studies	2	3	5
5	The total studies	27	41	68

Table 2: Summary of the review studies

Row	Author, year, country	Title	Study population/sample size	Data collection method	Results	Investigated factors affecting the accident
1	Herman et al., 2012, Auckland and New Zealand	Burden of road traffic injuries and the risk factors associated with it: a review of studies conducted during 1980-2010	Related studies - 1279 people	Documentary review: Related studies published	Road injuries were the most common cause of death) or hospitalization which was more observed among men. Head injuries was the most common cause of death or hospitalization. Two thirds of deaths had been occurred at the place of the accident or after entering the hospital. Most victims were passengers or pedestrians.	Gender, age, travel time, travel with unprotected equipment, crowd, traffic of vehicles and alcohol
2	Albalate et al., 2010, Barcelona	The severity of injuries caused by motorcycle: The role of the type of vehicle and the crowd	Barcelona 175,037 cases of the road violations	Documentary review: Data collected by the police in 2002-2008	Crowd and density of the roads reduce the severity and suffering of severe injuries, The severity and injuries caused by the motorcycles 2.3 times more than other vehicles	Gender, speed, road width, alcohol consumption, crowd and density of the roads, climate conditions

(continued)

3	Rodrigues et al., 2013, Geneva	The process of motorcycle fatal injuries in the United States in 1998-2010	17 countries of Pan American region	Documentary review: Pan American Health Organization Database (PAHO / WHO, 1998-2010)	The overall rate of death caused by the motorcycle had been from 0.8 to 1.6 per 100,000 people. The highest death rates were in Colombia with 3.6 and the lowest rate was in Chile and Ecuador with 0.2 per 100,000 people. Most deaths were observed in the age groups of 15- 24 and 25- 34 years old	Gender, age group, socio-economic characteristics of the region, income level
4	Kardamanidis et al., 2010, Australia	Training for the motorcyclists to prevent the road traffic injuries (review)	Database data	Documentary review: Cochran data of 2008 and other database data without time limitation	Most of the studies had weakness of a serious method, lack of control confounding factors, mere relying on the police' information, small size of samples and short time of follow up. Duration of training was from 3 hours to 3 days and most of the training was theoretical or practical and without evaluation.	Duration of training, type of training, the use of helmet, Traffic rules, driving experience, the amount of breaking the law, accidents, injuries and deaths
5	Roung Lin et al., 2009, America	Investigating the risk factors and patterns of motorcycle injuries	220 titles of articles	Documentary review: From Medline data	Deaths caused by the motorcycle were 34 times greater than other vehicles. Head injury leads to more death than other motor vehicles. The helmet is effective in reducing this injury. Alcohol is the major cause of fatal accidents.	Injury pattern, helmet and other safety equipment, alcohol, modifiable factors, the severity of the injuries, age group, gender, socio-economic status, Haddon Matrix, drugs, driving instruction and motorcycle riding skills, driving license, speed, risky behaviors
6	Liu et al., 2009, England	Articles	Documentary review: Databases of Cochrane, MEDLINE, EMBASE, CINAHL, TRANSP, TRIS, ITRD, IRRD, ATRI	Documentary review: Studies of databases and consultations with the researchers.	The most effective preventive measure is in the behaviors related to the accidents, structural and environmental reforms, and the interventions have the greatest impact on learning of the community members when to be done as face-to-face communication in small groups.	Type of accident, the target group, location, vehicle safety equipment, training messages, rewards for desirable behaviors, rules and regulation, environmental reforms and the products, prevention measures and their integration, geographical region, culture

(continued)

7	Lund et al., 2004, Norway	Preventing accidents. Providing a model with an emphasis on the individual, structural and cultural factors	Studies of databases	Documentary review: Studies of databases and consultations with the researchers.	The most effective preventive measure is in the behaviors related to the accidents, structural and environmental reforms, and the interventions have the greatest impact on learning of the community members when to be done as face-to-face communication in small groups.	Type of accident, the target group, location, vehicle safety equipment, training messages, rewards for desirable behaviors, rules and regulation, environmental reforms and the products, prevention measures and their integration, geographical region, culture
8	Ghorbani Birgani et al., 2012, Khuzestan	Epidemiological study of fatal traffic accidents in Khuzestan Province in 2010	7856 records of 24 cities of Khuzestan province	Existing documents all dead individuals who have been died due to the traffic accidents and have been referred to the Legal Medicine Centers.	45% of the head injuries victims and 35% of the dead individuals had been in the age range of 15-30, and the cause of death of 57% of fatal accidents was due to the passenger cars and in the suburban roads. The highest percentage of victims was the occupants of passenger cars with 46.5% and motorcyclists with 21.5%.	Age group, gender, place of residence, time of death, place of death, driver, occupant or pedestrian, type of vehicle, the injured anatomical area and the main causes of death.
9	Hashemi Nazari et al., 2011, Khuzestan	Investigating the 5-years process of deaths caused by traffic accidents in Khuzestan province (2006-2010).	Accidents-related records of Legal Medicine Centers	Documentary review: Statistics of fatal traffic accidents referred to the Legal Medicine Center of the Province in the 5-years period.	On average, 7% of deaths caused by accidents have been decreased in 2006-2010. Most of the dead individuals are drivers with 45.06%, occupants with 32.83% and pedestrians with 21.53%.	Strikes, gender, education, mortality, dead individual' status, location of accident, location of death.
10	Zokaei Alamdari et al., 2011, Urmia	An exploration of the relationship between the economic development and death caused by the road accidents in Iran	30 provinces of the country during 2005-2008	Documentary review: Legal Medicine Center, Iran Statistics Center, institute of Iran Statistics Center and statistical yearbooks of Iran transportation and terminals organization	There is an inverse U-shape relationship between the economic growth and casualties caused by the road traffic accidents. Unequal distribution of income has a positive impact on the casualties. Therefore, higher levels of the per capita income along with adopting the policies effective in reducing the accidents and eliminating the accident-prone point scan improve the situation.	Accident-prone points, economic growth, casualties caused by the road accidents, income, roads length.

(continued)

11	Hartling et al., 2004, Canada	Issuing the driving license to reduce the accidents of young drivers	16 years old individuals who were teenage driver	Documentary review: Databases, government websites as well as consulting with the experts and authors	Reduction was observed for all types of accidents among all teenage drivers. Reduction in the various programs during the first year was 31%. Rate of accidents during the prohibited hours of commuting (5 am -22) had a 17 percent reduction for the drivers with license limitation. There was also a 19 percent reduction for the prohibition of alcohol consumption.	Fatal injuries, alcohol, driving limitation at night, being admitted to the hospital, issuing the driving license, being teenage the passenger, condemnation experience, damage to property.
12	Macpherson et al., 2006, Australia	The law of the use of helmet to attract the use and prevent further injuries	Studies	Documentary review: Search in the electronic databases such as: CENTRAL, Cochrane, MEDLINE, EMBASE, TRANSPORT and government websites	In the studies on the use of helmet, some changes in the amount of head injuries and the use of helmet were observed. Significant changes were observed in reducing the head injuries in implementing the law.	The use of helmet, injuries
13	Kardamanidis et al., 2008, Australia	Training for the motorcyclists to prevent the road traffic injuries	Studies	Documentary review: From all data of Cochrane, TRANSPORT, MEDLINE, EMBASE, CINAHL, WHO, LILACS, SSCI, ERIC, ZETOC, SIGLE	Most studies had a weakness in methodology and had no method to control confounding factors and were non-random and had been used inappropriate measuring tools. The sample size was small and the time of follow up was short. Therefore, it was not able to conclude on the effectiveness of training.	Formal and informal training at different levels, driving license, training time, gender, age, experience of riding motorcycle, previous driving experiences (crime, injury), previous training, speed, alcohol / drug consumption
14	Hurst, 2011, England	An investigation of texts and exploratory analysis of deaths accidents leading to the serious injury in the motorcyclists	Studies	Documentary review: The library investigation of the studies	51% of the serious injuries and 48% of mortality were in the afternoon (12-18 pm), 55% of injuries and 72% of casualties have been occurred on rural roads, 60% of injuries and 39% of deaths at intersections, 20% of injuries and 29% of deaths in road twist, 25% of injuries and 25% of deaths due to the speed, 12% of injuries and 12% of deaths due to the overtaking, 15% of injuries and 30% of casualties due to the collision with an obstacle.	Day hours, weekend holidays, the summer, speed, good weather, dry road, motorcycle size, obstacles, intersections and road twist, motorcycle capacity, demographic characteristics, individual differences (risk taking, seeking excitement, attitude, motivation, social factors), educational, breeding, legal, and engineering initiatives

Table 3: Summary of descriptive analytic studies

Row	Author, year, country	Title	Study population/ sample size	Data collection method	Study result	Investigated factors affecting the accident
15	Teschke et al., 2012, Canada	Personality and travel features related to the use of healthy equipment by the adult injured cyclists: A cross sectional study	The adult injured cyclists (more than 19 years old) who had been hospitalized less than 24 hours in the emergency room.	Interviews with the eligible participants in relation to investigating the amount of use of the bicycle lights, the specifying clothes and helmet.	The use of bicycle lights in all trips was 20%, but on the night trips was 77%. The amount of use of colored specifying clothes was 33% and the use of helmets on trips was a total of 69%. It was 76% in Vancouver where there was the law of using the helmet, and was 59% in Toronto without law.	Travel at night, inappropriate climate conditions, weekly travels, the use of helmet, travel on long distances, the type of bicycle, the lack of use alcohol within 6 hours before travel, age, and higher income, the purpose of travel and higher education.
16	Lang ley et al., 2012, New Zealand	The effects of age, time and being teammate in the incidence of the motorcyclists' casualties in traffic accidents.	The motorcyclist and the carrier who had been injured in riding the motorcycle during 1979-2008.	Data was obtained from database of the Ministry of Health and hospitals and the injured motorcyclist and the carrier (aged 10-69) or those who had died less than 30 days after the accident or had been treated less than one day in 12 age groups.	Data was obtained from database of the Ministry of Health and hospitals and the injured motorcyclist and the carrier (aged 10-69) or those who had died less than 30 days after the accident or had been treated less than one day in 12 age groups.	Age, time, casualties, injuries
17	Ackaah et al., 2013, Mexico	The use of non-standard helmet in low-income and middle-income countries: A multi-focal study	5563 motorcyclists with helmets and the passengers and marketers and investigating the law	A survey of marketers and investigation of the law and the method of implementing it regarding non-standard helmets in nine countries China, Ghana, India, Malaysia, Mexico, Nigeria, Pakistan, Thailand and Vietnam.	The lack of the use of helmet (due to the price), while 7 of 9 countries studied had the law of prohibition of the use of non-standard helmet. Only 4 of them had the law of production and sale and only 3 of them had the law of prohibition of imports. Implementing the law was also too weak.	The lack of the use of helmet (due to the price), while 7 of 9 countries studied had the law of prohibition of the use of non-standard helmet. Only 4 of them had the law of production and sale and only 3 of them had the law of prohibition of imports. Implementing the law was also too weak.

(continued)

18	Daly et al., 2013, Australia	Studying the population based on case-control on non-fatal motorcycle accidents	Studying the population based on case-control on non-fatal motorcycle accidents	The questionnaire was completed by the motorcyclists, the observed information of the road was also collected from a location (about a kilometer), and the speed of the vehicle was estimated through these data.	The risk factors are the speed and infrastructure of the roads and have a role in the accidents, age, experience and training.	Demographic factors, medical status, the reasons for riding motorcycle, experience, training, the behaviors of riding motorcycle, speed of accidents, alcohol and drugs, type of motorcycle, security features,; engine, capacity, date of fixing and maintenance, travel factors (weather and light conditions, length and purpose). Traffic density; the presence of other riders; driving license, individual protective equipment and sight (use lights, color of clothes), road infrastructures (type of road, width, shoulder, type of intersection; curvature topography, marking line, traffic, control devices)
19	Crankson, 2006, Saudi Arabia	Damages (injuries) of motor vehicles in children: a research based on hospital data	Children under 12 years old	Medical chart of the children injured by the motor vehicles and the reasons for it were investigated. According to the medical records from 1994 to 2003, the physician' reports and data were analyzed.	Medical chart of the children injured by the motor vehicles and the reasons for it were investigated. According to the medical records from 1994 to 2003, the physician' reports and data were analyzed.	Age, gender, mechanism of injury, type of injury, management and outcome
20	Mikocka et al. 2010, Australia	Age, gender, mechanism of injury, type of injury, management and outcome	Motorcycle-related injuries: Profile and the cases of incidence of injury in unauthorized ways and routes for motorcycles (along the street – sidewalks)	Information about the major injuries and damages registered in the national legal medicine information system, NCIS database, 10 years from 2001 to 2008 was prospectively collected. This information included the patients, survivors and the dead individuals.	1157 people had been injured by the accident. The incidence of injuries was higher in unauthorized routes. (76%) of the survivors and (87.5%) of the dead individuals by the accident had occurred on unauthorized routes. 344 people had died of the accident.	Road type, weekdays, mortality, injury, age, gender

(continued)

21	Stella et al., 2002, Australia	Most of fatal head injuries caused by motorcycle accident are due to the low driving skills.	Cases of deaths caused by the accident with motorcycle	Data of database of Western Australia Coronial government and investigation of deaths related to the head injuries as well as the preliminary report of the police were used and a 2-year retrospective study was conducted from 1998 to 1999.	Young men and insecure riding behavior are the major causes of brain damage related to the motorcycle deaths, because (56.4%) died at the age range of 29-15 years old and (64.1%) died in the accident scene. (30.8%) of cases had been consumed alcohol and (28.2%) drugs. (30.8%) of cases had high speeds and (12.8%) had not been used appropriate secure equipment.	Age, gender, location, type of accident, the role of speed, ethanol or other drugs, and the use of secure equipment
22	O KyungHam, 2007, South Korea	Psychological factors associated with life span experience after unwanted serious injuries	24327 people aged 19-65 years	Secondary data were collected from NHNS.13, 200 households were randomly classified and a face-to-face interview was conducted on health behaviors and psychological characteristics.	63.9% had a history of traffic accidents. There was a statistically significant relationship between high-risk behaviors (drinking wine, the lack of use of seat-belts and driving with alcohol), limitation of daily activity, suicidal thoughts, alcohol consumption and the experience of accident. There was apposite relationship between higher age, education, income, inappropriate occupation and accident.	Age, being male, low literacy, low income, occupation (being a worker), membership in medical targeting programs, marital status, type of insurance, place of residence, accident history, cause of accident, type of injury, quality of life, alcohol consumption in driving, fasten seat belt
23	Phillips on et al., 2012, Tanzania	Information and consequences of injuries of the victims of traffic accidents to Bugando Medical Center in Tanzania	Accident victims	Data from all patients referring during (2010-2011) by selecting all age and gender groups regardless of the severity of the damage caused by the road injuries were collected using a questionnaire. The severity of injury was calculated using the Kampala injury criterion.	The mean of hospitalization was 23.5 days.3.8% had a permanent disability. The mortality rate was 17.5%. Alcohol consumption before the accident had been reported in 17.2%. Motorcycle was responsible for 58.8% of road accidents.	Age, occupation, gender, mechanism of injury, severity of injury, systolic blood pressure over 90 and head injury, scores of trauma, injured area, treatment provided, complications due to the treatment, duration of hospitalization, mortality and disability, alcohol consumption, the waiting time
24	Imran Khan et al., 2008, Pakistan	The factors associated with the use of helmets in Pakistan's Karachi motorcyclists	The motorcyclists	Through interviewing and self-reporting and investigating 300 motorcyclists randomly in three parking sessions at busy times	(56%) had used helmets to prevent the injury and have had better training than other people. There was no significant difference between two groups between the mean of age, marital status and awareness of the laws of the use of helmets.	Age, marital status, frequency of the use of helmet, the reasons for the use or lack of use, awareness of the laws of the use of helmets, income, education
25	Lower et al., 2003, Australia	Accidents caused by the motorcycles of agriculture sectioning adolescents in Western Australia	Students of Australian Colleges of Agriculture	Data were collected using a questionnaire through a targeted sampling of 326 students in 2 times in 2 weeks intervals.	48% of all students had been injured. Approximately one-third of the injured individuals were needed to the medical treatment. The most predictors were the high speed and the lack of permanent use of helmets.	Speed, the use of helmet

(continued)

26	Eric et al., 2010, USA	The role of the type of motorcycle in fatal accidents of the motorcycle	The motorcyclists	The motorcyclists who had been used 12 types of motorcycles (according to the researchers' classification) were investigated. Data of the motorcycles was obtained from R.L. Polk company during 2000 and 2003 to 2008, and data of samples was obtained from the FARS reporting system.	The deaths were 27,524 people during 2000-2008. The deaths of SUPERSPORT motorcycles were 4 times higher than other types. The reasons had been related to the risky behaviors such as speed and alcohol consumption.	Age, gender, blood alcohol concentration (BAC), driving license status, the use of helmet, the conditions of accident such as speed; motorcycle identification number, motorcycle model
27	de Rome et al., 2011, Australia	The effectiveness of motorcycle protective clothes: the results of drivers' health in 6 months after the accident	The effectiveness of motorcycle protective clothes: the results of drivers' health in 6 months after the accident	Data was collected through face-to-face interviews at home or two weeks after the accident in the hospital and investigations of the medical records during 2008-2009 for 12 months were collected. Samples were selected from two hospitals and 13 repair shops of the motorcycle. Evaluation was conducted 2 and 6 months later by post.	The injured motorcyclists who had worn protective clothes had fewer hospitalization days and less pain after the accident and less probability of disability in physical activities and generally faster complete improvement than other motorcyclists, especially when the guard covered the entire body.	Accident, severity of injury, protective clothes, demographic characteristics, 4 components of physical health (physical function, physical role, physical pain, general health), type of motorcycle, duration of hospitalization
28	Zambon et al., 2006, Sweden	Zambon et al., 2006, Sweden	The motorcyclists	Data of police' reports and hospital-based reports during 1988 to 1995 on mild and severe injuries and deaths of the motorcyclists born in 1970-1972 were collected.	1567 people had been injured and 467 people died. There was a significant difference between the incidence of injury at the age of 17 and other ages. The most difference in the injuries was observed in the socio-economic groups at the age of 17-19 years. The incidence of injury at the age of 18 in the low socio-economic class was 2.5 times greater than the high socio-economic class. Drivers with the lower socio-economic class had a greater chance for both mild and severe injuries than their counterparts at the highest socio-economic class.	Age, socio-economic class, type of motorcycle, driving license, accident history
29	de Rome et al., 2011, Australia	Motorcycle protective clothes: Protection from damage or just the weather?	The motorcyclists and carrier aged 17-70 years	Data was collected through face-to-face interviews at home or two weeks after the accident in the hospital collected. Samples were selected from two hospitals and 13 repair shops of the motorcycle. Evaluation was conducted 2 and 6 months later by post.	The motorcyclists who had been worn protective clothes such as coats, trousers and gloves at the time of accident had less probability to be injured, but there was no relationship between wearing these clothes and the risk of fractures. The amount of fracture of these coverings due to the accident was as follows: coat: 29.7, gloves: 25.7 and trousers: 28.1%.	Accident, severity of injury, protective clothes, demographic characteristics

(continued)

30	Bambach et al., 2011, Australia and New Zealand	Typology of injury caused by fatal accidents by roadside barriers	The motorcyclists	Data of website of legal medicine was used. This data was included police reports of the accident such as sketch and the report of dissection and accident situation and the type of motorcycle.	The injuries to 31 motorcyclists were reported that the area of the chest and then the head injury had the highest injury in the fatal accidents. 1462 roadside deaths had been occurred. 81% of the motorcyclists had been died at the accident scene. 97% of the motorcyclists had used helmets. The behaviors of speed and alcohol / drug consumption were identified as the common factors.	Demographic information, involved issue and the location of death, type of injury, severity of injury, the injured organ, speed, roadside accidental barriers, alcohol consumption
31	Carlos et al., 2011, USA	The risk factors related to driving and accident of the motorcyclist without a helmet	The motorcyclists	The motorcyclists who had an accident once during 13 years from 1994 to 2008 were selected and divided into two groups of with helmet and without helmet. Available data was entered into the computer and analyzed.	he motorcyclists with helmets suffer less injury. Drunken people and those without insurance and those in carrier are less likely to use helmets. The motorcyclists without helmet had the scale of severity of further injuries, less Glasgow Coma Scale (GCS), more blood pressure drop, worse results such as the severity of disability, needed more medical care and more hospitalization days.	The use of helmet, age, gender, ethnicity, insurance status, alcohol, being passenger or driver the motorcyclist, blood pressure drop, type of injury, score of the severity of the injury, score of GCS, the hospital of ICU, duration of hospitalization, hospital fees, function
32	Mayrose, 2008, USA	The impact of the mandatory law of motorcycle helmet and the injury patterns due to riding the motorcycle	Male and female motorcyclists	Mortality data was obtained from FARS reporting and (NCSA) analysis systems. The use of helmets among the motorcyclists in fatal accidents was investigated from 1995 to 2003 in all 50 states and districts of Columbia, Texas and Arkansas. The countries were divided into three groups of with a primary law, with a secondary law and without the law of helmet.	The use of helmets was 84% in the countries with the primary law of helmet, 36.2% with the secondary law of helmet, and 17.6% in the countries without law, and 57.4% in general. Changing the primary law of helmet to the secondary law in 1997 was led to decrease the use of 78.2% in 1996 to 31.7 in 2000.	Age, gender, the severity of injury, the use of helmet
33	Ankarath et al., 2002, England	Injury patterns associated with the mortality due to the motorcycle accidents	The motorcyclists	Data was retrospectively collected for all motorcycle accidents. Data of victims from January 1993 to December 1999 was collected including demographic details, the use of helmet, clinical details, injury severity score (ISS), GCS, Emergency, therapeutic interventions, rehabilitation requirements, duration of hospitalization, and mortality.	The most severe fatal injuries were head, neck and face (11.8%), skull fracture (25%) and concussion (27%) and chest injury (17.4%). 10% of the injured people had not been used the helmet. The most important variable affecting mortality was the head injury accidents. Therefore, wearing a helmet should be mandatory.	Head injury, fatal and serious injuries, demographic characteristics, helmet, severity of injury, therapeutic interventions, rehabilitation requirements, duration of hospitalization, and mortality

(continued)

34	Paulozzi et al., 2005, USA	The role of buying and selling the new motorcycles in the recent increase in the amount of deaths of the motorcyclists	Buyers of the new motorcycles	Data was retrospectively collected from the police reports of traffic accidents due to the model of motorcycles and related deaths in 30 days after the accident.	The motorcycles aged from 0 to 3 years were responsible for deaths of 33.4% in 1997 and 52.5% in 2003. The number of deaths had increased to 1495 people. When the sale of new motorcycles develops, exposure to their risks will be also increased due to inexperience.	Information about making the motorcycle, model, and model year for the motorcycle
35	Peek-As a et al., 1999, USA	The prevalence of the use of non-standard helmet and head injuries among the motorcyclists	The injured motorcyclists	The individuals were classified into 3 groups of the injured ones using standard helmet, non-standard helmet, and without helmet. The motorcyclists were observed from 29 locations. 5119 people were observed for two years.	1335 people were suffered from fatal head injuries. 375 people had non-standard helmets and 146 people were suspected to have non-standard helmets. The non-standard helmet provides little protection against the hit to the motorcyclist.	The use of standard and non-standard helmet, accident casualties, injuries
36	Kasantikul et al., 2005, Thailand	The role of alcohol in motorcycle accidents in Thailand	The motorcyclist	The research team rebuilt 12 weeks of training for the motorcyclists' accidents with the method of investigating the motorcycle accidents. Accidents were randomly sampled and were included all levels of injury severity by considering the cause of the accident, alcohol. Then, the motorcycle accidents in two alcoholic and non-alcoholic groups were prospectively compared by measuring the concentration of alcohol.	90% of accidents were due to alcohol and were frequently occurred on weekends and at night. 30% of the alcoholic riders were outpatient treated and 46% were admitted to the hospital. 11% of the consumers died in the accident that alcohol consumption was effective on 75% of those who had been died. 36.3% had been consumed alcohol before the accident.	Alcohol, weather, road type, motorcycle manufacturer, gender of the rider, time and day of the accident
37	Zulkipli et al., 2008, Malaysia	Spinal cord injury related to the motorcycle: accident feature	The injured motorcyclists	Data was obtained from the accidents reports of the royal police database MIROS during 2005-2007 and the motorcyclists' data was filtered. Then, the injured people were classified into 2 categories of spinal cord injury (experimental) and without spinal cord injury (control). Moreover, the Police Storytelling method was also used as an additional resource to describe the accident.	57.6 of the study subjects had severe injuries and 42.4 had been died of injury. There was a significant relationship between creating spinal cord injury and the situation and status of the accident and when the vehicle alone had an accident with the fixed objects.	Demographic characteristics, helmet, driving license, having a carrier, motorcycle capacity, time, day, type of road, type of vehicle, fixed roadside objects, the position of the motorcyclist
38	Magazz et al., 2006, Italy	Are the car drivers who have a motorcycle license less responsible for the accidents? A non-parametric approach	Drivers and passengers of all two-wheel vehicles	Data was obtained from the MAIDS database in 1999-2001. Samples were the injured people transferred to the emergency department. Each accident was rebuilt and analyzed by the statisticians, engineers, orthopedists and experienced motorcyclists. The same data except for the variables of describing accidents and injuries was collected for the control group.	The motorcycle drivers who have motorcycle license have less accidents as well as more control in driving than those without license which is due to the experience or the routine routes for them. The speed of motorcycles' riders is higher than other drivers (22.4 versus 13.8).	Mechanical, environmental and human variables, the location of the accidents happened, accident dynamics, mechanical characteristics of vehicles, the injury, personal, social and behavioral characteristics of drivers, driving experience with the vehicle, driving experience in general in any vehicle (year), age, vehicle speed before the accident, driving license

(continued)

39	Langley et al., 2000, New Zealand	The size of the motorcycle and the mean of the risk of fatality of motorcycle accidents	Motorcycle drivers	The motorcyclists on Auckland roads were selected in the three-year period from 1993 to 1996 (1518 people) who had been admitted to the hospital or to the emergency or had been died of accident. The control group was randomly selected from the same road, and both groups completed the questionnaire. Face to face interviews were conducted in the hospital or the relatives were asked by telephone if they were discharged.	The higher capacity of the cube of motorcycle, (250cc and above), the accidents will be also increased. There were 32 deaths of motorcyclists in the study. The use of headlights, having the carrier, and having the license also affected the accidents.	Time of accident, year of make, model and volume of the motorcycle, age, gender, low socio-economic status, speed, having the carrier, driving license, headlights, low experience
40	Gkritza, 2009, USA	Modeling the use of motorcycle helmets in the Iowa State: Evidence from 6 cases of the roadside observational studies	The drivers and carrier	An observational study of the drivers and carrier from 6 roadside locations was conducted. Then, The use of helmet by the motorcyclists and carrier was investigated and reported using a simultaneous equation model.	Road type, weather conditions and other factors affect the amount of use of motorcycle helmets and the government laws is one of the most effective methods of mandatory use of helmet. The use of helmets depends on whether conditions, caution in riding motorcycle is higher at the beginning of riding motorcycle.	Road type, weather conditions and location, the use of motorcycle helmets, government laws
41	Younesian et al., 2004, Tehran	Evaluation of the effect of the plan to intensify the punishment of the motorcyclists on the number of injured people caused by traffic accidents	Injured people caused by traffic accidents referred to the hospital	The study population was selected by census method within 1 month and data were collected by completing the questionnaire in 3 steps: 1 month before the intervention, the corresponding month of last year, and the month after the intervention. Required data were extracted from the records and were coded based on the international system of classification of diseases.	Daily mean of the injured people was increased in the first month of implementing the organizing plan and the corresponding month of the previous year, but the incidence of injuries caused by accidents as well as head and neck injuries was decreased. The results indicated that although the implementation of the organizing plan of the motorcyclists' traffic did not reduce the number of injuries, it had reduced the severe injuries and head and neck injuries by making changes in the pattern of incidence of these accidents.	Demographic characteristics, type of admission, time of referring, type of injury, location of injury, severity of brain injury, the condition of injured individual, the condition of the other party
42	Khosravi Shadmani et al., 2010, Tehran	Investigating the effect of some factors related to the person and vehicle on the status of fault in traffic	All accidents occurred in 2009	Data of all accidents occurred in 2009 were used by census method. After refinement and revision of data by the statistician and epidemiologist, the eligible samples were entered to the study and finally, 557,182 accidents were investigated by census method with the outcome of being guilty and being not guilty in accidents.	The most effective factor in the suburban axes was speed. Men had the greater chance (20.1) in urban axes and the less chance (0.5) of being guilty in the suburban axes.	Age, gender, speed, type of driving license, type of vehicle, status of fault
43	Rahmani Firouzjah et al., 2006, Babol	Sociological investigation of the causes of road accidents (Case study of Babol)	All road drivers	Data were collected through a questionnaire by 389 drivers.	Age, education, wisdom, fatalism, normative system, job satisfaction and the method to get a license, marital status, place of residence, type of vehicle and law-orientation affect the amount of accidents	Age, education, wisdom, fatalism, normative system, job satisfaction and the method to get a license, marital status, place of residence, type of vehicle and law-orientation

(continued)

44	Salmani et al., 2008, Isfahan	Investigating the factors affecting road accidents and providing strategies to reduce it	Field information of the villages of Isfahan	40 samples were selected from elites (literate, councils, and local reliable persons) of 7 villages were selected and the questionnaire was completed. Data of field survey during (1996-2006) was also used.	Human factors have played the most role with 54% that high speed, hurry up to arrive at the destination, failure to observe traffic laws, being sleepy drivers, illegal overtaking and the far distance and fatigue caused by it have played more role than other factors. Management factors 34% and natural factors 12% are other effective factors.	Human factors, management factors, natural factors, vehicle factors
45	Pak Gohar et al., 2007, Tehran	Investigating the causes and factors effective in reducing the accidents using regression models	Road accidents occurred in 2006	Road accidents occurred in 2006	The dead individuals were about 75 people a day and 64.5% of the accidents have been due to the lack of attention to the regulation. The contribution of human factors was 49%, vehicle 15%, and road 36%.	Human factors, road factors, vehicle factors
46	Farahmand et al., 2009, Tehran	Investigating the security status of the motorcyclists in the cities of Arsanjan, Eghlid, Kazeroon and Neyriz	the motorcyclist	1286 cases were systematically selected from the motorcyclists at crowded points of Mojri city and information was obtained through observation, interviews and completing the questionnaires.	92.1% did not have helmet, 35% had helmet, but only 4.6% were used it regularly. The reasons for the lack of use: inconvenience and heaviness 7.5%, embarrassment: 8.2%, forgetfulness: 6.8%, lack of hearing: 1.2%. Moreover, more than 70% of the motorcyclists believed that the use of helmets should be mandatory.	Demographic characteristics, the status of awareness and attitude of the motorcyclists of the benefits of using helmets, security behaviors including the registered plaques, carrying the huge burden with the motorcycle, carrying two or more people with the motorcycle, having driving license, incidence of accident, the reason for accident, incidence of injury and type of injury to the motorcyclist
47	Baghiani Moghadam et al., 2006, Yazd	Investigating the character and status type of accident in the injured motorcyclists	the injured motorcyclists	Data were obtained from direct referring to the injured motorcyclists (305 people) through the list of police stations randomly and using the questionnaire.	74% of the motorcyclists had an A-type character and 26% had B-type character. 72.7% of the samples of type A did not observe the traffic laws and stated that the cause of accident has been the barrier.	Character type, demographic characteristics, performing insecure behaviors and inappropriate environmental and equipment conditions, time of accident
48	Alizadeh Aghdam et al., 2010, Tabriz	Drivers' cultural lifestyle, a tool to explain their traffic behavior	Urban drivers	The data collection tool was a questionnaire. 400 samples were selected by stratified random sampling from the drivers' gathering centers and completed the questionnaire.	The lowest mean of observing traffic behaviors was related to the illiterates and the highest was related to those who have academic education. The number of accidents is reduced with increasing the cultural capital of drivers which is the best way to reduce dangerous traffic violations.	The number of accidents is reduced with increasing the cultural capital of drivers which is the best way to reduce dangerous traffic violations.

(continued)

49	Khalaji et al., 2006, Qazvin	Risk factors of occurring the injuries caused by traffic accidents in road drivers of Qazvin, Lushan, 2005	drivers	Data was obtained from the interviews with the cases that were the drivers of all motor vehicles and had a traffic accident reported to the police station on the road during the period of conducting the study in the hospital and witnesses in the police station as well as using the reports of the police station.	The relationship between these cases and the occurrence of injury was showed in the analysis with multiple logistic model: the use of safety tools, thrown out of the vehicle, severe accident, and more accident of the motorcycle than the automobile, unfavorable weather conditions, the interaction of the severity of accident and weather conditions. The motorcyclists' riders had the risk of occurrence of injury 5.5 times higher than truck drivers and 7.03 times of automobile drivers.	The relationship between these cases and the occurrence of injury was showed in the analysis with multiple logistic model: the use of safety tools, thrown out of the vehicle, severe accident, and more accident of the motorcycle than the automobile, unfavorable weather conditions, the interaction of the severity of accident and weather conditions. The motorcyclists' riders had the risk of occurrence of injury 5.5 times higher than truck drivers and 7.03 times of automobile drivers.
50	Rasekh et al., 2008, Khuzestan	The study of mortality due to the incidence of unintentional injuries and accidents in Khuzestan province in 2001-2005	All dead individuals during 2001-2005 with the cause of unintentional accidents and incidents	Data of the causes of mortality due to the unintentional accidents according to the age and gender among all registered dead people were collected from information of legal medicine center and calculation of the amount of deaths.	The first three fatal accidents of all the study years were: 1- traffic accidents 2- burning with flames and fire smoke and 3- drowning in water. The mean of lost years of life has been 11.08 during 5 years that this percentage in men has been always higher than in women. The deaths from traffic accidents have had a growth of 11% in the 5 years of study.	Gender, city of birth, date of death, city of death, age at death, place of death, marital status, the source of diagnosis and the cause of death
51	Hatami et al., 2011, Karaj	Comparison of the character features of the drivers causing accident and normal drivers (a case study of Karaj city)	Comparison of the character features of the drivers causing accident and normal drivers (a case study of Karaj city)	Criterion group was the ordinary drivers and peer group was drivers causing accident. Karaj taxi was randomly selected from 20 taxi services and terminals with multi-stage cluster sampling method and the character features of the two groups of 35 people were measured by the NEOPI-R test.	The more age of people and driving experience, less causing-accident driving occur. Neuroticism and extraversion indicators in drivers causing accident and the indicators of being flexible, agreement and being conscientious in drivers of do not cause accident gained significantly higher scores.	Previous educational backgrounds of skill and character features of causing accident
52	Bahari et al., 2009, Roodehen	The relationship between the character features and attachment styles and risk-seeking youth	students	120 male and female students were selected and different questionnaires were used to measure the character features and attachment styles and risk-seeking.	Character features, attachment styles, gender and place of residence explain a total of 24% of the variance of risk-seeking students. The variables: gender, age and pleasantness have a significant predictive effect on the level of risk-seeking.	Age, gender, character features, attachment styles, place of residence, pleasantness
53	Haghshenas et al., 2008, Shiraz	The relationship between character features and driving behavior in Shiraz City (2005)	drivers	537 male and female drivers completed the Manchester driving behavior and NEO FFI questionnaires. Through sampling in the vehicle tag change agency and central specialized clinic Center.	There is a direct relationship between the amount of anger and the amount of types of errors and performing violent illegal acts and there is an inverse relationship between the amount of agreement and extraversion and the amount of types of errors and performing illegal acts	Age, gender, years of formal education, job status, years of driving experience, intentional and unintentional hazardous errors, violent and nonviolent illegal acts

(continued)

54	Hajlu et al., 2012, Ardabil	Predicting the driving behavior based on character features and sensation seeking	drivers	160 drivers of the drivers' gathering centers completed the Manchester driving behavior and NEO FFI questionnaires and Zuckerman sensation seeking scale with available sampling method.	There was a significant relationship between the age and number of accidents and driving behavior. Character features of neuroticism, agreement, sense of duty, and sensation seeking were predicted driving behavior. The mean of intentional violations in the motorcyclists was higher than other drivers.	Demographic characteristics, personality factors, the type of behavior and the amount of risk of that behavior for others, the individual' tendency for hazardous activities
55	Hefng et al., 2012, United Arab Emirates	Motorcycle-related injuries in the United Arab Emirates	The injured and hospitalized motorcyclists	The data were collected from hospitals during the 4 years (2003-2007). 95% of the injured motorcyclists were investigated.	The most injury (54%) was to the upper limb, then the lower limbs with 48%, the head with 41%, and the face with 30%. Mortality was 6%. The young motorcyclists and accidents related to the accident of motorcycle with automobile and being native the motorcyclist had the most prevalence in accidents.	Being native, risk-taking, type of stroke, time of incident, demographic characteristics

Table 4: Summary of qualitative and combined studies

Row	Author, year, country	Title	Study population	Type of study	Data collection method	The factors affecting the accident (Obtained themes)
56	Shams et al., 2010, Tehran	Tehran taxi drivers' views on hazardous driving behaviors: a qualitative study	Taxi drivers	qualitative	Selection of districts 4 and 6 of Tehran, 42 taxi drivers were divided into four groups and was were collected through a focused group discussion.	The best channels to communicate with taxi drivers and encourage them to modify hazardous driving behaviors is to use the behavioral interventions based on comments of audience. The use of encouraging messages to increase the drivers' attention to driving can be helpful (from the perspective of the drivers).
57	Zamani, Alavijeh et al., 2010, Tehran	Risk-taking behaviors in motorcyclists in the Middle East	Motorcyclist, carrier, police	qualitative	32 motorcyclists were selected through the available sampling method and data were collected using data collection methods of focused group (7 sessions), deep interview (29 people) and field observation.	Being young and single, poverty, poor physical health and stress affect the risk-taking behaviors. The lack of laws, access of adolescents without license to a motorcycle, the cost of effectiveness of motorcycle in transportation, insecure roads and the lack of special routes and reckless drivers of cars and trucks are the enabling factors of high-risk behaviors. Enjoy motorcycle riding and the lack of punishment for disobedience of the law intensify the high-risk behaviors.
58	Watson et al., 2007, Australia	Psychological and social factors affecting the intent and behavior of motorcyclists	Psychological and social factors affecting the intent and behavior of motorcyclists	combined	Data were obtained from the perceptions of 43 motorcyclists using a focused group method and a quantitative study (229 people) based on a self-report survey.	In the qualitative section, the themes: 1- skillful control of motorcycle 2- having a high level of focus 3- observing the road rules 4- heckler (includes any behavior that reduces consciousness and concentration) 5- ignoring the individual restrictions 6- high speeds were obtained. In the quantitative section: the perceived behavioral control structure was predicted the intention of be safe and attitude of intention of danger. The structure of subjective norms was a relatively poor predictor of behavior. Sensation seeking along with the violence of the motorcyclist were specified as a strong predictor of all 6 behaviors.
59	Zamani, Alavijeh et al., 2007, Tehran	Motives to use motorcycles in the motorcyclists with high-risk behaviors (A qualitative study)	Motorcyclist, carrier, police	qualitative	Target-based sampling was used with maximum diversity. Data were obtained from field observation and the registration of the behavior of 34 motorcyclists during driving, reports and information of the records existing in the police station and deep interview with 22 motorcyclists, carrier and police.	The four main themes were abstracted to describe the motivations of riding motorcycle including: the use of quick and easy vehicle in traffic, job necessity, meet the emotional needs, ease in committing crime and escaping from the law

(continued)

60	Zamani, Alavijeh et al., 2007, Tehran	Causes of high-risk behaviors in the motorcyclists: A qualitative study	Motorcyclist, carrier, police, existing records	qualitative	The integrated data were obtained from field observation and the registration of the behavior of 32 motorcyclists at different times and places, investigating the existing records in the police station and 13 deep interviews and 2 focused group discussions.	Causes of hazardous behaviors were classified into 5 main themes of the individual factors, socio-cultural factors, motorcycle status, abuse of security equipment and environmental factors.
61	Zamani, Alavijeh et al., 2007, Tehran	Motorcyclists' experience of hazardous behaviors: A qualitative study	Accident record of the motorcyclists	qualitative	Using the target-based sampling with maximum diversity and at different places through deep interviews (61 people) and field observation and the registration of the behavior of 34 motorcyclists	Motorcyclists' behaviors are two categories: 1- unintentional behaviors (errors) due to the ability and experience and insufficient concentration while driving 2- intentional behaviors (violations) such as driving without paying attention to the health of the motorcycle and its parts, unauthorized use, the lack of use security equipment, dramatic movements, carrying a passenger or carrier at the front of the motorcycle, carrying huge and heavy burdens, failure to observing traffic regulations.
62	Arasteh et al., 2010, Tehran	The role of optimal interaction between the constabulary and education in promoting the culture of traffic order and security of the country	Experts of traffic and educational issues	combined	Quantitative and qualitative methods (content analysis) were used. The current status of the traffic doctrine was investigated in the textbooks. There was snowball sampling method and data collection methods were interviews, content analysis of documents and questionnaires.	Traffic contents do not have logical connection and technical errors in text and images are scattered. In addition to the limited size of the contents, combining theoretical traffic trainings with practical training and practice in the street has not been predicted. Due to being specialized the traffic issues, it is not clear whether the educators have the ability to teach it or not? All software, hardware, structural, theoretical training and practical training factors affect the interaction between the constabulary and education to promote the culture of traffic order and security. Achieving each of the three knowledge, emotional and behavioral dimensions of traffic culture was emphasized by the above factors.
63	Zamani, Alavijeh et al., 2011, Tehran	Frequency and predictors of the use of helmet among the Iranian motorcyclists: A quantitative and qualitative	drivers	combined	A hybrid approach was used including deep interviews (29 people) with motorcyclists and carrier and focused group and then a cross-sectional study was conducted with a dedicated observation of the use of helmets while riding motorcycle.	10% of the motorcyclists were used standard helmets and 23% non-standard helmets. The themes achieved were categorized into three categories: 1- properties of helmet 2- social and cultural factors 3- individual and physiological factors.

Table 5: Summary of the interventional studies

Row	Author, year, country	Title	Study population	Type of study	Data collection method	Description of the intervention	Amount of success of interventions
64	Woratanarat et al., 2013, Thailand	The program of healthy riding motorcycle and injuries related to the motorcycle in Thailand	motorcyclists	Interventional	Before and after training, information was collected through postal questionnaires. Moreover, 257 records of accidents caused by motorcycle were retrieved for analysis.	The intervention was included a multidisciplinary training course consisting of: 15 minutes of security recommendations before delivering the motorcycle for the new buyers, training 2 hours a day for students and in general, motorcyclists (including traffic rules, repair and maintaining the motorcycle, techniques for riding motorcycle, secure riding and understand the risk using the simulator), 100 hours of playing movie for practical demonstration of skills including setup, move and control of motorcycles, gear shift, right and quick brake, discussion about the road twist, race on the twisted road with barrier, narrow roads, intersections, bridges, and transportation of the passenger and keeping balance, a 15-hour license course for students and drivers and a 30-hour course for instructors and salespersons, and after completing these steps, the license was issued automatically. The control group was matched one by one in terms of training groups of district and the date of getting license.	Age and gender (male) were significantly related to the accidents caused by motorcycle and every one year of changing the age was led to a 2% reduction in the risk of the motorcyclist accident. The trained individuals had been 30% less injured and in general, the training course had been reduced the risk by 29%. The prevalence of motorcycle-related injuries was 21.8% before training and 10.3% after training. There has been improvement in understanding the secure behavior in riding motorcycle in most people in the training group (93.5%) and they were felt more confidence in riding motorcycle (96.9%).
65	Souri et al., 2010, Tehran	The role of police assistants in the amount of traffic violations and accidents in the country	students	Interventional	The study samples were 2800 students aged 8 to 15 years old in six education districts of Tehran. The samples were selected by multi-stage cluster sampling. The intervention was the police assistant plan. Information was collected from police reports.	Police assistants were included four groups of first assistant (pre-school students), first grade elementary (second assistant), second and third grade elementary students (third assistant), fourth and fifth grade elementary students (police assistant) and first grade guidance students. 47.7% of the assistants were boys and the rest were girls. Do not fasten seatbelts (39.1%), talking with cell phone (31.8), and non-authorized speed (29.8) were three major violations which were more reminded by the police assistants. Violations and accidents registered were collected from traffic police information systems in the last six months.	The amount of violation was reduced to 17.9% in the year after the intervention. The most cases of violation reduction was related to eating and drinking while driving (92.7%). Reduction was observed in all cases of trained except talking with cell phone while driving which had been increased.
66	Swadd-iwudhipong et al., 1998, Thailand	The effect of training motorcyclists on changing high-risk behaviors and injuries caused by motorcycle accident	Village people in two control and experimental groups	Interventional	A community-based program for training motorcyclists was randomly implemented in three villages. Then, the program was followed up for 2 years until 1997.	Community-based training programs (training the cases related to the motorcycle injuries and epidemiology of accidents, the benefits of helmet, the risks of insecure riding motorcycle, traffic signs and rules) were presented and interviews with the motorcyclists in 16 villages about the effects of training programs were done by the health education specialist and physician, hospital and police reports were collected and training was conducted through mass media.	The amount of injuries was significantly decreased in the intervention areas compared to the control (6.4%). Although the amount of mortality had been decreased, was not significant (0.4). The amount of use of helmet and getting license was increased 25.5% and 23.2%, respectively in the intervention group.

(continued)

67	Mehri et al., 2011, Yazd	The effect of training based on the theory of planned behavior on the amount of use of helmets in the motorcyclist staff	Motorcyclist staff of the offices in Yazd	Interventional	The questionnaire designed based on the theory of planned behavior by interview with 120 people was completed, educational content was compiled and was presented to the experimental group (60 people).	The training program was developed and presented to the experimental group according to the results of the questionnaire. Training program was presented for 10 days using lectures and question and answer (a 45-minute session), face to face training (at least 5 minutes for poster), and training aid materials including posters and pamphlets. The control group received no training program. Data were collected again one month after implementing training program to minimize the effects of environmental conditions.	The most important barrier to use helmet (86.6) is the feeling of heat when use. Abstract norms and attitudes (59%) were predicted the intention of use of helmets and the direct effect of control perceived behaviors was more than other variable. Implementing the training program was effective on all variables of the pattern and was effective on the intention of use of helmets more than all.
68	Baldi et al., 2005, Colombia	Identifying the best practice for training and issuing license for the motorcyclists	the motorcyclists	Interventional	First, published documents, internet websites, government programs and comments of the government managers of motorcycle security were used to confirm the registered data and several variable were investigated in this data. Then the intended model was designed and validate.	According to the studies conducted, the best model was designed for issuing license which was the best model to help the health of the motorcyclists, policymakers and researchers from the perspective of the authors in order to identify the factors contribute to high-quality training for the motorcyclists and issue the license. The criterion for evaluating the validity of the proposed model was to reduce the mortality of motorcyclists. To evaluate the validity of the model, four variables were used: the criterion for the best practice, trips of the vehicle to miles, the number of registered motorcycles and the number of registered licenses for the motorcycle operator.	There was a negative relationship between proposing the model and the mortality of motorcyclists. The lowest mortality rate of the motorcyclists was observed by proposing this model. Due to the increase in motorcycle accidents, it is very important to investigate the defects of program using the experiences of other countries and to use efficient and cost effective strategies to apply the best practice in training motorcyclist and issuing the license.

From 41 studies in the world, the frequency of Australia was identified with 10 cases of study, America with 7 cases, Thailand and England each with 3 cases, Canada and New Zealand each with 2 cases, and other each with 1 case, respectively. The number of studies conducted in Iran was 27

cases that about half of them, had been conducted in Tehran. The information about the type of studies is shown in Table 6.

In terms of the factors studied, the studies were divided into four categories as table 7 shows.

Table 6: Classification of studies based on the type of factors studied

Row	Characteristics of studies	Iran studies	World studies	Total studies
1	Investigation of human factors associated with traffic accidents of motorcyclists	27	41	68
2	Investigation of environmental factors associated with traffic accidents of motorcyclists	6	7	13
3	Investigation of environmental factors associated with traffic accidents of motorcyclists	7	8	15
4	Investigation of environmental factors associated with traffic accidents of motorcyclists	15	22	37

Each of the above mentioned factors includes sub-components that show the type of effective factor better and in more detail. These sub-components are classified in Table 11 to better understand their effect on occurrence of the accident:

Conclusion

Unfortunately, the motorcyclists are a group that has been relatively neglected in research as less than a third of all identified studies have focused on accidents in motorcyclists. Among these, few studies have contributed to better understanding of the strategies to reduce their risk or have properly evaluated an Intervention to reduce their risk.

However, in general, these reviews showed that severity of injuries caused by motorcycle was higher than other

vehicles, men are at more risk of traffic accidents than women, most deaths were observed in the age group of 25-5 years old, and lower economic status. In addition, half of the road injuries had happened between 12 AM-18 PM and the Review studies showed that the most effective preventive measure in accident-related behaviors had been structural and environmental reform, while training can have a very positive effect on the reduction of accidents done by face-to-face communication in small groups.

Table 7: Classification of the studied factors in the studies

Factors	Sub-components
Human	1-The amount of crime and its types in relation to the motorcyclists 2-riding motorcycle training 3- the lack of concentration 4- sensation seeking 5- risk-taking 6- to race 7- bragging 8- reported culprit 9- motivation of the use of motorcycle 10- understanding the risk of riding motorcycle 11- history of causing accidents 12- motorcycle ownership 13- ownership of motorcycle license 14- type of injury / death 15- characteristics of the pedestrian involved in the accident 16- number, gender and age of the motorcyclists 17- alcohol or drugs consumption 18- secure behaviors of riding motorcycle 19- talking on cell phone 20- unauthorized overtaking 21- carrying heavy burden 22- riding motorcycle on the sidewalk 23- insufficient experience 24- attitude of the motorcyclist 25- time of getting license 26- economic status of the motorcyclist 27- health status of the motorcyclist 28- character type of the motorcyclist 29-enjoying riding motorcycle 30- reaction time of the motorcyclist 31- having hurry while riding motorcycle 32-fatigue while riding motorcycle 33-knowledge and attitude of the motorcyclist 34- accident-related behaviors
Legal	1-motorcyclists-related rules 2-how to give the license 3- violation and avoidance of the police 4- the amount of arresting motorcycle 5- escaping from the law
Vehicle	1-technical problem 2-the amount of types of motorcycle 3- characteristics of the motorcycle causing accident 4- rate of speed of the vehicle 5-having secure equipment
Environmental	1-the sudden accident with the obstacle (the existence of bump) 2-bad weather 3-slippery road 4- the general condition of roads and streets 5-the darkness of air 6- other drivers 7- not seen 8- road crowdedness 9-a separate route for riding motorcycle

As reported by the World Health Organization (2, 3), the factors affecting the incidence of accidents include human, environmental, vehicle and legal aspects. Review of 41 descriptive-analytic studies (15-30, 57-81) indicated that several factors had significant and meaningful relationship with higher risk of accidents among motorcyclists. These factors include individual factors such as age group, speed and weak road infrastructure, low driving experience, inadequate training, risky driving behavior especially unauthorized overtaking, alcohol consumption, low education, low socio-economic status, marital status, faulty motorcycles, lack of driving license, risk taking personalities and character type, not obeying the traffic rules, being sleepy or tired, and environmental factors such as weekend holidays and especially nights, natural factors such as light, inappropriate weather conditions, driving culture. It can be said that almost all explored papers in this review have studied to different degrees, human factors. Human factors have been the most effective factor in the incidence of accidents (17, 18). After human factors, legal factors and then vehicle and finally the environmental factors were studied in reviewed papers with less frequency.

Investigation of 8 qualitative and combined studies (31-37) showed that being young and single, poverty, poor physical health, stress, the lack of laws, access of adolescents without license to the motorcycle, insecure roads and the lack of special routes and reckless drivers of cars and trucks, enjoying motorcycle riding and the lack of punishment for disobedience of the law affected the risk-taking behaviors.

Also, the causes of hazardous behaviors were classified into 5 main themes of the individual factors such as not using security equipment, socio-cultural factors, motorcycle status, and environmental factors. According to the drivers' views, the use of behavioral interventions based on audience comments is the best way to modify hazardous driving behaviors. It can be said that these studies have considered high-risk behaviors and identifying

these behaviors can be very helpful in this regard due to the goal of health education which is changing behavior, because extensive analysis of behavior is conducted to provide a general image of the current patterns and trends of driver behavior, and the interventions are also determined and designed by considering four key areas of behavior including: formation and creation of behavior, maintain and strengthen and control behavior based on ethical principles (43).

Reviewing 5 interventional studies (38-42) showed different success rates. For instance, the success amount of these studies in reducing the risk of accident after training was obtained at 30%, reducing violations 17.9%, reducing the amount of injuries 6.4%, reducing the amount of death 0.4%, increasing the amount of use of helmet 25.5%, and increasing getting license 23.2%. It was reported that some modifiable risk factors of motorcycle accidents and their severity can be reduced. For example, it was reported that training can improve understanding of secure driving behavior, feeling of confidence, motivation to get driving license, and behaviors such as use of security equipment, obeying traffic rules, and finally reduce injuries and mortality caused by motorcycle accidents.

This review provides a long list of different type of influencing factors on motorcycle accidents and their severity. But it doesn't indicate which factor is more important. Future research and programs should take into account the identified influencing factors on motorcycle accidents and their severity as mentioned above. Considering that in different countries and even different cities in one country, the role of each factor might differ, it is suggested that before any interventions, the most important influencing factors in that social context is explored and then interventions are targeted addressing those factors. This approach will increase the chance and rate of success in reducing the accidents and their severity. This review also reveals that shortages and gaps in road traffic accidents among motorcyclists. There is a great need for more comprehensive interventional studies

which include different types of influencing factors and not just individual factors helping to identify best practices for reducing motorcyclist accidents.

However, generalizing findings and suggestions of this review should be considered in light of its limitations. This study was not completely systematic, it was not possible to compile the results as they had used different tools, focused on different factors, and implemented different strategies.

Acknowledgment: We wish to express our sincere gratitude to all those who assisted us to conduct this study, especially the esteemed deputy of research and technology of University of Medical Sciences and esteemed experts of that field. Moreover, the ethics code is (IR.10 (66000505)1394/08/231394/08/26).

References

1. World Health Organization. Road safety- Speed. Translated by: Ministry of Health and Medical Education, Department of Communicable Diseases Center. 1st Edition, Seda: Tehran. 2004[Persian].
2. World Health Organization. World report on road traffic injury prevention. Translated by: Soori H, translators of the Shahid Beheshti University of Medical Sciences. Safety Promotion and Injury Prevention Research Center 1st Edition, Roonans: Tehran. 2011[Persian].
3. Violence WHO, Prevention I, Organization WH. Global status report on road safety 2013: supporting a decade of action: World Health Organization; 2013.
4. World Health Organization. Global status report on road safety 2015. World Health Organization, Geneva, 2015. . Available from URL: [http:// www.who.int](http://www.who.int) (Accessed: 2016 Feb10).
5. Akrami Z, F. Sa. International report of youth health status indicators. National Institute of Youth Studies, and Youth: Tehran,. 2005[Persian].
6. Asian Development Bank. Road Safety Management. Translate by: Ghorbani M, Noriamiri M. Transportation Research Center: Tehran. 2006[Persian].
7. Peden M, Scurfield R, Sleet D, Mohan D A, Hyder A, Jarawan E. World report on road traffic injury prevention, World Health Organization, Geneva, 2004. Translated by: Naseh MH, Sotodeh M, Kermanchi J 1st Edition, Tandis: Tehran. 2006[Persian].
8. Khazaei S, Mazharmanesh S, Mirmoeini R. An Epidemiological Study on the Incidence of Accidents Among under 5 Years of Age Referred to Emergency Hospital Units in Hamadan Province. *Ta-vir-i salāmat*. 2016;7(2):50-6.
9. Khazaei Z, Khazaei S, Valizadeh R, Mazharmanesh S, Mirmoeini R, Mamdohi S, et al. The epidemiology of injuries and accidents in children under one year of age, during (2009-2016) in Hamadan Province, Iran. *International Journal of Pediatrics*. 2016;4(7):2213-20.
10. Khazaei Z, Tosang MA, Zadeh SZM, Khazaei S, Goodarzi E, Asadi ZS. Prevalence of risky behaviors and related factors among students of Dezful University of Medical Sciences in 2014. *Iranian Journal of Psychiatry*. 2017;12(3):188.
11. Khazaei S, Mazharmanesh S, Khazaei Z, Goodarzi E, Mirmoini R, Mohammadian-Hafshejani A, et al. An epidemiological study on the incidence of accidents in the Hamadan province during 2009 to 2014. *Pajouhan Scientific Journal*. 2016;14(2):8-16.
12. Ministry of Roads and Transportation, Road Safety Commission Secretariat. Road Safety Strategic Plan. 2nd Edition, Ministry of Roads and Transportation Deputy of Education. Research and Technology the Bureau of Technology & Safety Studies: Tehran. 2011[Persian].
13. Noori H KsA. Traffic behavior and culture. Ministry of Health and Medical Education, Department of Communicable Diseases Center. . 1st Edition, Seda: Tehran,. 2002[Persian].
14. Zhao D, Traore I, Sayed B, Lu W, Saad S, Ghorbani A, et al. Botnet detection based on traffic behavior analysis and flow intervals. *Computers & Security*. 2013;39:2-16.
15. Younesian M, Moradi A, Khaji A, Mesdaghi nia A R, M Z. Assessing the impact of the toughened sanctions on the number of injures motorcyclists leading road traffic injuries. *Payesh*:. 2006;6(1):19-26[Persian].
16. Khosravi F, Soori H, Zayeri F, Eini E, R MM. Study the effect of some human and vehicle factors on the blamable condition of the road traffic injuries in Iran. *Journal of Transportation Engineering*. 2011;3(2):117-24[Persian].
17. Rahmani firooz jah A, Farzaneh S A, Abasi esfajir AA, 1(2): ZpNA. Study sociological on the causes of road crashes (Case study of road drivers in Babol). *Journal of social studies*. 2006;1(2):182-98[Persian].
18. Salmani M, Ramezan zadeh besooii M, Drikvand M, 65:87-104[Persian]. SF. Study of the factors affecting of road crashes and offering strategies to reduce them, Case: Rural South Khoro Biabanak. *Journal of research in human geography*:. 2008;1(65):87-104.
19. Pak gohar A R, KHalili M, M Sz. Study of the causes and factors affecting the reduction of road crashes by using regression models LR , CRT و GLM. *Journal of Police knowledge*. 2009;12(1):77-106[Persian].
20. Farahmand M, M S. Study of the safety motorcyclists in the cities: Arsanjan, Eghlid, Kazeroon, Neyriz. The selected articles collections in the second conference in Tehran Safe Community. 2009[Persian].
21. Baghiani moghadam M H, Halvaih GH H, H EpM. Study of personality and status of the injured motorcycle accident in Yazd city in 2004. *Journal of Mazandaran University of Medical Sciences*. 2006;16(51): 69-74[Persian].
22. Alizadeh eghdam M B, Z. S. Driver's cultural lifestyle, a tool for explaining the behavior of traffic (Case Study: Drivers in the city of Tabriz). *Rahvar*. 2011;8(15):21-40[Persian]. .
23. Khalji K, Majd zadeh R, Eshraghian M R, Motavalian A, K Hn. Risk factors of injuries due to road traffic accidents in Qazvin – Loshan in 2005. *Iranian Journal of Epidemiology*. 2006;1(3):27-35[Persian].
24. Rasekh AA, B. M. Study of mortality of the unintentional accidents in Khuzestan in the 2001-2005. *Journal of legal medicine*. 2008;14(4): 222-9[Persian].
25. Hatami H R, Fathi ahmad sarai N, B. D. Comparison of personality characteristics in normal and accident drivers (A case study of Karaj). *Journal of Social security studies*. 2011;1(5):99-127[Persian].

26. Bahari S A, M S. Relationship between personality characteristics, attachment styles and risk taking in youth. *Journal of new ideas in of Educational sciences*:. 2009;4(3):29-45[Persian].
27. Hagh-Shenas H, Hosseini M, Jamshidi M, HR A. Relation of personality traits with driving behavior in city of Shiraz in 2005. *Hakim*. 2008;11(3):47-54[Persian].
28. Hajloo N, J. Ag, Shiri A, AA. Driving behavior prediction based on personality characteristics and Sensation. *Journal of Social security studies*. 2012:143-57[Persian].
29. HefnyAF, Barss P, Eid HO, Abu-Zidan FM. Motorcycle-related injuries in the United Arab Emirates. *Accident Analysis & Prevention*. 2012;49:245-8.
30. SHAMS M, RASHIDIAN A, SHOJAEIZADEH D, Majdzadeh S, MONTAZERI A. Attitudes, self-reported and observational behaviors related to risky driving behaviors among taxi drivers in Tehran, Iran. 2010.
31. Zamani-Alavijeh F, Niknami S, Bazargan M, Mohamadi E, Montazeri A, Ghofranipour F, et al. Risk-taking behaviors among motorcyclists in middle east countries: a case of islamic republic of Iran. *Traffic injury prevention*. 2010;11(1):25-34.
32. Watson BC, Tunnicliff DJ, White KM, Schonfeld CC, Wishart DE. Psychological and social factors influencing motorcycle rider intentions and behaviour. 2007.
33. Zamani Alavijeh F, Niknami SH, Mohamadi E, Ahmadi F A, Montazeri A, 12(1): GpF. Reasons for Riding Motorcycles and Taking Risky Behaviors: A Qualitative Study. *Behbood*. 2009;12(1):85-101.[Persian].
34. Zamani Alavijeh F, Niknami sh, Mohamadi E, Montazeri A, Ahmadi F A, Ghofrani pour F. The causes of the high risk behavior in motorcyclists: A Qualitative Study. *Payesh*:. 2010;9(3):269-78[Persian].
35. Zamani Alavijeh F, Niknami sh, Mohamadi E, Montazeri A, Ghofrani pour F, A AF. Iranian Motorcyclists' Personal Experiences of Risky Riding. *Behbood*.12(3):271-87[Persian].
36. Arasteh H R, Behrangi M R, Naveh ebrahim AA, R RH. The role police optimal interaction and education in order to promote the traffic safety culture of the country. *Journal of Police knowledge*: . 2011;13(2):137-62[Persian].
37. Zamani-Alavijeh F, Bazargan M, Shafiei A, Bazargan-Hejazi S. The frequency and predictors of helmet use among Iranian motorcyclists: A quantitative and qualitative study. *Accident Analysis & Prevention*. 2011;43(4):1562-9.
38. Woratanarat P, Ingsathit A, Chatchaipan P, Suriyawongpaisal P. Safety riding program and motorcycle-related injuries in Thailand. *Accident Analysis & Prevention*. 2013;58:115-21.
39. Soori H, Eini E, Montazeri A, Omidvari S, Jahangiri AR, R SG. The role of the police of Hamyaran in violations and road traffic injuries in the country. *Payesh*: 2010;9(4):339-48[Persian].
40. Swaddiwudhipong W, Boonmak C, Nguntra P, Mahasakpan P. Effect of motorcycle rider education on changes in risk behaviours and motorcycle-related injuries in rural Thailand. *Tropical medicine & international health*. 1998;3(10):767-70.
41. Mehri A, Mazloomi mahmood abad S, A MsaM. The effect of education on the basis of the theory of planned behavior on the use of staff of motorcycle helmet. *Payesh*. 2011;11(1):13-2 [Persian].
42. Baldi S, Baer JD, Cook AL. Identifying best practices states in motorcycle rider education and licensing. *Journal of Safety Research*. 2005;36(1):19-32.
43. Rezaei-Pandari H, Keshavarz-Mohammadi N. Social Marketing Approach In Health Care: A Review Study. *Iranian Journal of Health Education and Health Promotion*. 2014;2(2):109-30.
44. Herman J, Ameratunga S, Jackson R. Burden of road traffic injuries and related risk factors in low and middle-income Pacific Island countries and territories: a systematic review of the scientific literature (TRIP 5). *BMC Public Health*. 2012;12(1):479.
45. Albalate D, Fernandez-Villadangos L. Motorcycle injury severity in Barcelona: the role of vehicle type and congestion. *Traffic injury prevention*. 2010;11(6):623-31.
46. Rodrigues EM, Villaveces A, Sanhueza A, Escamilla-Cejudo JA. Trends in fatal motorcycle injuries in the Americas, 1998–2010. *International journal of injury control and safety promotion*. 2014;21(2):170-80.
47. Kardamanidis K, Martiniuk A, Ivers RQ, Stevenson MR, Thistlethwaite K. Motorcycle rider training for the prevention of road traffic crashes. *The Cochrane Library*. 2010.
48. Lin M-R, Kraus JF. A review of risk factors and patterns of motorcycle injuries. *Accident Analysis & Prevention*. 2009;41(4):710-22.
49. Liu BC, Ivers R, Norton R, Boufous S, Blows S, Lo SK. Helmets for preventing injury in motorcycle riders. *The Cochrane Library*. 2008.
50. Lund J, Aarø LE. Accident prevention. Presentation of a model placing emphasis on human, structural and cultural factors. *Safety Science*. 2004;42(4):271-324.
51. Ghorbani birgani A R, Hakim A ZK. Epidemiological study of leading death accidents per year in Khuzestan province in 2010. *Journal of Rescue*. 2012;4(2):25-35[Persian].
52. Hashemi nazari S, Kazemian M, F H. Trend of Five Years Traffic Accident Mortality in Khuzestan Province (2006-2010). *Journal of Legal Medicine*. 2011;17(2):123-9[Persian].
53. Zakii alamdari A, Khodaveisi H, F F. An investigation on the relationship between economic development and mortality from road accidents in Iran: a practical approach to regression of the negative binomial distribution. *Journal of economic growth and development Research*: . 2011;2(5):184-205[Persian].
54. Hartling L, Wiebe N, Russell K F , Petrak J , Spinola C , 1. KT. Graduated driver licensing for reducing Motor vehicle crashes among young drivers (Review). *The Cochrane collaboration, the Cochrane library*. 2009;1(5):30-54.
55. Macpherson A, A. S. Bicycle helmet legislation for the uptake of helmet use and prevention of head injuries (Review). . *The Cochrane collaboration the Cochrane library*. 2009;1(5):74-83.
56. Hurst L. A literature review and exploratory analysis of fatalities and serious injury collisions in relation to motorcyclists: Implications for education, engineering and enforcement initiatives. 2011.
57. Teschke K, Brubacher JR, Friedman SM, Crompton PA, Harris MA, Reynolds CC, et al. Personal and trip characteristics associated with safety equipment use

- by injured adult bicyclists: a cross-sectional study. *BMC public health*. 2012;12(1):765.
58. Langley J, Samaranyaka A, Begg DJ. Age, period and cohort effects on the incidence of motorcyclist casualties in traffic crashes. *Injury prevention*. 2012;injuryprev-2012-040345.
59. Ackaah W, Afukaar F, Agyemang W, Anh TT, Hejar A, Abdul G, et al. The use of non-standard motorcycle helmets in low-and middle-income countries: a multicentre study. *Injury prevention*. 2013;19(3):158-63.
60. Day L, Lenné MG, Symmons M, Hillard P, Newstead S, Allen T, et al. Population based case-control study of serious non-fatal motorcycle crashes. *BMC public health*. 2013;13(1):72.
61. Crankson SJ. Motor vehicle injuries in childhood: a hospital-based study in Saudi Arabia. *Pediatric surgery international*. 2006;22(8):641-5.
62. Mikocka-Walus A, Gabbe B, Cameron P. Motorcycle-related major trauma: On-road versus off-road incidence and profile of cases. *Emergency Medicine Australasia*. 2010;22(5):470-6.
63. Stella J, Cooke C, Sprivulis P. Most head injury related motorcycle crash deaths are related to poor riding practices. *Emergency Medicine Australasia*. 2002;14(1):58-61.
64. Ham OK. Psychosocial factors associated with lifetime experience of serious unintentional injury in South Korea. *Public Health Nursing*. 2008;25(1):37-45.
65. Chalya PL, Mabula JB, Dass RM, Mbelenge N, Ngayomela IH, Chandika AB, et al. Injury characteristics and outcome of road traffic crash victims at Bugando Medical Centre in Northwestern Tanzania. *Journal of trauma management & outcomes*. 2012;6(1):1.
66. Khan I, Khan A, Aziz F, Islam M, Shafqat S. Factors associated with helmet use among motorcycle users in Karachi, Pakistan. *Academic emergency medicine*. 2008;15(4):384-7.
67. Lower T, Egginton N, Owen R. Agricultural motorcycle injuries in WA adolescents. *Australian and New Zealand journal of public health*. 2003;27(3):333-6.
68. Teoh ER, Campbell M. Role of motorcycle type in fatal motorcycle crashes. *Journal of safety research*. 2010;41(6):507-12.
69. de Rome L, Ivers R, Fitzharris M, Haworth N, Heritier S, Richardson D. Effectiveness of motorcycle protective clothing: Riders' health outcomes in the six months following a crash. *Injury*. 2012;43(12):2035-45.
70. Zambon F, Hasselberg M. Socioeconomic differences and motorcycle injuries: age at risk and injury severity among young drivers: a Swedish nationwide cohort study. *Accident Analysis & Prevention*. 2006;38(6):1183-9.
71. de Rome L, Ivers R, Fitzharris M, Du W, Haworth N, Heritier S, et al. Motorcycle protective clothing: protection from injury or just the weather? *Accident Analysis & Prevention*. 2011;43(6):1893-900.
72. Bambach MR, Grzebieta RH, McIntosh A. Injury typology of fatal motorcycle collisions with roadside barriers in Australia and New Zealand. *Accident Analysis & Prevention*. 2012;49:253-60.
73. Brown CV, Hejl K, Bui E, Tips G, Coopwood B. Risk factors for riding and crashing a motorcycle unhelmeted. *The Journal of emergency medicine*. 2011;41(4):441-6.
74. Mayrose J. The effects of a mandatory motorcycle helmet law on helmet use and injury patterns among motorcyclist fatalities. *Journal of Safety Research*. 2008;39(4):429-32.
75. Paulozzi LJ. The role of sales of new motorcycles in a recent increase in motorcycle mortality rates. *Journal of safety Research*. 2005;36(4):361-4.
76. Peek-Asa C, McArthur DL, Kraus JF. The prevalence of non-standard helmet use and head injuries among motorcycle riders. *Accident Analysis & Prevention*. 1999;31(3):229-33.
77. Kasantikul V, Ouellet JV, Smith T, Sirathranont J, Panichabhongse V. The role of alcohol in Thailand motorcycle crashes. *Accident Analysis & Prevention*. 2005;37(2):357-66.
78. Zulkipli ZH, Rahmat AMA, Faudzi SAM, Paiman NF, Wong SV, Hassan A. Motorcycle-related spinal injury: Crash characteristics. *Accident Analysis & Prevention*. 2012;49:237-44.
79. Magazzù D, Comelli M, Marinoni A. Are car drivers holding a motorcycle licence less responsible for motorcycle—Car crash occurrence: A non-parametric approach. *Accident Analysis & Prevention*. 2006;38(2):365-70.
80. Langley J, Mullin B, Jackson R, Norton R. Motorcycle engine size and risk of moderate to fatal injury from a motorcycle crash. *Accident Analysis & Prevention*. 2000;32(5):659-63.
81. Gkritza K. Modeling motorcycle helmet use in Iowa: evidence from six roadside observational surveys. *Accident Analysis & Prevention*. 2009;41(3):479-84.

Investigating the Relationship between Intellectual Capital and Organizational Intelligence among Nurses Working in Ayatollah Rouhani Hospital in Babol in 2017

Fatemeh Rezaei (1)

Nasibeh Ramazannezhad (2)

Fataneh Sabz Alipour Shiadeh (3)

(1) Department of Nursing, Faculty Member, Babol Branch, Islamic Azad University, Babol, Iran

(2) Anesthesiologist, Valiasr Hospital, Qaemshahr, Iran

(3) Department of Nursing, 17 Shahrivar Hospital, Amol, Iran

Corresponding Author:

Fatemeh Rezaei

Department of Nursing, Faculty Member, Babol Branch,

Islamic Azad University,

Babol, Iran

Received: January 30, 2018; Accepted: February 10, 2018; Published: March 1, 2018. Citation: Fatemeh Rezaei, Nasibeh Ramazannezhad, Fataneh Sabz Alipour Shiadeh. Investigating the Relationship between Intellectual Capital and Organizational Intelligence among Nurses Working in Ayatollah Rouhani Hospital in Babol in 2017. *World Family Medicine*. 2018; 16(3):216-233. DOI: 10.5742/MEWFM.2018.93332

Abstract

Objective: To determine the relationship between intellectual capital and organizational intelligence among nurses working in Babol Ayatollah Rouhani Hospital in 2017 in order to gain an understanding of the status of these variables and their relationship with each other in the population under study.

Methodology: The research is objective in terms of its purpose and it is descriptive-analytical survey type. The population included 713 people in 2017 in all faculty members and staff members of the Babol University of Medical Sciences. The research was carried out based on the collected data from 254 members of the community and the method of sampling was simple random method and using Cochran's formula, the number of sample groups was selected. Data were collected using standard questionnaires and analyzed by SPSS software. Kolmogorov-Smirnov test, one-sample t-test, Pearson correlation test and Friedman test were used to test the hypotheses.

Results: The results of one-sample t-test showed that according to mean values, standard deviation, t-value and probability value, the zero hypotheses were rejected for all variables of research, such as intellectual capital management, organizational intelligence and its components. Therefore, the status of these variables is desirable. Findings

of the research showed that there is a significant positive relationship between the management of intellectual capital and organizational intelligence and its components from the viewpoint of faculty members and staff members of Babol University of Medical Sciences.

Conclusion: According to the results, in order to improve the status of organizational intelligence and its components through the management of intellectual capital, practical suggestions are presented.

Key words: Intellectual Capital Management, Intelligence, Organizational Intelligence.

Introduction

Intellectual capital is a concept that has been strongly emphasized in today's knowledge economy. Intellectual capital is one of the main factors in increasing productivity and long-term profitability in a knowledge-based economy, and many organizations and corporations consider their superiority to be more intangible assets than tangible assets [1]. Most research has acknowledged that intellectual capital plays a key role in creating competitive advantage as well as in creating value, and intellectual capital (in general, the sum of capabilities, values, knowledge, cultures, strategies, processes, intellectual resources and communication networks) are the basis of the competitive advantage of the organization and the catalyst for achieving organizational goals [2]. Today, organizations, and universities in particular, have many differences from past organizations due to the nature of the era they live in. The prominent feature of 21st Century organizations is accountability, self-regulation, risk tolerance and instability. Organizational intelligence is an important issue with developmental and organizational behavioral experts and is the key to empowering subordinate forces in vital activities and processes governing organizational life [3]. Today, with full confidence, it can be argued that identifying and using organizational intelligence can increase the competitiveness of an organization and distinguish it from other organizations [4]. The necessity of reviewing organizational intelligence is currently responding to current requirements and the need of managers. Organizations, using organizational intelligence, have increased the effectiveness of using existing information structures in line with their goals, and the information has been developed from operational and restricted to use in the organizational layers for use by managers [5]. Given that managers work in organizations that are affected by their internal and external environment, they need learning power to respond to their problems, such as people. Therefore, the issue of organizational intelligence can help managers in this matter and enable them to meet their needs and problems and timely response to environmental changes, according to their organizational memory. Therefore, managers need organizational intelligence to advance their organizational goals and achieve them so that they can improve their performance [6]. Regarding the components of organizational intelligence, one can briefly say: **Strategic perspective:** Each organization requires a theory, a concept, an organizing principle, or a definition of what is to be sought and satisfied [7]. **Common fate:** All people in an organization, including stakeholders, such as suppliers and partners, and sometimes family members of an organization, need to know what their mission is. **The desire to change:** change, expresses challenges, is a place for new experiences, exciting, and a chance to achieve something new [8]. **Courage:** Daring and courage involves consenting to do something beyond the established standards of work. **Alliances and agreements:** Any group of more than a dozen individuals will be in conflict with each other without a set of functional rules. **Application of Knowledge:** Today, many companies are pushing for success or failure due to the effective

use of knowledge, information and data. **Performance pressure:** In an intelligent organization, everyone has to have a proposition for action, that is, they have a sense of what to achieve and to be aware of the purposefulness of the goals [9]. The universities of medical sciences have to choose, employ and maintain capable human resources in terms of assigned duties. The extensive tasks and the position of medical universities in the policies of health and medicine as well as the country's education, as well as having experienced staff and managers in their field of work, emphasize the importance of proper management of intellectual capital in the ministry for the best possible success in the implementation of goals, tasks and missions. So, for the operation of the above concept at the Babol University of Medical Sciences, is there a concern that members and staff can be smarter? In the next step, let us think. Do you hear and pay attention to the ideas of the staff and the faculty to gain more knowledge than we hire them for? Is the culture governing the university open and supportive, and has the university developed a reward system related to the performance of faculty members, and are all employees contributing to the organization's program and achievements? Are the University's approach to some of the affairs based on a strategic approach? Is there a connection between employee career stability and organizational bureaucracy, and is there a minimum in this bureaucracy organization? Therefore, the researcher's questions were asked to investigate the relationship between intellectual capital and organizational intelligence among nurses working in Ayatollah Rouhani Hospital in Babol or, in other words, to seek to answer the main question: Is there any relation between intellectual capital and organizational intelligence among nurses working at the Ayatollah Rouhani Hospital in Babol? Also, "intellectual capital management" as an independent variable and organizational intelligence and its seven dimensions based on the Albrecht model, are dependent variables of this research.

Main Objective

✓ Determining the relationship between intellectual capital and organizational intelligence among nurses working in Ayatollah Rouhani Hospital in Babol.

Secondary objective

1. Determining the relationship between intellectual capital and strategic perspective among nurses working in Ayatollah Rouhani hospital in Babol.
2. Determining the relationship between intellectual capital and common fate among nurses working in Ayatollah Rouhani hospital in Babol.
3. Determining the relationship between intellectual capital and desire to change among nurses working in Ayatollah Rouhani hospital in Babol.
4. Determining the relationship between intellectual capital and courage among nurses working in Ayatollah Rouhani Hospital in Babol.
5. Determining the relationship between intellectual capital and alliances and agreement among nurses working in Ayatollah Rouhani hospital in Babol.

6. Determining the relationship between intellectual capital and application of knowledge among nurses working in Ayatollah Rouhani Hospital in Babol.

7. Determining the relationship between intellectual capital and performance pressure in faculty members and staff of Babol University of Medical Sciences.

Main hypothesis

✓ There is a relationship between intellectual capital and organizational intelligence among nurses working at Ayatollah Rouhani Hospital in Babol.

Secondary objective

1. There is a relationship between intellectual capital and strategic perspective among nurses working in Ayatollah Rouhani hospital in Babol.

2. There is a relationship between intellectual capital and common fate among nurses working in Ayatollah Rouhani hospital in Babol.

3. There is a relationship between intellectual capital and desire to change among nurses working in Ayatollah Rouhani hospital in Babol.

4. There is a relationship between intellectual capital and courage among nurses working in Ayatollah Rouhani Hospital in Babol.

5. There is a relationship between intellectual capital and alliances and agreement among nurses working in Ayatollah Rouhani hospital in Babol.

6. There is a relationship between intellectual capital and application of knowledge among nurses working in Ayatollah Rouhani Hospital in Babol.

7. There is a relationship between intellectual capital and performance pressure among nurses working in Ayatollah Rouhani Hospital in Babol.

Methodology

The research is objective in terms of its purpose and it is descriptive-analytical of survey type. The population included 713 people in all faculty members and staff members of the Babol University of Medical Sciences in 2017. The research was carried out based on the data collected from 254 members of the community and the method of sampling was simple random method and using the Cochran formula, the number of sample groups was selected. Data were collected using standard questionnaires (Karl Albrecht, 2003) and Bontis Intellectual Capital Management (2010), and analyzed by SPSS software. Kolmogorov-Smirnov test, one-sample t-test, Pearson correlation test and Friedman test were used to test the hypotheses.

Table 1: Cronbach Alpha Criteria for Research

Row	Variable	Cronbach's Alpha	Description
1	Strategic Perspective	0.844	Likert Five Option Spectrum Scale
2	Common Fate	0.856	Likert Five Option Spectrum Scale
3	Desire to Change	0.843	Likert Five Option Spectrum Scale
4	Courage	0.876	Likert Five Option Spectrum Scale
5	Alliances and Agreement	0.87	Likert Five Option Spectrum Scale
6	Application of Knowledge	0.869	Likert Five Option Spectrum Scale
7	Performance Pressure	0.861	Likert Five Option Spectrum Scale
8	Organizational Intelligence	0.871	Likert Five Option Spectrum Scale
9	Intellectual Capital Management	0.874	Likert Five Option Spectrum Scale

Findings

Table 2: Frequency distribution of research sample in terms of demographic information

Demographic factors	Groups	Frequency	Percent
Gender	Male	150	59.1
	Female	104	40.9
Marital status	Married	218	85.8
	Single	36	14.2
Level of education	Bachelor	123	48.4
	Master's degree	82	32.3
Work experience (years)	Under 10 years old	96	37.8
	10 to 15	68	26.8
	From 16 to more than 20 years	90	35.4
Age	Less than 30 years	41	16.1
	31 to 40 years	76	29.9
	41 to 50 years	76	29.9
	More than 50 years	61	24.0

Table 3: Normal test for research variables

Variable	Kolmogorov-Smirnov statistics	Sig.	Test result
Strategic Perspective	0.59	0.87	Normal
Common Fate	0.87	0.43	Normal
Desire to Change	0.83	0.49	Normal
Courage	0.78	0.56	Normal
Alliances and Agreement	0.88	0.41	Normal
Application of Knowledge	0.46	0.98	Normal
Performance Pressure	0.82	0.51	Normal
Organizational Intelligence	0.62	0.83	Normal
Intellectual Capital Management	1.18	0.12	Normal

As can be seen from Table 3, all the research variables are normal, so we use a parametric test to test these variables.

As you can see from Table 4, the status of all variables is less than 0.05 according to the test probability value, which has led to the rejection of the zero hypothesis. As a result, from the perspective of the nurses working in the Ayatollah Rouhani hospital in Babol, the status of all variables above is more than average and desirable.

Table 4: Investigating the status quo of research variables based on single sample t test

Variable	Kolmogorov-Smirnov statistics					Test result	Status
	Average	Standard deviation	T Statistics	Degrees of freedom	Probability value		
Strategic Perspective	3.84	0.52	25.96	253	0.0009	Reject the hypothesis	More than average
Common Fate	3.71	0.55	20.50	253	0.0009	Reject the hypothesis	More than average
Desire to Change	3.85	0.52	25.93	253	0.0009	Reject the hypothesis	More than average
Courage	4.02	0.55	29.31	253	0.0009	Reject the hypothesis	More than average
Alliances and Agreement	3.85	0.62	21.75	253	0.0009	Reject the hypothesis	More than average
Application of Knowledge	3.89	0.60	23.41	253	0.0009	Reject the hypothesis	More than average
Performance Pressure	3.67	0.49	21.80	253	0.0009	Reject the hypothesis	More than average
Organizational Intelligence	3.83	0.46	28.99	253	0.0009	Reject the hypothesis	More than average
Intellectual Capital Management	3.82	0.42	30.79	253	0.0009	Reject the hypothesis	More than average

Table 5: Pearson Correlation Coefficients for Main and Secondary Hypotheses

Intellectual Capital Management	Organizational Intelligence		Test result
	Pearson Correlation Coefficients	Probability value	
Main hypothesis	0.708**	0.0009	Significant
Secondary hypothesis 1	Strategic Perspective		Significant
	0.562**	0.0009	
Secondary hypothesis 2	Common Fate		Significant
	0.537**	0.0009	
Secondary hypothesis 3	Desire to Change		Significant
	0.630**	0.0009	
Secondary hypothesis 4	Courage		Significant
	0.565**	0.0009	
Secondary hypothesis 5	Alliances and Agreement		Significant
	0.527**	0.0009	
Secondary hypothesis 6	Application of Knowledge		Significant
	0.672**	0.0009	
Secondary hypothesis 7	Performance Pressure		Significant
	0.620**	0.0009	

As can be seen from Table 5, the correlation coefficient between intellectual capital management and organizational intelligence and probability less than 0.05 indicates a significant and positive relationship between all variables. The result shows that from the perspective of the nurses working in Ayatollah Rouhani hospital in Babol between the variables of intellectual capital management, organizational intelligence, strategic perspective, common fate, desire to change, courage, alliances and agreement, application of knowledge and performance pressure has a meaningful positive relationship and by improving intellectual capital management in the organization, the organizational intelligence of the staff is also enhanced. Simply put, all the research hypotheses are verified.

As outlined in Table 6 (next page), the viewpoint among nurses working at Ayatollah Rouhani Hospital in Babol that has the highest priority relates to the courage with a an average rating of 5.07. The second priority relates to the application dimension of knowledge with an average rating of 4.31. The third priority relates to the alliance and agrees with the variable with an average rating of 4.29. The fourth priority is related to the dimension of fate with an average rating of 4.25. The fifth priority relates to the strategic perspective dimension with an average rating of 4.10. The sixth priority relates to the dimension of the desire to change with an average rating of 4.01, and finally, the performance pressure was at the last place with a mean score of 2.97.

Table 6: Ranking Seven Dimensions of Organizational Intelligence

Variable	Average rating	Priority
Strategic Perspective	4.10	Fifth
Common Fate	4.25	Fourth
Desire to Change	4.01	Sixth
Courage	5.07	First
Alliances and Agreement	4.29	Third
Application of Knowledge	4.31	Second
Performance Pressure	2.97	Seventh

Discussion and Conclusion

The findings of the research showed that between intellectual capital management and organizational intelligence, intellectual capital management and strategic perspective, intellectual capital management and common fate, intellectual capital management and desire to change, intellectual capital management and courage, intellectual capital management and alliance and agreement, intellectual capital management and knowledge application, and finally, intellectual capital management and performance pressure, there is a significant positive relationship, and with the improvement of the status of the predictor variable in the organization, the criterion variable also improves. In Mirzadeh and Safar's research in 2014, researchers said that developing the dimensions of organizational intelligence in the organization would increase the organizational learning power. This research shows the importance of focusing on organizational intelligence in today's agencies and organizations. Velashani and others in their 2013 study examined the effects of intellectual capital management and its dimensions, such as human capital and structural capital, on performance, the results of which have shown the positive effects of intellectual capital management. This research demonstrates the positive effects of the proper management of intellectual capital in the organization. In 2007, Gorji Korsami and Asadi Rad, in the same way as previous research, investigated the effects of intellectual capital management and its dimensions on the performance of the organization. The results indicate a positive impact of intellectual capital management [12]. Shirsavar and Marzban Moghaddam in their 2013 research evaluated the relationship between organizational intelligence and its dimensions with organizational entrepreneurship components [13]. Hosseini and Chili Saril in 2013 examined the relationship between organizational intelligence and organizational learning and assessed this relationship as meaningful and positive [4]. The results of Rahmani and Asgharzadeh's research in 2013 indicate that there is a positive and significant relationship between organizational intelligence and strategic thinking power in managers, also, between the components of organizational intelligence based on the seven dimensions of categorization of the Albrecht model, which include: strategic perspective, common fate, desire to change, courage, alliance and agreement, performance pressure and knowledge development, and the power of strategic thinking of managers has a positive and significant relationship [8]. In 2010, Sattari Qahfarokhi reviewed the

relationship between intellectual capital management and organizational intelligence. This research is one of the few studies that is quite similar to the subject of this research. The researcher has found a significant and positive relationship between intellectual capital management and organizational intelligence, which fully confirms the result of the main hypothesis of the present study, so, the results of the research are consistent with what was found in the current research from the main hypothesis of the research [16]. In 2010, Nazari Pour and Parvizi examined the relationship between intellectual capital management and organizational intelligence. This research, along with previous research (Sattari Qahfarokhi), was the only similar research done in the country. The researcher has tried to establish a constructive relationship between elements of intellectual capital and organizational intelligence for gaining competitive advantage. This approach is the same as the result obtained in the present research in the main hypothesis and special hypotheses [17]. Simply put, the results of two similar studies in the present study are consistent with what was achieved in this study and are in the same direction. This research, like previous research, indicates the need to pay attention to the organizational intelligence of the organization's employees (especially managers) and the effects that can have on different aspects of the organization. In 2012, Lou reviewed the relationship between intellectual capital management and performance in the academic environment and evaluated the results positively. Considering the fact that the statistical society in the study of Lou was similar to the present study, it was a significant academic environment. In 2011, Kesti et al. reviewed the relationship between human capital, one of the components of intellectual capital management and organizational intelligence, and assessed the relationship between them [19]. Because human capital is considered as a component of intellectual capital management, the results of the research can be compared with the results of this research. Tan, Plowman and Hancock, in their 2006 study, ranked the relationship between intellectual capital management and organizational performance positively [20].

Research Constraints

This research, like other studies, has been confronted with limitations. Among these limitations are the following:

- The limitations in the members of the statistical society, as the respondents to the research questionnaires, were limited to among the nurses working in Ayatollah Rouhani

Hospital in Babol.

- Having a cross-sectional nature, either temporally or locally, has been one of the fundamental constraints of this research.

Suggestions

Based on the results of the research hypothesis, the suggestions derived from the researcher's experiences are presented as follows:

- Managing the time and the high value of time and doing useful work in the office is one of the features that will improve the structural capital (from the dimensions of intellectual capital management) of any organization, so it is necessary to pay attention to it.

- The organization's senior managers' support for new ideas, talented and empowered forces, and considering the specific conditions for supporting innovative projects are among the ways to improve structural capital.

Acknowledgment: Of all the nurses of Ayatollah Rouhani Hospital in Babol who helped us in this research.

References

- 1) Abzari, Mahdi, Etebarian, Akbar and Sattari Qahfarokhi, Mehdi, (2006), Organizational intelligence, and the prevention of mental subjective organization. *Organizational Knowledge Management Monthly No.99 October*.
- 2) Ardalan Mohammad Reza, Eskandari Asghar, Gilani. Maryam Atae. Nafiseh (2014), The Relationship between Personality Characteristics and Organizational Intelligence of Employees with Intellectual Capital Management, *Quarterly Journal of Research and Planning in Higher Education*, No. 71.
- 3) Jamshidi, Mina (2010). Investigating the Position of Organizational Intelligence on Organizational Effectiveness, Islamic Azad University Press. Dec 2010
- 4) Hosseini Seyyed Yaqoob, Chilli Saril Nina (2013). The Effect of Organizational Intelligence on Learning in Organizations, *Journal of Management Studies*, Vol. 23, No. 71, Pages 131-159.
- 5) Khalili, Mojtaba, Chopani, Heydar, Hayat, Ali Asghar (2010). Organizational intelligence, Necessity, Infrastructures and Consequences, First Conference on Organizational Intelligence and Business Intelligence, Tehran, Islamic Azad University, Tehran Branch, //www.civilica.com/Paper-OIBI01-OIBI01_065.html
- 6) Kheyrkhan, Hoshyar. (2011). Investigating the Relationship between Social Capital and Intellectual Capital (Case Study of Educational Offices in Kurdistan Province). Master's thesis, Islamic Azad University, Sanandaj Branch.
- 7) Zabihi, Mohammad Reza; Saeedeh Jami; Tektam al-Ghuri Moghadam and Samira Saghaei Shahri, (2014), Organizational Intelligence Factors, International Management Conference in the 21st Century, Tehran, Institute of Managers of Idea Capital, Vieira, http://www.civilica.com/Paper-ICMNG01-ICMNG01_597.html
- 8) Rahmani, Zain al-Abidin and Mohsen Asgharzadeh (2013). The Relationship between Organizational Intelligence and Strategic Thinking for Managers in the Business Environment Case Study: Sarkhon and Qeshm Refinery, The First National Conference on Business Management, Hamedan, Science and Technology Tolo Farzin Industry, Bu-Ali Sina University, http://www.civilica.com/Paper-NCBM01-NCBM01_273.html
- 9) Sadat Mostafavi, Mahshid and Mojtaba Hadizadeh (2014). Organizational Intelligence, Its Origin, The First International Conference on Economics, Management, Accounting and Social Sciences, Rasht, Azad University Anzali Academic Entrepreneurs Association, http://www.civilica.ac.ir.com/Paper-EMASS01-EMASS01_011.html
- 10) Sattari Qahfarokhi Mehdi (2010). Prediction of Organizational Intelligence Based on Intellectual Capital Components at Payame Noor University of Mazandaran, Second International Conference on Intellectual Capital Management, Zanjan, Zanjan University of Applied Sciences, http://www.civilica.com/Paper-IICM02-IICM02_017.html
- 11) Seyyed Naghavi, Mir Ali; Sepandarand, Sadegh; Ramin Mehr, Hamid (2012). Investigating the Effects of Intellectual Capital on Organizational Performance, Emphasizing the Mediating Capacity of Learning in Branches of Bank Saderat, Tehran Province. Faculty of Management, University of Tehran. Volume 4, Issue 12. P. 53- 70.
- 12) Shekarchizadeh, Ahmad Reza; Mohammad Javanmardi and Alizadeh Pardis (2012). The Study of Intellectual Capital Situation and its Relationship with Organizational Performance in the Insurance Industry of Iran. Case Study: Isfahan Insurance Companies, First National Conference on Industrial Engineering and Systems, Najaf Abad, Azad University Islamic branch of Najaf Abad, Department of Industrial Engineering, http://www.civilica.com/Paper-NIESC01-NIESC01_257.html
- 13) Shirsavar Hamidreza, Marziban Moghadam Efat (2013). The Relationship between Organizational Intelligence and Entrepreneurship in Productive Companies of Guilan Province, *Quarterly Journal of Technology Growth, Quarterly Journal of Parks and Growth Centers*, Vol. 9, No. 36.
- 14) Alem Tabrizi, Akbar; Haji Babaei, Ali and Rajabi Fard, Iman. (2009). Intellectual capital. Tehran: Iran Industrial Research and Training Center.
- 15) Aliwliou, Roghaieh, Ghorbani, Saber (2010). Organizational intelligence and creativity and innovation, Tehran, Institute of Creative Science, Innovation and TRIZ, http://www.civilica.com/Paper-ICIC03-ICIC03_101.html
- 16) Ghafari, Rahman and Amirnezam Zomorodi (2014). Introducing a model for identifying the components of organizational intelligence as a powerful tool in improving the knowledge transfer cycle in organizations. National Conference on Computer Engineering and Information Technology Management, Tehran, Tolo Farzin Co., http://www.civilica.com/Paper-CSITM01-CSITM01_206.html
- 17) Loghman Keshavarz, Farahani Abolfazl, Asghari Zahra (2014). Developing a Communication Model for Job Self-Efficacy and Organizational Intelligence at the Ministry of Sports and Youth of Iran. *Applied Research in Sport Management*, Volume 2, Issue 4, Success Story 8, pp. 67-87.
- 18) Lou, Wen-M., (2012). Intellectual capital and university performance in Taiwan. *Economic Modeling* Volume 29, Issue 4, July 2012, 1081-9. Available online at www.sciencedirect.com.
- 19) Kesti, M., Syvajarvi. A., Stenvall. J., Rivera. M., (2011). Human capital scenario analysis as an organizational intelligence tool for performance.
- 20) Tan, H.P., Plowman, D., and Hancock, P., (2012). Intellectual Capital and Financial Returns of Companies. *Journal of Intellectual Capital*, 8 (1), 76-95.

The Relationship between the Family Functions and Health-Promoting Behaviors of Nursing Students in Tehran, Iran

Meimanat Hosseini (1)

Parvin Sarbakhsh (2)

Soliman Mollaei (3)

(1) Department of Community Health Nursing, School of Nursing & Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran

(2) Department of Statistics and Epidemiology, School of Public Health, Tabriz University of Medical Sciences, Tabriz, Iran

(3) Student's research committee, School of Nursing & Midwifery, Shahid Beheshti University of Medical Science, Tehran, Iran

Corresponding Author:

Meimanat Hosseini

Department of Community Health Nursing, School of Nursing & Midwifery,
Shahid Beheshti University of Medical Sciences,
Tehran, Iran.

Received: January 30, 2018; Accepted: February 10, 2018; Published: March 1, 2018. Citation: Meimanat Hosseini, Parvin Sarbakhsh, Soliman Mollaei. The Relationship between the Family Functions and Health-Promoting Behaviors of Nursing Students in Tehran, Iran. *World Family Medicine*. 2018; 16(3):234-226. DOI: 10.5742/MEWFM.2018.93333

Abstract

Background: The health-promoting behaviors (HPBs) of nursing students may affect the clinical services that they provide to clients. In turn, these students' HPBs may be related to their perceptions of how their families function. On the basis of these issues, this correlational study was conducted to determine the relationship between the HPBs and family functions of nursing students.

Methods: Through stratified random sampling, 458 students from Tehran universities were selected for participation in the study. Data were collected using a demographic characteristics questionnaire, the Health-Promoting Lifestyle Profile II (HPLP-II), and the Family Assessment Device (FAD). The data were then analyzed using an independent t-test and Pearson's correlation coefficient.

Results: The mean overall HPLP-II score of the participants was 2.57 ± 0.35 , and their mean overall FAD score was 2.51 ± 0.17 . The total score with regard to family functions was negatively correlated with HPBs ($r = -0.178$, $P < 0.01$).

Conclusion: Policymakers in the nursing discipline should pay increased attention to nursing students' family functions and HPBs and determine the factors that may influence their engagement in such behaviors.

Key words: Nursing students, Family function, Health-promoting behaviors, Health-Promoting Lifestyle Profile II.

Background

Health promotion and individuals' health have been accentuated in previous studies [1] given the importance of exercising healthy lifestyle behaviors in maintaining health and stimulating a positive approach to life [2]. As future healthcare personnel, nursing students have the potential to influence public health, thus making health promotion one of the key factors in these students' effectiveness as care providers [3]. Health-promoting behaviors (HPBs) are an essential concept in the nursing field, yet previous studies indicated a high level of engagement in risky health conduct among nursing students. Investigating the health and lifestyle behaviors of nursing students and the factors that influence such conduct is important in promoting healthful practices among them [4]. HPBs encompass health responsibility, physical activity, nutrition, interpersonal relations, spiritual growth, and stress management [5]. Family function is an equally consequential factor of health behaviors [6], as evidenced by studies in which parents and children who reported high levels of family functioning were found to typically lead healthier lives [7]. The aforementioned HPB components and family functioning are measured using two instruments, namely, the Health-Promotion Lifestyle Profile II (HPLP-II) [5] and the Family Assessment Device (FAD) [8], respectively. Despite the usefulness of the HPLP-II and FAD, no study has been devoted to the use of these questionnaires in relation to nursing students. Given the importance of family functions and HPBs in the nursing domain, the current research examined the relationship between the HPBs and family functions of nursing students.

Methods

Participants

Stratified random sampling was carried out to select the participants of this correlational study. A total of 458 students from universities in Tehran, Iran were recruited.

The inclusion criteria were as follows: (1) The participants are undergraduate and postgraduate nursing students; (2) they are Iranian; (3) they are amenable to participation in the study; and (4) they are healthy individuals. The

exclusion criterion was failure to complete 40% of the questions in the questionnaires.

Procedures

The nursing students were asked to complete a three-part questionnaire that included questions regarding their demographic characteristics. They were also asked to fill out the FAD and HPLP-II. The demographic data required from the participants were age, gender, marital status, grade, and educational level.

Statistical analyses

In a previous work, the FAD exhibited good validity and reliability, and the testing of the Iranian version yielded a Cronbach's α of 0.81 [9, 10]; the HPLP-II also exhibited good validity and reliability, and the testing of the Iranian version registered a Cronbach's α of 0.86. In the current research, the internal consistencies of the FAD and HPLP-II were $\alpha = 0.88$ and $\alpha = 0.86$, respectively. Data were analyzed using SPSS version 20 [11-13]. The Pearson's correlation coefficient and an independent t-test were used for inferential statistical analysis; a $P < 0.05$ was considered statistically significant [14-17].

Results

Out of the 458 nursing students, 281 were male (59.6%) aged between 18 and 51 years (23.80 ± 5.80), 368 (84%) were undergraduate students, and 69 (16%) were postgraduate students. In terms of marital status, 337 (76.9%) were single. The overall average item score of the participants in the HPLP-II was 2.57 ± 0.35 (Table 1), indicating a high level of engagement in healthy behaviors. The highest average item scores were those for the relationship dimension. The male students exhibited a significantly better nutritional status and a higher quality of interpersonal relationships, but both genders scored high in these two dimensions.

The overall average item score of the participants in the FAD was 2.51 ± 0.17 (Table 2), indicating good family functioning. The highest average item scores were observed in the behavioral control dimension, and the lowest average item scores were earned under the problem solving dimension. No significant difference was found between the male and female students in this regard.

Table 1. HPB scores of the nursing students

Dimension	Number of items	Scores of all students (n = 458)	Scores of female students (n = 177)	Scores of male students (n = 281)	Order	P-value
HPLP-II	52	2.57±0.35	2.57±0.36	2.57±0.34		0.918
Relationships	9	2.91±0.44	2.85±0.46	2.94±0.42	1	0.044
Spiritual growth	9	2.88±0.55	2.92±0.54	2.86±0.55	2	0.269
Nutrition	9	2.61±0.45	2.55±0.51	2.65±0.40	3	0.033
Stress management	8	2.44±0.43	2.46±0.45	2.43±0.42	4	0.551
Health responsibility	9	2.37±0.43	2.37±0.43	2.36±0.42	5	0.796
Physical activity	8	2.13±0.62	2.24±0.64	2.06±0.59	6	0.004

Note: Entries are mean±SD.

The correlational analyses showed that the total score with regard to family functions was negatively correlated with health behaviors. That is, a high score with respect to family functions translates to poor family functioning; high family functioning corresponds to good engagement in HPBs. With the exception of the score for affective responsiveness, the scores for all the dimensions of family functioning were negatively correlated with HPBs, with problem solving ($r = -0.368$) showing the strongest correlation with HPBs (Table 3 - opposite page). Except for physical activity and spiritual growth, all the dimensions of HPBs were negatively correlated with the overall score for family functioning, with the nutrition ($r = -0.232$) dimension exhibiting the strongest correlation with family functioning.

Table 2. Family function scores of the nursing students

Dimension	Items (n)	Scores of all students (n = 458)	Scores of female students (n = 177)	Scores of male students (n = 281)	Order	P-value
FAD score	60	2.51±0.17	2.50±0.17	2.52±0.17		0.234
Behavioral control	9	2.88±0.32	2.86±0.31	2.89±0.33	1	0.319
Affective involvement	7	2.78±0.42	2.76±0.41	2.80±0.43	2	0.376
Role function	11	2.58±0.34	2.56±0.35	2.58±0.32	3	0.575
Affective responsiveness	6	2.48±0.29	2.48±0.30	2.47±0.28	4	0.852
Communication	9	2.46±0.28	2.45±0.30	2.47±0.26	5	0.509
General functioning	12	2.42±0.22	2.40±0.22	2.43±0.21	6	0.181
Problem solving	6	1.95±0.47	1.94±0.50	1.97±0.43	7	0.547

Discussion

In the present research, the mean [standard deviation (SD)] of HPB engagement among the nursing students was 2.57 ± 0.35 , whereas in another study, the value derived was 2.55 ± 0.35 [5]. Hong et al. reported that the mean (SD) of HPB engagement among nursing students was 2.99 ± 0.33 [18], and McElligott et al. estimated this value to be 2.60 ± 0.41 . The findings of the present study correspond with those of McElligott et al. but are lower than those of Hong et al. In the HPLP-II, physical activity registered lower scores than did the other dimensions, consistent with other reports but contrary to that of McElligott et al., who found that stress management among nurses had the lowest mean [19]. The differences between the findings may lie in samples, cultural issues, limitations in sports equipment and facilities in Iran, lack of time management, lack of good policies for leisure time, and lack of attention by people and authorities to the adverse consequences of immobility. The results of the current research indicated that the nursing students currently have a high level of family functioning. No other studies that generated the same findings for the same target population (i.e., nursing students) were found. The nursing students in the present work scored higher on the FAD questionnaire than did the patients in previous studies [20]. The dissimilarity in findings may be due to study population. Furthermore, the highest average scores were derived for behavioral control and affective involvement, indicating that the nursing students perform weakly in these domains of family functioning. This result may be explained by the nature of traditional Iranian culture, which tends to suppress personal expression among family members. Insufficient behavioral control will prevent nursing students from developing health-promoting habits, such as physical activity, health responsibility, and appropriate stress management. The present research found that a health-promoting lifestyle was related to

family functioning, consistent with the results of other studies [16, 20]. Our analyses also revealed that HPBs were most strongly correlated with the problem solving and role function dimensions. Problem solving within families is grounded in communication [21, 22], and the role function focuses on whether a family has established patterns of behaviors for handling a set of family functions. Families with good role functioning can serve as sources of support for HPB engagement among nursing students. Thus, effectively improving students' HPB engagement or preventing unhealthy behaviors necessitates the addressing of all aspects of family functioning.

Conclusion

The nursing students demonstrated high engagement in HPBs and obtained high scores with respect to family functioning. However, they exhibited weakness in some aspects. Effective relevant measures should be taken to improve HPB engagement among nursing students. This study showed that nursing students' HPBs were related to their family functions. Officials at universities and colleges should consider this result and endeavor to establish a close relationship with the families of their students to enhance community health.

Abbreviations

HPLP- II: Health-promoting lifestyle profile II
 FAD: Family assessment device
 HPBs: Health-Promoting Behaviors

Acknowledgments

The researcher wishes to express his appreciation to the full cooperation of the personnel who participated in this study and the School of Nursing & Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

Table 3. Correlation between family functions and HPBs

	FAD	Problem solving	Communication	Role function	Affective responsiveness	Affective involvement	Behavioral control	General functioning
HPLP-II	-0.178**	-0.368**	-0.111*	-0.322**	-0.021	-0.167**	-0.258**	-0.201**
Health responsibility	-0.161**	-0.205**	-0.005	-0.279**	-0.033	-0.112**	-0.135**	-0.108*
Nutrition	-0.232**	-0.252**	-0.059	-0.338**	-0.066	-0.160**	-0.316**	-0.179**
Stress management	-0.110**	-0.248**	-0.095*	-0.225**	-0.048	-0.068	-0.151**	-0.200**
Physical activity	-0.038	-0.180**	-0.037	-0.180**	-0.116*	-0.068	-0.012	-0.073
Relationships	-0.197**	-0.378**	-0.113*	-0.271**	-0.071	-0.204**	-0.353**	-0.217**
Spiritual growth	-0.068	-0.350**	-0.168**	-0.151**	-0.087	-0.117*	-0.208**	-0.122*

Note: *P<0.05, **P<0.01

References

- Altun, I., Effect of a health promotion course on health promoting behaviours of university students. *East Mediterr Health J*, 2008. 14(4): p. 880-7.
- Alpar, Ş.E., et al., Change in the health promoting lifestyle behaviour of Turkish University nursing students from beginning to end of nurse training. *Nurse Education in Practice*, 2008. 8(6): p. 382-388.
- Wittayapun, Y., et al., Factors affecting health-promoting behaviors in nursing students of the faculty of nursing, Srinakharinwirot University, Thailand. *Journal of Public Health*, 2010. 40(2): p. 215-225.
- Dong, W., X. Xiao-hui, and W. Xian-bo, The healthy lifestyle scale for university students: development and psychometric testing. *Australian journal of primary health*, 2012. 18(4): p. 339-345.
- Lee, R.L. and A.J. Loke, Health-promoting behaviors and psychosocial well-being of university students in Hong Kong. *Public health nursing*, 2005. 22(3): p. 209-220.
- Thanakwang, K. and K. Soonthornthada, Family relations and health-promoting behavior among older people in Nan Province. *Medical journal of the Medical Association of Thailand*, 2008. 91(7): p. 1102-8.
- Halliday, J.A., et al., The relationship between family functioning and child and adolescent overweight and obesity: a systematic review. *International journal of obesity*, 2014. 38(4): p. 480-493.
- Eshah, N.F., Lifestyle and health promoting behaviours in Jordanian subjects without prior history of coronary heart disease. *International Journal of Nursing Practice*, 2011. 17(1): p. 27-35.
- Hosseini, M., et al., The correlation of family functioning dimensions and self-concept of adolescent smokers in Zanjan. *Journal of Health Promotion Management*, 2012. 1(4): p. 61-68.
- Ferdosian, M., et al., Identification of immunotopes against *Mycobacterium leprae* as immune targets using PhDTm-12mer phage display peptide library. *Tropical Journal of Pharmaceutical Research*, 2015. 14(7): p. 1153-1159.
- Jalali, H.K., et al., Antagonistic Activity of *Nocardia brasiliensis* PTCC 1422 Against Isolated Enterobacteriaceae from Urinary Tract Infections. *Probiotics and Antimicrobial proteins*, 2016. 8(1): p. 41-45.
- moghaddasi Mohammad, S., H.H. Kashani, and Z. Azarbad, *Capparis spinosa* L. Propagation and Medicinal uses. *Life Science Journal*, 2012. 9(4): p. 684-686.
- Kamani, M., et al., Efecto Protector de Extracto de Semilla *Lepidium sativum* Sobre la Histopatología y Morfología del Epidídimo en Modelo de Rata Diabética. *International Journal of Morphology*, 2017. 35(2): p. 603-610.
- Saba, M.A., et al., Diagnostic Value of Neuron-Specific Enolase (NSE) and Cancer Antigen 15-3 (CA 15-3) in the Diagnosis of Pleural Effusions. *Asian Pac J Cancer Prev*, 2017. 18(1): p. 257-261.
- Sharif, A., et al., The Role of Probiotics in the Treatment of Dysentery: a Randomized Double-Blind Clinical Trial. *Probiotics and Antimicrobial Proteins*, 2017: p. 1-6.
- Sharif, M.R., et al., The Effect of a Yeast Probiotic on Acute Diarrhea in Children. *Probiotics and Antimicrobial Proteins*, 2016. 8(4): p. 211-214.
- Hosseini, E.S., et al., Intein as a novel strategy for protein purification. *Life Science Journal*, 2012. 4: p. 9.
- Hong, J.F., S. Sermsri, and B. Keiwkarnka, Health-promoting lifestyles of nursing students in Mahidol University. *Journal of Public Health and Development*, 2007. 5(1): p. 27-40.
- McElligott, D., et al., The effect of a holistic program on health-promoting behaviors in hospital registered nurses. *Journal of Holistic Nursing*, 2010. 28(3): p. 175-183.
- Jiang, S.-S., et al., Family function and health behaviours of stroke survivors. *International Journal of Nursing Sciences*, 2014. 1(3): p. 272-276.
- Heppner, P.P., T.E. Witty, and W.A. Dixon, Problem-solving appraisal and human adjustment: A review of 20 years of research using the Problem Solving Inventory. *The Counseling Psychologist*, 2004. 32(3): p. 344-428.
- Lotfi, A., et al., Comparing the effects of two feeding methods on metabolic bone disease in newborns with very low birth weights. *Global journal of health science*, 2016. 8(1): p. 249.

Investigation of Serum Levels of Vitamin D in Patients with intractable Carpal Tunnel Syndrome Referred to Physical Medicine and Rehabilitation Clinics of Shiraz University of Medical Sciences in 2015

Seyed Mohammad Saghanezhad (1)
Sharareh Roshanzamir (2)
Marzieh Mohtashamkia (1)

(1) Student Research Committee, Shiraz University of Medical Sciences, Shiraz, Iran

(2) Department of Physical Medicine & Rehabilitation, Shiraz University of Medical Sciences, Shiraz, Iran

Corresponding Author:

Sharareh Roshanzamir

Telephone: +989177111359

Email: Sharareh.roshanzamir@gmail.com

Received: January 30, 2018; Accepted: February 10, 2018; Published: March 1, 2018. Citation: Seyed Mohammad Saghanezhad, Sharareh Roshanzamir, Marzieh Mohtashamkia. Investigation of Serum Levels of Vitamin D in Patients with intractable Carpal Tunnel Syndrome Referred to Physical Medicine and Rehabilitation Clinics of Shiraz University of Medical Sciences in 2015. World Family Medicine. 2018; 16(3):227-230. DOI: 10.5742/MEWFM.2018.93343

Abstract

Introduction: One of the factors which can influence Carpal Tunnel Syndrome (CTS) is vitamin D. Vitamin D is an essential and fat-soluble vitamin which acts like a steroid hormone, is produced in the body and targets certain tissues.

Objective: This study investigated serum levels of vitamin D in patients with intractable CTS referred to the Physical Medicine and Rehabilitation Clinics of Shiraz University of Medical Sciences in 2015.

Method: This observational, cross sectional analysis evaluated 85 patients with intractable CTS referred to the Physical Medicine and Rehabilitation Clinics of Shiraz University of Medical Sciences in 2015, determined their serum level of vitamin D and compared results with 85 healthy controls.

Results: Mean age and BMI of case and control groups were identical ($P > 0.05$). There was a significant difference ($P = 0.0001$) in mean serum level of vitamin D between case group (23.2 ± 9.2 nm/l) and control group (41.3 ± 16.8 nm/l).

Discussion and Conclusion: It is concluded that serum level of vitamin D is lower in patients with intractable CTS compared to the general population.

Key words: carpal tunnel syndrome, vitamin D, treatment-resistant

Introduction

Carpal tunnel syndrome (CTS) is the most common peripheral neuropathy of hand and arm caused by pinched or pressed nerves in the wrist (as a result of compression of median nerve in the carpal tunnel) (1). The tunnel is a narrow path for nine tendons and one nerve (Median nerve), to pass from the forearm to the hand. This path lies on the carpal bones and is roofed by a strong ligament, flexor retinaculum. In the case of CTS there is a group of symptoms which are called a syndrome and any cause which narrows space of the tunnel, increases pressure or size of the tissues inside the tunnel and leads to these symptoms (1, 2). This pressure will lead to motor and sensory dysfunction in the affected hand and areas supplied by the median nerve and its branches such as structures on the lateral side of the hand that include the thumb, index, middle finger and the outer half of the ring finger. The pain is mainly referred to the forearm and beyond the wrist.

Prevalence of this syndrome ranges as high as 15% in the industrial population whereas the annual incidence of CTS is 1 to 3.46 per 1000 persons in the general population.

It is most common in middle-aged housewives, and caused by overuse of the wrist such as when typing on a keyboard, driving, doing carpentry, illustrating, and in butchers, automobile mechanics and workers who work with their hands all day long. (3, 4).

Causes of CTS are divided into: 1) anatomic causes such as fractures, dislocations, osteophytes of wrist bones, tumors, cysts, thickened synovium and arthritis;

2) inflammatory or neuropathic causes such as diabetes mellitus, alcoholism, pregnancy and thyroid diseases; 3) mechanical causes such as repetitive movements of the wrist and fingers and vibration, particularly in labourers and computer users (5, 6).

CTS patients are usually diagnosed by numbness, pain and paresthesia in the median nerve distribution (thumb, index and middle finger). These symptoms significantly reduce quality of life of patients; thus, treatment of this disease is highly important (6, 7).

The patients usually complain about numbness, pain, and paresthesia in the median nerve innervation. These symptoms are often worsened during nights and with repetitive and strong movements of hands. In some cases, straightening or waving the hand will improve symptoms. Occasionally, inability in precise movements of the fingers (such as needlework) and motor weakness are reported. Thenar atrophy is one of the objective symptoms of this disorder [4, 8].

Conservative treatments such as splinting, rest, physiotherapy, exercise and nonsteroidal anti-inflammatory drugs and finally surgical release of the carpal tunnel is usually used for treatment of CTS; however, this surgery is essential for those patients for whom other conservative therapy has not worked. In this operation the retinaculum is divided to create more space for the nerve. (9).

When medical and supportive treatments fail to reduce symptoms (less than half of the patients), surgery is prescribed for removing pressure on the nerves. The surgery tends to widen the carpal tunnel by releasing transverse carpal ligament and its extensor fascia. Surgery is successful in 90% of cases ; however, full recovery takes several months. Recently, endoscopic surgery has been used [4, 8].

If left untreated and not done in a timely manner, the patient will have irreversible nerve damage leading to intractable pain, numbness and muscle weakness in the areas innervated by the median nerve.

One of the factors which can improve symptoms of CTS is vitamin D. Vitamin D is an essential and fat-soluble vitamin which acts like a steroid hormone produced in the body and certain target tissues. Vitamin D is naturally present in very few foods, is added to others and available as a dietary supplement; however, it can be absorbed along with other fats (50% absorption efficiency)(10,11). Vitamin D is also synthesized endogenously by ultraviolet rays from sunlight striking the skin. Serum levels less than 18 nmol/l are considered as severe deficiency, 18 to 23 nmol/l are considered as average deficiency, 23 to 36 nmol/l are considered as mild deficiency and over 36 nmol/l are considered as a sufficient amount of vitamin D (12).

Vitamin D promotes calcium absorption in the gut and maintains adequate serum calcium and phosphate concentrations to enable normal mineralization of the bone and prevent hypocalcemia (10, 11).

Calcitriol increases tubular reabsorption of calcium and phosphate in kidneys. Calcitriol is also involved in cell differentiation, proliferation and growth of many tissues such as skin, muscles, pancreas, nerves, parathyroid gland and immune system (10, 11) .

It is also needed for bone growth and bone remodeling by osteoblasts and osteoclasts. Without sufficient vitamin D, bones can become thin, brittle, or misshapen. Vitamin D sufficiency prevents rickets in children and osteomalacia. Together with calcium, vitamin D also protects older adults from osteoporosis. Serum level of vitamin D is closely regulated by parathyroid hormone, calcium and phosphate (10, 11).

The main function of calcitriol is similar to steroid hormones, that is, reacting with membrane and nuclear receptors and influences on gene transcription in many tissues. Binding of calcitriol to nuclear receptor proteins increases affinity of these proteins to specific precursor regions of the genes or vitamin D response elements (VDRE), leading to their binding. Then, specific mRNA transcription begins in order to induce production of specific proteins or prevent their production. There are over 50 known genes including the gene related to Calbindin of which activity is regulated by vitamin D (10, 11).

Risk factors of vitamin D deficiency include preterm birth, skin pigmentation, lack of light exposure, obesity, malnutrition and aging. Serum level of 25-hydroxyvitamin D is higher in northern European countries than in southern European countries(11,12).

Involvement of vitamin D in the immune system (immunomodulatory effect) and increase in levels of inflammatory markers such as 6-IL/10-IL ratio and CRP are associated with decrease in serum levels of vitamin D. An optimal serum level of vitamin D is required to increase function of immune system, particularly in the elderly (13, 14).

The role of vitamin D has been noted in the development of many musculoskeletal disorders (11, 12). However, no study has been conducted on serum level of vitamin D in patients with CTS compared to the general population.

Accordingly, this study evaluates serum level of vitamin D in patients with intractable CTS referred to the Physical Medicine and Rehabilitation Clinics of Shiraz University of Medical Sciences in 2015.

The developed hypothesis is that serum level of vitamin D in patients with treatment-resistant CTS is different from the normal population.

Materials and Methods

This is an observational, cross-sectional analysis. With Assumption of Confidence: 95%, D:0.1, P:70% , estimated Sample size was 85, estimated Control Group was 85 and Sample selection pattern was Simple.

Population and Sample

The studied population included 170 patients with treatment-resistant CTS. The patients were assigned to two groups of 85 with and without treatment-resistant CTS by using convenient sampling. Inclusion criteria included treatment-resistant CTS (6 months of treatment with NSAIDs (Non steroidal Anti-inflammatory Drugs), splint and physiotherapy), consent to participate, 18 to 24 BMI and age 20 to 50 years. Exclusion criteria included treatment-responding CTS, known history of trauma to the wrist and hand, diabetes, hypothyroidism, radiculopathy, peripheral neuropathy, known chronic liver and renal disorder, pregnancy, lactation and metabolic diseases.

Methods

This observational, cross-sectional analysis evaluated 85 patients with treatment-resistant CTS referred to the Physical Medicine and Rehabilitation Clinics of Shiraz University of Medical Sciences in 2013-2014. Serum level of vitamin D was determined by high-performance liquid chromatography (HPLC) and compared with 85 healthy controls who were selected from people accompanying the patients. A questionnaire was designed to collect data including age, gender, BMI, past medical history, drug history, exclusion and inclusion criteria and serum level of vitamin D.

Inclusion and Exclusion Criteria

Inclusion criteria included treatment-resistant CTS (6 months of treatment with NSAID, splint and physiotherapy and dissatisfaction with treatment), consent to participate, 18 to 24 BMI and age 20 to 50 years. Exclusion criteria included severe CTS, known history of trauma and tumor in the wrist and hand, diabetes, hypothyroidism, radiculopathy, peripheral neuropathy, known chronic liver and renal disorder, pregnancy, lactation, and metabolic diseases.

Ethical considerations

This study was approved by the Ethics committee of Shiraz University of Medical Sciences at 2015-08-19 with the reference number of IR.SUMS.REC.1394.S290. Personal information was not disclosed. Nobody was forced to participate in the study. Written informed consent was obtained from all participants before any test.

Scales

Questionnaire was used to collect data.

Data Analysis

Data was compiled on the Excel 2013 software. Independent-Samples T Test with P value of 0.05 in SPSS20 were used to analyze data.

Results

Table 1 reports distribution of age, BMI and level of vitamin D in the two groups studied.

Table 1: distribution of age, BMI and level of vitamin D in the two groups studied

		Mean	Std. Deviation	Std. Error	P Value
Age year	Case	42.0706	10.44121	1.13251	> 0.05
	Control	40.8353	7.95351	.86268	
	Total	41.4529	9.27430	.71131	
BMI	Case	21.1353	1.20482	.13068	> 0.05
	Control	21.1471	1.17985	.12797	
	Total	21.1412	1.18888	.09118	
Vit. D nm/l	Case	23.1882	9.16709	.99431	0.0001
	Control	41.2941	16.83804	1.82634	
	Total	32.2412	16.28284	1.24884	

Total sample size was set at 170 cases who were assigned to control group (85) and experiment group (85). In the experiment group, lower bound of age was 39.81 and upper bound of age was 42.07 (42.07 ± 10.44 ; p -value>0.05). In the control group, lower bound of age was 39.11 and upper bound of age was 42.55 (40.83 ± 7.95 ; p -value>0.05). In total (control group + experiment group), lower bound of age was 40.04 and upper bound of age was 42.85 (41.45 ± 9.27 ; p -value>0.05). In the experiment group, lower bound of BMI was 20.87 and upper bound of BMI was 21.39 (21.13 ± 1.20 ; p -value>0.05). In the control group, lower bound of BMI was 20.89 and upper bound of BMI was 21.40 (21.14 ± 1.17 ; p -value>0.05). In total (control group + experiment group), lower bound of BMI was 20.96 and upper bound of BMI was 21.32 (21.14 ± 1.18 ; p -value>0.05). In the experiment group, lower bound of serum vitamin D was 21.21 nm/l and upper bound of serum vitamin D was 25.16 nm/l (23.18 ± 9.16 ; p -value=0.0001). In the control group, lower bound of serum vitamin D was 37.66 nm/l and upper bound of serum vitamin D was 44.92 nm/l (41.29 ± 16.83 ; p -value=0.0001). In total (control group + experiment group), lower bound of serum vitamin D was 29.77 nm/l and upper bound of serum vitamin D was 34.70 nm/l (32.44 ± 16.28 ; p -value=0.0001). Mean age was identical in both groups (P >0.05). Moreover, mean BMI was identical in both groups (P >0.05). There was a significant difference (p =0.0001) in mean serum level of vitamin D between the case group (23.2 ± 9.2 nm/l) and control group (41.3 ± 16.8 nm/l).

Discussion and Conclusion

Some CTS patients do not respond well to the treatments which are currently used. It will be helpful to identify effective factors on lack of response. It is essential to provide solutions for promoting health and increasing quality of life of these people.

Vitamin D is a fat-soluble element that seems to have some anti-inflammatory and immune-modulating properties. In addition, recent epidemiologic studies have observed relationships between low vitamin D levels and increased overall and cardiovascular mortality, cancer incidence and mortality, and autoimmune diseases such as multiple sclerosis.(13)

A cross-sectional descriptive study in a multi-ethnic general practice in Norway in 2010 showed a high prevalence of hypovitaminosis D in patients with non-specific musculoskeletal pain, headache, or fatigue for whom the GP had suspected a low vitamin D level. These results indicate that GPs should maintain awareness of hypovitaminosis D and refer such patients with minimal sun exposure and a low dietary vitamin D intake for more evaluation.(9)

According to a study conducted in 2014, a strong relationship can be found between low level of vitamin D concurrent with the increased level of inflammatory markers such as IL-6/IL-10 ratio and CRP in the elderly; an optimal serum level of vitamin D is required to increase function of immune system, particularly in the elderly (14).

Moreover, practitioners should be aware of non-calcitropic effects of vitamin D, such as differentiation control, meiosis and its involvement in immune system (immunomodulatory effects) (15).

One potential cause of CTS is the role of vitamin D. Accordingly, this study evaluated serum level of vitamin D in patients with intractable CTS referred to the Physical Medicine and Rehabilitation Clinics of Shiraz University of Medical Sciences in 2015.

No study has been conducted in this regard; most of the studies conducted focused on vitamin B6. However, Oh et al (2013) evaluated six CTS patients and compared them with six controls. They reported down regulation of vitamin-D binding protein (VDBP) in CTS patients compared to controls. This is consistent with the current study.

In this study, mean age and BMI were identical in both groups ($P>0.05$). There was a significant difference ($p=0.0001$) in mean serum level of vitamin D between the case group (23.2 ± 9.2 nm/l) and control group (41.3 ± 16.8 nm/l).

In conclusion, serum level of vitamin D is lower in patients with intractable CTS compared to the general population. Finally, it is recommended to conduct further studies with larger samples in order to confirm current findings.

Acknowledgement

This paper has been driven out of the thesis of Seyed Mohammad Saghanezhad student of the School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran with the number of 87/1004

References

- [1]. Ferry S, Hannaford P, Warskyj M, Lewis M, Croft P. Carpal tunnel syndrome: a nested case-control study of risk factors in women. *American Journal of epidemiology*. 2000;151(6):566-74.
- [2]. Atroshi I, Gummesson C, Johnsson R, Ornstein E, Ranstam J, Rosén I. Prevalence of carpal tunnel syndrome in a general population. *Jama*. 1999;282(2):153-8.
- [3]. Kragstrup TW. Vitamin D supplementation for patients with chronic pain. *Scandinavian journal of primary health care*. 2011;29(1):4-5.
- [4]. Ibrahim I, Khan WS, Goddard N, Smitham P. Suppl 1: Carpal Tunnel Syndrome: A Review of the Recent Literature. *The open orthopaedics journal*. 2012;6(2):65-69.
- [5]. Lundborg G, Dahlin LB. The pathophysiology of nerve compression. *Hand clinics*. 1992;8(2):214-215.
- [6]. Violante FS, Armstrong TJ, Fiorentini C, Graziosi F, Risi A, Venturi S, Curti S, Zanardi F, Cooke RM, Bonfiglioli R, Mattioli S. Carpal tunnel syndrome and manual work: a longitudinal study. *Journal of Occupational and Environmental Medicine*. 2007;49(11):1189-1196.
- [7]. Gelfman R, Melton LJ, Yawn BP, Wollan PC, Amadio PC, Stevens JC. Long-term trends in carpal tunnel syndrome. *Neurology*. 2009;72(1):33-41.
- [8]. Ghasemi-rad M, Nosair E, Vegh A, Mohammadi A, Akkad A, Lasha E, Mohammadi MH, Sayed D, Davarian A, Maleki-Miyandoab T, Hasan A. A handy review of carpal tunnel syndrome: From anatomy to diagnosis and treatment. *World journal of radiology*. 2014;6(6):284.
- [9]. Pomerance J, Zurakowski D, Fine I. The cost-effectiveness of nonsurgical versus surgical treatment for carpal tunnel syndrome. *The Journal of hand surgery*. 2009;34(7):1193-200.
- [10]. Kulie T, Groff A, Redmer J, Hounshell J, Schragger S. Vitamin D: an evidence-based review. *The Journal of the American Board of Family Medicine*. 2009;22(6):698-706.
- [11]. Alshahrani F, Aljohani N. Vitamin D: deficiency, sufficiency and toxicity. *Nutrients*. 2013 ;5(9):3605-3616.
- [12]. Knutsen KV, Brekke M, Gjelstad S, Lagerlöv P. Vitamin D status in patients with musculoskeletal pain, fatigue and headache: a cross-sectional descriptive study in a multi-ethnic general practice in Norway. *Scandinavian journal of primary health care*. 2010;28(3):166-71.
- [13]. Kragstrup TW. Vitamin D supplementation for patients with chronic pain. *Scandinavian journal of primary health care*. 2011;29(1):4-5.
- [14]. Laird E, McNulty H, Ward M, Hoey L, McSorley E, Wallace JM, Carson E, Molloy AM, Healy M, Casey MC, Cunningham C. Vitamin D deficiency is associated with inflammation in older Irish adults. *The Journal of Clinical Endocrinology & Metabolism*. 2014;99(5):1807-15.
- [15]. Lang CL, Wang MH, Chiang CK, Lu KC. Vitamin D and the Immune System from the Nephrologist's Viewpoint. *ISRN endocrinology*. 2014.
- [16]. Oh YM, Ma TZ, Kwak YG, Eun JP. Proteomic evaluation to identify biomarkers for carpal tunnel syndrome: a comparative serum analysis. *Connective tissue research*. 2013;54(1):76-81.

Investigating the Effect of Knowledge Management Dimensions on the Level of Performance of Nurses Working in Ayatollah Rouhani Hospital in Babol

Fatemeh Rezaei (1)
Hamed Hosseinzadeh (2)
Abbas Dehghan (3)

(1) Department of Nursing, Faculty Member, Babol Branch, Islamic Azad University, Babol, Iran

(2) Master of Knowledge and Information Science, Ayatollah Rouhani Hospital, University of Medical Sciences, Babol, Iran

(3) Master of Knowledge and Information Science, Public Library, Amol the Institution of the Public Library of the Country, Amol, Iran

Corresponding author:

Fatemeh Rezaei

Department of Nursing, Professor of Faculty, Babol Branch, Islamic Azad University, Babol, Iran

Received: January 30, 2018; Accepted: February 10, 2018; Published: March 1, 2018. Citation: Fatemeh Rezaei, Mohsen Hosseinzadeh Savadi, Maedeh Faraji Douki. Investigating the Effect of Knowledge Management Dimensions on the Level of Performance of Nurses Working in Ayatollah Rouhani Hospital in Babol. *World Family Medicine*. 2018; 16(3):231-236. DOI: 10.5742/MEWFM.2018.93336

Abstract

Objective: The aim of this study was to determine the effect of knowledge management dimensions on the level of performance of nurses working in Ayatollah Rouhani Hospital in Babol.

Methodology: After reviewing the subject literature, the proposed model was presented in four effective factors of knowledge management on the level of performance. Then, a questionnaire consisting of 25 questions was designed based on these factors, and after gaining assurance of its validity and reliability based on expert judgment and calculating the Cronbach alpha coefficient, 350 questionnaires were distributed among 350 nurses of Ayatollah Rouhani Hospital in Babol in 2017, which were selected by random sampling method. In order to test the fitting of the research model and study the relationship between its variables, structural equation modeling was used using Lisrel software.

Findings: The scores obtained from nurses' productivity in the four dimensions of knowledge management (knowledge creation, knowledge sharing, knowledge application, and knowledge storage of services), independent t-test and independent variance analysis showed that there was no

significant difference in any of the different levels of demographic variables including gender, marital status, education, work experience, employment status and organizational status ($p > 0.05$). In contrast, the result of a single-sample t-test showed that the mean of the four dimensions was greater than 3 ($p < 0.05$), and the result of the level of performance of the four dimensions of the mentioned dimensions had a reasonable likelihood.

Conclusion: The results of this study showed that most of the nurses of this center believe that the quad size of knowledge management on the level of performance among hospital nurses, in addition to improving the quality of nurses' services, also reduces the cost of the hospital.

Key words: Knowledge Management, Performance, Nurses.

Introduction

It is argued from this view that knowledge is an intangible asset that is more important than traditional wealth in a new economy. The intangible assets of organizations include: information, knowledge, experience and skills of the organization's staff, which, of course, is not easy to measure, because there are no specific evaluation techniques and criteria. Drucker believes that in today's world economy, knowledge as the result of learning is not the same source and is not the same in other sources of production, such as labor, capital and land, but rather a much more important source for the present [1]. Organizations need to use adaptable and intelligent strategies to succeed and compete in an increasingly sophisticated environment, including knowledge management practices and processes. Therefore, knowledge management is required as one of the ways to achieve desirable performance in organizations and, in particular, in libraries for the success and competitiveness of today's environment [2]. Yang and Lynch argue that many new business management practices have emerged for the first time in the transitional sector and then in the nonprofit sector [3]. The implementation of knowledge management is important not only for large corporations and organizations, but also for non-profit organizations such as universities and health centers. The health sector, is an organization that requires skilled and knowledgeable nurses, and because of the association with community health, it is necessary to use efficient methods in providing services to improve quality, low health costs and timely addressing the needs of clients, which is only possible in the light of the use of modern information management techniques and the allocation of suitable time to knowledge management [4]. Knowledge management is developing its theoretical background as a new discipline. Organizations need efficient knowledge management to improve organizational performance and to compete successfully in global markets, although the need for knowledge management is generally accepted as an applied practice, but it is still a non-objective concept, and most writings seek to explore this issue [5]. Health organizations are more or less faced with similar issues to other organizations.. Moving human resources and leaving them out of the system will eventually lead to the outflow of intellectual capital. There are also differences between health organizations and other organizations. One of these differences is having goals as do other organizations, namely, promoting patient protection and reducing medical errors, and another difference is the growing use of advanced health services that makes it necessary to employ trained and expert staff. On the other hand, the necessity of doing things group-wide and around the patient's axis is to increase the knowledge sharing and organization and management in these organizations [6]. Another important application of knowledge management in health organizations is clinical coding [7].

Methodology

After reviewing the subject literature, the proposed model was presented in four effective factors of knowledge management on the level of performance. Then, a questionnaire consisting of 25 questions was designed based on these factors, and after gaining assurance of its validity and reliability based on expert judgment and calculating the Cronbach alpha coefficient, 350 questionnaires were distributed among 350 nurses of Ayatollah Rouhani Hospital in Babol in 2017, which were selected by random sampling method. In order to test the fit of the research model and study the relationship between its variables, structural equation modeling was used using Lisrel software.

Findings

In Table 1, some of the demographic and occupational characteristics of the sample are shown. Most of the subjects were women with a record of less than 10 years of work experience and undergraduate education. Also, the mean age of participants in this study was 31.11 ± 4.47 .

The scores obtained from nurses' productivity in the four dimensions of knowledge management (knowledge creation, knowledge sharing, knowledge application, and knowledge storage of services), independent t-test and independent variance analysis showed that there was no significant difference in any of the different levels of demographic variables including gender, marital status, education, work experience, employment status and organizational status ($p > 0.05$). In contrast, the result of a single-sample t-test showed that the mean of the four dimensions was greater than 3 ($p < 0.05$), and the result of the level of performance of the four dimensions of the mentioned dimensions had a reasonable likelihood (Table 2).

In the study of goodness of fit, the fitting of the conceptual model was presented and the causal relationships between the variables were derived from the structural equations and specifically by the path analysis method (Figure 2 - page 232).

According to the information obtained from the structural equation model, the results showed that the conceptual model of the research was fit. There is also a significant difference between the variables of knowledge creation, knowledge sharing and the knowledge application with productivity.

Given the output of the Lisrel software, the χ^2 value is 1.75 and less than 3, which is a good value. The low level of this indicator indicates a small difference between the conceptual model of the research and the observed data; also, the RMSEA value is 0.04 and less than 0.08. In addition to χ^2 , the more RMSEA index is less, the model has a better fit and the indexes (NFI-NFI-IFI-CFI) are greater than 0.9, and the GFI and AGFI indices are greater than 0.8; Therefore, the model has suitable fit and is confirmed.

Figure 1: Conceptual model of research

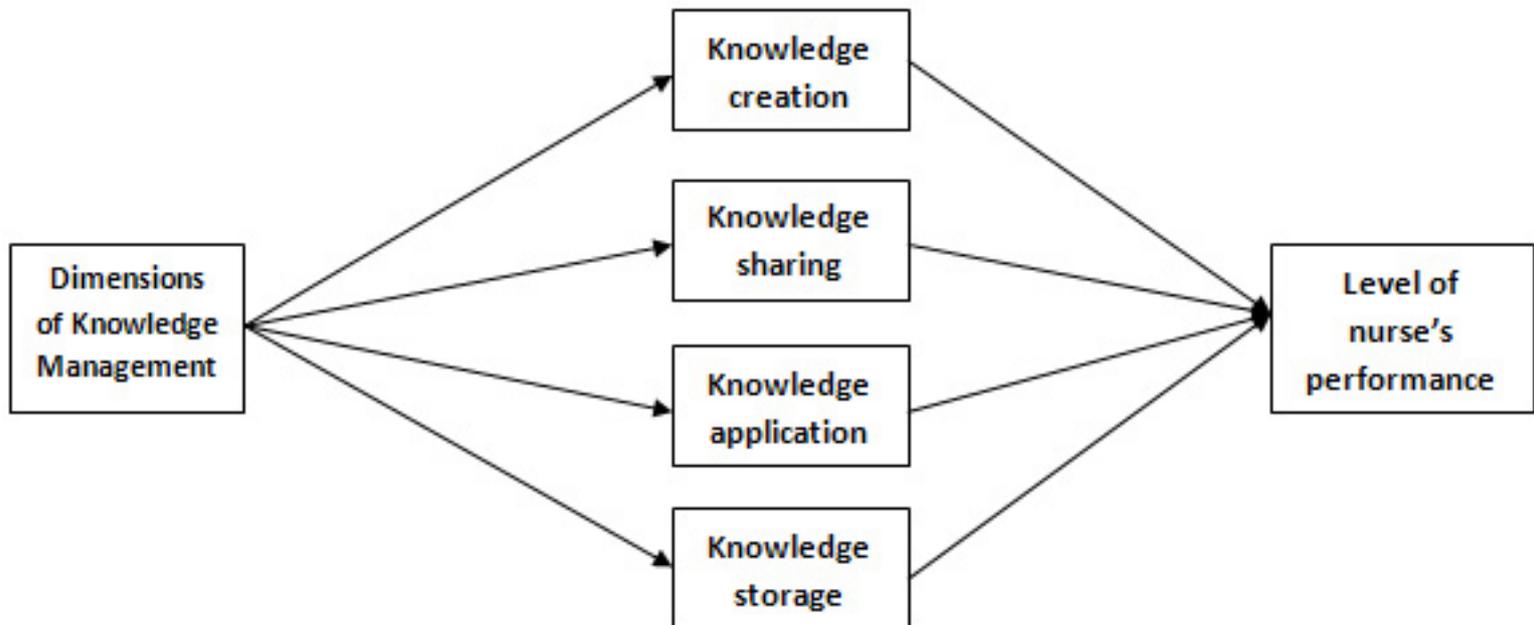


Table 1: Frequency distribution of research sample in terms of demographic information

Demographic factors	Groups	Frequency	Frequency percentage
Gender	Male	11	3.1
	Female	339	96.9
Marital status	Married	305	87.1
	Single	45	12.9
Level of Education	Bachelor	336	96
	Master's degree	14	4
Work experience (years)	under 10 years	270	77.1
	10-15	63	18
	20	17	4.9

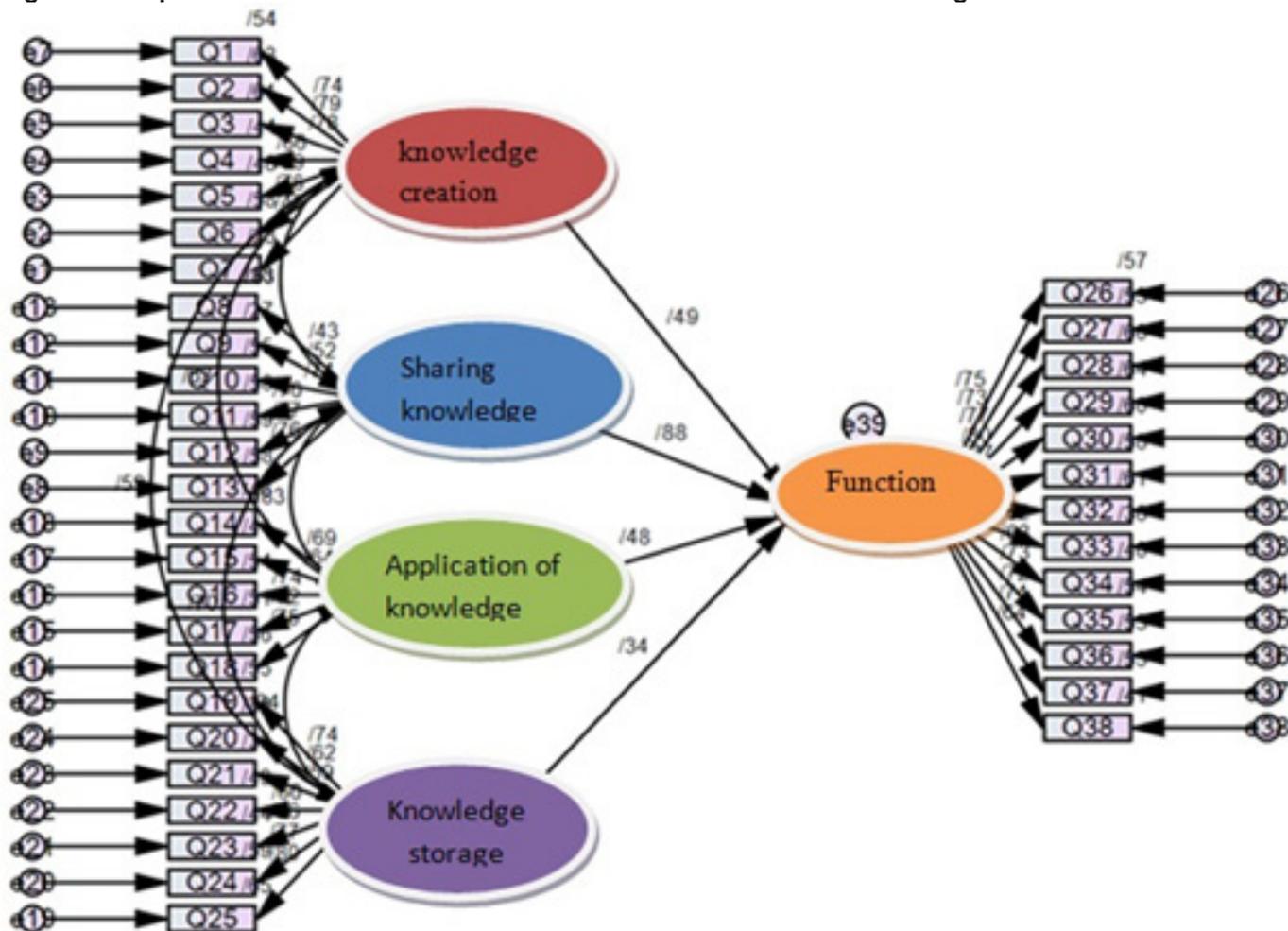
Table 2: Examining the utility of quadruple dimensions (knowledge creation, knowledge sharing, knowledge application and knowledge storage)

Dimensions	Number	Average	t-value	p-value
Knowledge creation	350	0.84±3.96	21.36	P<0.01
Knowledge sharing	350	0.71±4.14	30.13	P<0.01
Knowledge application	350	0.69±3.99	27.05	P<0.01
Knowledge storage	350	0.67±3.90	24.81	P<0.01
Performance	350	0.84±3.71	15.55	P<0.01
Total	350	0.65±3.94	26.59	P<0.01

Table 3: Evaluation of fitness indicators

Indicators	X2/DF	RMSEA	RFI	NFI	CFI	IFI	GFI	AGFI
Amount	1.75	0.04	0.99	0.99	0.99	0.99	0.99	0.96

Figure 2: Output of the causal relation test between the research variables using the standard Lisrel software



Discussion

The findings, according to Figure 2, show the output of the causal relation test between the variables of the research using the standard Lisrel software, which showed that there is a significant relationship between the four components of knowledge management in this research with the level of organizational performance and there was very little difference in the knowledge storage component with the amount of productivity. This suggests that culture (beliefs) is shared by members of the organization. Organizational values, unwritten rules and regulations, and methods of execution are the cultural resources of knowledge. The content of the organization’s culture, as a source of knowledge, can be strengthened by individuals, directions, work methods and computer organizations. Therefore, individual and organizational learning and development must be regarded as a value. All nurses of the organization at all levels and in each situation believe that they should share their knowledge and information for the sake of the organization’s growth and success, and this thinking is encouraged and supported by the organization, allowing nurses to trial and error, experience and learn. In such an organizational culture, thinking is not a waste of time, it is encouraged. The atmosphere of the organization is such that all people are enthusiastically endeavoring to learn and transfer their learning to others.

Communications are not limited to team, part, and even organizational boundaries, and there is a free flow of information, knowledge and ideas. All individuals are evaluated and encouraged based on the contribution they make to the development of knowledge in the organization. The organizational environment has many characteristics that are the source of potential knowledge. Therefore, by communicating with these attributes, an organization can find its own knowledge resources. This can be considered as a source of virtual knowledge that can be accessed or obtained from the environment. Also, research has been done and in our research that is being addressed. Mir Fakhredini and colleagues (2010) evaluated and prioritized knowledge management components related to knowledge innovation and innovation performance using the method. This research has proved a positive and significant relationship between knowledge innovation and knowledge management, and knowledge management and innovation performance. In this research, it was determined that the most and least components of knowledge management are “timely distribution of news” and “sharing of knowledge between nurses” respectively [8]. Mir Ghafouri et al. (2010) investigated the dimensions of knowledge management process in health centers in Yazd city, and concluded that the “knowledge management process” and “knowledge utilization” had the lowest and highest performance respectively [9]. Hosseinzadeh (2010) compared and determined the level of knowledge

management among nurses in the libraries of Isfahan and Tabriz University of medical sciences based on the Hissig model (creation, storage, sharing, and application of knowledge). The results of this study showed that the overall level of knowledge management application based on the Hissig model of the nurses of the libraries of Isfahan University of Medical Sciences with a mean of 2.8 and Tabriz University of medical sciences with a mean of 2.9 is less than average [10]. Shirvani et al. (2009) concluded that in the six components studied (identification, acquisition, development, sharing, distribution, use, and storage of knowledge), the necessary fields for the establishment of knowledge management in Isfahan University of Medical Sciences is less than average [11]. Fakher and colleague (2009) also ranked the colleges of Shahid Chamran University of Ahvaz using the Topsis Technique. In order to rank the colleges, a total of 30 indicators were selected and weighted with AHP technique (analytic hierarchy process). Subsequently, ranking was performed according to indicators. Out of the various colleges, 10 colleges entered the ranking process, which ultimately the Faculty of Psychology and Educational Sciences ranked first and the Faculty of Economics and Social Sciences ranked tenth [12]. In an article entitled "The Process Model for Knowledge Transfer Using the Theories of Knowledge Communication and Knowledge Translation", written by Liyanage et al in 2012, the introduction of an advanced model for the knowledge criticism process according to the advanced theoretical knowledge transfer model was studied in six main stages [13]. In an article titled "Research on Knowledge Transfer in Organizations: Linguistics," written by Kumar and Ganesh in 2013, a presentation on the literary linguistics of knowledge transfer in organizations was presented. In this research, the eight dimensions that had been derived from the literature study (research background) were introduced as the characteristics of transfer and knowledge sharing, and for each dimension they was found between two to six attributes [14]. An article entitled "The deterrent effect on organizational learning in complex organizations," written by McLaughlin et al in 2012, investigated the behavior of employee and provides knowledge and information in a complex production chain by looking at a better understanding of how to identify and manage the barriers that make such a change. In this study, the ways in which employees of a large corporation access and create and share information and knowledge are investigated and they attempted to understand, identify, and manage the barriers to knowledge transfer. This research in a field work has tested the barriers to knowledge transfer in a large company (IBM), and ultimately concluded that the effect of each of these obstacles in the organization is not the same and has different weight [15].

Conclusion

Knowledge management is creation, storage, absorption, sharing and knowledge application to increase the efficiency and effectiveness of an organization's activities. Along with all the factors that influence the organization's quality and quantity of knowledge management, human resources can also have a significant impact. Although

the impact of manpower seems to be on the sharing and absorption of knowledge, and although the impact of manpower on obvious knowledge management, or codified knowledge, is greater, it creates many abilities that help create and apply knowledge, as well as implicit knowledge management. The results of this study showed that most of the nurses of this center believe that the four dimensions of knowledge management on the level of performance among hospital nurses, in addition to increasing the quality of nurses' services, also reduce the costs of the hospital.

Acknowledgment: In this regard, I thank all the hospital intensive personnel for the necessary cooperation in this research.

References

- 1) Nick Bakhte, Akram, Seyyed Ali Siadat, Reza Hoveida, Azam Moghaddam (2009) The Relationship between Knowledge Management and Leadership Styles of Faculty Members from the Faculty Members of Isfahan University of Medical Sciences, *Journal of Health Information Management, Period Seventh / Second number / summer 2009*.
- 2) Lowson S. Examining the relationship between organization culture & knowledge management. PhD Thesis, Nova South East University; 2003 [Cited 28 Nov. 2009]. Available from: <http://202.28.199.34/multim/3100959.pdf>.
- 3) Yang W, Lynch B. P. On the knowledge management and the role of the library in the process of knowledge management. *Chinese Librarianship: An International Electronic Journal*, 2006; 21. [Cited on Sep. 24 2009]. Available From www.white-clouds.com/iclc/cliej/cl21YangLynch.htm.
- 4) Mirghafoor H, Farhang Nejad M.A., Sadeghi Arani Z. Performance evaluation of Yazd's health sector is Applying knowledge management process. *IJMS Journal Systems* 2010; 13 (39): 79-88. [Article in English]
- 5) Piri Z, Asefzadeh S. How can knowledge management (KM) be applied to healthcare organizations? *The journal of Qazvin University of Medical Science* 2006; 10 (1): 124-132. [Article in English]
- 6) Karamati M, Piri Z. From clinical coding to knowledge management in healthcare organizations. *Health Information Management* 2007; 4 (2): 239-248. [Article in English]
- 7) Atashk M, Mahzadeh P. Methodological Knowledge Management Process Models to Provide Integrated Technique. In the Proceedings of the National Conference on Knowledge Management and Information Science: Links and Interaction. Tehran: Ketabdar Prees; 2009: 419-447. [Book in Persian].
- 8) Darroch J, Mc Naughton R. Examining the link between knowledge management practices and types of innovation. *Journal of intellectual capital* 2002; 3 (3), 210-222. [Cited on Nov. 19 2009]. Available from: <http://www.emeraldinsight.com/journals.htm?articleid=883959&show=pdf>.
- 9) National Library for Health: Knowledge Management specialist library. A B C of knowledge management, NHS National Library for Health: Knowledge Management

specialist library; 2005. [Cited on 12 Feb. 2009]. Available from: <http://www.library.nhs.uk/knowledgemanagement/>

10) Azar A, Rajabzadeh A. Multi Criteria Decision Making. Tehran: Negah Danesh; 2000. [Book in Persian].

11) Mirfakhrodini S.A., Hataminasab S.H., Taleifar R., Konjavmonfared A.R. Knowledge management, knowledge innovation and performance of knowledge in small and medium enterprises. Business management outlook 2010; 2 (35): 103-118. [Article in English]

12) Hosseinzade A. An Application of Knowledge Management at the Isfahan University of Medical Science and Tabriz University of Medical Science based on the Hissig Model. [Thesis in Persian]. University of Isfahan, Faculty of Education and Psychology; 2010

13) Shirvani A, Safdarian A, Alavi A. Scale survey of knowledge management process mastery (Isfahan Medical Science University's reading scale). Health Information Management 2009; 6 (1): 75-82. [Persian].

14) Fakher I, Arman A, Zara Nejad M. Ranking of the Shahid Chamran University School of TOPSS technique. Journal of Psychology and Education 2008; 15 (3): 151-176. [Article in English]

15) Liyanage C, Elhag. T, Ballal T and Li Q, "Knowledge communication and translation a transfer model", Journal of knowledge management, 2009, Vol. 13 No. 3, pp. 118-131.

16) Kumar J.A. and Ganesh I.S. "Research on knowledge transfer in organizations: a morphology", Journal of knowledge management, 2009, Vol. 13 No. 4 pp. 161-17.

17) McLaughlin S., Paton R.A. and Macbeth D.K., "Barrier effect on organizational learning within complex organizations", Journal of Knowledge Management, 2008, Vol. 12 No. 2, pp. 107-123.

Medical Social Workers in Iran: Professionals or Employees?

Sareh Abri (1)

Mohammad Zahedi asl (2)

(1) Ph.D. candidate, Department of social work, Faculty of Social Sciences, Allameh Tabataba'i University, Tehran, Iran

(2) Professor, Department of Social Work, Faculty of Social Sciences, Allameh Tabataba'i University, Tehran, Iran

Corresponding author:

Mohammad Zahedi asl

Professor, Department of Social Work, Faculty of Social Sciences, Allameh Tabataba'i University, Tehran, Iran

Received: January 30, 2018; Accepted: February 10, 2018; Published: March 1, 2018. Citation: Sareh Abri, Mohammad Zahedi asl. | Medical Social Workers in Iran: Professionals or Employees? World Family Medicine. 2018; 16(3):237-245. DOI: 10.5742/MEWFM.2018.93334

Abstract

The present research was conducted to identify the current roles of social workers in Iranian hospitals. The data were collected using in-depth interview method, after which the textual data of the participants were analyzed through a qualitative content analysis. The MAXQDA 12 software program was employed to analyze the data. The participants consisted of experienced social workers who hold a Master's Degree in social work and have more than 15 years of work experience in hospitals. Purposive sampling was initiated and continued until data saturation was reached. In order to determine the main concepts, the initial codes were revised, examined, and classified. The number of initial codes was 50. After combining some of the codes, they were finally classified into 13 categories and 2 themes. Indirect care roles and direct care roles were the two themes extracted from the findings of the study. The indirect care roles include 4 categories that deal with research, cooperation with and membership on the treatment team and hospital committees, documentation, and fundraising. The direct care roles include 9 categories, namely, psychosocial and financial support, educator, liaison, service provider, guide and counseling, discharge planning and follow-up after discharge, assessment, crisis intervention and client and system advocacy.

Key words: Medical Social Work, Hospital, Role, Qualitative Study

Introduction

A look at the performance of medical social workers in Iran, shows their most significant continuous duty was to reduce the cost of treatment to the patients by providing financial rebates. This was done not with specialized evaluations, but in an unskilled manner and sometimes even as an obligation. With the development of the Health Promotion Plan of May 5, 2014 in Iran, the main purpose of which was to reduce the cost of treatment to patients in hospitals, some of the costs were covered by the plan which thereby significantly reduced the total cost of hospitalization to the patients. It seemed that, under the Ministry of Health, the time had come for social workers in hospitals to finally be able to fulfill their primary role of providing support by empowering the individual and the family and assisting the individual in adapting to his/her situation after suffering from an injury or a disease. However, not only was this not achieved, but it led to the diminution of the role of social workers because there was now a substitute for the only role the social workers were expected to play in this area, namely, to reduce the costs of treatment. Prior to the implementation of the Health Promotion Plan, some hospital officials viewed social workers as employees who incurred heavy costs to the financial system of the hospitals. They ignored the fact that social workers, if allowed to provide their main roles, such as organizing discharge planning for patients who are in need of services, could not only reduce the length of a patient's hospital stay, which is one of the most significant performance indicators of hospitals, but could also reduce the costs that are incurred through a longer hospital stay.

In fact, the social work profession is not as well recognized as other health professions, even though the main responsibility of psychosocial health-related problems is entrusted to social workers.

The role of hospital social workers in Iran is poorly defined. Those working in professions other than social work expect that medical social workers will seek to provide

financial services, while social workers themselves are interested in defining their roles by providing services with psychosocial functions. Social workers operate from a person-in-environment perspective providing interventions that address issues at both the personal and social level (Australian Association of Social Workers, 2016: 3), although social work services in Iranian hospitals are mostly offered for the purpose of providing financial assistance or referral services.

This study seeks to discover what the roles of Iranian medical social workers in public hospitals are.

Literature Review

History of medical social work in Iran

In Iran, after the establishment of the College of Social Services and employment of social workers in health care institutions, the services provided by such social workers proved to be effective in the treatment of physically and mentally ill patients.

Among all health care institutes in Iran who use social workers effectively, social insurance agencies, the Ministry of Health, health care institutions related to Tehran University, charities, and NGO's can be mentioned as the most outstanding pioneers. The Social Security Agency was one of the first institutions that accepted social workers since the very beginning of their activities in Iran. It was during the academic year of 1958-1959 that social workers were accepted for an internship at Sorkhehesar Hospital of Tehran. Later, in September 1960, a group of five social workers were hired to work in hospitals "Sorkhehesar" and "Children". In 1965, the Bureau of Social Works started an independent operation in the Agency of Social Security as its headquarters.

By 1969, twenty social workers had jobs at the Social Security Agency to address social, mental, and physical health issues of the covered patients. The lack of recognition as professionals and the nonexistence of accommodation were among the initial challenges of the social workers in the Social Security Agency.

These social workers would sometimes be expected by the chiefs of hospitals to serve as medical team members. However, giving injections and guidance to patients was not what the social workers had been trained for or had seen themselves ending up doing when they began their jobs in hospitals.

While lacking basic office space at the hospitals, they would be expected by the medical staff to interview all the patients. Understanding the need for privacy and confidentiality, one Iranian hospital finally agreed to provide the social workers with a small room to conduct their interviews. This change was followed by a better recognition of the role of social workers by hospitals, and gradually the workers were provided with the required work space in more and more hospitals. In 1969, twenty-five hospitals asked for social work services (College of Social Services, Iran; Record of a decade; 1969:33).

Roles of social workers in the 21st century

A wide variety of views can be found in literature on the role of the social worker. Social work is a contested concept and subject to competing definitions. Its language is confusing and contributes to the lack of clarity on what exactly social workers do. This means that there are no universally accepted ideas of the sure knowledge, skills or expertise of social workers. However, there is fairly wide agreement that those who are employed in the field of social work are committed to rights and justice, and that the field exists to assist, support, and enable those who suffer from the negative effects of social inequalities.

Several key conceptions on the role of social workers imply that social workers may play all of the following roles in different contexts and at different times in their career:

Counselor (or caseworker): one who works with individuals to help them address personal issues.

Advocate: one who works on behalf of the poor and socially excluded.

Partner: one who works together with disadvantaged or disempowered individuals and groups.

Assessor of risks or needs: one who works for a number of client groups to assess the risks or needs of individuals and is also associated with surveillance. This role may at times conflict with that of a counselor.

Care manager: one who arranges services for clients in a mixed economy of care, but may have little direct client contact.

Agent of social control: one who helps maintain the social system against the demands of individuals whose behavior is problematic (Asquith, et. al, 2005: 2).

The role of social workers is affected by changes in the social context such as:

Demographic changes, especially the ageing population and falling family size, which will affect the ability of families to provide care for their dependents.

Poverty and social exclusion are seen by some commentators as reasons to make the continued provision of social work especially important.

Social problems have been internationalized with increased migration and the tendency of social problems to cross national borders.

Modern communications technologies radically affect record keeping in (Asquith, et. al, 2005: 2).

The social services. They may also offer increasing opportunities for new forms of information provision, remote services, and self-help.

Social work has been affected by changes in welfare policies and ideologies since the postwar years. The provision of services has been dominated by the following models, in approximate succession:

Welfarism: social democratic paternalism.

Professionalism: ideology that stresses the expertise and authority of professionals.

Consumerism: that focuses on the power of the service user as a consumer.

Managerialism: that gives privilege to managerialism ideology and economic concerns.

Participationism: that stresses a more equal partnership between the service provider and the service user (Asquith, et.al, 2005: 3).

Rebecca G. Judd & Sherry Sheffield (2009) examined the roles and activities of current hospital social workers in United States. The authors first refer to the roles previously played by social workers in hospitals and categorize them into five sections: discharge planning, direct action activities such as counseling and intervention in crisis, guiding evidence-based activities, emphasis and participation in bioethical issues, and income producing projects. Then, the new roles and responsibilities of social workers were identified as follows: direct patient care activities, discharge activities, coordination with social support systems, and patient relocation, among which social workers spend the most on direct patient care activities (41.7%).

Lois Anne Cowles & Myron J. Lefcowitz (1995) examined the views of physicians, nurses, and social workers on the tasks that medical social workers undertake in hospitals. The findings of this study indicate that the role of social workers is a combination of activities, problems, and references. Physicians and nurses also agree on the activities of social workers, and believe that the main activity of social workers is to refer the patients to social resources and the association of clients with these resources, both for the patient and the family members for emotional or socio-environmental problems. In other words, when the activity is evaluation or treatment, social workers tend to be more responsible than physicians or nurses, especially when the primary client is the patient and the problem is mostly emotional. In contrast, the only assessment or treatment that physicians and nurses consider appropriate for social workers is to evaluate and treat the socio-environmental problems of the patient's family; they do not consider the evaluation and treatment of the patient's emotional problems as one of the social worker's duties. In short, the task that social workers expect to be a core part of their duties, other groups (doctors and nurses) consider to be a common part of the job.

Chack-kie Wong, Becky Chan, and Victor Tam (2000), classified the duties of medical social workers in Hong Kong hospitals into psychosocial assessments, psychosocial interventions, tangible assistance, and the mobilization of new social resources, and classified the activities related to the tasks in the following order: 1) Psychosocial assessment activities: assessing the patient's needs for utilizing social services, assessing the psychological conditions of the patient, evaluating the psychosocial function and the patient's role in society in terms of their disease. 2) Psychosocial intervention activities: helping the patient with emotional problems through personal counseling, assisting the patient with emotional problems through therapeutic groups, helping families of patients through personal counseling, assisting families of patients through group counseling. 3) Tangible assistance activities: evaluating patients for the use of financial services for therapeutic needs and other needs, patient evaluation for residential arrangements and services, and

referral services to social sources. 4) Activities related to mobilizing new social resources: communicating with leaders in society for new social services, and organizing supportive and self-supporting groups.

Christopher Chitereka (2010) examined the daily roles and responsibilities of hospital social workers in Zimbabwe, the challenges they face, and some solutions to these challenges. Social workers in the hospitals of this country are involved in two parts of the inpatient and outpatient wards. In the outpatient department, they deal with psychosocial, emotional, and environmental problems requiring social assistance services in the form of personal and family interventions. The technique that is often used by them is crisis intervention. The social worker, as an interlocutor on the healthcare committee, plays a facilitating role in inter-professional communication. It also helps the patient to adapt to the medical conditions for the maximum rehabilitation services. Moreover, in the case of a long hospitalization, the social worker plans some welfare services in coordination with the medical staff. In addition, the provision of counseling services is also one of the other duties of social workers in a hospital.

Method

Qualitative Approach

The present study is a qualitative study conducted according to the qualitative content analysis method. A qualitative content analysis is an analytical method used for the subjective interpretation of the content of textual data (Hsieh, H. F & Shannon, S. E, 2005: 1277). In this method, through a systematic classification, codes and categories are extracted directly and inductively from raw data (Green B, 2004: 82).

In the process of a qualitative content analysis, data collection and an analysis are carried out simultaneously. The unit of analysis, which is the analytic section of the text used to achieve the research objectives, is selected from the text of the interview. The initial codes, which are a significant and indispensable part of the units of analysis, will be extracted. These initial codes can include the content of the participants' interviews and/or the abstraction of the researcher of the content. (Graneheim U & Lundman B, 2004: 105). Then, the number of initial codes are reduced to subcategories based on similarities and differences, and finally, the subcategories are classified into abstract categories and themes (Priest H, Roberts B & Woods L, 2002: 30).

Recruitment/ Data Collection

This study focused on the roles and activities of social workers employed in public hospitals in Iran. Interviews were conducted with 11 social workers working in 11 public hospitals in Tehran, Fars, Semnan, Hormozgan, Lorestan and Hamedan provinces. The inclusion criteria consisted of 1) having M.Sc. social work degree, 2) having at least 15 years of work experience in the social work unit in hospitals and being able to articulate one's own professional roles and activities.

The Ministry of Health provided us the database of social workers of the hospitals. We made phone calls with eligible ones and every social worker we approached, agreed to participate. Participants were selected relying on a non-probability sampling strategy by purposive sampling and continued until data saturation was reached and no new concepts emerged.

Participants` ages ranged from 42 to 57 years old and their work experience in social work units in hospitals was between 15 and 26 years. Their work experience in their current hospital was between 9 and 20 years. Participants consisted of 9 females and 2 males. We selected Participants from different types of hospitals including general, children, heart, dermatology, cancer, and burn injuries.

In-depth interviews were conducted in Persian based on a semi-structured guide, field notes, and observations. Before each interview, the purpose of the study was explained to the participant. Moreover, with the consent and permission of the participants, the interviews were audio recorded. The duration of each interview was between 30 and 60 minutes. Table 1 shows the interviewees` characteristics.

Data collection lasted from February 2017 to May 2017. Interviews were conducted by a female interviewer who was a Ph.D. student of social work with 11 years of work experience in social work unit at a hospital in Iran, qualified in qualitative research and familiar with the essential skills of the interview, such as follow-up questions, clarification, active listening, paraphrasing, explanation, summary and conclusion. The interview with each social worker was conducted in her/his hospital during working hours because of the need to observe activities and also medical social workers have a hectic schedule making it difficult for them to leave their workplace for an extended period. Interview guide included a short checklist of questions to begin the interview such as what do you do in hospital? How do you perceive your role in providing psychosocial care? And how do you define your job for other professionals or people? Then during the interview, questions were designed to guide and encourage the participants to speak.

Data analysis

The research team transcribed the text of each interview verbatim in Persian and immediately after the interview analyzed by means of a qualitative content analysis by using MAXQDA12 software program. Using this method, the text of the interviews, the units of analysis and the initial codes were extracted based on the meaning units derived from the participants` descriptions. Then, the classification was done by considering the similarities and differences in the initial codes. Finally, based on the accurate interpretation of the researcher and the continuous comparison of the data, categories and themes were extracted.

Methods to Ensure Rigor

In this study, the credibility, confirmability, dependability, and transferability were used to ensure the trustworthiness of the data.

To confirm the validity and the credibility of the data, the researcher spent a prolonged period of time collecting and analyzing the data and integrating the information sources. Multiple methods were employed to collect the data, such as interviews, notes in the field, observations, and member checks. Three of the participants, participant three, ten and eleven, were contacted to confirm the accuracy of the transcription. They did one on one interview and all three confirmed the interviews were transcribed accurately. Member checking aid in the process of reflexivity, was done through monitoring of self and being rigorously subjective (Morrow, 2005).

To verify the confirmability and compliance of interviews and results of data analysis, such as basic codes and categories, we used peer check with the assistance of two PhD students in social work with work experience in the field of health care and there were no big differences between results.

Utilizing negative case analysis the researcher thoroughly searched for cases that did not fit her interpretations (Rubin, 2000). This involves a deliberate and articulated search for disconfirmation and helps to combat the investigator`s natural tendency to seek confirmation of her or his preliminary or emerging findings (Morrow, 2005). By

Table 1: interviewees` characteristics

Interviewee	Gender	Age	Working history as a medical social worker	Working history as a medical social worker in current hospital	Kind of hospital
1	female	45	18	15	general
2	female	47	20	20	general
3	female	53	25	20	children
4	female	50	20	20	heart
5	female	42	17	9	general
6	female	46	16	13	dermatology
7	female	57	26	20	general
8	male	50	20	16	general
9	female	47	15	15	cancer
10	male	48	21	21	general
11	female	45	15	12	Burn injuries

By repeatedly comparing the transcriptions and codes, the researcher decreased the influence of personal bias and increased the accuracy of the codes and categories.

Findings

By continually comparing the basic codes and data and considering the similarities and differences, similar codes were placed in the same class and an initial classification of codes was obtained. The number of initial codes was 50. After combining some of them, they were classified into 13 categories and 2 themes. According to the data analysis and code extraction, two main themes emerged, namely, indirect care roles and direct care roles, each of which included subcategories.

The first theme: Indirect Care Roles

This concept represents the roles and responsibilities that the participants did not directly relate to the references, but the indirect result of these roles and activities was directed at the authorities (or the patient). This concept includes the following subcategories: "Research in the field of healthcare", "Co-operation and membership on the treatment team and hospital committees," "Documentation" and "Fundraising" which will be described in detail.

Research in the field of healthcare: some participants stated that research in the field of healthcare is one of the main roles of the hospital social worker. Social workers have a responsibility to be familiar with the literature crucial to their area of practice. As professionals, social workers in all settings have a mandate to improve the knowledge of the field, and this can best be accomplished through participation in research activities. Rich data sources that permit opportunities for quantitative and qualitative research exist within hospitals.

Participant (11): "I am interested in research. So far, I have done three articles on hospital social work that were published, but many of my colleagues in other hospitals are not familiar with research methods".

Co-operation and membership on the treatment team and hospital committees: Participants pointed out the complete need for the social worker to participate in the activities of the treatment team and to actively participate in hospital committees. The presence of a social worker on the treatment team is essential to assist the physician in diagnosis and treatment of the patient through study of the patient in their social situation and by interpreting the patient and their environment to the physician. In addition the medical social work is to assist by organized sources in making medical treatment more effective and expediting the treatment process by resolving the ambiguities in the treatment process for the patient and his/her family.

Participant (1): "If the treatment team is composed of the most experienced physicians, but lacks a social worker who could explain the illness and medical terms for the patient and their family according to their level of education and make them understand, the treatment process will be troublesome."

Documentation: Social workers shall maintain records or documentation of social work services, which reflect the client and client systems' pertinent information for assessment and treatment. Documentation and the submission of information about the actions and duties of the social work profession were extracted from another category. Participants spoke about spending a lot of time writing down financial exemption information in the Health Information system (HIS) of the hospital as well as the portal of the Ministry of Health.

Participant (4): "We will record discounts on patients' treatment costs based on the patient's medical records and medical records on the Ministry of Health Portal. Of course, daily discount rates are recorded in the HIS system of the hospital, which takes a lot of time for me and my colleagues."

Fundraising: This category refers to the great role of the social worker in treatment centers. Participants stated that, despite their desires, as well as the doctrines of the social work profession, much of the social worker's activities in the hospital were allocated to providing financial resources (from good doers and public organizations). The lack of government funding to address the pharmaceutical and therapeutic needs of patients takes place through discounting and providing financial resources.

Participant (4): "I remember when I was serving at a hospital in a social work unit, I only had five thousand Tomans cash. But I had more than 20 clients in need of money for medical treatment. I decided to find some associations and good doers. It took a lot of time for me, but it was effective."

The second theme: Direct care roles

This concept represents the roles and responsibilities that the participants said are directly related to the references. They include the subcategories: "financial and psychosocial support", "educator", "liaison", "service provider", "guide and counselor", "discharge planning and follow-up after discharge", "assessment", "crisis intervention", and "client and system advocacy", which will be described in detail. Client and system advocacy: Social workers are trained on promoting self-determination and patient autonomy. They often do this through a strengths based perspective. Participants mentioned the role of advocacy in social work, pointing out the importance of performing different tasks for the patient and/or on his/her behalf when the existing services are not related to their needs or the organization does not meet those needs.

Participant (4): "The job of head of the complaint proceeding unit for clients and patients to the social work unit was given to me and my colleagues at the hospital. Each day we investigate numerous complaints from the doctor regarding the treatment and the physics of the hospital, and inform the authorities."

Crisis intervention: According to the participants, social workers are always called upon to eliminate any difficult or complicated medical and/or communication issues between the patient and the personnel. Their ability

Table 2: themes, categories and codes

Themes	Categories	Codes
indirect care roles	research	Research in the field of medical social work
		Collaborate on conducting academic research
	cooperation and membership in the treatment team and hospital committees	Connector of the treatment team
		Referral of patient to receive counseling services from other institutions
		Setting up treatment time for patients (after health promotion plan)
		Membership in hospital committees and attending relevant meetings
		Coordinate Patient Health Care
	documentation	Setting financial documents for cancer patients
		Registration of discount statistics at the Ministry of Health and Hospital's HIS system
		Preparing a Accident record for Traffic Injuries
	providing financial resources	Relations with charities and institutions
		The formation of charity markets
Introducing patients with ill-considered and costly illnesses to charity and getting help from them		
direct care roles	psychosocial and financial support	Social group work
		Financial excuse, free of charge according to the instructions
		Psychosocial support of patients, their families and medical staff
		Providing housing, accommodation and equipment for the patient to treatment at home
	educator	Preparing the family to rejoining the patient to the family
		Preparing patients to rejoin family and community
		training the family of patients about the process of the disease and the treatment process
		Informing the family about the illness of the referrals and teaching the appropriate communication method
		Efforts to prevent the disruption of patient and family function
		Helping patients to understand the type of illness
	liaison	Connector between the patient and his family
		Connector between the patient and other agencies
		Connector between the patient and the treatment staff
	service provider	Providing Services for patients referred from hospital management
		Providing services to patients presented by the presidential institution and the university's treatment department
		Issuance of card for patients' companions
		Getting insurance for non-insured patients
		Getting insurance for homeless and addicted patients
	guide and counsel	Providing psychosocial counseling to amputees, patients, and special patients
		Guides for patients and their families on how to use insurance
		Guiding patients in the use of hospital care
		Guidance and assistance to patients with severe illness to receive a discount from the Ministry of Health
	discharge planning and follow-ups after discharges	Referral of homeless patients to care centers
		Home visit
Providing patient transfer conditions after discharge		
Follow up after discharge		
assessment	Assessing the family's socioeconomic status and qualification in patient care	
	Assessing the socioeconomic status of patients and identifying patients in need of financial assistance	
	Daily ward round to identify patients' needs	
	Identifying social injuries and report cases at risk	

(continued next page)

crisis intervention	Continuous presence in difficult and complex situations
	Applying for help from a social worker when acute problems occur
client and system advocacy	Execution of client respect plan
	Protecting the interests and rights of the hospital
	Defending the rights of patients and preventing their rights being violated
	Follow up complaints from the medical staff
	Follow up on treatment and insurance and discharge of seniors, abandoned children and homeless

to manage crises in matters related to the social work profession is obvious to all personnel and medical staff.

Participant (8): "You know that the definition of critical conditions in a hospital differs from the definition of critical situations in urban management. For example, perhaps the occupation of a bed for more than a week by a patient whose course of treatment has been terminated, but his family cannot manage to get him/her discharged, or the detection of cancer has been reported for an illegal Afghan are considered crises. In all these cases and in similar situations, they call me and I must have a solution."

Guide and counselor: Guiding and counseling, according to the participants, are other roles of social workers in hospitals. Some of the issues with which social workers must deal include providing guidance on the treatment process or the use of health insurance, offering counseling on judicial affairs related to victims of an accident or those injured at work, and providing counseling to patients with special diseases or candidates for organ transplants.

Participant (9): "Organ transplant candidates and special patients as well as cancer patients are referred to us in order that we can provide guidance on health issues and treatment costs, including discounts given by the Ministry of Health."

Liaison: Another key role identified is the role of liaison. This role encompasses facilitating the communication between families and the medical team, to help the team understand the families perspective, and vice versa. As the group works together, the social worker guides the communication and helps with everyone's understanding through reflections, asking clarifying questions, and assessing reactions to information. Participants stated that one of the most commonly requested roles of the social worker in the hospital is for communication or mediation.

Participant (5): "One of the things we do is to establish a relationship between the patient and the doctor or other health care practitioners which may include taking the patient to the doctor, introducing the patient to the physician, and/or introducing the patient to a specialist before starting treatment."

Financial and psychosocial support: Many of the participants introduce himself/herself to the patients or families and identify themselves as a support person while the patients and families are in the hospital. Support is viewed as an important part of the medical social worker's work, listening to and bearing witness to the stories of them. They offer support for the three types of welfare, including providing accommodation, transportation, and appliances for keeping an incurable patient at home, financial assistance, such as financial exemptions, providing free services based on notes and instructions, and psychosocial support for the patients, their families, and the medical staff, as well as the team of social workers.

Participant (11): "For some patients with burns that require tissue expanders after surgery, and there is a need to visit the hospital once or twice a week to get for injections in the tissue, the cost can be unaffordable for the family. In such cases, we introduce the patient to the Relief Committee or the Welfare Organization. Therefore, according to the social worker's discretion, the cost and conditions of the accommodations or transportation during treatment are provided. "

Another type of support provided for patients and mostly done by social workers in hospitals is financial assistance, which includes discounted treatment costs for specific, and severely ill patients, burn patients and staff and their immediate family members. This exemption is made by the hospital or on the basis of instructions and comments from the Ministry of Health and/or by the cost of community-based associations.

Participant (9): "The highest number of our clients come to us in order to receive a donation or a discount. Discounts are made according to internal memorandums, instructions, and notes from the Ministry of Health. Cash donations from charities and governmental and non-governmental organizations are being spent to cover the cost of treatment for those in need. "

Psychosocial support is also considered part of the role of social workers and, according to the statement of the participants, involves the permanent presence of a social worker in difficult situations for the patient and his family as well as the hospital staff.

Participant (8): "We ensure the patient that we are always present and we support him/her, and that the process of the treatment can be tolerated by him/her."

Educator: the other major role that the participants identified educator. The social worker may be educating the staff on the dynamics and beliefs of the patient and family, or they may be teaching the patient and family what resources are available and what the meaning is of the different options for care available. The participants referred to the educator role of the social worker in the hospital and believed that the social worker plays a significant role in the hospital regarding educating the patient and family about the patient's process, the type of disease the patient has, the treatment plan, the acceptance of the disease, the patient's rejoining the family and the community after treatment, and instructing the patient on the manner of behavior.

Participant (1): "When a patient enters the hospital environment, he/she needs education to complete the treatment process, which is our responsibility. He/She also needs education before returning home with the help of the treatment team. At the same time, family members also need special education in certain cases, particularly when the patient is not able to take care of himself/herself. "

Service provider: Another role that a social worker is expected to play is a service provider. According to the participants, anyone entering the social worker's room expects to leave after having received a service. Services such as taking an insurance booklet for a patient without a companion, providing social services to specific and severely ill patients, such as financial assistance for medication and treatment, providing shopping bins that are acquired from a social worker from the Relief Committee or other institutions, and following up on the treatment of patients referred to the social workers are among the roles of the social worker.

Participant (8): "The client enters the social worker's room with the thought of receiving a service. This service can be taking a treatment booklet, receiving medication or treatment grants and, in some cases, getting a food bin."

Discharge planning and follow up: The largest role identified by all, is discharge planning and the follow-up of the patient affairs after discharge. This ranged from sending patients to a rehabilitation facility, coordinating home care, arranging hospice, visiting the patient's home to assess the patient's place of residence for the transfer of the patient to the home, the referral of homeless patients to care centers and the provision of post-discharge conditions and post-discharge follow-ups.

Participant (9): "There are about 80 unidentified and homeless patients in our hospital during the month. From the patient's arrival to the moment of discharge, all the insurance affairs, the cost of treatment, the process of discharge, and the arrangement of accommodation for the patient are all upon the social worker."

Assessment: One of the most significant duties of a social worker, founded by Perlman in the social diagnostic approach, is the assessment and the evaluation of the patient, which is carried out every day by social workers in hospitals. A key aspect to social work practice is performing comprehensive assessments. Medical social workers assess patient's prior living situation and potential needs post-discharge for discharge planning, he/she assess the family dynamics and potential conflict that may arise, as well as assess the various stressors impacting the patient and family. This is done through a daily routine ward round by the social worker on the newly admitted patient. The economic and social conditions of the patient and his/her family as well as the patient's health insurance should be considered, and if the patient is entitled, the social work services will begin.

Participant (8): "We will print the names of new patients from the HIS system, we will make referrals based on the segmentation of the wards, and we will examine the cases based on the self-prepared assessment form and identify the patients who need help and deal with it."

Conclusion and recommendations

As was discovered in the findings, medical social workers play direct and indirect care roles in hospitals and many of them are part of the specialized roles of social workers in hospitals as we saw in the studies of other researchers from

the other countries. Rebecca G. Judd & Sherry Sheffield (2009), nevertheless, they are still considered to be a part of the administrative staff of these hospitals, and they have no place on the treatment team in most cases. It is significant to address a few points in this regard:

First of all, what is significant and participants acknowledge is that providing financial resources and financial assistance is undoubtedly a major role played by social workers among all of the roles they play and it takes a lot of time during their daily activities. Social workers, according to participants and observations during interviews, are so busy doing activities financial forgiveness, freeing up, and reducing the costs to the patients, that the rest of their activities are practically overshadowed. This is one of the reasons that social workers are sometimes recognized as "discounters" by the staff and patients in hospitals of Iran. This view has grown to such an extent in hospitals that patients often do not refer to the social work unit except when they are in need of financial help.

Secondly, nurses, doctors and other health care professionals often refer patients to the social work unit when dealing with patients who have financial problems. Their familiarity with the area of social work services in the hospital is limited to this level, and they consider social workers as solvers of financial problems that pay the cost of patients through charities, thus, their expectations of social workers are limited to this area.

The third most significant issue is that many of the roles that were extracted from the analysis of interviews as categories (including assessment, discharge planning, educator, liaison, guide and counselor, crisis intervention, advocacy, documentation and research) are in accordance with the specialized roles of medical social workers in other countries. However, attention to the obtained codes, that is, the task-related roles, shows that many of the tasks assigned to the roles involve two major drawbacks, the first being that they are either not professionals or specialized, such as for financial exemption, freeing costs, card issuance for the patient companions, serving patients referred from the hospital management and presidential institutions and university treatment departments (most often in the form of grants and hospital fees), etc., or the second being that they are not clear, such as the demand for help from a social worker at the time of the emergence of acute problems, permanent presence in difficult and complex situations and so on.

The last issue is related to the social workers themselves. They perform tasks and roles other than those related to the cost of treatment, but there is a lack of knowledge and awareness about the roles played. In other words, they don't recognize the role related to the activity, and thus, they have lost the ability to protect themselves from performing their professional duties have fallen to the level of the expectations of management, medical and non-medical personnel and patients.

If in fact a limited understanding results in restraining the roles and activities of hospital social workers, patients may not receive optimum outcomes, which will in turn impact the hospitals ability to maintain a positive bottom line.

Although understanding the role of the medical social worker is a necessary step, this is only the first step in the process of improving professional accountability. Medical social workers need to ensure that patients and health-care professionals clearly understand the role of the medical social worker so that they are able to use the social work services and skills more effectively.

The researchers suggest that, by recognizing the current roles and responsibilities of medical social workers in Iran given in this article, others will explore the causes of the weakened role of social workers within the hospital structure in recent decades, and will identify ways to return the real status of professional social workers in hospitals. Also it is crucial for social workers to provide evidence that their interventions are both beneficial to the patient and cost effective to the hospital.

Implications for practice and education

Implications for Practice

It appears from this research that there is a great deal of diversity as to how social workers provide care and services in hospitals. There is the need to develop guidelines for social work in care settings. This is crucial for social workers as well as for hospital administrators.

While this survey process did not directly inquire as to respondents' job difficulties and expectations, the majority of respondents indicated they need being under supervision. Hence this research demonstrates a need for supervision when working in different roles. Supervision is the major factor that aids the participants to perform better, to feel supported and to process their reactions of difficult cases.

As reimbursement of health care services become increasingly tied to patient outcomes and best practices, it will be vital for medical social workers to demonstrate the efficacy of their interventions.

Furthermore, it is vital that hospital social workers, along with those in other health care settings, take a proactive stance and conduct outcome evaluations for the services they provide which will contribute to the foundation of evidenced based practice.

Implications for Social Work Education

The results of this study highlight the need for further investigation into the development and integration of social work in health care into the BSW and MSW programs. There are no syllabi related to this field in the current training of social workers in Iran and most of them do not have the knowledge and skills needed to work in hospitals. There is a need to develop a concentration on medical social work to improve the practice of social workers.

There is an urgent need for increased education on health care in MSW programs as well as continuing education training opportunities for how social workers should incorporate directives and guidelines into their practice.

References

- Abbas Zadeh, Mohammad (2012). Reflection on Validity in Qualitative Research. *Applied Sociology*, Vol. 23, No. 45
- Asquith, S., Clark, C. L., & Waterhouse, L. (2005). The role of the social worker in the 21st century: A literature review. Scottish Executive Education Department.
- Auerbach, C., Mason, S. E., & Laporte, H. H. (2007). Evidence that supports the value of social work in hospitals. *Social Work in Health Care*, 44(4), 17-32.
- Beder, J. (2013). *Hospital social work: The interface of medicine and caring*. Routledge. Taylor & Frances Group.
- Berkman, B., Bonander, E., Rutchick, I., Silverman, P., Kemler, B., Marcus, L., & Isaacson-Rubinger, M. J. (1990). Social work in health care: Directions in practice. *Social Science & Medicine*, 31(1), 19-26.
- Blewett, J., Lewis, J., & Tunstill, J. (2007). The changing roles and tasks of social work. A Literature Informed Discussion Paper.
- Chitereka, C. (2010). Hospital Social Work Practice in Zimbabwe. *Social work in health care*, 49(9), 769-782.
- Coen, Bruce (2012). *Principles of Sociology*. Trans. by Gholam Abbas Tavassoli and Reza Fazel. Tehran: Samt Publication
- Coser, Lewis and Rosenberg, Bernard (1999). *Basic Theories of Sociology*. Trans. Culture of Guidance. Tehran: Ney Publication
- Cowles, L. A., & Lefcowitz, M. J. (1992). Interdisciplinary expectations of the medical social worker in the hospital setting. *Health & Social Work*, 17(1), 57-65.
- Dargahi, Hossein (1999). *Hospital comprehensive organization and management*. Tehran: Omid Publication
- Delawar Ali (2009). *Qualitative Methodology*. Strategy Quarterly, Vol. 19, No. 54
- Dominelli, L. (2004). *Social work: theory and practice for a changing profession*. Polity Press.
- Evans, A. (2005). *Social work values and hospital culture: an examination from a competing values framework* (Unpublished doctoral dissertation). University of Central Florida Orlando.
- Flick, Eve (2012). *An introduction on qualitative research*. Trans. Hadi Jalili. Tehran: Ney Publication
- Gehlert, S., & Browne, T. (2011). *Handbook of health social work*. John Wiley & Sons.
- Giddens, Anthony (2006). *Sociology*. Trans. Manouchehr Sabouri. Tehran: Ney Publication
- Judd, R. G., & Sheffield, S. (2010). Hospital social work: Contemporary roles and professional activities. *Social work in health care*, 49(9), 856-871.
- Marshall, Catherine and Russman, Gretchen B (2011). *Qualitative research method*. Trans. Ali Parsayian and Seyyed Mohammad Arabi. Tehran: Office of Cultural Research
- Mohammadpour, Ahmed (2010). *Metaphysics (Philosophical and Practical Foundations of Combined Research in Social and Behavioral Sciences)*. Tehran: Sociologists Publication
- Mohseni, Manouchehr (2000). *Medical Sociology*. Tehran: Tahouri
- National association social workers. (2005). *NASW standards for social work practice in health care setting*. Washington
- Pockett, R. (2002). Staying in hospital social work. *Social Work in Health Care*, 36(3), 1-24.
- Priest, J. (2012). The integration of health and social care. *Health Policy & Economic Research Unit, BMA*.
- Sadoughi, Majid (2008). *Qualitative research evaluation*. Scientific-Research Quarterly of Methodology of Humanities, Vol. 14, No. 56
- Tavassoli, Gholam Abbas (2009). *Sociological Theories*. Tehran: Samt Publication
- Wong, C. K., Chan, B., & Tam, V. (2000). Medical social workers in Hong Kong hospitals. Expectation, authority structure and role ambiguity. *International Social Work*, 43(4), 495-516.

The factors affecting effective clinical education from the viewpoint of students, Nursing Trainers, and nursing staff

Saeedeh Elhami (1)

Maryam Heidari (2)

Maryam Ban (3)

Sajedeh Mosaviasl (3)

Mohammad Khavasi (3)

(1) Student research committee, Abadan school of medical sciences, Abadan, Iran

(2) Instructor, department of medical-surgical nursing, Abadan school of medical sciences, Abadan, Iran

(3) Abadan school of medical sciences, Abadan, Iran

Corresponding author:

Mohammad Khavasi

Abadan school of medical sciences,
Abadan, Iran

Received: January 30, 2018; Accepted: February 10, 2018; Published: March 1, 2018. Citation: Elhami S. et al.

The factors affecting effective clinical education from the viewpoint of students, Nursing Trainers, and nursing staff .
World Family Medicine. 2018; 16(3):246-251. DOI: 10.5742/MEWFM.2018.93335

Abstract

Background: The planners of nursing training consider clinical training as the central part in nursing education. This research was conducted with the aim of determining the factors affecting effective clinical education in the viewpoint of students, trainers, and nursing officials of Abadan University of medical sciences. Hopefully, we can take effective steps by identifying these factors and presenting as well as employing the practical solutions for achieving educational objectives, training skilled individuals, and enhancing the quality of care services.

Method: In this descriptive cross-sectional study, the study population consisted of all students, instructors and nursing staff of the hospitals affiliated to the Faculty of Medical Sciences of Abadan who were included in the study. The data collection instrument included two sections, demographic information and a checklist of factors affecting clinical education. The sampling was performed with an in-person visit by the interviewer to the site of apprenticeship in the wards and the data were analyzed statistically.

Results: The views of students, instructors and nursing staff indicate that individual characteristics and clinical educators have a greater impact on clinical education than other areas ($p < 0.005$).

Conclusion: Based on the results of this research paying attention to the trainers and improving their personal characteristics, employing competent trainers, systematic curriculum development and planning, providing a suitable clinical environment, presentation of solutions to enhancing clinical learning in students, and timely reflection of problems by educational officials can facilitate and improve the process of effective clinical training.

Key words: clinical education, nursing students, Nursing Trainers, nursing staff

Introduction

Nursing is a complex and difficult profession, which takes steps towards physical, mental, and social health through its special sciences and skills. Further, as an academic major, through its special knowledge and skills, it offers services to healthy and patient individuals across different centers. Therefore, during academic courses, a nursing student not only needs to acquire knowledge but also to gain clinical skills. The planners of nursing training consider clinical training as the central part in nursing education (1), and the value of ideal clinical training in individual and professional development as well as clinical skills of nursing is undeniable (2). Clinical training can be considered as a facilitator of learning in clinical environments, in which the clinical trainer and student contribute the same, and the aim is to develop measurable changes in the student for clinical care (2-8). Clinical training provides an opportunity for the student to convert theoretical knowledge to different mental, psychological, and kinesthetic skills, which are essential for patient care (4,5,7,8,9). Evidence shows that the new graduates of nursing and midwifery, in spite of having a strong theoretical background, do not have the adequate skill and conversance in clinical environments and have problems in the process of problem solving (8). Although the fundamental part of nursing training is related to clinical training, unfortunately the results of research on nursing training has suggested that the quality of clinical training is not favorable and has some deficiencies (1).

Studies conducted in this regard indicate that factors including not valuing clinical training, insufficient lack of access to clinical trainers, lack of appropriate coordination between clinical training of the faculty and the facilities of performance in hospitals, the unsuitability of the time required for contact with each disease for complete practice of teachings in clinical environments, and lack of integration between theoretical and clinical training are among the major problems of clinical education. The statistics resulting from these studies have shown that 88.9% of nursing students believe that clinical nursing training has some problems. In spite of the attempts performed by the authorities of nursing education and healthcare officials for correcting the problems of clinical training, the reality is that with regard to training clinical nurses, nursing education has numerous shortcomings (1,8,10).

Evidently, the factors affecting the quality and quantity of clinical education are very diverse, such that it is not possible to always mention one certain factor or a group of specific factors for it. Accordingly, in the questionnaires designed for this purpose, this variety can be observed and the different studies conducted in this regard, given the investigated instrument, have examined different factors as the influential factors affecting the quality and quantity of clinical education. Therefore, considering the results of different studies which have mentioned different factors as the factors affecting the quality of clinical education (8), clinical education trainers are tangibly facing clinical problems and the students as the receivers of professional services of these trainers are the best

source for identification of the educational behavior of their teachers (11).

As fewer studies have been conducted to determine the viewpoints of students and trainers, and as the viewpoints and experiences of the head nurses of wards, which are tightly involved in implementing the clinical education of the students, have been understudied (12), this research has been conducted with the aim of determining the factors affecting effective clinical education in the viewpoint of students, trainers, and nursing officials of Abadan University of medical sciences. Hopefully, we can take effective steps by identifying these factors and presenting as well as employing the practical solutions for achieving educational objectives, training skilled individuals, and enhancing the quality of care services.

Method

This descriptive- cross-sectional study was conducted in the academic year 95-96 at Abadan faculty of medical sciences. The research population consisted of all students, trainers of clinical units and head nurses of the hospitals of Abadan faculty of medical sciences, who met the inclusion criteria. The inclusion criteria included: the admission criteria of nursing students was passing at least two semesters of clinical training experience. For nursing trainers, a bachelor's or Master's degree in nursing and having at least one year of clinical education experience was the inclusion criteria. The sampling was performed through available sampling and with in-person visit by the interviewer to the site of apprenticeship in the wards. The data collection instrument included two sections:

- 1) The questionnaire for demographic information containing data including age, gender, marital status, academic semester, the GPA, level of education (trainer/head nurse), background of educational experience (trainer/head nurse), clinical working background (trainer/head nurse).
- 2) The checklist of factors affecting clinical training across five general areas (comprehensive personal characteristics including 7 items, trainer's personal characteristics including 10 items, the conditions of clinical environment including 6 items, the educational objectives and planning including 12 items, and supervision and assessment including 7 items).

The questions of each area were scored based on a 5-option Likert scale as very low to very high with the scores of 1 to 5, where out of 42 items, the maximum and minimum acquirable scores were 210 and 42, respectively. The content validity of the checklist was provided by taking the comments of experts of medical education, which was used after final confirmation. The scientific reliability of the questionnaires was also estimated as around 0.94 using Cronbach alpha coefficient of test internal consistency. Eventually, for data analysis, in statistical analysis, descriptive statistics were used for acquiring primary information including the frequency, mean, minimum and maximum values, the number of data, and standard deviation. In the inferential statistics section, Kolmogorov-Smirnov test was used to get information about normality

of the variables, while analysis of variance, Kruskal-Wallis, independent-T, Mann-U-Whitney and Friedman tests were also used in SPSS 21, where the statistical significance level was considered as $p < 0.05$. Note that ethical principles were also followed in the research including receiving permission from the university's ethics committee (Code ir.abadanums.rec.1395.134). Also, giving discretion to all students in case they wanted to quit the research, ensuring the participants regarding confidentiality of information and the final report of the results in general, were taken into account.

Results

The total number of participants in this research was 156, broken down into the three groups of students, clinical trainers, and nursing officials. They included 118 students, 23 clinical trainers, and 15 nursing officials. The individual demographic information of all participants is presented in Tables 1 and 2.

Comparison of the dimensions of clinical education (comprehensive personal characteristics, personal characteristics of the clinical trainer, conditions of clinical environment, educational objectives and planning, as well as clinical supervision and assessment) from the viewpoint of nursing students, Nursing Trainers, and officials is provided in Table 3. Considering the normality or abnormality of the sample distribution, fit test (analysis of variance or Kruskal-Wallis tests) has been used.

Comparison of the order of dimensions of clinical training (comprehensive personal characteristics, personal characteristics of the clinical trainer, conditions of clinical environment, educational objectives and planning, as well as clinical supervision and assessment) separately from the viewpoint of nursing students, Nursing Trainers, and officials has been provided in Table 4. Considering the abnormality of normality of some of the dimensions, Friedman test or replicable sizes have been used.

Table 1: demographic data of all participants

		student		Instructor		Nursing staff	
		Number	Frequency percentage	Number	Frequency percentage	Number	Frequency percentage
Gender	Female	68	57/6	15	65/2	14	93/3
	male	50	42/4	8	34/8	1	6/7
Marital status	Single	104	88/9	7	31/8	3	20
	Married	13	11/1	15	68/2	12	80
Level of Education	Bachelor of Nursing	118	100	0	0/001	0	0
	Master of nursing	0	0	6	26/1	12	80
	Phd	0	0	17	73/9	3	20
Term	2	31	26/7	-	-	-	-
	4	36	31	-	-	-	-
	6	22	19	-	-	-	-
	7	3	2/6	-	-	-	-
	8	24	20/7	-	-	-	-

Table 2: Descriptive statistics of age, average, educational experience and clinical experience

		Number	Minimum	Maximum	Average	standard deviation
Student	Age	105	18	45	22/17	3/83
	Average	105	12	15	16/06	1/17
Nursing Trainers	Age	21	26	55	36/57	8/17
	Educational experience	23	36	324	102/65	76/44
	Clinical experience	20	10	144	56/2	39/48
Nursing staff	Age	14	35	48	41	4/35
	experience of educational experience	1	67	67	67	0/0000
	Clinical experience	15	96	342	186/66	70/81

Table 3. Comparison of the dimensions of clinical education from the viewpoint of students, Nursing Trainers and nursing staff

Variable	Classification	Average	standard deviation	Statistics	Degrees of freedom	p-value
personal characteristics**	student	3/60	0/63	15/61	2	0/0001
	Nursing Trainers	4/04	0/50			
	nursing staff	3/97	0/33			
personal characteristics of the clinical trainer *	student	3/51	0/68	6/17	2	0/003
	Nursing Trainers	3/96	0/39		150	
	nursing staff	3/85	0/30		152	
conditions of clinical environment**	student	3/27	0/82	21/27	2	0/0001
	Nursing Trainers	3/97	0/49			
	nursing staff	3/75	0/40			
educational objectives and planning*	student	3/36	0/62	13/09	2	0/0001
	Nursing Trainers	3/98	0/39		153	
	nursing staff	3/78	0/39		155	
clinical supervision and assessment*	student	3/22	0/70	17/77	2	0/0001
	Nursing Trainers	3/98	0/39		153	
	nursing staff	3/84	0/45		155	

* All four groups are normal using the ANOVA test

** At least one group is not normal using the Kruskal-Wallis test

Discussion

Clinical training has several components. As this research also shows, the trainers and practitioners of clinical training as influential people and students as affective individuals as well as the main officials of the future of healthcare have attached great importance to the components involved in education (personal characteristics of the learner, trainer, environment, planning, and assessment). Comparison of the order of dimensions of clinical training (personal characteristics of the learner, trainer, environment of clinical training, educational objectives and planning, and clinical supervision and assessment) in the viewpoint of nursing students, tutors, and officials indicates that comprehensive personal characteristics and clinical trainers are more effective than other areas in clinical training. Further examination reveals that the opinions of nursing trainers and officials have no significant difference with each other and are the same, but the opinion of students lies at a lower level in comparison with the ideas of nursing trainers and officials. This has been emphasized in studies including Taheri et al (13), Zahraei et al (14), and Maslarpak et al (15). However, in the study by Delaram, it found a lower priority, and according to him, the reason is the desirable conditions of clinical trainers in his research population (5). According to the students, seven items of the comprehensive personal characteristics have a significant difference with each other ($p=0.0001$), out of which cases such as "interest in clinical training", "internal motivation", "being respected", and "talent in clinical training" were considered more important than others. As interest is one of these personal characteristics, if the students continue the selected major and their favorite academic activities, they will definitely achieve more success. Further, interest should be developed in the clinical environment for the

student, through which one can help them to progress. Although nursing tutors and officials have considered all items related to the area of clinical environment conditions to be of the same importance, students have chosen "development of the self-confidence of the student in the clinical environment" as the first priority with a significance level of 0.020. Academic atmosphere coupled with mutual relationship and respect results in diminished stress and improved self-confidence in students. This both facilitates the learning process and helps them to become interested in the clinical environment and working with patients, which in turn can lead to effective care for the patients. Nasiri et al also reported that according to students, student self-confidence is the most effective factor in learning nursing clinical skills (16). Moreover, considering the importance of clinical tutors as the facilitators of education and empowerment of learners in effective and efficient learning as well as development of an environment for experiencing clinical skills of students (17-19), employing a set of personal characteristics such as complete support by the trainer for students in the clinical environment, good treatment of students, sufficient patience, ability to reduce the stress of students, interest in clinical work, sufficient teaching background (at least 5 years), background of working in clinical environments, sufficient skill in performing clinical jobs and having initiative for promoting training are recommended for clinical tutors.

Further investigation of the questions of the area of clinical supervision and evaluation indicates that from the viewpoint of nursing trainers and officials, they have no significant difference. However, according to students, the question "the knowledge of students about the manner of clinical evaluation at the beginning of the apprenticeship course" has a significant difference with the six other questions, and lies at the top, where the other six questions with a

Table 4: Comparison of the dimensions of clinical training (comprehensive personal characteristics, personal characteristics of the clinical trainer, conditions of clinical environment, educational objectives and planning, as well as clinical supervision and assessment) from the viewpoint of nursing students, Nursing Trainers, and nursing staff.

Variable	Classification	Average	standard deviation	Statistics	Degrees of freedom	p-value
* student	personal characteristics	3/60	0/63	30/91	4	0/0001
	personal characteristics of the clinical trainer	3/51	0/68			
	conditions of clinical environment	3/27	0/82			
	educational objectives and planning	3/36	0/62			
	clinical supervision and assessment	3/22	0/70			
* Nursing Trainers	personal characteristics of the clinical trainer	4/04	0/50	2/51	4	0/64
	conditions of clinical environment	3/96	0/39			
	educational objectives and planning	3/97	0/49			
	clinical supervision and assessment	3/98	0/39			
	personal characteristics of the clinical trainer	3/98	0/39			
nursing staff**	personal characteristics of the clinical trainer	3/97	0/33	0/84	4	0/50
	conditions of clinical environment	3/85	0/30			
	educational objectives and planning	3/75	0/40			
	clinical supervision and assessment	3/78	0/39			
	personal characteristics of the clinical trainer	3/84	0/45			

* All five dimensions are normal and use repeatable test sizes

** At least one dimension is not normal and use Friedman

significance level of 0.113 have no significant difference with each other. In the study by Boraz Pardanjani (8) and Veton and Gonda (20) also the students were not satisfied with the status of clinical assessment and regarded it as devoid of objectivity. The assessment process can be considered a determinant of learning level and the fundamental pillar for future planning. Further, considering its importance in the extent of achievement to the expected objectives and skills, and feedback for comprehensive recognition of their strong and weak points, modification and revision of the clinical assessment methods seem to be essential (21).

In addition, the results obtained from Pearson correlation test indicate that the clinical background of the tutors has a correlation of 0.473 with the persona characteristics of clinical trainers, such that the longer the clinical background, the greater the incidence of personal characteristics in the performance of trainers will be.

Considering the importance of each of the five dimensions, the opinion of students has a lower level than that of nursing tutors and officials. However, the unique difference of these opinions is negligible and it can be stated that across the three groups, nursing students, tutors, and officials have

evaluated these factors with a huge impact on clinical training. Indeed, by considering and caring for the personal characteristics of learners, employing experienced and committed clinical tutors, provision of a suitable clinical environment in terms of equipment and employees, precise and targeted planning, systematic clinical evaluation and presenting its feedback to all educational stakeholders, ranging from managers and planners of clinical training is a step towards effectiveness.

Conclusion

Based on the results of this research, the two areas of individual characteristics of the clinical trainer and comprehensive have more effect than other areas on the clinical training of students, where the level of impact of the two mentioned areas had no considerable difference in the viewpoint of the three groups. Thus, in this regard, paying attention to the trainers and improving their personal characteristics, employing competent trainers, systematic curriculum development and planning, providing a suitable clinical environment, presentation of solutions for enhancing clinical learning in students, and timely

reflection of problems to educational officials can facilitate and improve the process of effective clinical training.

Note that this research had also some limitations, which limits generalizability of the findings. For example, use of self-reporting method in data collection can be limiting as the contributing units may not want to reflect their real opinion. In this regard, attempts were made to control this issue as much as possible by giving sufficient explanation and caring for confidentiality.

Acknowledgments:

This article is based on the research project, approved by the Faculty of Medical Sciences Abadan with the code 95st-0090. Finally, the authors appreciate all those who sincerely have collaborated with researchers in this research, particularly, the Vice Chancellor for Education and Research of Abadan Faculty of Medical Sciences as well as respected authorities in selected clinical departments in this study for their support.

References

- Zamanzadeh V, Abdollahzadeh F, Lotfi M, Aghazadeh A. Assessing Clinical Education Fields From The Viewpoints of Nursing And Midwifery Instructors in Tabriz University of Medical Sciences, 2006. *Iranian Journal of Medical Education* 2008; 7(2): 299-306. [In Persian]
- Rahimi A, Ahmadi F. The Obstacles and Improving Strategies of Clinical Education from the Viewpoints of Clinical Instructors in Tehran's Nursing Schools. *Iranian Journal of Medical Education* 2006; 5(2): 73-79. [In Persian]
- Omidvar SH, Bakouee F, Salmalian H. Clinical Education Problems: The Viewpoints of Midwifery Students in Babol Medical University. *Iranian Journal of Medical Education* 2006;5(2): 15-20. [In Persian]
- Saheb Alzamani M, Salahshorian Fard A, Akbar Zadeh A, Mohamadian R, Parisa F. Comparison of Preventing and Facilitating Factors of Effective Clinical Teaching of Nursing Students and Trainers in Islamic Azad University. *Journal of Medical Sciences, Islamic Azad University*. 2011; 21(1): 38-43. [In Persian]
- Delaram M. Clinical Education from the Viewpoints of Nursing and Midwifery Students in Shahrekord University of Medical Sciences. *Iranian Journal of Medical Education* 2006; 6(2): 129-134. [In Persian]
- Tahery N, Kaiali M, Yaghoobi M, Koleini Z. The Stressors of Clinical Training in Nursing Students Abadan Nursing Faculty 2009. *Modern Care, Scientific Quarterly of Birjand Nursing and Midwifery Faculty*. 2011; 8 (3): 159-165. [In Persian]
- Tahery N, Hachem Bachari Y, Hojjati H, Cheraghian B, Mohammadi H. Factors Affecting The Improvement of Clinical Education of Nursing Students in Abadan. *Dena Journal*. 2009; 4(3-4): 27-34. [In Persian]
- Baraz SH, Fereidoni Moghadam M, Louri Zadeh M. Clinical Education from the Perspective of Nursing and Midwifery Tehran University of Medical Sciences. *The Journal of EDC*. 2007; 5(2): 102-111. [In Persian]
- Abedini S, Abedini S, Agha Molayi T, Jomeh Zadeh A, Kamjo A. Clinical Education Problems from the Perspective of Nursing and Midwifery Students in Hormozgan University of Medical Sciences. *Hormozgan Medical Journal*. 2007; 12(4):249-253. [In Persian]
- Jokar F, Salami K. Nursing Student's Perspective on the Factors Influencing Capability in Clinical-Surgical Ward. *Proceedings of the National Congress of Clinical Training 1385*. Tabriz: School of Nursing and Midwifery, Tabriz University of Medical Sciences: 68
- Mahmoudi Far Y. View of Educational instructors and Nursing Students in Clinical Training. *Journal of Educational Strategies*. 2008; 2(1):7-12. [In Persian]
- Aein F, Alhani F, Anoosheh M. The Experiences of Nursing Students, Instructors, and Hospital Administrators of Nursing Clerkship. *Iranian Journal of Medical Education* 2009 Aut; 9(3): 191-199. [In Persian]
- Taheri A , Forghani S , Atapour SH, Hassanzadeh A. The Effective Clinical Teaching from Faculty Members' and Rehabilitation Students' Point of View. *IJME Special Issue for Educational Development and Health Promotion* 2012: 11(9). [In Persian]
- Hassan Zahraei R, Atash Sokhan G, Salehi Sh, Ehsanpour S, Hassanzadeh A. Comparing the Factors Related to the Effective Clinical Teaching from Faculty Members' and Students' Points of View. *Iranian Journal of Medical Education*. 2008; 7 (2):249-256. [In Persian].
- Hemmati Maslakkpak M, Khalilzadeh H. Nursing Students' Perspectives on Effective Clinical Education: A Qualitative Study. *IJME* 2011; 11(7): 718-727. [In Persian]
- Nasiri A, Kaheni S, Sinaeinejad K. Effective factors on learning of nursing clinical skills from the viewpoints of clinical instructors and nursing students in Birjand city. *Iranian Journal of Medical Education*. 2003; 3(Suppl 10): 31. [In Persian]
- Hassan Zahraei R, Atashsokhan G, Salehi SH. Comparison of correlative factors with effective clinical teaching from teacher & student insight. *Iranian Journal in Medical Education* 2007; 7 (2): 249 – 256. [In Persian]
- Alavi M, Abedi H. Nursing student experience and perception of effective instructor in clinical education. *Iranian Journal in Medical Education* 1386; 7 (2): 325 - 334. [In Persian]
- Ghodsbin F, Shafakhah M. Facilitating and preventing factors in learning clinical skills from the viewpoints of the third year students of Fatemeh School of Nursing and Midwifery. *Iranian Journal in Medical Education* 1386; 7 (2): 343 – 352. [In Persian]
- Wotton K, Gonda J. Clinicians and student evaluation of a collaborative clinical teaching model. *Nurs Educ Prac* 2004; 4(2): 120-7.
- Kamran A, Sharghi A, Malekpour A, Biria M, Dadkhah B. Status and strategies for improving nursing education in view of nursing students in Ardebil University of Medical Sciences. *Nursing research* 2012; 7(27): 25-31.[in Persian]

Effects of hot temperament herbs on primary Dysmenorrhea: a systematic review

Farrin Rajabzadeh (1)
 Seyyed Mohammadbagher Fazljou (2)
 Laleh Khodaie (3)
 Shamsi Abbasalizadeh (4)
 Leila Sahebi (5)

(1) Department of Iranian Traditional Medicine, School of Traditional Medicine, Tabriz University of Medical Sciences, Tabriz, IR Iran.

(2) Department of Iranian Traditional Medicine, School of Traditional Medicine, Tabriz University of Medical Sciences, Tabriz, IR Iran.

(3) Medical Philosophy and History Research Center, Tabriz University of Medical Sciences, Tabriz, IR Iran.

(4) Department of Obstetrics and Gynecology, Alzahra Hospital, Faculty of Medicine, Tabriz University of Medical Sciences, Tabriz, IR Iran.

(5) Assistant Professor of Epidemiology, Maternal, Fetal and Neonatal Research Center, Tehran University of Medical Sciences, Tehran, IR Iran.

Corresponding author:

Seyed Mohammad Bagher Fazljou,
 Department of Iranian Traditional Medicine,
 School of Iranian Traditional Medicine, Tabriz University of Medical Sciences,
 Tabriz, IR Iran.
 Tel: +98-4113379527, Fax: +98-4113379527

Received: January 30, 2018; Accepted: February 10, 2018; Published: March 1, 2018. Citation: Rajabzadeh F. et al. Effects of hot temperament herbs on primary Dysmenorrhea: a systematic review. World Family Medicine. 2018; 16(3):252-258. DOI: 10.5742/MEWFM.2018.93338

Abstract

Context: Dysmenorrhea refers to the symptom associated with painful menstruation which affects the quality of life of a large number of females who suffer from this disorder. Dysmenorrhea has two categories: primary, which occurs in the lack of pelvic pathology and secondary, from identifiable organic causes. Current treatment for primary dysmenorrhoea has a failure rate of 20% to 25% and may be contraindicated or not tolerated by some patients. Herbal medicine may be an appropriate alternative. In this article we focus on herbal medicine to identify the efficacy and safety of herbs with 'hot temperament' for primary dysmenorrhea compared with placebo and other treatments.

Evidence Acquisition: This systematic review study was designed and executed in 2017. In this review, 128 studies were evaluated, only 18 of which were randomized clinical trials of herbal medicines in Iran. These trials included hot temperament herbs. Required data was gathered using electronic databases, such as Scopus, Pub med, Web of science, EMBASE and Chinese scientific journal database, also articles were evaluated according to the JADAD scale.

Result: There is no negative result in the studies. Most of studies showed that the effects of Ginger are higher than other herbs in the treatment of primary dysmenorrhea. All of the mentioned studies showed the higher effect of herbal medicines than Ibuprofen on the treatment of dysmenorrhea.

Conclusions: The present study discusses the use of hot temperament herbs for primary dysmenorrhea. Effective herbal medicines can be used as a good alternative to treat women who do not respond well to conventional therapies or have contraindications to use of these drugs.

Key words: herbal medicine, dysmenorrhea, randomized clinical trial

Introduction

Dysmenorrhea is defined as symptoms associated with painful menstruation which can be divided into primary and secondary dysmenorrhea (1). The latter is a type of menstrual pain not a primary gynecologic disorder (2). More than 50% of women have primary dysmenorrhea. (3). For most women, menstrual pain tends to occur after pregnancy. Primary dysmenorrhea is affected by unnecessary levels of prostaglandins, hormones which make uterus indenture during menstruation and childbirth. The pain seems to result from uterus contractions, due to reduced blood supply in the inner uterine lining (endometrium) (4). Other factors which can cause the pain of primary dysmenorrhea, include a retroverted uterus (5). Non-steroidal anti-inflammatory drugs (NSAIDs) are operative in dismissing the pain of primary dysmenorrhea but which has side effects of nausea, dyspepsia, peptic ulcer, and diarrhea. (6). Hormonal birth control may progress signs of primary dysmenorrhea (7). Recent studies have shown that the birth control pill, comprising low doses of estrogen, reduces pain related with dysmenorrhea. (6,8). Norplant and Depo-Provera are also effective, since these methods often induce amenorrhea (9). Because of side effects and contraindication of these medicines, some peoples cannot use chemical or hormonal drugs. That is what makes us think of new treatments (10). Traditional medicine has enjoyed a special status among people throughout the past, most of which is related to medicinal herbs (11).

In the past, a verity of studies have been conducted for treatment of dysmenorrhea (12). There are inadequate data to commend the use of herbal supplements for the treatment of dysmenorrhea such as melatonin, vitamin E, and fennel (13). Supplementary research is recommended to follow up strong evidence of advantage of ginger, valerian, zinc sulphate, fish oil, and vitamin B1(14). Traditional Chinese herbal medicines are a method for the treatment of dysmenorrhea, some of which were not accepted in Iranian Culture (15). Traditional Iranian books are a rich source of medicinal herbs for dysmenorrhea. Some of these herbs have undergone clinical trials and have had effective results (16).

The functional mechanism of herbal medicines is still not understood but some of them have anti-inflammatory and anti-spasmodic effects (17). However, a variety of studies have focused on herbal medicines. In addition, a lot of studies have shown the effect of herbal medicines on dysmenorrhea in Iran. Because of dysmenorrheal etiology which is prostaglandin F₂ α (PG-F₂α) effects stimulate the uterine muscles and cause severe vascular contraction (18). For this reason, one of the effective treatments for primary dysmenorrhea is the administration of prostaglandin-medications. Some women cannot use herbal medicines with 'cold temperament', so the present study focused on hot temperament herbs to find the efficacy of 'hot temperament' herbs on primary dysmenorrhea.

Methods

Study design and search strategy

In this systematic review which was performed in 2017, the required data was gathered using electronic databases, such as Scopus, Pubmed, Web of Science, EMBASE and Chinese scientific journal database. The key words used in the present study were dysmenorrhea, primary dysmenorrhea, herbal medicines, medicinal plants, hot temperament. All randomized controlled trails (RCTs) had to be included in this study. Observational, cohort, qualitative, and laboratory studies were excluded. Women of reproductive age with primary dysmenorrhea and no identifiable pelvic pathology, ultrasound scan and laparoscopy examination and self reporting women were included in this study. Exclusion criteria consisted of dysmenorrhea resulting from use of intra uterine contraceptive devices and patients with a diagnosis of pregnancy, stroke, and organic disease; in addition, cold temperament herbs were excluded from the study.

Article evaluation

The selected papers extracted from the databases were assessed by two investigators using Jadad scale. Discrepancies between the two raters were referred to the third investigator. In this balance, the maximum mark is 5 and the papers with marks of 3 were examined in this study.

Results

In this review, 128 studies were identified, only 18 of which were clinical trials of herbal medicines in Iran. These trials include hot temperament herbs (Figure 1 & Table 1).

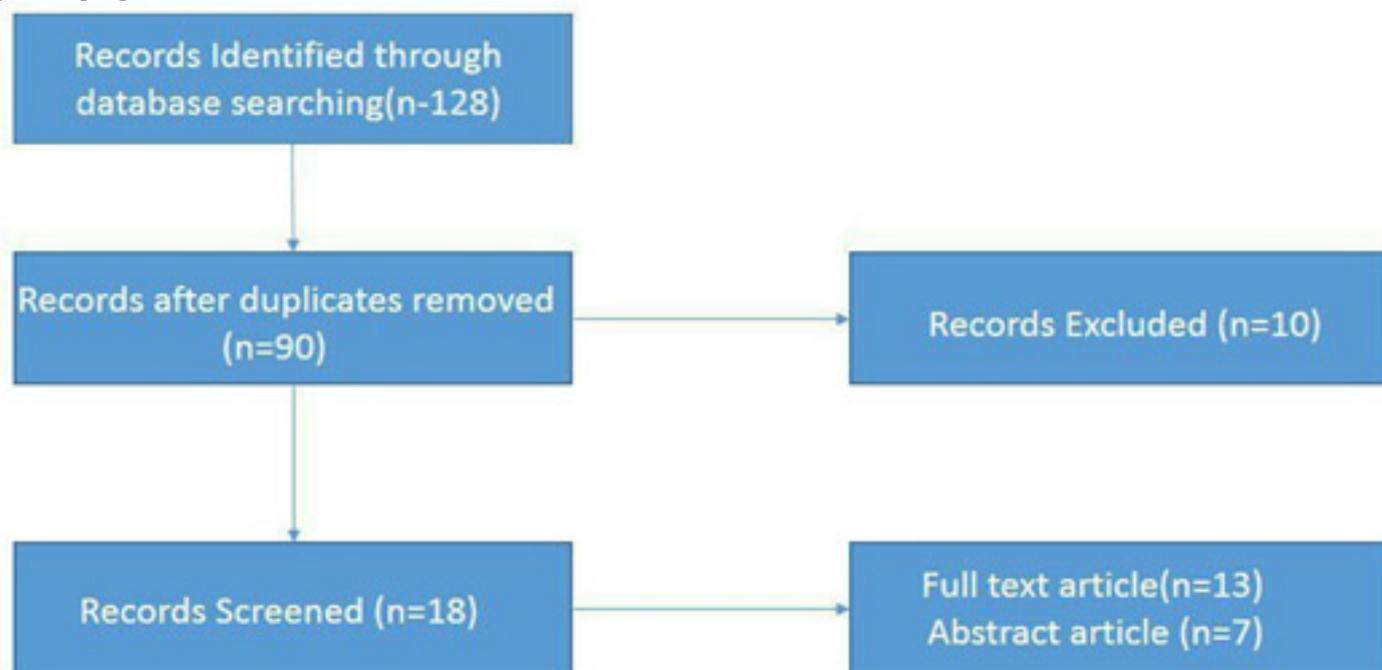
Ginger (*Zingiber officinale* Rosc)

Ginger is one of the main hot temperament herbal inhibitors of prostaglandins, which has been traditionally used for the treatment of dysmenorrhea, arthritis, and colic (19). Ginger is grown in more countries such as India, China, Nigeria, and Thailand (20). The main effects of Ginger are anti-nausea, blood clotting, antibacterial, antioxidants, anti cough, anti-liver poisons, anti-inflammatory, urinating, reduced spasm, anti-flatulence. In Iranian traditional medicine ginger was used with a mix of candy and buckthorn to prevent flatulence of premature fruit (21). Also Ginger can secrete cortisol and manage kidney transplantation (22). Blood cholesterol lowering Oleoresin and essential oil are also produced from ginger (23). Ginger can be boiled in water and drinking the solution can reduce the pain. Ozgoli et al., in a double-blinded clinical trial study, showed that ginger has the same effect of mefenamic acid or ibuprofen in pain reduction. Their study had 3 groups, including Ginger (64%), ibuprofen (66%) and mefenamic acid (58%). The mechanism of Ginger is to inhibit cyclooxygenase and lipooxygenase pathways in prostaglandin, which is the main effect of ginger on menstrual pain (24).

Chamomile (*Matricaria Chamomilla*)

This flower is a traditional herbal medicine whose extract shows both anti-inflammatory and anti-spasmodic effects. It is also helpful for women with constipation, leading to

Figure 1: Flowchart showing the trial selection process for the study investigating hot temperament plants on primary dysmenorrhea



pain reduction with sedative and anti-anxiety effects (25-27). Chamomile is used for a sore stomach, bowel syndrome, and gentle sleep aid. It is also affected as a mild laxative and is anti-inflammatory and bactericidal (28). Chamomile is a little bitter herb that effects to soothe nerves, increase mental awareness, settle the stomach and promote digestion (29). Its formal use is tea to calm hyperactive children, menstrual cramps, and asthma. Chamomile is useful for the liver and lungs and helps reduce jaundice, relieve chest pain, eliminate infection, swelling, and ease withdrawal from drugs (30-34, 35). For treating the sore stomach can take a cup not accompanied by food for three months. Chamomile assists healing of wounds in animals. It also showed some benefit in an animal model of diabetes (36). Essential oil of chamomile is an important antiviral agent against herpes simplex virus type 2 (HSV-2) in vitro (37). The methanol extract of *M. recutita* showed effective anti allergic activity by reserve of histamine release from mast cells in cell-mediated allergic models (38). A variety of studies have examined the effect of Chamomile on primary dysmenorrhea. A study carried out by Bani et.al. showed that prescription of Chamomile tea to a study group was significantly different from control groups after one month's drinking (39). Another study showed that the Chamomile was more effective than mefenamic acid in pain reduction.

Mint (*Mentha Longifolia*):

This medicine is another hot temperament herb which has been used to treat stomach disorders, nausea, vomiting, and dysmenorrhea (40). Mint has a common use for alleviation of stomach pain, as a blood diluent and is effective in strengthening the stomach. Mint contains phenolic compounds such as Rosmarin Acid and Flavonoids and has antimicrobial, antiviral, antioxidant and analgesic properties. It has been shown in laboratory studies that the menthol content of mint oil acts as an antagonist of calcium channels and has the property of muscle relaxation (41).

This herbal medicine can be used as a tea. In a study conducted by Xu Huaxi et al., no significant difference was found between Mint and nonsteroidal anti-inflammatory drugs (NSAIDs)(42). *Zataria Multiflora* is a member of the mint family and its oil is thymol and carvacrol. Some studies showed that *Zataria* is useful to treat respiratory diseases and dysmenorrhea(43). Antispasmodic effects of smooth muscles are a common property of *Multiflora*. This herb can inhibit contractions caused by cell depolarization and block calcium channels. Amoueeroknabad. divided these herbs randomly into 3 groups, including placebo, 1% of the multiflora oil and 2% of the multiflora oil. The study showed that multiflora leads to pain reduction in a third group (44).

Valeriana officinalis:

This has been a sedative drug since the 11th century (45). The main effects of valeriana are strengthening the brain, reducing infections and strengthening the liver and stomach to treat icterus (jaundice). It is also useful for uterine inflammation and kidney pain (46). It can reduce chest pain (47). Valerian has a function similar to benzodiazepines; however, as a substitute of binding to the gamma subunit like a benzodiazepine, it seems to bind to the beta subunit on the GABA-A receptor instead (48). Valerian can decrease the removal or metabolism of GABA, thereby allowing GABA to stay around longer (49). Valeriana roots and rhizomes have essential oil which contain valepotriates. Three studies have been conducted on Valeriana which associated the consequence of its root with placebo, mefenamic acid and other NSAIDs, respectively. The first study showed that Valeriana was most effective in pain reduction, as compared with placebo (50). In the second and third studies, it was found that valeriana has the same effect as mefenamic acid and other NSAIDs. Recent studies have shown that systematic symptoms of dysmenorrhea were reduced after taking Valeriana (51).

Table 1.summary of included trials

References	Participants	Experiment Group	Control Group	Results	Treatment Duration	Side Effects	Jadad Score
25	60 students	Chamomile	Mefnamic A	No significant Difference	3MCs	No	Not Calculated
26	50 single F	Chamomile	placebo	Chamomile is effective in Dysmenorrhea	3MCs	No	4
27	90 students	Chamomile	placebo	Chamomile is effective in Dysmenorrhea	3MCs	No	4
30	50 students	Chamomile	placebo	Chamomile is effective in Dysmenorrhea	6MCs	No	3
31	104 single F	Chamomile	Mefnamic A	No significant Difference	3MCs	No	5
52	110 single F	Cramp Bark	placebo	Cramp is effective in Dysmenorrhea	6MCs	No	4
53	65 single F	Cramp Bark	Ibuprofen	No significant Difference	3MCs	No	5
55	105 single F	Cramp Bark	placebo	Cramp is effective in Dysmenorrhea	3MCs	No	5
56	60 single F	Cramp Bark	placebo	Cramp is effective in Dysmenorrhea	3MCs	No	3
20	150 students	Ginger	Mefnamic A	Ginger is effective in Dysmenorrhea	3MCs	No	5
22	122 students	Ginger	Mefnamic A	Ginger is effective in Dysmenorrhea	3MCs	No	Not Calculated
23	150 single F	Ginger	Mefnamic A	Cramp is effective in Dysmenorrhea	3MCs	No	Not Calculated
24	120 single F	Ginger	Mefnamic A	Ginger is effective in Dysmenorrhea	3MCs	No	5
25	47 single F	Ginger	placebo	Ginger is effective in Dysmenorrhea	3MCs	No	4
49	100 students	Valerian	placebo	valerin is effective in Dysmenorrhea	6MCs	No	3
42	102 students	Mint	Ibuprofen	No significant Difference	3MCs	No	5
43	210 single F	Mint	Ibuprofen	No significant Difference	6MCs	No	Not Calculated
44	100 single F	Mint	placebo	Mint is effective in Dysmenorrhea	3MCs	No	4

Cramp Bark and Black Haw:

Cramp Bark and Black Haw are most effective herbs to reduce uterine cramps and relieve pains and uterine muscle contractions (36, 52). The suitable dose of cramp bark depends on user's age, health, and several other conditions. There is no study to regulate a suitable range of doses for cramp bark. (32, 53-55). A study carried out by Su Zhaolaiang et al. showed that these herbs are safe for use for several days to prevent painful cramps. In that study, the herbs were compared with ibuprofen, and their results showed that there is no significant difference between the herbs and chemical effects. However, ibuprofen exhibits more side effects as compared with Cramp (28, 33, 56-58).

Foeniculum vulgare

Fennel is a herb that has been used for many years in traditional Iranian medicine as an anti-inflammatory and analgesic pain in cats. The herb has a warm and dry effect and is used to strengthen the stomach and remove its inflammation. In addition, it is a diuretic and leads to an increase in menstrual blood and assists in breastfeeding. According to Iranian medical documents, due to its warm and dry nature, it is useful in removing biliary obstruction (59). This herbal medicine has numbing effects in uterus by constraining reductions induced by oxytocin and prostaglandins. (59). Khorshidi et al. showed that *F. vulgare* essential oil was beneficial in reducing pain and systemic symptoms of primary dysmenorrhea compared with placebo (60), but the study of Zahrani et al., showed no effect on systemic symptoms (61). Jahromi et al. compared *F. vulgare* and mefenamic acid in their study. (62). In the study of Zeraati et al *F. vulgare* and *Vitex* are more effective than mefenamic acid in reducing dysmenorrhea. (63) *F. vulgare* has been active in reducing of dysmenorrhea in all studies which compare with placebo.(64,65).

Cuminum cyminum

In a randomized clinical trial, the effect of *C. cyminum* on primary dysmenorrhea compared to placebo and mefenamic acid, demonstrated that treatment with *C. cyminum* was equal to treatment with mefenamic acid (66). Cumin has a warm and dry nature and is useful in the treatment of epistaxis and is useful for embroidery, anti-flaking and sweating, it causes weight loss. Due to its nature, it makes it easy to reduce blood pressure and reduce menstrual pain.

Cinnamomum zeylanicum

Cinnamon is warm and dry, it is mentioned in Iranian medical texts and has been used as an antibiotic, for anesthetizing, diuretic and regulating, enhancing the libido, strengthening the stomach and liver. It is also used to treat 'cough Prodotti'. Cinnamon oil has been used to relieve uterine pains. Some studies reported that *C. zeylanicum* has an antispasmodic effect. Eugenol can also prevent biosynthesis of prostaglandins and affect inflammation (67). A study where *C. zeylanicum* capsule was compared with placebo showed the effect of *C. zeylanicum* on severity of dysmenorrhea was more than effect of placebo(68). *C. zeylanicum* has anti-microbial, anti-parasitic, anti-oxidant and free radical scavenging properties. In addition *C. zeylanicum* reduced blood glucose, serum cholesterol

and blood pressure, so it can be useful in treatment of cardiovascular diseases. (69)

Melissa officinalis (Lemon Balm)

It is warm and dry, and it is a central nervous system augmentator. It is useful in the treatment of neurological diseases. It is used in the treatment of sleep disorders and also has a sedative effect. It is also helpful in relieving pain. *Melissa officinalis* can be used for pain relief and treatment of some diseases. One study showed that *Melissa* was more operative than mefenamic acid in release of pain on primary dysmenorrhea (70).

Discussion

This study was conducted to evaluate the effect of medicinal plants on the treatment of primary dysmenorrhea in Iran. The aforementioned articles had a great deal of variation in the type of plant studied, which requires more studies with more stringent methodology to apply to many of these plants. It also examined hot temperament herbal medicine on the intensity of primary dysmenorrhea. Studies conducted on Ginger found it to be more useful than those conducted on other herbs. Eight trials received score 4 from Jadad. (29). There is no negative result in the studies. Most of the studies showed that the effects of Ginger are higher than other herbs in the treatment of primary dysmenorrhea. However, only one study presented that the effect of Mint herbs is higher than Ginger (30). Collectively, all of the above-mentioned studies showed the higher effect of herbal medicines than Ibuprofen on the treatment of dysmenorrhea (41). In addition, some publications discussed 'cold temperament' herbal medicine such as Coriander to reduce dysmenorrhea. Some studies focused on Cramp and multiflora, showing positive results and on their ability to reduce dysmenorrhea. The present study demonstrated the higher effect of herbal medicines as compared with NSAIDs; in addition, Ginger may be a real and safe therapy for pain relief in women with primary dysmenorrhea if administered during the days prior to menstruation. Conclusion of this study is focus on those hot temperament herbs which passed the clinical trials studies and are common in Iranian traditional medicine. Effective herbal medicines can be used as a good alternative to treat patients who do not respond well to conventional therapies or have contraindications to use these drugs.

Acknowledgements

The authors gratefully acknowledge the financial support for this work that was provided by Tabriz University of Medical Sciences. This research presented as a PhD thesis at School of Iranian Traditional Medicine, Tabriz University of Medical Sciences.

References

1. Joshi T, Kural MR, Agrawal DP, Noor NN, Patil A. Primary dysmenorrhea and its effect on quality of life in young girls. *Int J M Sci Pub Health* 2015; 4(3):381-5.
2. Weissman AM, Hartz AJ, Hansen MD, Johnson SR. The natural history of primary dysmenorrhoea: a longitudinal study. *BJOG* 2004; 111(4):345-52.

3. Jonathan S, Berek J. *Novak's Gynecology*. 14th ed. New York: Lippincott Williams and Wilkins Publishers; 2012.
4. Sultan C, Gaspari L, Paris F. Adolescent dysmenorrhea. *Endocr Dev* 2012; 22:171-80.
5. Ju H, Jones M, Mishra G. The prevalence and risk factors of dysmenorrhea. *Epidemiol Rev* 2014; 36:104-13.
6. Rehman H, Begum W, Tabasum H, Anjum F. Primary Dysmenorrhea: A Review with Special Reference to Unani Concepts. *J Unani Siddha Homeopat* 2014; 1(1):29-37.
7. Kalvandi R, Alimohammadi S, Pashmakian Z, Rajabi M. The effects of medicinal plants of melissa officinalis and salvia officinalis on primary dysmenorrhea. *J Hamadan Univ Med Sci* 2014; 21(4):105-11.
8. Charu S, Amita R, Sujoy R, Thomas GA. Dysmenorrhea on quality of life of medical students. *Int J Collaborat Res Med* 2012; 4(4):275-93.
9. Wang L, Wang X, Wang W, Chen C, Ronnennberg AG, Guang W, et al. Stress and dysmenorrhoea: a population based prospective study. *Occup Environ Med* 2004; 61(12):1021-6.
10. Famarzi M, Salmalian H. Association of psychologic and nonpsychologic factors with primary dysmenorrhea. *Iran Red Crescent Med J* 2014; 16(8):e16307.
11. Tavallaee M, Joffres MR, Corber SJ, Bayanzadeh M, Rad MM. The prevalence of menstrual pain and associated risk factors among Iranian women. *J Obstet Gynaecol Res* 2011; 37(5):442-51.
12. Bettendorf B, Shay S, Tu F. Dysmenorrhea: contemporary perspectives. *Obstet Gynecol Surv* 2008; 63(9):597-603.
13. Grandi G, Ferrari S, Xholli A, Cannoletta M, Palma F, Romani C, et al. Prevalence of menstrual pain in young women: what is dysmenorrhea? *J Pain Res* 2012; 5:169-74.
14. Zangene M, Veisi F, Nankali A, Rezaei M, Ataee A. Evaluation of the effects of oral vitamin-D for pelvic pain reduction in primary dysmenorrhea. *Iran J Obstet Gynecol Infertil* 2014; 16(88):14-20.
15. Reyhani T, Jafarnejad F, Behnam HR, Ajam M, Baghaei M. The effect of brisk walking on primary dysmenorrhea in girl students. *Iran J Obstet Gynecol Infertil* 2013; 16(46):14-9.
16. Ameri F, Vahabi MR, Khatoonabadi SA, Andalibi L. On the relevance of medicinal plants consumers in Iran: investigating statistics for consumers, states of consumption, informative and source area. *Teb Tazkiyeh* 2013; 22(3):37-42.
17. Johnston L. Menstrual pain (dysmenorrhoea). *Profession Nurs Today* 2014; 18(1):4-13.
18. French L. Dysmenorrhea. *Am Fam Physician* 2005; 71(2):285-91.
19. Proctor M, Farquhar C. Diagnosis and management of dysmenorrhoea. *Br Med J* 2006; 332(7550):1134-8.
20. Ortiz MI. Primary dysmenorrhea among Mexican university students: prevalence, impact and treatment. *Eur J Obstet Gynecol Reprod Biol* 2010; 152(1):73-7.
21. Serajadini M. Herbal medicine in ancient Iran. *J Med History* 2010; 2(2):11-33.
22. Zhu X, Proctor M, Bensoussan A, Wu E, Smith CA. Chinese herbal medicine for primary dysmenorrhoea. *Cochrane Database Syst Rev* 2008; 2:CD005288.
23. Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, et al. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Syst Rev* 2015; 4(1):1.
24. Ozgoli G, Goli M, Moattar F. Comparison of effects of ginger, mefenamic acid, and ibuprofen on pain in women with primary dysmenorrhea. *J Altern Complement Med*. 2009 Feb;15(2):129-32.
25. Salamon I. Chamomile: a medicinal plant. *The Herb, spice and medicinal plant. Digest* 1992; 10:1-4.
26. Singh O, Khanam Z, Misra N, Srivastava MK. Chamomile (*Matricaria chamomilla* L.): an overview. *Pharmacogn Rev* 2011; 5(9):82-95.
27. Birdane FM, Cemek M, Birdane YO, Gülçin I, Büyükkokuroğlu ME. Beneficial effects of chamomile on ethanol-induced acute gastric mucosal injury in rats. *World J Gastroenterol* 2007; 13(4):607-11.
28. Zeraati F, Shobeiri F, Nazari M, Araghchian M, Bekhradi R. Comparative evaluation of the efficacy of herbal drugs (fennelin and vitagnus) and mefenamic acid in the treatment of primary dysmenorrhea. *Iran J Nurs Midwifery Res* 2014; 19(6):581-4.
29. Bokaie M, Farajkhoda T, Enjezab B, Khoshbin A, Mojgan KZ. Oral fennel (*Foeniculum vulgare*) drop effect on primary dysmenorrhea: effectiveness of herbal drug. *Iran J Nurs Midwifery Res* 2013; 18(2):128-32.
30. Villa-Rodriguez JA1, Aydin E1, Gauer JS1, Pyner A1, Williamson G1, Kerimi A1. Green and Chamomile Teas, but not Acarbose, Attenuate Glucose and Fructose Transport via Inhibition of GLUT2 and GLUT5.: *Mol Nutr Food Res*. 2017 Sep 3 311-3.
31. Moslemi L, Bekheradi R, Hasani S, Khaleginejad K. Effect of chamomile on primary dysmenorrhea. *J Family Health* 2013; 1(4):15-20.
32. Moslemi L, Bekhradi R, Galini Moghaddam T, Gholamitabar Tabari M. Comparative effect of chamomile extract on the intensity of primary dysmenorrhea. *African J Pharm Pharmacol* 2012; 6:1770-3.
33. Delaram M, Forouzandeh N. The effect of chamomile on the primary dysmenorrhea in students of Shahrekord university of medical sciences. *Sci Med J* 2011; 10(2):81-8.
34. Tork Zahrani SH, Akhavan Amjadi M, Mojab F, Alavi Majd H. Clinical effect of *Foeniculum vulgare* extract on primary dysmenorrhea. *J Reproduct Infertil*. 2007; 8:45-51.
35. Nazarpour S, Azimi H. The comparison chamomile and Mefenamic acid on primary dysmenorrhea. *J Mazandaran Univ Med Sci* 2007; 17(61):54-61.
36. Modaress Nejad V, Motamedi B. Comparison between the pain-relief effect of Chamomile and mefenamic acid on primary dysmenorrhea. *J Rafsenjan Univ Med Sci* 2006; 5(1):1-6.
37. Saxena M, Shakya A, Sharma N, Shrivastava S, Shukla S. Therapeutic efficacy of Chamomile and *Rosa damascena* Mill. on acetaminophen-induced oxidative stress in albino rats. *J Environ Pathol Toxicol Oncol* 2012; 31(3):193-201.
38. *M. recutita*. Anti-allergic activity of German chamomile (*Matricaria recutita* L.) in mast cell mediated allergy model. *J Ethnopharmacol*. 2011 Sep 1;137(1):336-40

39. Bani S, Hasanpour S, Mousavi Z, Mostafa Garehbaghi P, Gojazadeh M. The effect of chamomile extract on primary dysmenorrhea: A double-blind cross-over clinical trial. *Iran Red Crescent Med J* 2014; 16(1):e14643.
40. Flores KE and Quinlan MB. Ethnomedicine of menstruation in rural Dominica, West Indies. *Journal of Ethnopharmacol.* 2014; 153 (3): 624 - 34.
41. McKay DL, Blumberg JB. A review of the bioactivity and potential health benefits of mint. *Phytother Res* 2006; 20(8):619-33.
42. Xu Huaxi, Wei X, Triggle D. The actions of peppermint oil and menthol on calcium channel dependent processes in intestinal, neuronal and cardiac preparations. *Aliment Pharmacol Ther* 1988; 2(2):101-18.
43. Nasri S. A review of the use of analgesic drugs in Iran. *J Tradition Med Islam Iran.* 2012; 3(3):293-310.
44. Amoueeroknabad M, Sarafraz N. Effect peppermint extract on primary dysmenorrhea compared with ibuprofen: a randomized clinical trial. *Qom Univ Med Sci* 2011; 5(3):37-41.
45. Khayat S, Kheirkhah M, Behboodi Moghadam Z, Fanaei H, Kasaeian A, Javadimehr M. Effect of treatment with ginger on the severity of premenstrual syndrome symptoms. *ISRN Obstet Gynecol* 2014; 2014(4):792708.
46. Stevinson C, Ernst E. Valerian for insomnia: a systematic review of randomized clinical trials. *Sleep Med* 2000; 1:91-9.
47. Ziegler G, Ploch M, Miettinen-Baumann A et al. Efficacy and tolerability of valerian extract LI 156 compared with oxazepam in the treatment of non-organic insomnia - a randomized, double-blind, comparative clinical study. *Eur J Med Res* 2002; 7:480-6.
48. Benke D, Barberis A, Kopp S et al. GABA(A) receptors as in vivo substrate for the anxiolytic action of valerianic acid, a major constituent of valerian root extracts. *Neuropharmacology* 2009; 56:174-81.
49. Ebadi M. Valerian. In: *Pharmacodynamic basis of herbal medicine.* 2nd Ed. Taylor & Francis Group. Boca Raton, FL. 2007:599-609.
50. Mennini T, Bernasconi P, Bombardelli E et al. In vitro study on the interaction of extracts and pure compounds from Valeriana officinalis roots with GABA, benzodiazepine and barbiturate receptors. *Fitoterapia* 1993; 64:291.
51. Jenabi E, Asltugiri M, Hejrati P. Compare Valeriana Officinalis and mephenamic acid on primary dysmenorrhea. *Iran J Obstet Gynecol Infertil* 2012; 15(2):44-8
52. Ataollahi M, Akbari SA, Mojab F, Alavi Majd H. The effect of cramp bark extract on premenstrual syndrome symptoms. *Iran J Pharm Res* 2015; 14(1):159-66.
53. Atallahi M, Akbari SA, Mojab F, Alavi Majd H. Effects of cramp bark extract on the severity and systemic symptoms of primary dysmenorrhea: a randomized controlled clinical trial. *Iran Red Crescent Med J* 2014; 16(8):e19503.
54. Zaidi SA, Khatoun K, Aslam KM. Role of herbal medicine in Ussurutams (Dysmenorrhoea). *J Acad Indus Res.* 2012; 1(3):113-7.
55. Aghajani Delavar M, Naseri Amiri F, Hoseini H. The effect of cramp barks on premenstrual syndrome. *J Herbal drug* 2001; 1(2):15-21.
56. Golian Tehrani S, Bazzazian S, Bakhtiarian A, Ghobadzadeh M. Effects of calci soya balance and cramp bark on menopausal symptoms. *Iran Red Crescent Med J* 2014; 16(10):e13551.
57. Valadi A, Nasri S, Abbasi N, Amin G. Antinociceptive and anti-inflammatory effects of hydroalcoholic extract of anethum graveolens L. seed. *J Med Plant* 2010; 2(34):124-30.
58. Alcaraz M, Hoult JR. Actions of flavonoids and the novel anti-inflammatory flavone, hypolaetin-8-glucoside, on prostaglandin biosynthesis and inactivation. *Biochem Pharmacol* 1985; 34(14):2477-82.
59. Shibata T, Morimoto T and Suzuki A. The effect of Shakyukokenzo-to on prostaglandin in human uterine myometrium. *Nippon Sanka Fujinka Zasshi* (1996) 48: 321-327.
60. Khourshidi N, Ostad SN, Mosaddegh M and Sooudi M. Clinical effects of fennel essential oil on primary dysmenorrhea. *Iran. J. Pharm. Res.* (2003) 2: 89-93.
61. Torkzahrani SH, Akhavan AM, Mojab F and Alavi-majd H. Clinical effects of Foeniculum vulgare extract on primary dysmenorrhea. *J. Reproduct. Infertil.* (2007) 1: 45-51.
62. Namavar Jahromi B, Tartifzadeh A and Khabnadideh S. Comparison of fennel and mefenamic acid for the treatment of primary dysmenorrhea. *Int. J. Gynaecol. Obstet.* (2003) 80: 153-157.
63. Zeraati F, Shobeiri F, Nazari M, Araghchian M, Bekhradi R. Comparative evaluation of the efficacy of herbal drugs (fennelin and vitagnus) and mefenamic acid in the treatment of primary dysmenorrhea. *Iran J Nurs Midwifery Res* 2014; 19(6):581-4.
64. Omidvar S, Esmailzadeh S, Baradaran M, Basirat Z. Effect of fennel on pain intensity in dysmenorrhoea: A placebo-controlled trial. *Ayu* 2012; 33(2):311-3.
65. Moslemi L, Bekheradi R, Hasani S, Khaleginejad K. Effect of fennel on primary dysmenorrhea. *J Family Health* 2013; 1(4):15-20.
66. Tavasoli F, Sharifian J and Mazlom R. Comparison of the effect of Mefenamic acid and Carum carvi on the severity of primary dysmenorrhea in Mashhad high- school students. *J. Sabzevar Uni. Med. Sci.* (2002) 8: 4-9.
67. Keller K. Cinamomum species. In: De Smet PAGM, Keller K, Hansel R and Chandler RF. *Adverse Effects of Herbal Drugs.* Vol. 1, Springer-Verlag. Berlin (1992) 105-114.
68. Akhavan Amjadi M, Mojab F and Shahbaz-Zadegan S. Effects of Cinnamomum zeylanicum on the severity and systemic manifestations of dysmenorrhea. *Med. J. Arak Uni.* (2009) 9: 204-209.
69. Ranasinghe et al.: Medicinal properties of 'true' cinnamon (Cinnamomum zeylanicum): a systematic review. *BMC Complementary and Alternative Medicine* 2013 13:275.
70. Safdari Dehcheshmeh F, Parvin N. The Effect of Mefenamic Acid and Melissa officinalis on Primary Dysmenorrhea: A Randomized Clinical Trial Study. *International Journal of Pharmacognosy and Phytochemical Research* 2016; 8(8); 1286-1292. Available online on www.ijppr.com

Natural Therapeutics for Common Psychiatric Disorders

Koroush Saki (1)
Mahmoud Rafieian-Kopaei (2)

(1) Shahid Beheshti University of Medical Sciences, Tehran, Iran
(2) Medical Plants Research Center, Basic Health Sciences Institute, Shahrekord University of Medical Sciences, Shahrekord, Iran

Corresponding author:

Prof Mahmoud Rafieian-Kopaei;
Medical Plants Research Center, Basic Health Sciences Institute,
Shahrekord University of Medical Sciences, Shahrekord, Iran;
Email: rafieian@yahoo.com

Received: January 30, 2018; Accepted: February 10, 2018; Published: March 1, 2018. Citation: Koroush Saki, Mahmoud Rafieian-Kopaei. Natural Therapeutics for Common Psychiatric Disorders. World Family Medicine. 2018; 16(3):259-265. DOI: 10.5742/MEWFM.2018.93337

Abstract

Background: According to the World Health Organization (WHO), about 500 million people in the world suffered from a mental disorder in 2002; about half of them included mild mental disorders such as depression and anxiety. Health has different physical, psychological, emotional, and social dimensions and the use of some medicinal herbs have improved brain functioning. Therefore, in this study, the most important medicinal herbs effective on common psychiatric disorders such as anxiety, stress, fatigue, insomnia, seizures, epilepsy, and memory loss have been studied.

Methods: In this review study, the searched keywords included Neurologic diseases, Medicinal Herbs, Traditional Medicine, Ethnobotany were searched in databases such as ISI, PubMed, Scopus, SID, Magiran.

Results: Based on the results, 84 medicinal herbs are used in Iran's ethnobotanics for common neurological diseases and disorders.

Conclusion: Knowledge of these native herbs in traditional medicine offers new and interesting ideas for modern pharmaceutical science and can help produce new and effective herbal medicines for problem-solving of psychiatric disorders.

Key words: Neurological diseases, Herbal medicines, Ethnobotany, Iran

Introduction

Mental health refers to healthy thought processes and shows a positive state and mental health can contribute to creating a valuable system for mobility, development, and progress at individual, national, and international levels. When mental health is achieved it can create a path to personal and social development. According to the World Health Organization (WHO), about 500 million people in the world suffered from a psychiatric disorder in 2002, about half of which included mild psychological disorders such as depression and anxiety (1-3). Health has different physical, psychological, emotional, and social dimensions and the physical aspects of health can be easily understood. Physical health indicates the function of the whole body when all bodily organs function normally. Many factors affect health; the most important of which include heredity, environment, lifestyle, economic and social status, health services, etc. (4-5). Neuropsychiatric health is one of the important issues that attracts the attention of many specialists in different fields, due to the association and the effect of mental health on various human functions. Anxiety, stress, depression, seizure, epilepsy, insomnia and other neuropsychiatric disorders are becoming increasingly widespread and cause abnormal functioning and discomfort as well as pain and suffering of individuals (6-14). Weak nerves, stress, anxiety, anger, insomnia, and other disorders can be treated by traditional medicines and medicinal herbs. Some medicinal herbs have been shown to cause better functioning of the brain and the best drugs are often obtained from herbs. Therefore, in this article, the most important medicinal herbs effective on common psychiatric disorders, such as anxiety, stress, fatigue, insomnia, seizure, epilepsy, and memory loss were reviewed.

Methodology

This review study was conducted by searching the keywords of nerves, mental disorder, remedy, medicinal plants, herbal plants, ethnobotany, and phytotherapy. Searching was done on databases including ISI Web of Science, PubMed, PubMed Central, Scopus, ISC, SID, Magiran and others.

Results

According to the obtained results, 84 effective medicinal plants were identified with properties for treatment of nerves and mental disorders based on ethnobotany and ethnopharmacological documents of Iran. The most important effective medicinal plants on nerves and mental disorders in Iran are shown in Table 1 (next page).

Discussion

Psychiatric disorders can happen at any age and for any reason. Psychiatric disorders are very diverse, but some of the disorders are more prevalent, such as insomnia, anxiety, stress, nerves, seizures, and epilepsy. The causes of these problems are also diverse. Various approaches have been searched, employed or recommended for these diseases (34-39). Use of medicinal plants is one of these approaches which has become very popular recently (40-43). Based on the results of this study, various medicinal herbs in Iran's have been used or tested in the treatment of psychiatric disorders as a drug source with less complications (44).

Most of these disorders, especially the neurodegenerative diseases, are oxidative and related to free radical induced stress (40-43). It means that they are related to oxidative stress and by reduction of free radicals and oxidative stress the disease may be prevented or treated. Medicinal plants presented in this article mostly have antioxidant activity. Hence, their effects might, in part, be attributed to their antioxidant activities. It should be noted that antioxidant activity is just one part of their effects. Plants have various components and they may act through one or more of these components all of which should be identified by preclinical and clinical trials. However, antioxidant properties of these plants usually act as an adjuvant to these compounds.

From the plants which are used for neurological disorders, *Ginkgo biloba* is an exception. It has ginkgolides which have antioxidant and neuroprotective properties as well as cholinomimetic activities. These properties make it useful in most neurologic disorders, especially in neurodegenerative diseases such as Alzheimer's disease. The efficacy of ginkgolides and *Ginkgo* extract in Alzheimer's disease has been reported to be similar to the currently prescribed drugs including donepezil or tacrine. More importantly, *Ginkgo* has very low side effects. Some other plants including *Melissa officinalis* and *Salvia officinalis* also have antioxidant and cholinergic activities and memory-improving properties (45).

Conclusion

In sum it can be concluded that native information of medicinal plants in the knowledge of traditional medicine offers new and interesting ideas for new pharmaceutical sciences and can produce new effective herbal remedies for problem solving and psychiatric disorders.

References

1. World Health Organization. Investing in mental health. 2003. www.who.int/mental_health/en/investing_in_mnh_final.pdf
2. The world health report 2001. Mental Health: New Understanding, New Hope. Available at: http://www.who.int/whr/2001/en/whr01_en.pdf
3. Shamloo S. [Psychological pathology]. 2nd. Tehran: Roshd Publication. 1989; p: 54.
4. Park JA, Park K. Drsnamh. Preventive and Social Medicine, General Health Services. Translator Shogaei Tehrani, Iran: Gilan University of Medical Sciences press; 1997:8-43.
5. Diagnostic and Statistical Manual of Psychiatric Disorders, Fourth Edition, 2000, American Psychiatric Association, Translation by Mohammad Reza Nikkho and Hamayak Avavadis Yans, 2002, p. 21
6. Meister A, Bernhardt G, Christoffel V, Buschauer A. Antispasmodic activity of thymus vulgaris extract on the isolated guinea-pig trachea: discrimination between drug and ethanol effects: *Planta Med* 1999; 65(6): 512-6..
7. Goldman L, Bennett JC. Cecil textbook of medicine, Volume 1, 11st ed, W.B. Saunders Co 2000; p: 103.
8. Andrew chevalier MH. The Encyclopedia of medicinal plant. London: Dorling. Kindersley; 1996. p: 171.
9. Lanni C, Becker EL. Inhibition of neutrophil phospholipase A2 by p-bromophenylacetyl bromide, nordihydroguaiaretic acid, 5,8,11,14-eicosatetraenoic acid and quercetin. *Int Arch Allergy Appl Immunol*. 1985; 76(3): 214-7.
10. Elisabetsky E, Amador TA, Albuquerque RR, Nunes DS, Carvalho Ado C. Analgesic activity of *Psychotria colorata* (Willd. ex R. & S.) Muell. Arg. alkaloids. *J Ethnopharmacol*. 1995; 48(2):77-83.
11. Beck AT, Alford BA, Depression: Causes and treatment. Univ of Pennsylvania Press, (2009).
12. Sadock BJ, Sadock VA. Kaplan & Sadock, Synopsis of Psychiatry: Behavioural Sciences/ Clinical Psychiatry. 9th. ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2003: 579-580..
13. Neubauer DN. Pharmacologic approaches for the treatment of chronic insomnia. *Clin. Cornerstone*. 2003; 5: 16 - 27.
14. Lownestein DH. Seizure and epilepsy In: Braunwald E, Hauser SL, Fauci AS. Harrison's principle of Internal Medicine. Mc Graw Hill. USA. 2001: 2354-2368.
15. Razmjoei D, Zarei Z and Akbari M: Study of ethnobotany of some medicinal plants in Abadeh, Fars Province. *Journal of Eco-physiology of Agricultural Plants*,7(3), 222-234, 2015.

(continued page 277)

Table 1: The most important medicinal plants on nerves and mental disorders of Iran

Scientific name	Family name	Persian name	Used organ	Province and place of use	Therapeutic effects
<i>Salvia sp</i>	Lamiaceae	Maryam goli	Petal	Abadeh shiraz (15)	Weak nerves, excessive fatigue
<i>Pistacia khinjuk</i>	Anacardiaceae	Kolkhonak	Fruit and resin	Abadeh shiraz (15)	Reinforcing the mind
<i>Achilla mellifolium</i>	Asteraceae	Boumadaran	Petal and leaf	Abadeh shiraz (15)	Epilepsy
<i>Allium sp</i>	Liliaceae	Piaz vahshi	-	Abadeh shiraz (15)	Nerve Strengthening
<i>Verbascum cheiranthifolium</i>	Scrophulariaceae	Gole mahour	Flower, root and leaf	Abadeh shiraz (15)	insomnia
<i>Sinapis sp</i>	Brassicaceae	Khardale vahshi	Seed	Abadeh shiraz (15)	Strengthening mind and memory
<i>Dianthus crinitus</i>	Caryophyllaceae	Mikhak	Seed	Abadeh shiraz (15)	Nervous incontinence
<i>Cichorium intybus</i>		Kasni	Root and leaf	Arasbaran (16)	Nervous tonic
<i>Hypericum perforatum</i>	Hypericaceae	Gole raei	Flowered flower	Arasbaran (16)	Relief of Nervous
<i>Leomurus cardiaca</i>	Labiatae	Dome shir	Aerial parts	Arasbaran (16)	Anticonvulsants
<i>Origanum vulgare</i>	Labiatae	Marzanjoush	Flowered flower	Arasbaran (16)	Nervous tonic
<i>Ballota nigra</i>	Labiatae	Anjideyeh siah	Aerial parts	Arasbaran (16)	Neurasthenia
<i>Rosa canina</i>	Rosaceae	Nastaran vahshi	Fruit and flower	Arasbaran (16)	Relaxation
<i>Asperula odorata L.</i>	Rubiaceae	Shirpanir	Aerial parts	Arasbaran (16)	Hypnotic
<i>Hyoscyamus niger</i>	Solanaceae	Bangdaneh	Leaf and seed	Arasbaran (16)	Anticonvulsants
<i>Echium italicum</i>	Boraginaceae	Gole gavzaban	Flower	Ilam (17)	Relaxation
<i>Popover dubium L.</i>	Papaveraceae	Khashkhash	Flower and leaf	Ilam (17)	Relaxation
<i>Stochys lavandulifolia</i>	Lamiaceae	Sonbolei	Flower and leaf	Ilam (17)	Relaxation
<i>Anchusa azurea</i>	Boraginaceae	Kiko	Flower and root	Toiserkan (18)	Relaxation
<i>Echium amoenum</i>	Boraginaceae	Gelga	Flower	Toiserkan (18)	Relaxation
<i>Hypericum perforatum</i>	Hypericaceae	Gole raei	Flower	Toiserkan (18)	Relaxation

<i>Nepeta crispa</i>	Lamiaceae	Mafra	Aerial parts	Toiserkan (18)	Relaxation
<i>Pistacia khinjuk</i> Stocks	Anacardiaceae	Khinjouk	Fruit	Khopar kerman (19)	Memory Improvement
<i>Ferula assa-foetida</i> L.	Apiaceae	Anghozeh	Root and resin	Khuzistan (20)	Seizure
<i>Ferula gumosa</i> Boiss.	Apiaceae	Barijeh	Resin	Khuzistan (20)	Seizure
<i>Heracleum persicum</i>	Apiaceae	Golpar	Leaf and fruit	Khuzistan (20)	Sedative
<i>Kelussia odoratissima</i>	Apiaceae	Karafse kouhi	Aerial parts	Khuzistan (20)	Sedative
<i>Pimpinella anisum</i>	Apiaceae	Anison	Fruit	Khuzistan (20)	Sedative
<i>Trachyspermum copticum</i> L.	Apiaceae	Zenian	Fruit and seed	Khuzistan (20)	Sedative
<i>Angelica archangelica</i> L.	Apiaceae	Babouneh	Flower and leaf	Khuzistan (20)	Seizure
<i>Centurea depressa</i>	Asteraceae	Gole gandom	Stem	Khuzistan (20)	Sedative
<i>Lactuca virosa</i> Habl	Asteraceae	Kahouye vahshi	Aerial parts	Khuzistan (20)	Sedative
<i>Taraxacum officinale</i>	Asteraceae	Gole ghasedak	Aerial parts	Khuzistan (20)	Sedative
<i>Brassica napus</i>	Brassicaceae	Shalgham	Seed and root	Khuzistan (20)	Sedative
<i>Boswellia papyrifera</i>	Burseraceae	Kondor	Resin	Khuzistan (20)	Memory Improvement
<i>Spinaci oleracea</i>	Chenopodiaceae	Esfenaj	Leaf	Khuzistan (20)	Nervous tonic
<i>Avena sativa</i>	Poaceae	Jo dosar	Seed	Khuzistan (20)	Insomnia
<i>Lycopus europaeus</i>	Lamiaceae	Pagorg	Aerial parts	Dastena (21)	Nervous incontinence
<i>Pistacia atlantica</i>	Anacardiaceae	Baneh	Fruit and leaf	Dehlo kerman (22)	Nervous incontinence
<i>Carthamus oxyacantha</i>	Asteraceae	Golrang	Seed and flower	Dehlo kerman (22)	Nervous tonic
<i>Onosma stenosisiphon</i> Boiss	Boraginaceae	Houchareh	Root and leaf	Dehlo kerman (22)	Nervous tonic
<i>Onobrychis altissima</i>	Fabaceae	Esperes	Stem and flower	Dehlo kerman (22)	Nervous tonic
<i>Stachys setifera</i>	Lammiaceae	Solbeh	Essential oil ointment	Dehlo kerman (22)	Nervous tonic
<i>Ziziphora clinopodioides</i>	Lamiaceae	Avishan kouhi	Leaf and flower	Dehlo kerman (22)	Nervous tonic
<i>Hymenocrater elegans</i>	Lamiaceae	Shenouk	Flower and leaf	Dehlo kerman (22)	Nervous tonic

<i>Perovskia abrotanoides</i>	Lamiaceae	Housh	Aerial parts	Dehlo kerman (22)	Sedative
<i>Stachys lavandulifolia</i>	Lamiaceae	Toklicheh	Flower	Dehlo kerman (22)	Nervous tonic
<i>Cannabis sativa</i>	Cannabaceae	Shahdaneh	Leaf	Sirjan kerman (23)	Nervous tonic
<i>Dianthus crinitus</i>	Caryophyllaceae	Mikhak kourki	Seed	Sirjan kerman (23)	Nervous incontinence
<i>Echium amoenum</i>	Boraginaceae	Gole gavzaban	Flower	Sirjan kerman (23)	Sedative
<i>Myrtus communis</i>	Myrtaceae	Mourd	Leaf and fruit	Sirjan kerman (23)	Sedative
<i>Avena sativa</i>	Poaceae	Jo dosar	Flower	Sistan (24)	Nervous tonic
<i>Foeniculum vulgare</i>	Apiaceae	Razianeh	Seed	Sistan (24)	Nervous tonic
<i>Cichorium intybus</i>	Asteraceae	Kasni	Stem and leaf	Northeast of Persian Gulf (25)	Sedative
<i>Helianthus annuus</i>	Asteraceae	Aftabgardan	Seed and flower	Northeast of Persian Gulf (25)	Nervous tonic
<i>Araucaria hispanica</i>	Brassicaceae	Manabi	Aerial parts	Northeast of Persian Gulf (25)	Nervous tonic
<i>Ixilirion tataricum</i>	Ixiliaceae	Khiaarak	Inflorescence	Northeast of Persian Gulf (25)	Nervous tonic
<i>Pistacia khinjuk</i> Stocks	Anacardiaceae	Peste kouhi	Fruit	Fasa (26)	Reinforcing the mind
<i>Phoenixdactylifera</i> L.		Nakhl	Fruit	Fasa (26)	Strengthen mental health
<i>Avenasativa</i>	Gramineae	Youlaf	Fruit	Fasa (26)	Reinforcing the mind
<i>Rosadamascena</i>	Rosaceae	Gole mohammadi	Flower and fruit	Fasa (26)	Nervous tonic
<i>Salixaeegyptica</i>	salicaceae	Bidmeshk	Flower	Fasa (26)	Sedative
<i>Datura stramonium</i>	Solanaceae	Tatoureh	Flower	Fasa (26)	Anticonvulsants
<i>Anethum graveolens</i>	Apiaceae	Shevid	Leaf	Kazeroun (27)	Anticonvulsants
<i>Achillea tenuifolia</i> Lam	Asteraceae	Boumadaran	-	Kazeroun (27)	Nervous tonic
<i>Lycopus europaeus</i>	Lamiaceae	Payegorg	-	Kazeroun (27)	Nervous incontinence
<i>Avena wiestii</i>	Poaceae	Youlaf	-	Kazeroun (27)	Nerve fatigue
<i>Leontice leontopetalum</i>	Podophyllaceae	Alafe shakhi	-	Kazeroun (27)	Epilepsy
<i>Trifolium stellatum</i>	Fabaceae	Soureh	Flower	Kohgiluyeh (28)	Sedative
<i>Ziziphus jujube</i>	Rhamnaceae	Anab	Fruit	Mobarake (29)	Sedative
<i>Rosa damascena</i>	Rosaceae	Gole mohammadi	Flower	Mobarake (29)	Sedative
<i>Ocimum basilicum</i>	Lamiaceae	Reyhan	Leaf	Mobarake (29)	Sedative
<i>Calendula persica</i>	Asteraceae	Gole gazan	Flower	Mobarake (29)	Sedative

	Boraginaceae	Gole gazan	Flower	Marave tapeh (30)	Nervous tonic
<i>Echium amoenum</i>					
<i>Levisticum officinale</i>	Apiaceae	Angdaneeye	Fruit	Mashhad (31)	Neurological diseases
<i>Artemisia vulgaris</i>	Asteraceae	Berenjasef	Flower	Mashhad (31)	Nervous tonic
<i>Coccinia macranthera</i>	Boraginaceae	Gavzaban	Aerial parts	Mashhad (31)	Sedative
<i>Eruca sativa</i>	Brassicaceae	Mandab	Seed	Mashhad (31)	Nervous tonic
<i>Nardostachys jatamansi</i>	Caprifoliaceae	Sonbolo teilb	Root	Mashhad (31)	Nervous tonic
<i>Nepeta binaioudensis</i>	Lamiaceae	Ostokhodous	Aerial parts	Mashhad (31)	Nervous tonic
<i>Stachys lavandulifolia</i>	Lamiaceae	Chaye kouhi	Flower	Mashhad (31)	Nervous tonic
<i>Tilia cordata</i>	Malvaceae	Zirfan	Leaf and fruit	Mashhad (31)	Nervous tonic
<i>Eremostachys laevigata</i>	Lamiaceae	Sonbole biabani	Flower and leaf	Natanz kashan (32)	Nervous tonic
<i>Withania coagulans</i>	Solanaceae	Khasht	Fruit and seed	Hormozgan (33)	Sedative

16. Zolfeghari E, Adeli I, Mozafarian V, Babaiy S and Habibi Bibalan GH: Identification of Arasbaran medicinal plants and ethnobotanical study of rural people knowledge (Case Study: Arasbaran forest, Mardanaghom watershed). *Iranian Journal of Medicinal and Aromatic Plants*, 28(3), 534-550, 2012.

17. Ghasemi Pirbalouti A, Momeni M and Bahmani M: Ethnobotanical study of medicinal plants used by Kurd tribe in Dehloran and Abdanan districts, Ilam province, Iran. *Afr J Tradit Complement Altern Med*, 10(2), 368-385, 2013.

18. Mosaddegh M, Esmaeili S, Hassanpour A, Malekmohammadi M, Naghibi F: Ethnobotanical study in the highland of Alvand and Tuyserkan, Iran. *Research Journal of Pharmacognosy (RJP)*, 3(1), 7-17, 2016.

19. Shariffar F, MoharamKhani MR, Moattar F, Babakhanloo P, Khodami M: Ethnobotanical study of medicinal plants of Joopar mountains of Kerman province, Iran. *Kerman Uni Med Sci J*, 21(1), 37-51, 2012.

20. Khodayari H, Amani SH, Amiri H: Ethnobotanical study of North east of Khuzistan province. *Med Plants Ecophytochemistry J*, 8, 2(4), 12-26, 2013.

21. Mohammadi H, Sajjadi SE, Noroozi M, Mirhosseini M: Collection and assessment of traditional medicinal plants used by the indigenous people of Dastena in Iran. *J HerbMed Pharmacol*, 5(2), 54-60, 2016.

22. Vakili Shahrabaki SMA: The Ethnobotanical Study of Medicinal Plants in (Dehe-lolo-vameghabadbidoieh) Village. Kerman, Iran. *Journal of Medicinal Plants and By-products*, 1, 105-111, 2016.

23. Shariffar F, Koohpayeh A, Motaghi MM, Amirkhosravi A, Puormohseni Nasab E, Khodashenas M: Study the ethnobotany of medicinal plants in Sirjan, Kerman province, Iran. *J Herb drugs*, 1(3), 19-28, 2010.

24. Iranmanesh M, Najafi SH, Yosefi M: Studies on Ethnobotany of important medicinal plants in Sistan. *J Herbal Drugs*, 1(2), 58-65, 2010.

25. Dolatkahi M, Nabipour I. An Ethanobotanic Study of Medicinal Plants in the Northeast Basin of the Persian Gulf. *Journal of Medicinal Plants* 2014; 50; 13(2): 129-143.

26. Ramezani M and Minaeifar AA. Ethanobotane Study of Fasa Medicinal Plants. *Journal of Traditional Medicine of Islam and Iran* 2016; 7(2): 221-231.

27. Amiri MS, Joharchi MR: Ethnobotanical investigation of traditional medicinal plants commercialized in the markets of Mashhad, Iran. *Avicenna Journal of Phytomedicine*, 3(3), 254-271, 2013.

28. Mosaddegha M, Naghibia F, Moazzenia H, Pirania A, Esmaeilia S: Ethnobotanical survey of herbal remedies traditionally used in Kohghiluyeh va Boyer Ahmad province of Iran. *Journal of Ethnopharmacology*, 141, 80– 95, 2012.

29. Mardanonejaz SH, Janghorban M, Vazirpour M. Collection and identification of medicinal plants used by the indigenous people of Mobarakeh (Isfahan), southwestern Iran. *Journal of Herbal Drugs*, Vol. 4, No.1: 23-32, 2013

30. Mirdeilami SZ, Barani H, Mazandarani M, Heshmati GHA. Ethnopharmacological Survey of Medicinal Plants in Maraveh Tappeh Region, North of Iran. *Iranian Journal of Plant Physiology* 2(1), 327-338.

31. Amiri MS, Joharchi MR: Ethnobotanical investigation of traditional medicinal plants commercialized in the markets of Mashhad, Iran. *Avicenna Journal of Phytomedicine*, 3(3), 254-271, 2013.

32. Sajadi SE, batouli H and Ghanbari A: Collection and evaluation of the traditional selection of medicinal plants in Kashan. *Journal of Traditional Medicine of Islam and Iran*, 2(1), 29-36, 2011.
33. Safa O, Soltanipoor MA, Rastegar S, Kazemi M, Nourbakhsh Dehkordi KH, Ghannadi A: An ethnobotanical survey on Hormozgan province, Iran. *Avicenna Journal of Phytomedicine*, 3(1): 64-81, 2013.
34. Dehkordi KS, Nikfarjam M, Sanaei S. Effectiveness of mindfulness-based stress reduction training and drug therapy on quality of life in patients with irritable bowel syndrome in Shahrekord. *Life Science Journal*. 2014;11(9):445-9.
35. Solati K, Mousavi M. The Efficacy of Mindfulness-Based Cognitive Therapy on General Health in Patients with Systemic Lupus Erythematosus: A Randomized Controlled Trial. *Journal of Kerman University of Medical Sciences*. 2015;22(5):499-509.
36. Hasanpour-Dehkordi A, Fatehi D, Solati K. Analgesic plus prayer versus analgesic alone. Effect of prayer on intensity of postoperative pain, anxiety and physiological indices in surgical patients. A randomized clinical trial. *Heroin Addiction and Related Clinical Problems*. 2016;18(6):13-20.
37. Hasanpour-Dehkordi A, Jivad N, Solati K. Effects of Yoga on Physiological Indices, Anxiety and Social Functioning in Multiple Sclerosis Patients: A Randomized Trial. *Journal of clinical and diagnostic research : JCDR*. 2016;10(6):VC01-VC5.
38. Hasanpour-Dehkordi A, Solati K. The Efficacy of Three Learning Methods Collaborative, Context-Based Learning and Traditional, on Learning, Attitude and Behaviour of Undergraduate Nursing Students: Integrating Theory and Practice. *Journal of clinical and diagnostic research : JCDR*. 2016;10(4):Vc01-vc4.
39. Hosseinpour M, Deris F, Solati-Dehkordi K, Heidari-Soreshjani S, Karimi N, Teimori H. The Effect of Consanguineous Marriage on Mental Health among the Students of the Shahrekord University of Medical Sciences. *Journal of clinical and diagnostic research : JCDR*. 2016;10(11):Gc01-gc4.
40. Rabiei Z, Gholami M, Rafieian-Kopaei M. Antidepressant effects of *Mentha pulegium* in mice. *Bangl J Pharmacol*. 2016;11(3):711-5.
41. Bahmani M, Sarrafchi A, Shirzad H, Rafieian-Kopaei M. Autism: Pathophysiology and promising herbal remedies. *Current pharmaceutical design*. 2016;22(3):277-85.
42. Rabiei Z, Naderi S, Rafieian-Kopaei M. Study of antidepressant effects of grape seed oil in male mice using tail suspension and forced swim tests. *Bangl J Pharmacol*. 2017;12(4):397-402.
43. Sarrafchi A, Bahmani M, Shirzad H, Rafieian-Kopaei M. Oxidative Stress and Parkinson's Disease: New Hopes in Treatment with Herbal Antioxidants. *Current Pharmaceutical Design*. 2016;22(2):238-46.
44. Rabiei Z, Bigdeli MR, Lorigooini Z. A review of medicinal herbs with antioxidant properties in the treatment of cerebral ischemia and reperfusion. *Journal of Babol University of Medical Sciences*. 2015;17(12):47-56.
45. Elaine KP, Anne TP, Wei WW, Peter JH, Nicolette SL. Medicinal Plants and Alzheimer's Disease: from Ethnobotany to Phytotherapy. *Journal of Pharmacy and Pharmacology*, 1999; 51(5): 527-534

Burden of Gastric Cancer: A Case Study of Iran

Rahim Ostovar (1)
 Abed Eghdami (2,3)
 Abdosaleh Jafari (4)
 Ramin Ravangard (5)

(1) Associate Professor, Ph.D in Health Services Management, Social Determinants of Health Research Center, Yasuj University of Medical Sciences, Yasuj, Iran

(2) Student Research Committee, School of Management and Medical Information Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.

(3) MSc Student of Health Economics, Social Determinants of Health Research Center, Yasuj University of Medical Sciences, Yasuj, Iran

(4) Health Management and Economics Research Center, Iran University of Medical Sciences, Tehran, IR Iran

(5) Health Human Resources Research Center, School of Management and Medical Information Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.

Corresponding Author:

Ramin Ravangard, Ph.D in Health Services Management, Associate Professor of Health Services Management, Department of Health Services Management, School of Management and Medical Information Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.

Email: ra_ravangard@yahoo.com

Received: January 30, 2018; Accepted: February 10, 2018; Published: March 1, 2018. Citation: Ostavar R. et al. Burden of Gastric Cancer: A Case Study of Iran. *World Family Medicine*. 2018; 16(3):266-270. DOI: 10.5742/MEWFM.2018.93341

Abstract

Introduction: Cancers have come to be one of the most significant causes of mortality in human societies today. Gastric cancer is more likely to cause more disease and more costs to the patient and the health system of the community. The present study was aimed to evaluate the burden of gastric cancer in Iran, Kohgiluyeh & Boyerahmad province in 2015.

Methods: The present descriptive cross-sectional study was conducted in Kohgiluyeh & Boyer-Ahmad Province of Iran in 2015. All 110 patients diagnosed with gastric cancer were studied. The patients' characteristics had been recorded in the Iran Cancer Registry System and records of patients with gastric cancer in the Health Department of Yasuj University of Medical Sciences. The required data was collected using a researcher-made data collection form and were analyzed using Excel 2013 software, assuming a zero discount rate and a steady-state weight of the patients' age.

Results: The results indicated that the number of disability adjusted life years (DALYs) in the province was 754.03 years (1.06 per 1000 people), which was higher in men (1.44 per 1000) and in the age group of 60-69 years (8.29 per 1000).

Conclusion: Considering the significant extent of valuable life years lost due to premature death or disability resulting from gastric cancer in the province, and the severe damage to both the family and the community, paying attention to adopting preventive policies, social and financial support for patients to prepare medicines and accommodation and establishing specialized medical centers in the cities are necessary.

Key words: Burden of disease, Gastric cancer, Kohgiluyeh and Boyer-Ahmad Province

Introduction

The health of the society is persistently altering and is considered as the basis for social and economic development of a society(1). Maintaining and promoting human health is dependent on identifying the status quo and future priorities. Non-communicable diseases, in particular in developing countries, are rapidly replacing infectious diseases and malnutrition and are also at the forefront of the causes of disability and early mortality (2). The results of the leading and most current study of 32 types of cancer in 195 countries show that cancer, after cardiovascular disease, is the most important cause of mortality in the world. Its results indicate a significant rise in the prevalence of cancer from 2005 to 2015, most of which have occurred in underdeveloped countries, so that in these countries new cases of cancer have increased by 50% (3). Gastric cancer is one of the main causes of death from cancer in the present century. Gastric cancer is the second most prevalent cancer in the world, and is the leading cause of death due to cancer in Japan, and is the fourth leading cause of cancer death in European countries(4). Iran likewise has the highest rate of gastric cancer in the Middle East, which is the most common cancer among men(5). The prognosis of this illness and the 5-year survival of this disease is 10-40% in most countries(6). Amongst numerous cancers, gastric cancer imposes more burden of disease on the patients, their families and the health care systems(3).

On the other hand, healthcare managers need to have an indicator for the burden of diseases and injury in order to promote the health and distribution of appropriate health facilities in the community. The index of disability adjusted life years (DALYs) provided by the World Health Organization has this feature. The study of Global Burden of Diseases, for the first time, was the joint project of the World Health Organization, the World Bank and Harvard University, and began in 1988 and calculated the burden of diseases for 1990, and since then several studies have begun in various countries. Now it is repeated in many countries at regular intervals(4). DALY quantifies the total years of life lost (YLL) due to premature mortality and years of life lost due to disability (YLD), and is used for prioritizing health plans(5).

Since 2011, gastric cancer has become more prevalent in the Kohgiluyeh and Boyer-Ahmad province, southwest of Iran. According to the data recorded in the cancer registry system affiliated to the Health Department of Yasuj University of Medical Sciences, in 2015, the total number of cancer patients in the province was 446, of which 155 with gastric cancer, about one-third of all cancers(7). These statistics indicate the ascending trend of this type of cancer in the province, and the continuing trend in the death or disability of the active labor forces at their work ages and its negative outcomes for both the family and the community is very worrying.

There are limited studies on the burden of gastric cancer, which have been reported in some countries or some provinces of Iran, all of which reported a high burden of

gastric cancer (6, 8-10). However, as the researchers did not succeed in finding a study on the burden of gastric cancer in Kohgiluyeh and Boyer-Ahmad province, and in light of the rising trend of this type of cancer in the province, the present study was conducted to investigate the burden of gastric cancer in Iran, Kohgiluyeh and Boyer-Ahmad province in 2015.

Method

This was a cross-sectional descriptive study conducted in Iran, Kohgiluyeh and Boyer-Ahmad province in 2015. The study population was patients with definite diagnosis of gastric cancer who had been registered in the Iran Cancer Registration. Of the 155 cases registered in this system, 45 cases were excluded due to their chart defects, therefore 110 cases were studied.

In order to collect the necessary data, a researcher-made data collection form was applied which included items associated to the patients' demographic data including gender, age, place of residence, occupation, marital status, year of disease onset, year of death, etc.. In order to estimate the burden of disease of disability adjusted life years (DALYs), the sum of Years of Life Lost due to Premature Mortality (YLLs) and Years of Life Lost due to Disability (YLDs) was calculated. Accordingly, a DALY is one year of life that should be spent in health has been lost due to a disability caused by diseases or injury or because of premature death(11).

To date, several methods have been used to determine the extent of lost years of life, the most prominent of which is the standard Life Expectancy. In this method, standard life expectancy at any age is used to estimate the lost years of life due to death at that age. The highest life expectancy in all nations, is 82.5 years of life expectancy for Japanese women, and has been considered as a standard. Moreover, the study of the Global Burden of Diseases (GBD) has considered the biological difference between women and men for survival as 2.5 years.

It is worth mentioning that, because there is no life table showing the life expectancy of men as 80 years, the life cycle table of the Coale and Demeny West Level for women was used to determine the life expectancy of men in different age groups; that is, the 80-year life expectancy for men is at the level of 25 in this model; therefore, in this study, the levels of 25 and 26 of the combined standard tables of this model were used in which the standard lifetime for all nations (undeveloped, developing and developed countries), has been shown.

Standard expected Years of Life Lost due to Premature Mortality (SEYLLs) is the subtraction of age at death and standard life expectancy for the same age in the same gender, and in fact the total of lives lost in a society is the sum of standard life expectancy for lives lost in that community(12).

In order to calculate the burden of diseases, for each level of disability associated with a disease or its outcome, a certain weight is set between zero and one, in which zero

means complete health and one means death. In order to calculate the YLDs, the length of time that a person lives with that disability is multiplied by the weight of that disability. Then, this is accumulated with the years YLLs due to the same cause and disease(12).

As mentioned above, the difference between the life expectancy of women and men in determining the burden of gastric cancer was 2.5 years(13).

YLDs and DALYs were estimated using Excel 2013, assuming a zero discount rate and a steady-weight of patients' age. This study was approved by the Medical Ethics Committee of Shiraz University of Medical Sciences (Project code: 95-01-07-11299). Written informed consent was obtained from all patients in order to participate in this study. Meanwhile, the confidentiality of their data and information was assured.

Findings

The results showed that the majority of 110 patients diagnosed with gastric cancer were male (77.3%), in the age group of 55-65 (39.1%), married (99.1%), illiterate or had elementary education (77.3%), and had rural health insurance coverage (48.2%), no complementary insurance coverage (80.9%), malignant tumors (60%), and their disease started in 2015 (59.1%). It should be noted that of the 110 patients under study, 32 patients died in 2015.

Findings related to YLLs showed that total YLLs in male patients was 262 years (0.72 per 1000). The highest YLLs among men was 7.65 years per 1000 which was related to the 60-69 age group and the lowest one was related to the age group over 80 years (-3.18 per 1000). In the present study, the total YLLs in women patients was 115 years (0.33 per 1,000). The highest YLLs among women was related to the 45-59 age group (2.07 per 1,000), and the lowest was related to the age group over 80 years (1.23 per 1000). In general and in all patients studied, the total YLLs was estimated at 377 years (0.53 per 1000), and the highest and the lowest were related to the 60-69 age group (4.41 per 1000) and the age group over 80 years (-2.97 per 1000) (Table 1).

Table 1: Years of Life Lost due to Premature Mortality (YLLs) in the studied patients by age and sex in Kohgiluyeh and Boyer-Ahmad province, 2015

Age groups	Men				Women				Total			
	Population	Number of deaths	YLLs	YLL per 1000	Population	Number of deaths	YLLs	YLL per 1000	Population	Number of deaths	YLLs	YLL per 1000
0-4	3805	0	0	0	35642	0	0	0	73709	0	0	0
5-14	62208	0	0	0	59330	0	0	0	121538	0	0	0
15-29	99498	0	0	0	98155	0	0	0	197653	0	0	0
30-44	90499	0	0	0	89782	0	0	0	180281	0	0	0
45-59	44671	5	139	3.11	44298	3	91.5	2.07	88969	8	230.5	2.59
60-69	14116	7	108	7.65	14594	1	18.5	1.27	28710	8	126.5	4.41
70-79	7286	7	47	6.45	5826	0	0	0	13112	7	47	3.58
+80	5023	7	-32	-3.018	4057	2	5	1.23	9080	9	-27	-2.97
Total	361386	26	262	0.72	351666	6	115	0.33	713052	32	377	0.53

The total YLDs in male patients was estimated to be 258.663 years (0.715 per 1000). The highest and lowest YLDs were related to the 60-69 age group (6.65 per 1000) and the age group over 80 years (-0.216 per 1000). The total YLDs among women was estimated to be 117.28 years (0.33 per 1000) and the highest and lowest among the women were related to the 45-59 age group (2.1 in 1000) and 30-44 age group (0.09 per 1000). In general, the total YLDs among all studied patients was 377.03 years (0.53 per 1000) and the highest and lowest YLDs were related to the 60-69 age group (3.82 per 1000 people) and the age group over 80 years (-0.12 per 1000) (Table 2 - next page).

Finally, the total DALYs in men was estimated to be 520.66 years (1.44 in 1000) and the highest and lowest were related to the 60-69 age group (14.31 per 1000) and the age group over 80 years (-6.59 per 1000). The total DALYs among women was estimated to be 232.28 years (0.66 per 1000) and the highest and lowest were for the 45-59 age group (4.17 per 1000) and 30-44 age group (0.1 per 1000 people). In general, the total DALYs in Kohgiluyeh and Boyer-Ahmad province was estimated to be 754.03 years (1.06 per 1000), with the highest and lowest among the patients in the 69-60 age group (8.22 out of 1000) and the age group over 80 years (-3.09 per 1000) (Table 3).

Table 2: Years of Life Lost due to Disability (YLDs) in patients by sex and age group in Kohgiluyeh and Boyer-Ahmad province, 2015

Age groups	Sex	Men				Women				Total			
		Pop.	Occ.	YLDs	YLD per 1000	Pop.	Occ.	YLDs	YLD per 1000	Pop.	Occ.	YLDs	YLD per 1000
0-4		3805	0	0	0	35624	0	0	0	73709	0	0	0
5-14		62208	0	0	0	59330	0	0	0	121538	0	0	0
15-29		99498	0	0	0	98155	0	0	0	197653	0	0	0
30-44		90499	2	16.93	0.187	89782	1	8.57	0.09	180281	3	25.5	0.14
45-59		44671	25	143.654	3.21	44298	14	93.093	2.1	88969	39	236.75	2.66
60-69		14116	26	93.96	6.65	14594	4	15.62	1.07	28710	30	109.58	3.82
70-79		7286	4	5.208	0.71	5826	0	0	0	13112	4	5.208	0.4
+80		5023	2	-1.085	-0.216	4057	0	0	0	9080	2	-1.085	-0.12
Total		361386	59	258.663	0.715	351666	19	117.28	0.33	713052	78	377.03	0.53

*: Weight of disability=0.217; Pop.: Population; Occ.: Occurrence

Table 3: DALYs in the studied patients by age group and sex in in Kohgiluyeh and Boyer-Ahmad province, 2015

Age groups	Men			Women			Total		
	Population	DALYs	DALYs per 1000	Population	DALYs	DALYs per 1000	Population	DALYs	DALYs per 1000
0-4	3805	0	0	35642	0	0	73709	0	0
5-14	62208	0	0	59330	0	0	121538	0	0
15-29	99498	0	0	98155	0	0	197653	0	0
30-44	90499	16.93	0.19	89782	8.57	0.1	180281	25.50	0.14
45-59	44671	285.65	6.33	44298	184.59	4.17	88969	467.25	5.25
60-69	14116	201.96	14.31	14594	34.12	2.34	28710	236.08	8.22
70-79	7286	52.21	7.17	5826	0	0	13112	52.21	3.98
+80	5023	-33.09	-6.59	4057	0	0	9080	-28.09	-3.09
Total	361386	520.66	1.44	351666	232.28	0.66	713052	754.03	1.06

Discussion

In the present study, the majority of patients were male, in the 55-65 age group, married, and had malignant tumors. These results are consistent with the findings of similar studies in the country, including those of Khasi et al. (2016)(10), Rajaeifard et al. (2009)(12), Ramesht et al. (2015) (13), and Bazyar et al.'s (2011)(2).

Also, the results indicated that YLLs in men was higher than women (262 versus 115 years). The highest and lowest YLLs among men were in the 60-69 age group and the age group over 80 years, and among women in the 45-59 age group and in the age group over 80 years. In general and in all the studied patients, YLLs was estimated to be 377 years, the highest and lowest of which were related to the 69-60 age group and the age group above 80 years.

The YLDs in men was higher than women (258.663 versus 117.28 years). The highest and the lowest YLDs among men were in the 60-69 age group and in the age group over 80

years, and among women were related to the 45-59 age group and the 30-44 age group. In general, the YLDs among all studied patients was 377.03 years. The highest and lowest ones were related to the 60-69 age group and the age group over 80 years.

Finally, according to the results, the DALYs among men was higher than women (520.66 vs. 232.28 years), and the highest and lowest DALYs among men were related to the 60-69 age group and the age group over 80 years, and among women were related to the 45-59 age group and the 30-44 age group. Overall, in the total population studied, the DALYs was estimated to be 754.03 years, with the highest and lowest related to the 60-69 age group and the age group over 80 years.

In the study of Haji Vandy et al. (2011)(1), which was conducted in Bushehr province with the aim of calculating YLLs of different diseases, the results showed that the YLLs per 1000 for cancers was 4.5 years(7). In a study conducted by Faghihi et al. (2015)(4), the YLLs per 1000 in

Qazvin province for all cancers in 2004 to 2008 were 574.42, 549.99, 513.69, 657.8 and 678.2 years. In the González-León et al.'s study (2016)(6), with the exception of breast and prostate cancers for which YLDs were greater than 50% of DALYs, the highest share of DALYs in other cancers was associated with YLLs, so that in some cases were more than 90% of DALYs(12).\

The results of these three studies are not consistent with the results of the present study. One reason for these differences can be due to the calculation of the burden of diseases in these three studies for various cancer diseases, while in the present study only gastric cancer has been considered. Also, the differences in the prevalence of cancerous diseases, especially gastric cancer, and the patients' ages in the studied regions in these three studies were different from those in the present study. In addition, the observed differences can be due to differences in geographical, economic and social conditions in the studied regions and provinces.

Conclusions

According to the findings, the DALYs in the Kohgiluyeh and Boyer-Ahmad province was 754.03 years (1.06 per 1000 people), which was higher in men and in the 60-69 age group than others. Considering the high amount of DALYs due to gastric cancer in this province and the irreparable damage to both patients and their families and the community, health managers and health planners should minimize the damage through providing preventive policies and holding related workshops. Also, they should reduce the costs and economic burdens imposed on the patients and their families and improve their quality of life by offering social and financial support of patients for preparing medicines and accommodation and establishing the specialized medical centers in the cities.

Acknowledgment:

The present article was extracted from the thesis written by Abed Eghdami supported by Shiraz University of Medical Sciences Project No. 95-01-07-11299. The researchers would like to thank the studied patients for their kind cooperation with the researchers in collecting and analyzing data, as well as the Social Determinants of Health Research Center and Center for Diseases Report of Yasuj University of Medical Sciences for their assistance in conducting the present study.

References

- Hajivandi A, Najafi F, Ghaffarian Shirazi HR. Determining the burden of leading causes of death responsible for years of life lost in Bushehr province, Iran. *Scientific Research Journal of Health System Research*. 2011;7(6):1029-39.
- Bazyar M, Akbari F, Mahmoudi M. Medical and non-medical direct costs of cancers in patients hospitalized in Imam Khomeini cancer institution-2010. *Journal of Hospital*. 2012;11(1):39-50.
- Daroudi A, Zendejdel K, Nahvijou A, Zahmatkesh H, Akbarisari A. A Review of Methods for Estimating Economic Burden of Cancer. *Hakim Research Journal*. 2014;16(4):349-57.
- Faghihi F, Jafari N, Akbari Sari A, Nedjat S, Maleki F, Hosainzadehmilany M. The Leading Causes of YLL (Years of Life Lost) in the Province of Ghazvin and Comparison with Other Countries, Iran. *Iranian Journal of Epidemiology*. 2015;11(1):20-30.
- Roshanaei G, Sadighi S, Safari M, Faradmal J. Estimated survival time in gastric cancer patients and its associated factors. *Koomesh*. 2012;14(1):47-54.
- González-León M, Fernández-Gárate JE, Rascón-Pacheco RA, Valladares-Aranda MÁ, Dávila-Torres J, Borja-Aburto VH. The burden of disease of cancer in the Mexican Social Security Institute. *Salud Pública de México*. 2016;58(2):132-41.
- Farahbakhsh M, Koosha A, Zakery A, Valizadeh K. Burden of common diseases in east Azerbaijan in year 2007. *Medical Journal of Tabriz University of Medical Sciences and Health Services*. 2012;34(1):81-7.
- Iravani S. Gastric cancer as a multifactorial disease. *Annals of Military and Health Sciences Research*. 2013;11(2):157-64.
- Khajedaluee M, Dadgarmoghaddam M, Saeedi R, Izadi-Mood Z, Abrishami M, Zamani M. Mortality, morbidity, survival, and burden of top 9 cancers in a developing country. *Razavi International Journal of Medicine*. 2014;2(3):DOI: 10.5812/rijm.20073.
- Khasi B, Khasi K, Khademi N, Fakhri Moradi Azam S. Investigate plenty of stomach cancer in Kermanshah city during. *Journal of Medical Sciences Zanko*. 2016;17(54):16-22.
- Naghavi M, Abolhassani F, Pourmalek F, Jafari N, Moradi Lakeh M, Eshrati B, et al. The burden of disease and injury in Iran in the year 2003. *Iranian Journal of Epidemiology*. 2008;4(1):1-19.
- Rajaeifard A, Moghimi Dehkordi B, Tabatabaei S, Zeyghami B, Safaei A, Tabeii S. Estimating survival rates in gastric cancer based on pathologic and demographic factors in Fars cancer registry (2001-2005). *Tabib Shargh*. 2009;11(1):49-57.
- Ramesht MH, Pourfarzi F, Entezari M, Karamati H. An Epidemiologic Study of Spatial and Temporal Patterns of Gastric Cancer in Ardabil, Years 2006-2012. *Journal of Health*. 2015;6(3):345-54.

Biliary Duct Large Stone

Abdulla Saleh Alyamani

Associate Professor, Surgical Department, College of Medicine and Health Sciences, Hadhramout University

Corresponding author:

Abdulla Saleh Alyamani,
Surgical Department, College of Medicine and Health Sciences,
Hadhramout University
Mobile: +967 735527299

Email: alyamani1000@yahoo.com

Received: January 30, 2018; Accepted: February 10, 2018; Published: March 1, 2018. Citation:
Abdulla Saleh Alyamani, . Biliary Duct Large Stone . World Family Medicine. 2018; 16(3):271-273.
DOI: 10.5742/MEWFM.2018.9334

Abstract

Gallstone disease is one of the most common medical conditions requiring surgical intervention.

Herein we report on a 75-year-old man who referred from Socotra Island to Al-Mukalla hospital. The patient complained of abdominal pain in the right upper quadrant and mild jaundice. The symptoms were present since a few years. His blood pressure was 85/135.

On examination the sclera was moderate yellow with occasionally pale stools and dark urine. Sometimes skin itching. Abdomen was mildly tender at the right hypochondrium.

Ultrasonography of abdomen: mild hepatomegaly with no focal lesion was seen and dilated intra hepatic biliary tree. Gallbladder was distended and dilated common bile duct (22mm) due to about (48mm length) stone in the distal part of the common bile duct.

Diagnosis was obstructive jaundice due to large biliary duct stone.

Emergency classical cholecystectomy was carried out and biliary duct stone was extracted successfully. After 10 days the patient was discharged in good condition and without any complications.

Key words: Biliary duct stone, Cholecystectomy, Al-Mukalla, Yemen

Introduction

Gallstone disease is one of the most common medical conditions requiring surgical intervention, and affects approximately 10 % of the adult population in the United States. Common bile duct stones develop in about 10%-20% of patients with gallbladder stones. The literature suggests that at least 3%-10% of patients undergoing cholecystectomy will have common bile duct (CBD) stones.(1)

The presence of stones in the common bile duct most commonly result from the passage of gallstones via the cystic duct into the common bile duct. Less frequently, they may form in the common bile duct itself.(2)

Recently the majority of the patients with large stones can be treated endoscopically. But if the extraction is unsuccessful, or the facilities of lithotripsy are not available, the patient should be referred for surgery.

Case Report

Male patient 75 years old from Socotra, Yemen referred to Al-Mukalla hospital with right hypochondrium pain and mild jaundice. The symptoms were present since a few years. Patient was moderately thin, working as a farmer. His blood pressure was 85/135.

On examination the sclera was moderate yellow with occasionally pale stools and dark urine. Sometimes skin itching. Abdomen was mildly tender at the right hypochondrium. No signs of cholangitis, pancreatitis, or secondary biliary cirrhosis.

Investigations:

Laboratory findings:

Hb was 10; ESR 20; Blood grouping A+ve; Total Serum bilirubin: 3.9 mg/dl; ALP IFCC Gen.2:1050,8 U/L; ALT(GPT): 34.2 U/L.

Blood urea: 14.15mg/dl; creatinine: 0.653mg/dl; Fasting blood sugar: 111.90mg/dl.

Radiology: Chest x-ray normal.

ECG: normal

Ultrasonography of abdomen: mild hepatomegaly with no focal lesion was seen and dilated intra hepatic biliary tree. Gallbladder was distended and dilated common bile duct (22mm) due to about (48mm length) stone in the distal part of the CBD. No pericholecystic free fluid was seen. No obvious mass was seen at the site of the pancreatic head (Figure 1).

CT: Mild hepatomegaly with no focal lesion was seen.

Diagnosis: obstructive jaundice due to large biliary duct stone.

Management: Through Rt. subcostal incision the abdomen cavity was opened. The gall bladder was found distended and the common bile duct was dilated. Cholecystectomy was performed and the common bile duct (CBD) was explored. It was found full with large stone around 5x2 cm. The stone was extracted in fragments. The largest fragment was 1.8cm. T tube drain was inserted in the common bile duct and kept in situ for 7 days and then the patient was discharged in good condition and without any complications.

Discussion

The presence of stones in the common bile duct most commonly result from the passage of gallstones via the cystic duct into the common bile duct. Less frequently, they may form in the common bile duct itself(2).

In this case the gallbladder was distended but empty of stones. Most probably the stones had migrated through the cystic duct to the common bile duct when it was small in size and then later its size increased in the common bile duct to form a large stone.

Although the bilirubin level in this patient was moderately high (3.9 mg/dl) the stone in the common bile duct was large (Figures 2,3). The mean bilirubin level in series of patients with choledocholithiasis was 1.5-1.7 mg/dl and minority (one third or less) of patients has reported at a level of 4mg/dl.(3,4,5)

When complete extraction of large stones is unsuccessful, the drainage of the common bile duct is mandatory either for bridging to the final therapy or as a curative therapy for very elderly patients with short life expectancy. Placing of more than one plastic endoprosthesis is better while the administration of Ursodiol is ineffective.(6)

Figure 1: Ultrasonography of abdomen**Figure 2: Longitudinal measure of biliary duct stone****Figure 3: Width measure of biliary duct stone**

In approximately 10%-15% of patients, managing biliary stones becomes formidable primarily due to difficulties in accessing the bile duct, the presence of a large number of stones (greater than 10), large size of stones (stones with a diameter > 15 mm) or location of the stones (intra hepatic, cystic duct, proximal to strictures).⁷ Also older age (> 65 years), shorter length of the distal CBD arm (\leq 36mm) or more acute distal CBD angulation (\leq 135 degrees) are all contributors to technical difficulty for endoscopic removal of bile duct stones.⁽⁸⁾ That is why the conventional surgical approach was chosen to extract this large stone which was completely impacted in the CBD.

In comparison between open surgery and endoscopic retrograde cholangiopancreatography (ERCP) in a seven trials, the participants with open surgery group had significantly fewer retained stones compared with the ERCP group (20 patients underwent open surgery with retained stones where 20 patients (6%) versus 47 patients (16%) in ERCP group p-value (0.0002). But regarding mortality and morbidity the comparison was not significant although 1% mortality among participants in open surgery group versus 3% among participants in ERCP group, while morbidity was 20% versus 67%.⁽⁹⁾

We concluded that the conventional surgical approach which was chosen to extract this large stone which was completely impacted in the CBD was successful.

References

- Freitas ML, Bell RL, Duffy AJ. Choledocholithiasis: evolving standards for diagnosis and management. *World J Gastroenterol.* 2006; 12: 3162-3167.
- Majid A. Almadi, Jeffrey S. Barkun, Alan N. Barkun. Management of suspected stones in the common bile duct. 2012 Canadian Medical Association or its licensors. *CMAJ.* 2012; 184(8): 884-892
- Barkun, A.N., Barkun, J.S., Fried, G.M. et al. Useful predictors of bile duct stones in patients undergoing laparoscopic cholecystectomy. *Ann Surg.* 1994; 220: 32-39
- Onken, J.E., Brazer, S.R., Eisen, G.M. et al. Predicting the presence of choledocholithiasis in patients with symptomatic cholelithiasis. *Am J Gastroenterol.* 1996; 91: 762-767
- Peng, W.K., Sheikh, Z., Paterson-Brown, S. et al. Role of liver function tests in predicting common bile duct stones in patients with acute calculous cholecystitis. *Br J Surg.* 2005; 92: 1241-1247
- Gerasimos Stefanidis, Christos Christodoulou, Spilios Manolakopoulos, Ram Chuttani. 2012. Endoscopic extraction of large common bile duct stones: A review article. *World J Gastrointest Endosc* 2012 May 16; 4(5): 167-179
- Binmoeller KF, Brückner M, Thonke F, Soehendra N. Treatment of difficult bile duct stones using mechanical, electrohydraulic and extracorporeal shock wave lithotripsy. *Endoscopy* 1993; 25: 201-206
- Kim HJ, Choi HS, Park JH, Park DI, Cho YK, Sohn CI, Jeon WK, Kim BI, Choi SH. Factors influencing the technical difficulty of endoscopic clearance of bile duct stones. *Gastrointest Endosc* 2007; 66: 1154-1160
- Martin DJ, Vernon D, Toouli J. Surgical versus endoscopic treatment of bile duct stones. *Cochrane Database of Systematic Reviews* 2006, Issue 2. Available at: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD003327.pub2/abstract?>

Investigating the Self-assessment of Clinical Competency of Nurses Working in Babol University of Medical Sciences Hospitals

Goliroshan S (1,2)

Babanataj R (1,2)

Aziznejadroshan P (3,2)

(1) Social Determinants of Health Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, I.R.Iran.

(2) Department of Nursing, School of Medicine, Babol University of Medical Sciences, Babol, I.R Iran.

(3) Nursing Care Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, I.R.Iran.

Corresponding author:

Aziznejadroshan P

Nursing Care Research Center, Health Research Institute,

Babol University of Medical Sciences,

Babol, I.R.Iran

Received: January 30, 2018; Accepted: February 10, 2018; Published: March 1, 2018.

Citation: Goliroshan S. et al. Investigating the Self-assessment of Clinical Competency of Nurses Working in Babol University of Medical Sciences Hospitals. *World Family Medicine*. 2018; 16(3):274-279. DOI: 10.5742/MEWFM.2018.93331

Abstract

Objective: Clinical competence, practical competence, and the ability to integrate knowledge, skills, attitudes and values are required in clinical situations. More than 71% of nursing errors are due to nurses' neglect or nonsecurity. Therefore, this study was designed to evaluate the clinical competency of nurses working in Babol University of Medical Sciences hospitals.

Methodology: The method of this research is cross-sectional. A total of 157 nurses working in hospitals affiliated to Babol University of Medical Sciences were selected by census method. The data collection tool was a nurses' clinical competence questionnaire which measures 73 different nursing skills in seven domains. The level of competence was determined based on the scale of 0-100 and the practical application of nursing skills in a clinical setting by a Likert scale of four. The validity of the questionnaire was confirmed by the professors and its reliability was 0.88 based on Cronbach's alpha coefficient. Descriptive statistics (mean and standard deviation) and inferential statistics (Spearman, ANOVA) were used to analyze the data using SPSS24 software.

Findings: The results showed that the mean score of nurses' clinical competency is 85.427 ± 11.874 . Also in the ranking of the variables studied, "diagnostic measures" and "management ability" had the highest average and the "quality assurance" range was the lowest. Also, findings from one-way analysis of variance showed that there was no significant difference between clinical competency in the two groups of nurses in general and special departments ($\text{Sig}=0.132$, $F=3.295$).

Conclusion: The level of clinical competence and utilization of nursing skills in the hospitals are desirable. Therefore, it is recommended that nursing managers pay more attention to the quality of nursing services and, therefore, ways to improve them.

Key words: Self-assessment, Clinical Competency, Diagnostic Measures, Management Ability.

Introduction

Today, nurses with more than 14,000 people in Iran are considered as the largest and most important provider of care. For this reason, the quality of nursing services is always assessed by the authorities to ensure that they have the capacity to provide effective and appropriate care (Abbasi et al., 2017). In this regard, clinical competence is of particular importance due to the significant impact on improving the quality of patient care and the creation of opportunities for professional promotion in health care (Moskoei et al., 2017). The purpose of clinical competence is the deliberate use of technical and communication skills, knowledge, clinical reasoning, emotions and values in clinical settings (Carr, 2004). Therefore, one of the most basic needs of community health is the training of people with special academic and practical abilities and competencies (Daily, 2010). Ensuring nurses have clinical competence to intervene in a crisis is essential (Garfield, 2008). Therefore, assessment of nurses' clinical competence plays a very important role in managing the process of providing care and achieving care objectives. This assessment is important in identifying the areas that need to be promoted and in determining the educational needs of nurses as well as ensuring that care is provided appropriately, to the extent that it mentions the performance of quality assurance systems, workforce planning and HRM, which is considered to be the key responsibility of nursing managers in clinical settings (Namadi Vosoughi et al., 2014). In this regard, self-assessment of clinical competencies involves the use of competence assessment tools to determine whether a nurse has the ability to perform specific tasks in a clinical setting (Pravikoff, 2016). Self-assessment also allows nurses to play a more active role in the learning process and facilitate their continuous learning through the process of rethinking (Hannigan, 2001). An overview of the literature shows that this issue has been considered in different areas of educational and clinical management. Having nurses clinically competent involves providing quality care services and obtaining patients' satisfaction and as a result is a key factor in the survival of hospitals. (Yekta, 2005). The importance of this issue for managers who are generally dissatisfied with the lack of competency in nursing newcomers, is they should be ready to spend significant sums of nursing competency-enhancing activities in spite of the existing economic bottlenecks to improve the quality of these services and, ultimately, increase profits and use new technologies such as computers, the Internet (Marcum, 2004), retraining and in-service training, monitoring, and efficient learning systems. Therefore, the application of competence assessment criteria not only leads to the recognition of nurses and managers towards the general nurses' status, but also identifies their skills and cognitive deficiencies (Girrot, 2000). Therefore, the consequences of lack of clinical competence in nurses are very unfortunate. Ali Akbari et al. (2014), in his research on the assessment of the competence of emergency nurses, showed that the performance scores in each of the nine assessed skills were lower than the average. Also in line with the research conducted by Ghanbari et al. (2017) in his research on the assessment of the clinical competence

of emergency nurses: an exploratory study of 710 nurses working in emergency departments of educational centers found 5 agents with 30 competencies divided into three areas of communication, professional maturity, and personality traits. Kalantari et al. (2017) showed that the mean score of nurses clinical competency is higher than average. Also in the ranking of the variables studied, the "quality assurance" field is the lowest and the variable "occupational and organizational tasks" is at the highest level. Since nursing is developing as a day-to-day clinical practice in various sectors, health care system officials should continuously evaluate, prioritize and determine the clinical competencies of nurses in these sectors; the lack of clear clinical competence indicators will challenge the assessment. Considering that nurses lacking the necessary skills in health centers can endanger the health of the community, qualification criteria not only increase the knowledge and knowledge of nurses and managers about their competency, but also identify shortcomings and cognitive impairments. Considering the above items and the fact that the clinical competence of nurses working in hospitals affiliated to Babol University of Medical Sciences has not been studied so far, the researcher aimed to determine the self-assessment of clinical competency of nurses working in hospitals affiliated to Babol University of Medical Sciences.

Methodology

The method of this research is cross-sectional. The study population included all nurses working in Babol medical sciences hospitals (Yahyanejad, Shahid Beheshti, Amirkola and Rouhani) in 2015-2016. A total of 157 nurses working in hospitals affiliated to Babol University of Medical Sciences were selected by census method. The data collection tool was a nurses' clinical competence questionnaire which measures 73 different nursing skills in seven domains. A two-part questionnaire was used to collect information. The first part included personal characteristics (age, gender, level of education, length of work experience and experience in the current sector and passing in-service training), and the second part of the questionnaire was designed to assess the clinical competency of nurses, which was designed according to the basic skilled banner framework and evaluated 73 different nursing skills in seven domains that included: The area of "duties and assistance" (seven skills), "education and guidance" (sixteen skills), "diagnostic activities" (seven skills), managerial positions "(eight skills)," therapeutic interventions "(ten skills)," quality assurance "(six skills) and finally the domain of "job and organizational tasks"(nineteen skills). The level of competence was determined based on the scale of 0-100, with the score between (0-25) low, the score between (26-50) relatively good, the score between (51-75) good and the score between (76-100) considered to be very good and the practical application of nursing skills in a clinical setting by a Likert scale of four, a zero rating meaning that it does not use that skill, rank 1 means that is a rarely used skill, rank 2 meaning applying it occasionally, and ranking three meaning reusing that skill. Validity of the questionnaire was evaluated and approved by the nursing community. In the study of Bahraini et al. (2010), the instrument's validity

index was 0.83 and its reliability coefficient based on the Cronbach's alpha coefficient in the seven domains ranged from 0.70 to 0.85 which indicates the intrinsic and desirable consistency of the domains and the high reliability of the tool. The validity of the questionnaire was confirmed by the professors and its reliability was 0.88 based on Cronbach's alpha coefficient. In order to collect information after obtaining permission from the university's research deputy and presenting it to the head of the covered hospitals (Yahyanejad, Shahid Beheshti, Amirkola and Rouhani) and performing the necessary coordination, the researcher with a data retrieval tool, a nurses clinical competency assessment questionnaire, in each of these skills based on the visual scoring scale asked the nurses in morning and afternoon shifts in the sampled environments, to evaluate their clinical competence in each of these skills based on the visual scoring scale. In this scale, the score of zero, was the lowest score, and the minimum clinical competence and the score of one hundred, was the highest score possible and

meant the maximum benefit of clinical competence. Then, according to the number of items in each area, the nurse's clinical competency score was calculated by calculating the mean scores of that area. In this research, inferential and descriptive statistics were used to analyze the data. Descriptive statistics (mean and standard deviation) and inferential statistics (Spearman, ANOVA) were used to analyze the data using SPSS24 software. Descriptive statistics in descriptive and dispersion indices were used to investigate the demographic characteristics of the research sample as well as to assess the clinical competence of the research samples in general and to the hospitals participating. In the inferential statistics section, in order to investigate the relationship between clinical competence of nurses with demographic characteristics (age, occupation and education) according to the scale of the demographic variables Spearman correlation test was used, and also, ANOVA was used to assess the difference between the two groups of nurses in both special and general sections.

Findings

1. Descriptive Findings

Based on the findings of demographic characteristics, it was found in Table 1 that 137 people were female and 20 people were male. The highest number of nurses was in the age range of 31 to 40 years old (68 people, 43.3%). From the work experience, 107 (68.2%) were under 10 years of work experience and 46 (29.3%) had more than 10 years of work experience. Also, 149 of the research samples had a bachelor's degree, and only 7 had master's degree.

Table 1: Describing demographic characteristics of nurses working in hospitals affiliated to Babol University of Medical Sciences

Demographic variables	Gender		Age						Education		Work experience		Employment type		
	Female	Male	Less than 25 years old	26 to 30 years old	31 to 35 years old	36 to 40 years old	41 to 45 years old	45 to 50 years old	Bachelor	Masters	Less than 10 years	More than 10 years	Official	Contractual	Projective
Demographic factors															
Frequency	137	20	33	29	36	32	19	8	149	7	107	46	67	65	25
Frequency percentage	87.3	20	21	18.5	22.9	20.4	12.1	5.1	94.9	4.5	68.2	29.3	42.7	41.4	15.9

In Table 2 (next page) information on the self-assessment of nurses of their clinical competence is reported. Based on the average results of the seven domains, the clinical competencies of nurses ranged from 79.133 to 87.426; therefore, the leveling results indicated that the nurses working in hospitals in Babol were evaluated at excellence level. Nurses had the lowest mean in skills related to "quality assurance" and "therapeutic measures" and had the highest average in "diagnostic measures" and "management ability" skills.

Spearman correlation test was used for the correlation between demographic characteristics and the results are shown in Table 3.

Table 2: Average clinical competencies of nurses working in hospitals affiliated to Babol University of Medical Sciences

Scope of clinical competence	Average	Standard deviation
Helping patient	85.827	11.671
Training and guidance	86.715	10.569
Diagnostic measures	87.426	11.378
Management ability	87.001	12.907
Therapeutic measures	84.492	14.930
Quality guarantee	79.133	17.510
Occupational and organizational tasks	86.101	14.091
Overall clinical competence	85.427	11.874

Table 3: Spearman correlation test (correlation of clinical competence with demographic characteristics)

Clinical Nurses Competency		
	Spearman correlation	Significance level
Age	0.104	0.194
Work experience	0.142	0.078
Education	0.035	0.667

The findings showed that there is no significant relationship between clinical competency of nurses with age (Sig=0.194, rho=0.104), job experience (Sig=0.078, rho=0.142) and education (Sig=0.667, rho=0.035). Also, ANOVA was used to assess the differences in clinical competencies of nurses in special and general sections. Prior to reporting the results of variance analysis, it is necessary to test the assumption of variance equation. For this purpose, the results of the Lyon test were first reported. Based on the results of variance, the variables of patient support and assistance, education and guidance, diagnostic measures, therapeutic measures, quality assurance, occupational and organizational tasks, and general clinical competence are equal in the two groups of nurses in the special and general sectors and there is no significant difference between them and the assumption of equality of variances is confirmed.

Table 4: Results of one-way ANOVA test (the difference between clinical competencies in nurses in the special and general sectors)

Variable		Mean Square	Degrees of freedom	Average squared	F value	Significance level
Helping patient	Intra-group	0.087	1	0.087	0.012	0.915
	Intergroup	1167.034	155	7.529		
Training and guidance	Intra-group	90.595	1	90.595	3.663	0.057
	Intergroup	3833.214	155	24.730		
Diagnostic measures	Intra-group	11.642	1	11.642	1.83	0.178
	Intergroup	986.077	155	6.362		
Management ability	Intra-group	9.878	1	9.878	1.104	0.295
	Intergroup	1386.67	155	8.946		
Therapeutic measures	Intra-group	26.614	1	26.614	1.399	0.239
	Intergroup	2948.456	155	19.022		
Quality guarantee	Intra-group	17.523	1	17.523	1.523	0.219
	Intergroup	1783.776	155	11.508		
Occupational and organizational tasks	Intra-group	64.362	1	64.362	1.231	0.269
	Intergroup	8105.549	155	52.294		
Overall clinical competence	Intra-group	1098.65	1	1098.65	2.295	0.132
	Intergroup	74190.25	155	478.649		

One-way analysis of variance analysis showed that there was no significant difference between two groups of nurses in special and general sectors, between helping patient and assistance (Sig=0.915, F=0.012), education and guidance (Sig=0.057, F=3.663), diagnostic measures (Sig=0.178, F=1.83), management ability (Sig=0.295, F=1.104), therapeutic measures (Sig=0.239, F=1.399), quality guarantee (Sig=0.219, F=1.523), occupational and organizational tasks (Sig=0.269, F=1.231), and clinical competence (Sig=0.132, F=2.295).

Conclusion

Based on the findings, the clinical competence of nurses in Babol was at the optimum and excellent level. The results are in line with the findings of Liu et al. (2007), which assessed the clinical competence of nurses by self-assessment method and showed that clinical competence of nurses was reported at a good level. Also with the results of Kalantari et al. (2016), which showed in their research, the overall average score of nurses' clinical competence is higher than the average. However, with the study of Ali Akbari et al. (2014), which showed that the average performance scores for each of the 9 evaluated skills were lower than the average, and it is inconsistent. The difference in results can be due to the different statistical population of the samples under investigation. These results indicate that the majority of nurses consider their clinical competence to be good and excellent in terms of the conditions, which can be related to nursing education and healthcare systems; adequate nurses' motivation, high quality and quantity of retraining courses, job satisfaction, interest in the profession, nurses' fitness with their profession, and the existence of specific standards. Based on the results, there was no significant relationship between the demographic characteristics of nurses with perceived clinical competency. The results are in line with the findings of Bahrain and colleagues (2010) and Abbasi et al. (2017), and are incompatible with the results of Salonen et al. (2007), which indicated that there was a significant relationship between competence level with age, duration of work experience and the frequency of use of competency; or the results of the study of Meretoja (2004) reported the relationship between these variables with nurses' clinical competence as meaningful. Differences in results can be due to different measurement tools, sample samples, cultural conditions, and working environment conditions. It seems that with increasing age and work experience of nurses, their clinical competencies should also be increased; however, as the results of this study indicate, there is no significant relationship between age, work experience and work experience in the current hospital nurses with their mean clinical competence. Probably, factors such as low salaries and benefits and job dissatisfaction among nurses in hospitals, cause nurses with increasing age and work experience to become more exhausted and discontented and display this discontent in their assessments. Based on the results, diagnostic and management capabilities were identified as the most important clinical competence indicators of Babol nurses. The results are in line with the findings of Meretoja (2004), which showed that the highest level of clinical competence of nurses in the field of managerial ability. Abbasi et al. (2017) also showed that managerial abilities were most important in nursing competencies. However, Liu et al. (2007) described interpersonal relationships as the most important clinical competence index. In general, due to differences in the clinical competence of nurses in different evaluation methods, different views and expectations of people may depend on their roles. Diagnostic measures and management ability are the most important nurses' qualifications; this shows that nurses' level of knowledge

and abilities in nurses' diagnostic procedures is desirable. The nurse uses scientific and practical abilities and practices and clinical evidence to apply their knowledge and skills in clinical practice and to make correct judgments. Timely diagnosis and quick action when nurses face the patient is very important to improve the quality of care. The health of patients is the top priority and all nurses need timely diagnoses and take the necessary action because the delay in diagnostic procedures compromises the patient's condition. A large number of sick and high-risk patients, short duration of hospitalization and unpredictable complicated situations require prompt response from nurses which can enhance their managerial skills. The results also showed that quality assurance had the lowest average among the clinical competencies among nurses in Babol. The results are in line with the findings of Kalantari et al. (2016) and Bahrainini et al. (2010) and Meretoja (2004). In their studies, quality assurance had the lowest importance among the areas of clinical competence. The role of quality in the success and failure of organizations is important to the extent that it is said that the organization that focuses on the core business of its organization to meet the demands of customers and satisfy their needs at minimum cost and maximum quality, will be able to survive. On the other hand, in assessing health care, one of the sources used is the satisfaction of patients with the services provided, where inaccurate findings and the necessary measures and taking necessary action to resolve problems will eventually make caregivers more permanently accessible (Mack, 2004), therefore, it is recommended that nursing managers pay more attention to the reasons for decreasing of quality of nursing care and its improvement. One-way variance analysis showed that in general, there is no significant difference between helping patient, education and guidance, diagnostic measures, management ability, therapeutic measures, the quality guarantee, job and organizational tasks, and clinical competency in the two groups of nurses in the special and general sectors; therefore, it can be said that there is no difference in the level of clinical competence and nursing skills in special and general groups. The results of this study are consistent with the results of the study of Bahraini et al. (2010) that assessed the clinical competence of nurses in two different clinical settings in two different cities. In explaining the similarities among these sectors, perhaps it is because the two areas did not differ in terms of management system, in-service training, functional environment, and organizational climate, which could affect the clinical competence of nurses working in these centers. The lack of this difference in the present study indicates that the level of skills in nurses in the special and general section is probably due to equal facilities, the same education and in general, proper organization of nurses' continuing education processes in the hospital in Babol in the special and general sections of the hospitals studied. Since the nurses' clinical competence is examined from their point of view, the results may contain inappropriate responses from respondents. This can be a limitation to the study itself. Also, the assessment of the degree of competence in different items makes the importance of applying scientific and research knowledge in the clinical setting clearer. Results in some areas, such as the use of

research evidence, are consistent with similar research. Obviously, it is necessary to provide the environment and conditions in which the nurse can apply their knowledge. Therefore, it is necessary to look for ways to increase the level of clinical competency in nurses. Therefore, it is recommended that evaluating clinical competency of nurses as a program and performed annually (i.e. Quality Assurance) and the results of this study are aimed at granting professional qualifications and employment, encouraging and punishing programs, planning of continuing education courses based on educational needs of nurses and also ranking nurses based on clinical competency with the aim of distributing them more appropriately in the public and specialized departments.

References

- 1) Bahraini M, Moattari M, Kaveh MH, Ahmadi F. (2010). Self assessment of the clinical competence of nurses in a major educational hospital of Shiraz University of Medical Sciences, Journal of Jahrom University of Medical sciences, 2010; 8 (1) : 28-36.
- 2) Abbasi AR, Bahrain M, Yazdankhah Fard MR, Mirzaei K. (2017). Compare Clinical Competency and Job Satisfaction among Nurses Working in Both University and Non-University Hospital in Bushehr in 2015. Iran South Med 2017; 20 (1): 77-89.
- 3) Aliakbari F, Aein F, Bahrami M. (2014). Assessment competencies among emergency nurses for responding in disaster situation with Objective Structured Clinical Examination. Journal of Health Promotion Management 2014-4; 3 (3): 47-57.
- 4) Kalantari S, Time F, Kazemi SB, Rahimian Sh, Araghianmojarad F, Jalali T. (2017). Determination of nurses' clinical competence in critical care ward in Golestan hospital. Nursing Development in Health.2017; 7 (1): 49-56.
- 5) Namadi-Vosoughi M, Tazakkori Z, Habibi A, Abotalebi-Daryasari GH, Kazemzadeh R (2014). Assessing Nursing Graduates' Clinical Competency from the Viewpoints of Graduates and Head Nurses. Journal of Health and Care 2014; 16 (1, 2): 66-73.
- 6) Carr SJ (2004). Assessing clinical competency in medical senior house officers: how and why should we do it? Postgraduate Medical Journal; 80 (940): 63-6.
- 7) Daily E, Padjen P, Birnbaum ML. (2010). A review of competencies developed for disaster Health care providers: Limitations of current processes and applicability. Prehospital disaster medicine; 25 (5): 387-395.
- 8) Garfield R, Al W, Nada JA (2008). Where are we and where shall we in nursing and emergencies? Prehospital and Disaster Medicine. 2008; 23 (1): 9-10.
- 9) Ghanbari Atefeh, Hasandoost, Fateme, Kazemnezhad Lyili, Ehsan., Tabari Khomeiran, Rasoul and Maryam Momeni (2017) Assessing Emergency Nurses' Clinical Competency: An Exploratory Factor Analysis Study, Iran J Nurse Midwifery Res. Jul-Aug; 22 (4): 280-286.
- 10) Girrot EA. (2000) .Assessment of graduates and diplomats in practice in the UK - are we measuring the same level of competence? Journal of Clinical Nursing. 2000; 9 (3): 330-36.
- 11) Hannigan B.A. (2001). Discussion of the strengths and weakness of reflection in nursing practice and education. J Clin Nurse; 10 (2): 278-83. 6
- 12) Lindpaintner LS, Bischofberger I, Brenner A. (2009). Defining clinical evaluation standards for bachelor's-prepared nurses in Switzerland. Journal of Nursing Scholarship; 41 (3): 320-327.
- 13) Liu M, Kuiktik W, Senaratana W, Tonmukayakul O, Eriksen L. (2007). Development of competency inventory for registered nurses in the People's Republic of China: scale development. Int J Nurs Stud. 44 (5): 805-13.
- 14) Mack J (2004). The effect of urgency on patient satisfaction and the future emergency department choice. Health Care Manage Rev. 2004; 20 (2): 15-7.
- 15) Marcum EH, Wet RD (2004). Structured Orientation for New Graduates- A Retention Strategy. Journal for Nurses in Staff Development.
- 16) Mertoy R, Leino-Kilpi H. (2003). Comparison of competency assessments by nurse managers and practicing nurses. J Nurs Manag 2003; 11 (6): 404-9.
- 17) Moskoei Sara, Jamileh Mohtashami, Mahdie Ghalenoeei, Maliheh Nasiri, and Mansoreh Zaghari Tafreshi (2017). Development and psychometric properties rating scale of "clinical competency assessment in mental health nurses": Exploratory factor analysis, Electron Physician. April 2017; 9 (4): 4155-4161.
- 18) Parsa Yekta Z, Ahmadi F, Tabari R. (2005). Factors defined by the nurses as influential on the development of clinical competence. Journal of Medical Faculty Guilan University of Medical Sciences 2005; 14 (54): 22-9.
- 19) Pravikoff, Diane (2016) Clinical Competencies: Assessing, NURSING PRACTICE & SKILL, Copyright, EBSCO Information Services
- 20) Salonen AH, Kaunonen M, Meretoja R, et al. (2007). Competence profiles of recently registered nurses working in intensive and emergency settings. J Nurse Manag. 15 (8): 792-800. Watson, Roger (2002) • Literary Review • October 2002 with 13,557 Reads DOI: 10.1046 / j.1365-2648.2002.02307.x • Source: Pub Med

