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.. a peaceful and prosperous 2023

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Editorial

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This issue of the year is a busy one with papers from the region covering various topics of interest to the health care professional. Hussein, et al., did a cross-sectional study to assess family practitioners' attitudes toward and awareness of evidence-based medicine in Egypt. There was a 100% response rate most of the participants were females 91 (68.9%), aged between 30-39 (73.3 %), and worked in mixed urban and rural settings (53.3%). Most physicians welcomed or strongly welcomed the use of EBM (54.1% and 38.2% respectively). Moreover, 97% of the respondents agreed that EBM is useful or extremely useful. The authors concluded that Egyptian family physicians generally have a good attitude towards EBM, however their general knowledge about it is still insufficient.

Zafar et al., did a systematic review of studies on progesterone's usage in the cure of nicotine craving was undertaken. The authors used the Boolean search approach and searching key terms (i.e. progesterone AND treat*, drug addiction AND withdrawal, smok*, nicotine), screened the title, abstract and full-text for data extraction during June 2021. A search in the PubMed, NIH, Elsevier, Scopus, Web of Science, Google Scholar, and Science Direct databases was performed. The authors concluded that in the majority of instances, 200mg was administered, and favorable outcomes were obtained. Although there were no major side effects observed, a few moderate side effects such as breast tenderness were reported in a few individuals. As a result, progesterone therapy helps to alleviate nicotine withdrawal symptoms, lowers smoking intensity, and treats smoking addiction in both men and women.

Alfaifi, et al., did a cross-sectional study among healthcare worker at Prince Mohammed bin Nasser Hospital. A total of 352 were included in the study. Data was collected through a self-administered questionnaire pertaining to socio-demographic characteristics and the depression anxiety stress scale 21-item questionnaire. The aim was to assess the prevalence and determinants of depression, anxiety, and stress among healthcare workers at Prince Mohammed bin Nasser Tertiary Hospital in Jazan City during the COVID-19 pandemic. The authors concluded that there was a considerable prevalence of depression, anxiety, and stress among healthcare workers during the COVID-19 pandemic, especially among those who experienced the death of a relative from COVID-19 and those who had a chronic disease.

Alateeq, et al., did a cross-sectional study conducted among the Saudi adult population. The aim to determine the relationship between the number of hours spent daily on social media and the Irritable Bowel Syndrome (IBS) symptoms in Saudi adults. Eight hundred ten participants completed the survey (59.8% females vs. 40.2% males). The most common age group was 20 to 29 years (58.1%). The authors concluded that consistent with the literature, there was a high prevalence rate of IBS among the adult population living in Saudi Arabia. This study also demonstrated that the duration of social media use and the number of hours of screen time were not independently accounted for as predictors of IBS.

Khalid et al., did a cross-sectional web-based study in Taif, Saudi Arabia. A self-administered questionnaire was used to collect the participants' socio-demographic characteristics, employment status, medical history, awareness, and knowledge about VV. SPSS was used to analyze the results. This study aimed to investigate the prevalence & awareness of VV among teachers and the general population of Taif city and find out the correlation and differences between teachers and other Taif residents with VV along with socio-demographic characteristics. A total of 1754 individuals (993 females) participated in the study. The authors concluded that the prevalence of VV in the current study is comparable to previous studies. Many significant modifiable VV risk factors were identified. The participants' awareness and knowledge about VV reasons, symptoms, and prophylactic measures were not adequate in some aspects. Increasing the general population's awareness about VV using simple methods is warranted in an attempt to reduce the prevalence of VV and its complications.

Alsahafi, et al., did a cross-sectional study on surgeons of all specialties at King Abdulaziz University Hospital, Jeddah city. The objective is to measure the knowledge and awareness of nutritional screening and support among surgeons in Makkah province, and to define their approach toward its implementation. Only 25.4% of the participants were screening all patients for their nutritional status, 39.8% were screening only who appear undernourished by inspection. The authors concluded that their findings indicated that the nutritional knowledge levels of surgeons, in the field of clinical nutrition was not satisfactory.

Mohsen et al., reviewed retrospectively the records of 40 consecutive patients with 40 displaced, supracondylar fractures of the humerus treated between January 2019 and December 2020, in Aden. To describe the patients' condition and to evaluate the treatment and the outcome. The total study patients were 40 patients. Twenty-one (52.5%) were males and 19 (47.5%) were females. The age of the patients ranged between 2 to 10 years and the mean age was 6.6 ± 2.1 years. Twenty-four (60%) had the fracture on the right arm, and 16 (40%) had on the left arm. All the patients underwent surgery within 24 hours of injury. The mean time was 8.1 ± 4.5 hours.

There were 11 (27.5%) cases of once trial reduction, 14 (35%) of twice trial reduction and 15 (37.5%) of three times trial reduction. The average removal of K-wires was 3.55 weeks. Twenty-six (65%) patients were treated by III lateral K-wires fixation and 14 (35%) were treated by crossed K-wire fixation. The authors concluded that the delay in surgical treatment may cause a number of complications.

Saleh, et al., report a case of acute hemolytic anemia in a 30-year-old Saudi male after receiving Semaglutide injection. A 30-year-old Saudi male with G6PD deficiency presented to the Emergency Department of Aseer Central Hospital, Abha City, Saudi Arabia with acute onset of yellow discoloration of the eyes, palpitation, mild backache, fatigue, and dark urine. The symptoms started one day after receiving the second dose of Semaglutide injection. The authors concluded that G6PD deficiency should be considered in all clinical settings, and the hemolytic conditions that can possibly be precipitated by drugs not well known to cause hemolysis. Screening of newborn infants to early detect G6PD deficiency is highly recommended, especially in those with positive family history of G6PD.

Alturkstani et al., looked at the Impact of the COVID-19 Pandemic on Makkah

Alturkstani et al., looked at the Impact of the COVID-19 Pandemic on Makkah City's Health Programs Performance. Coronavirus (covid-19) is an viral illness caused by a recently discovered coronavirus that began in the Chinese city of Wuhan in December 2019.(1) The impact of this globally pandemic affects all aspects of social, psychological, economic, and health.(1,2) The Saudi preventive health programs for Community health services to increase awareness and decrease preventable diseases. This study aimed to assess the impact of the COVID-19 pandemic on key performance indicators of health programs at Makkah Al-Mukarramah City.

Alotaibi, et al., did a cross-sectional study to examine the public knowledge and their fears about using topical corticosteroids in 2022. A total of 1,889 people participated in the study. Around half of the study participants (46.2%) reported using topical corticosteroids. The vast majority (88.8%) reported that topical corticosteroids effectively managed their dermatological condition. Approximately half (47.1%) reported worrying about side effects when using topical corticosteroids. The authors concluded that phobia about topical corticosteroids is a common problem that warrants further investigation. It affects patients' compliance with corticosteroid therapy, which ultimately will result in worsening their clinical outcomes. Healthcare professionals should focus on education on topical corticosteroids and correct any misconceptions about this group of medications.

Abdulrahman, et al., did a cross-sectional study targeted medical students at the college of medicine of IMSIU. The study aimed to examine emotional intelligence and burnout and their associated factors and identify their predictors among medical students at Imam Mohammed Ibn Saud Islamic University (IMSIU). The authors concluded that a significant correlation was found between medical students' emotional intelligence with burnout components, positively with academic achievement, and negatively with exhaustion and depersonalization burnout. Improving the student's ability to deal successfully with different situations (increasing emotional intelligence) is associated with a lower level of burnout and better academic achievement.

Alshurtan, et al., did a descriptive cross-sectional study that was conducted among 1172 participants from the general population in Hail city. Using a self-administered questionnaire, the sample was selected at random from 18-60 years old. The aim was assessing the public awareness of cardiovascular risk factors and diseases is critical. A total of 1172 participants responded to the survey. Participants who responded were mostly males (69.1%) and (30.7%) were females.

Participants managed to recognize that coronary heart disease (74.5%), congenital heart disease (53.4%) as types of CVDs. The overall knowledge on cardiovascular disease was poor with mean score of 12.24 out of 25.0. The authors concluded that the available data indicate poor knowledge about cardiovascular diseases and associated risk factors, it's very important to establish more widespread awareness campaigns regarding CVDs awareness.

Alqahtani et al., did a cross sectional study in Aseer region of Saudi Arabia. Sample size of 350 was calculated by self-made questionnaire. Quantitative analysis was done on Social package of statistical sciences. The objective was to determine the prevalence of awareness of cast complications among fracture patients. Results showed a lack of awareness of cast complications; only half of the respondents knew that gypsum casts may cause skin ulcers (50.0%) and joint stiffness (48.0%). Most respondents were unaware that a cast may cause skin burns (74.3%) and ischemia (61.7%). The authors concluded that most of the participants were not aware of the complication of cast, so it is necessary to provide information of those patients who have fractures and will go for cast so that we should timely diagnose complications and treat on time.

Alfawaz, et al., reviewed whether Probiotics be used as an adjuvant thereby for diabetes, hope or hype, Narrative review of literature. As Probiotics have been demonstrated to be helpful for patients with diabetes mellitus, particularly at the cellular level, based on clinical trials and animal research, as well as their high tolerability. In preclinical investigations and human trials, probiotics have shown that they can lower insulin and fasting blood glucose levels in people with diabetes. Recently, probiotics have been used to treat a range of ailments, such as autoimmune conditions, allergic reactions, and inflammation. However, there was a lot of heterogeneity in these trials. Examples include the kind of species used, how many probiotics are used, and the level of effectiveness.

Alkeridy, et al., did a cross-sectional, descriptive study with a quantitative approach. The aim to understand the perspective of the caregivers towards the early signs of memory decline and cognitive impairment in their elderly relatives, and we aim to understand the impact of culture on their perspective. A sample of 101 participants enrolled in this study, of which about 60.4% (n=61) were males and 39.6% (n=40) were females. Some cultural perspective could be identified that could help earlier detection of cognitive impairment in elderly people who rely largely on their caregivers. Caregivers are the first person to encounter the early changes in the behavior of the demented

elderly, understanding their perspective can help providing more efficient health care

Shehata, et al., did a descriptive cross-sectional survey in Aseer region, targeting all medical students and interns at college of medicine. This study aims to assess awareness and perception of Degenerative Cervical Myelopathy among medical student in Aseer region, Saudi Arabia. A total of 380 medical students and interns completed the study survey. Students ages ranged from 18 to 30 years with mean age of 22.6 ± 2.1 years old. Exact of 235 (61.8%) students were females and 212 (55.8%) were at their clinical study years. Exact of 106 (27.9%) of the students had good awareness level regarding DCM while 274 (72.1%) had poor awareness level. The authors concluded that the current study showed that medical students' awareness regarding DCM was poor especially male students and others who did not teach about the disease.

Al-Fawzan, et al., did a cross-sectional study among the students from 11 universities in Riyadh City. Convenience sampling was used, and the survey was not validated. The survey was distributed manually but collected electronically. It consisted of four sections: socio-demographics, risk factors, complications, and general statements. The aim was to determine the level of knowledge of hypertension and its associated risk factors among Saudi undergraduate students in the universities of Riyadh City. This study identifies some gaps in the knowledge of hypertension among undergraduate university students. Further research is advised to reach conclusive and more accurate data.

Alghtanie, et al., stressed that health care providers are expected to gain vital information regarding the patient, illness, and relationships from family members and the social network through therapeutic conversation. The involvement of family members within a patient's social network is essential for the development of an appropriate medical and nursing care plan. There is a pressing need to effectively use information obtained from family therapy interviews. Keeping an open communication channel with close family members during patient hospitalization is beneficial to the patient, family members and to healthcare providers. This will also offer a mutual understandings and a better adherence to the agreed healthcare plan.

Yaghmour, et al., did a cross-sectional study on 201 medical students in their last year to evaluate medical students' attitudes and views toward lower back pain. Responders who had a course outside the curriculum were 163 (81.1%) and who hadn't 38(18.9%). The mean number of correct answers were (4.1) and (3.8) for whom had a course and hadn't respectively, representing an insignificant difference.

Knowledge and phobias about the use of topical corticosteroids among the Saudi population: A cross-sectional study

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Abstract

Background: Topical corticosteroids are the first line of treatment for many dermatological disorders. Patients frequently have excessive concerns about the side effects of steroids and may even refuse to use topical steroids to treat their dermatological conditions due to their fear of steroids. This study aimed to explore knowledge and phobias regarding using topical corticosteroids among the Saudi population.

Method: A cross-sectional study was conducted to examine the public knowledge and their fears about using topical corticosteroids in 2022. A previously developed questionnaire was adapted and used in this study. Binary logistic regression was conducted to identify factors that affect participants' fear of using topical corticosteroids.

Results: A total of 1,889 people participated in the study. Around half of the study participants (46.2%) reported using topical corticosteroids. The vast majority (88.8%) reported that topical corticosteroids effectively managed their dermatological condition. Approximately half (47.1%) reported worrying about side effects when using topical corticosteroids. About 15.0% reported having delayed a hospital visit due to concern about prescribing topical corticosteroids. Although 16.4% of them refused to get prescribed topical corticosteroids, 17.0% have not applied corticosteroids. The study participants showed a low

level of phobia about using topical corticosteroids, with a mean phobia score of 1.7 (SD: 1.6), representing 28.3% (out of the maximum phobia score). The mean phobia score showed a statistically significant difference between the participants who reported having experienced or are presently experiencing skin disease ($p < 0.05$).

Conclusion: Phobia about topical corticosteroids is a common problem that warrants further investigation. It affects patients' compliance with corticosteroid therapy, which ultimately will result in worsening their clinical outcomes. Healthcare professionals should focus on education on topical corticosteroids and correct any misconceptions about this group of medications.

Keywords: Topical corticosteroids; Fear; Phobia; Skin diseases; Saudi Arabia

Introduction

Topical corticosteroids (TC) are the first line of treatment for many dermatological disorders because they effectively reduce inflammation, relieve itching, and improve quality of life (1–3). Dermatologists and general practitioners are often prescribed TC for various skin conditions (4,5). They are available in multiple formulations and potencies. For children and the application of sensitive areas, mild formulations are typically used. Topical therapies are often used to treat skin conditions in this way. However, they are not recommended to treat several other disorders and may have unfavorable side effects if misused (6–8).

TC failed to meet fundamental prescription requirements when initially launched. This resulted in topical corticosteroid misuse, which has several adverse effects and could cause the current steroid fear (9–11). Previous literature reported that strict rules must be implemented concerning the only prescription-based dispensing of local corticosteroids (12,13). This should reduce the extremes of TC for well-founded purposes and the increasing incidence of steroid-induced dermatoses in routine dermatology practice (8,12,14). The media has dramatically exaggerated the adverse side effects of TC.

Due to media reports and the dissemination of medical information, more people are becoming aware of the potential side effects of topical steroid use (3,15–17). TC could be associated with different side effects, such as worsening or spreading of a skin infection, inflamed hair follicles, changes in skin color, or excessive hair growth in the area of skin being treated (18–20). Patients frequently have extreme concerns about the side effects of steroids and may even refuse to use topical steroids to treat their dermatological conditions due to their “fear of steroids.” Due to their worries, they can stop taking the prescription regularly, providing inadequate care and raising the possibility of infectious consequences from untreated skin conditions (21). In a previous study, 85.7% of 257 children in China reported using TC (22). 25% of parents rejected a prescription for steroid ointment, and 32.3 % of parents did not apply it to their children even though they had a prescription. 95.7 % of parents expressed extreme anxiety about topical steroid side effects while their children received steroid treatment. Due to concerns about TC, 138 parents (42%) decided not to use a topical steroid ointment for recurrent eczema (22). A recent Saudi Arabian survey examining topical facial corticosteroids has reported that it is not uncommon (16.5%). However, a large population is unaware of the side effects of the unsupervised use of TC (23). To establish successful health education programs that can address the right groups and reduce topical corticosteroid phobia, it can be helpful to pinpoint the specific elements and the reasons behind the fear produced among people using TC. This will promote the optimal use of TC and enhance the safety and effectiveness of its use.

This study aimed to explore the use of TC and the phobia among the general public in Saudi Arabia.

Subjects and Methods

Study design

A cross-sectional study used an online self-administered questionnaire to examine the public knowledge and fears about using TC in August 2022.

Sampling procedure

A convenience sampling procedure was applied to invite the study population to participate. The questionnaire link was distributed through social media platforms (Facebook, Twitter, Snapchat, and Instagram) to reach a broader range of participants from different sociodemographic groups. The questionnaire cover letter made the study objectives and inclusion criteria clear. Participants were asked to confirm their participation before the questionnaire even started. If participants agreed to provide their consent, they were instructed to begin answering the questions; otherwise, the survey was closed.

All Saudis over 18 willing to participate were included in the study. Individuals under 18 years old or living outside of Saudi Arabia were excluded. The sample size was calculated using Raosoft (Raosoft Inc., Seattle, Washington, USA) based on a confidence interval of 95% and a 5% margin of error to meet the standard approximation assumption, resulting in a sample size of 724 volunteers.

Questionnaire tool

A previously designed questionnaire developed by Li et al. was adapted and used (22). The study instrument is divided into three main sections and 26 questions (multiple choice and yes/no format). The first section, which consists of nine items, examined the sociodemographic characteristics of the study participants (age, sex, education, monthly income, marital status, and employment status), whether they have any dermatological conditions and the duration of the disease. The second section consisted of eight questions that asked participants about their use of a corticosteroid history. The third portion examined participants' fear of using topical corticosteroids (nine items). Expert healthcare professionals reviewed the questionnaire instrument for comprehensibility. The questionnaire was translated into Arabic using a forward-backward translation technique. It was tested on a random sample of our study population to identify any concerns with context and content.

Piloting of the Questionnaire Tool

Expert clinicians evaluated and approved the questionnaire tool for its external validity. They were questioned about the questions' simplicity and understandability, its face validity, and whether any of the questions were challenging to comprehend. Before using the questionnaire on a broader scale, a pilot test was conducted with a small group of participants to evaluate its comprehensibility.

Statistical analysis

Data analysis was carried out using the Statistical Package for the Social Sciences, version 27 (SPSS, Armonk, NY: IBM Corp.). Descriptive statistics were used

to present categorical variables such as frequency and percentage. Continuous variables were presented as mean (standard deviation (SD)). Phobia related to topical corticosteroids was assessed using a continuous scale based on participants' responses that explored their fear of using topical corticosteroids (items 1-6). Each confirmed statement (by choosing yes) was given a score of one; the higher the score, the greater the fear of using topical corticosteroids. An independent sample t-test and ANOVA were used to compare the mean fear score between different demographic groups. Binary logistic regression was performed to identify factors affecting participants' fear of using topical corticosteroids. The dummy variable for the binary logistic regression used the mean fear score of the study participants as the cut-off point. A P-value of $0 < 0.05$ was set as the significant level.

Results

A total of 1,889 people participated in the study. More than half of them (60.8%) were female. A similar proportion (57.1%) of the study participants were between 18 and 25 years of age. A total of 62.6% of them were single. Around 60.0% of them had bachelor's degrees. Approximately half of them (46.4%) were students. More than half of them (54.8%) reported their monthly income was 3000 Saudi Riyals (SAR). Of these, 43.0% reported that they either experienced or were currently experiencing skin disease, of whom 38.6% reported that they have been suffering from this dermatological condition for around 3-5 years. For further details on the demographic characteristics, refer to Table 1.

Table 1: Participants' demographic characteristics

Variable	Frequency	Percentage
Gender		
Female	1,149	60.8%
Age		
18-25 years	1,092	57.8%
26-30 years	233	12.3%
31-35 years	121	6.4%
36-40 years	141	7.5%
41-45 years	100	5.3%
46-50 years	93	4.9%
51 years and over	109	5.8%
Marital status		
Single	1,182	62.6%
Married	645	34.1%
Divorced	39	2.1%
Widowed	23	1.2%
Education		
Secondary school or lower	450	23.8%
Diploma	186	9.8%
Bachelor	1,123	59.4%
Higher education	130	6.9%
Occupation		
Student	877	46.4%
Unemployed	294	15.6%
Working in the healthcare sector	203	10.7%
Working outside the healthcare sector	425	22.2%
Retired	90	4.8%
Monthly income		
3000 SAR or lower	1,036	54.8%
3000-6000 SAR	218	11.5%
6000-9000 SAR	153	8.1%
9000 SAR and above	482	25.5%
Have you ever suffered from skin disease, or are you currently suffering from it? (Yes)	803	42.5%
For how many years have you suffered from this dermatological condition? (n=803)		
Less than one year	227	28.3%
1-3 years	96	12.0%
3-5 years	310	38.6%
More than five years	170	21.1%

SAR: Saudi Riyal

Table 2 below presents the pattern of topical corticosteroids use among study participants. Approximately half of the study participants (46.2%) reported having used topical corticosteroids before, of whom 69.4% used topical corticosteroids for less than seven days. The vast majority (88.8%) reported that topical corticosteroids effectively managed their dermatological condition. Around 82.0% of them reported discontinuing topical corticosteroid therapy immediately after improving their dermatological condition. More than half of them (61.2%) reported that they know that topical corticosteroids can treat various dermatological conditions (such as eczema and contact dermatitis (which

causes symptoms such as dandruff and scaly patches on the skin), and psoriasis. A similar percentage of them (65.5%) reported using topical corticosteroids until the skin lesions completely disappeared. Approximately half (50.2%) reported using topical corticosteroids for less than five days after the onset of their dermatological condition. More than half (56.5%) reported that they are aware that topical corticosteroids are a first-line drug for the treatment of various dermatological conditions (such as eczema, contact dermatitis (which causes symptoms such as dandruff and scaly patches on the skin), and psoriasis.

Table 2: Topical corticosteroids utilization pattern.

Variable	Frequency	Percentage
Have you used topical corticosteroids? (Yes)	872	46.2%
If yes, how many days did you use topical corticosteroids during each episode? (n= 872)		
1-3	340	39.0%
4-6	265	30.4%
7-9	86	9.9%
10 days and above	181	20.8%
Was the use of topical corticosteroids effective? (n= 872) (Yes)	774	88.8%
Were topical corticosteroids discontinued immediately after improvement in your dermatological condition? (n= 872)(Yes)	716	82.1%
Are you aware that topical corticosteroids can treat various dermatological conditions (such as eczema, contact dermatitis (which causes symptoms such as dandruff and scaly patches on the skin) and psoriasis)? (Yes)	1,156	61.2%
Were topical corticosteroids used until the skin lesions completely disappeared? (n= 872)(Yes)	572	65.5%
How many days after the onset of your dermatological condition were topical corticosteroids used? (n= 872)		
Less than 5 days	438	50.2%
6-10 days	150	17.2%
11-15 days	64	7.3%
16-20 days	44	5.0%
21 days and above	176	20.2%
Are you aware that topical corticosteroids are a first-line drug for treating various dermatological conditions (such as eczema, contact dermatitis (which causes symptoms such as dandruff and scaly patches on the skin) and psoriasis)? (Yes)	1,067	56.5%

Around half of the study participants (47.1%) reported worrying about side effects when they used topical corticosteroids. Around 15.0% reported having delayed a hospital visit due to concerns about prescribing topical corticosteroids. A similar percentage of them (16.4%) reported that they had declined a prescription for topical corticosteroids, and 17.0% reported that they had not applied the prescribed topical corticosteroids. 19.0% of them reported that they think that topical corticosteroids should never be used for dermatological conditions. More

than half (57.3%) reported using other topical ointments labelled 'without steroids.' Local skin irritation and the appearance of acne were the most frequently reported side effects participants were concerned about when using topical corticosteroids. Around one-fifth of the study participants (21.1%) reported having experienced the associated side effects of topical corticosteroids, of which local skin irritation and the appearance of acne were the most frequently encountered side effects, with 53.8% and 29.4%, respectively, Table 3.

Table 3: The relationship between the demographic factors of the participants and their level of knowledge about depression.

Number	Variable	Frequency	Percentage
1	Were you concerned about side effects when you used topical corticosteroids? (Yes)	889	47.1%
2	Have you ever delayed a hospital visit because of concerns about the prescription of topical corticosteroids for you? (Yes)	291	15.4%
3	Have you ever refused a prescription for topical corticosteroids for yourself? (Yes)	309	16.4%
4	Have you ever not applied prescribed topical corticosteroids? (Yes)	321	17.0%
5	Do you think topical corticosteroids should never be used for dermatological conditions? (Yes)	354	18.7%
6	Have you used other topical ointments labelled "without steroids"? (Yes)	1,083	57.3%
7	What side effects are you concerned about? (More than one answer could be chosen)		
	Local skin irritation	907	48.0%
	The appearance of acne	592	31.3%
	Skin pigmentation	576	30.5%
	Relapse or rebound	487	25.8%
	Skin atrophy	488	25.8%
	Hypertrichosis	206	10.9%
8	Do you think you have experienced the associated side effects of topical corticosteroids? (Yes)	398	21.1%
9	If 'yes,' what side effects? (More than one answer could be chosen)		
	Local skin irritation	214	53.8%
	The appearance of acne	117	29.4%
	Skin pigmentation	108	27.1%
	Relapse or rebound	87	21.9%
	Skin atrophy	65	16.3%
	Hypertrichosis	57	14.3%

The study participants showed a low level of phobia about using topical corticosteroids, with a mean phobia score of 1.7 (SD: 1.6), representing 28.3% (out of the maximum phobia score). The mean phobia score showed a statistically significant difference between the participants

who reported experiencing or are presently experiencing skin disease ($p < 0.05$), (Table 4). Participants who had never experienced any skin disease showed a higher level of phobia of using topical corticosteroids compared to others.

Table 4: The mean score of topical corticosteroid phobia stratified by demographics. (* $p \leq 0.05$)

Variable	Mean phobia score (standard deviation)	P-value
Gender		
Female	1.7 (1.6)	0.230
Male	1.8 (1.7)	
Age		
18-25 years	1.7 (1.6)	0.388
26-30 years	1.8 (1.7)	
31-35 years	1.5 (1.5)	
36-40 years	1.6 (1.6)	
41-45 years	1.8 (1.7)	
46-50 years	1.6 (1.3)	
51 years and over	1.9 (1.8)	
Marital status		
Single	1.7 (1.6)	0.477
Married	1.7 (1.6)	
Divorced	1.7 (1.5)	
Widowed	2.2 (2.0)	
Education		
Secondary school or lower	1.8 (1.7)	0.597
Diploma	1.8 (1.6)	
Bachelor	1.7 (1.6)	
Higher education	1.7 (1.6)	
Occupation		
Student	1.7 (1.6)	0.633
Unemployed	1.7 (1.7)	
Working in the healthcare sector	1.8 (1.6)	
Working outside the healthcare sector	1.7 (1.6)	
Retired	1.9 (1.8)	
Monthly income		
3000 SAR or lower	1.7 (1.6)	0.123
3000-6000 SAR	1.5 (1.4)	
6000-9000 SAR	1.8 (1.6)	
9000 SAR and above	1.8 (1.7)	
Have you ever suffered from skin disease, or are you currently suffering from it?		
No	1.8 (1.7)	0.048*
Yes	1.6 (1.6)	
For how many years have you suffered from this dermatological condition?		
Less than one year	1.5 (1.5)	0.606
1-3 years	1.7 (1.6)	
3-5 years	1.7 (1.7)	
More than 5 years	1.5 (1.6)	

The binary logistic regression analysis did not identify significant differences between the study participants regarding their fear of using topical corticosteroids ($p < 0.05$), Table 5.

Table 5: Binary logistic regression analysis.

Variable	Odds ratio (95% confidence interval)	P-value
Gender		
Female (Reference group)	1.00	
Male	0.99 (0.95-1.04)	0.778
Age		
18-25 years (Reference group)	1.00	
26-30 years	1.09 (0.82-1.43)	0.560
31-35 years	0.81 (0.55-1.18)	0.807
36-40 years	0.92 (0.65-1.29)	0.616
41-45 years	1.02 (0.68-1.53)	0.930
46-50 years	0.78 (0.51-1.19)	0.245
51 years and over	1.19 (0.81-1.75)	0.381
Marital status		
Single (Reference group)	1.00	
Married	1.02 (0.85-1.24)	0.807
Divorced	1.07 (0.57-2.02)	0.841
Widowed	1.14 (0.50-2.60)	0.752
Education		
Secondary school or lower (Reference group)	1.00	
Diploma	1.10 (0.82-1.49)	0.525
Bachelor	0.89 (0.74-1.07)	0.205
Higher education	0.88 (0.61-1.26)	0.471
Occupation		
Student (Reference group)	1.00	
Unemployed	0.95 (0.74-1.22)	0.698
Working in the healthcare sector	1.18 (0.88-1.58)	0.262
Working outside the healthcare sector	0.92 (0.74-1.15)	0.476
Retired	1.15 (0.75-1.75)	0.531
Monthly income		
3000 SAR or lower (Reference group)	1.00	
3000-6000 SAR	0.81 (0.61-1.07)	0.141
6000-9000 SAR	1.08 (0.78-1.51)	0.634
9000 SAR and above	1.05 (0.85-1.29)	0.659
Have you ever suffered from skin disease, or are you currently suffering from it?		
No (Reference group)	1.00	
Yes	0.95 (0.79-1.14)	0.596
For how many years have you suffered from this dermatological condition?		
Less than one year (Reference group)	1.00	
1-3 years	0.96 (0.70-1.31)	0.774
3-5 years	0.844 (0.56-1.28)	0.425
More than 5 years	1.11 (0.87-1.42)	0.394

Discussion

This study aimed to explore the use of topical corticosteroids and fears about their use among the Saudi population. Around half of the study participants reported having used topical corticosteroids. The vast majority of them reported that topical corticosteroids were effective in managing their dermatological condition. More than half know that topical corticosteroids can treat several dermatological conditions, such as eczema, contact dermatitis, and psoriasis. About half were concerned about side effects when they used topical corticosteroids. About half have experienced the associated side effects of topical corticosteroids, of which local skin irritation and the appearance of acne were the most commonly encountered side effects. The study participants showed a low level of phobia about using topical corticosteroids, and patients who had never experienced any skin disease showed a higher level of phobia.

Around half of the participants (46.2%) reported having used topical corticosteroids before. More than half of them (61.2%) know that topical corticosteroids can treat several dermatological conditions, such as eczema, contact dermatitis, and psoriasis. Eczema, contact dermatitis, localized vitiligo, localized bullous pemphigoid, and psoriasis are just a few common conditions treated with topical corticosteroids (24,25). A study in China reported that 86.0% of the patients used topical corticosteroids to manage eczema (22). The vast majority (88.8%) of the current study reported that topical corticosteroids effectively managed their dermatological condition. This confirmed the findings of a previous study that reported that 60% of parents of children diagnosed with eczema confirmed their acceptability of topical corticosteroids in managing their children's condition (26).

In our study, 47.1% of the participants reported worrying about side effects when using topical corticosteroids. A previous survey of parents of children with eczema reported that around 96% of them were concerned about the side effects associated with the use of topical corticosteroids, of whom 93% delayed the medical treatment of their children due to their fear about the side effects of steroids (22). A study in the United Kingdom reported that 73% of participants were worried about using topical corticosteroids for themselves or their children (27). Another study in China reported that 60% of eczema patients feared using topical corticosteroids (28). In patients with the same study, only 20% of the non-eczematous skin disease feared using topical corticosteroids (28). Unfortunately, patients and physicians abuse topical corticosteroids at an alarming rate. Today, red-burning skin syndrome and topical steroid addiction are recognized clinical conditions (29). As a result, physicians everywhere are beginning to identify the issue of steroid phobia, which is sometimes linked to simple fear (30). Fear of topical corticosteroids is associated with inappropriate use of this medication, including discontinuation of treatment and requesting spare medications (22,26). A previous study reported that 79.0% of the patients discontinued topical corticosteroids immediately after improvement in their dermatological condition (22). Short usage

periods and premature medication discontinuation result in disease relapse (31). To preserve the therapeutic impact after improvement in dermatological conditions, physicians in clinical practice must inform patients to continue steroid therapy for a few additional days. Untreated dermatological conditions such as eczema can progress or lead to infectious complications (3,32).

About one-fifth (21.1%) of the participants have experienced the associated side effects of topical corticosteroids, of which local skin irritation and the appearance of acne were the most commonly encountered side effects, with 53.8% and 29.4%, respectively. The most frequently reported side effects of topical corticosteroids is a burning or stinging sensation when the medicine is applied. However, this usually improves as your skin gets used to the treatment. Less common side effects can include: worsening or spreading of a skin infection you already have (26,28). Despite that, in clinical practice, hypertrichosis and skin atrophy are associated with the long-term use of topical corticosteroids; skin dyspigmentation and atrophy or hypertrichosis are common side effects of concern for many patients (31,33).

Participants in our study showed a low level of phobia about using topical corticosteroids, with a mean phobia score of 1.7 (SD: 1.6), representing 28.3% (out of the maximum phobia score). Previous studies have reported that the nature of fears about the use of topical corticosteroids was mainly interpersonal and less frequently iatrogenic (28). Multiple studies have documented the prevalence of fear of using topical corticosteroids, which ultimately reduced the therapeutic efficacy of dermatological treatment (26,28). Patients fear topical corticosteroids due to the media exaggerating their side effects while using them to treat dermatological conditions (22). In our study, participants who had never experienced skin disease before showed more phobia about using topical corticosteroids than others. Fear of using topical corticosteroids has an important influence on adherence (34). A previous study reported that 36% of the patients did not adhere to their topical corticosteroid therapy due to their fear of its associated side effects (34). Topical corticosteroid phobia was related to the need for assurance, the conviction that topical corticosteroids enter the bloodstream through the skin, a history of adverse events, conflicting information on how much cream to use, a desire to self-treat for as little time as possible and poor treatment adherence (34). Healthcare professionals play an essential role in patient education regarding the proper use of topical corticosteroids (35–37). Physicians should educate patients about topical corticosteroids and the importance of compliance with physician's therapy instructions (38,39). This should include topical corticosteroids as per their prescription in terms of their potency, frequency, and duration of therapy. They should be informed about the negative consequences of improper use of topical corticosteroids, including disease relapse and the occurrence of unfavorable adverse effects (40). They should be informed about the importance of topical corticosteroid maintenance therapy to minimize flare-ups or relapses (41).

Limitations

To our knowledge, this study is one of the first few studies to examine topical corticosteroids and the phobia regarding their use among the general Saudi population. However, this study has limitations. First, we could not confirm any association due to its design limitation. Furthermore, a self-administered survey conducted online on a platform that excluded some of the targeted population could be biased.

Conclusion

Regarding topical corticosteroids, a phobia is a common problem that warrants further investigation. It affected patients' compliance with corticosteroid therapy, which ultimately resulted in a worsening of their clinical outcomes. Healthcare professionals should focus on education on topical corticosteroids and correct any misconceptions about this group of medications. Educational efforts should be directed toward all patients with dermatological conditions that warrant using topical corticosteroids, specifically those who have never experienced skin diseases.

Statement of the Institutional Review Board

The IMSIU research ethics committee approved the study (project number 305-2022; approval date, 22 July 2022). All writings were made in accordance with the ethical principles of the Declaration of Helsinki. A brief description of the study was included with the survey link, with a full explanation on the survey's front page. The participants were told that consent was given by filling out the survey. All participants' consent and data were obtained in complete confidence throughout the study.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

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Awareness of Nutritional Screening and Support Among surgeons

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Abstract

Background: Surgical nutrition is a critical part of surgery that many surgeons overlook or undervalue. No previous studies are present to fill the gap of knowledge in Saudi Arabia about nutritional screening awareness and support among surgeons.

Objectives: to measure the knowledge and awareness of nutritional screening and support among surgeons in Makkah province, and to define their approach toward its implementation.

Methods: a cross-sectional study was done and surgeons of all specialties at King Abdulaziz University Hospital, Jeddah city, Saudi Arabia were included.

Study instrument: a predesigned questionnaire was sent to the targeted participants. The questionnaire included items to collect data about surgeons' gender, specialty, position, work duration, institution, screening of nutritional status of their hospitalized patients, patients screened for malnutrition, system used in nutrition screening, participation in meetings on clinical nutrition, calculation of daily energy requirement and practice in nutritional support.

Ethical considerations: ethical approval was obtained from the research ethics committee of King Abdul-Aziz University.

Results: Only 25.4% of the participants were screening all patients for their nutritional status; 39.8% were screening only those who appear undernourished by inspection and 50.8% were using multiple methods to determine the nutritional risk. 61% did not participate in meetings on clinical nutrition, 14.4% participated in more than 2 yearly

meetings, and 39.8% started nutritional support in a patient with a high nutrition risk 10-14 days prior to the operation. Most of them (58.5%) did not calculate daily energy requirement and consult a dietitian; 59.3% mentioned that they give postoperative nutritional support if the patient will not be able to fulfill his/her nutritional needs by oral food intake. 34.7% did not prescribe nutritional support products to patients when discharged if given nutritional support during hospital stay and 33.1% ceased oral intake of solid food in a patient who will be undergoing a major abdominal operation at midnight before the operation day. 30.5% cease the oral intake of clear fluids in a patient who will be undergoing a major abdominal operation at midnight before the operation day and 38.1% give standard nutritional support to patients at nutritional risk who will undergo a major abdominal operation for cancer. Females and surgeons who participated in more than 2 meetings on clinical nutrition in a year had a significant higher percentage of those who were screening the nutritional status of their hospitalized patients.

Conclusion: Our findings indicated that the nutritional knowledge levels of surgeons in the field of clinical nutrition was not satisfactory. To improve nutritional care in hospitals, effective nutrition training and ongoing education for all staff must be prioritized.

Keywords: awareness, nutritional, screening, support, surgeons, Saudi Arabia

Introduction

Preoperative surgical nutrition, which includes providing the patient clear fluids until 2-3 hours before anesthesia, is safe and shown to reduce the feeling of thirst while preventing dehydration (1).

The goal for postoperative patients is to promote faster recovery and well-being, with fewer complications and a shorter hospital stay. This can be accomplished in a variety of ways, including early oral intake and movement, sip feeds, or artificial feeding via enteral or parenteral methods. Surgical nutrition should always be considered because of its positive impact on clinical practice and costs.

Surgical nutrition is a critical part of surgery that many surgeons overlook or undervalue. Even though it has a significant impact on surgical recovery, a lack of information can lead to a variety of issues, including decreased wound healing, decreased immunological responses, increased organ dysfunction, delayed recovery, and increased morbidity and mortality (3,4).

According to a Turkish research of Turkish surgeons, there is still room for development in terms of clinical nutrition awareness and understanding (5). Another Swiss-Austrian study found that, despite the well-established link between malnutrition and poor postoperative outcomes, surgeons fail to adopt routine screening and support based on evidence-based guidelines (6).

There are no previous studies present to fill the gap in knowledge in Saudi Arabia about nutritional screening awareness and support among surgeons. This study aimed to measure the knowledge and awareness of nutritional screening and support among surgeons in Makkah province, and to define their approach toward its implementation.

Methods

Study design: a cross-sectional study was done.

Study setting: King Abdul-Aziz university hospital Jeddah, Saudi Arabia.

Study population: Surgeons of all specialties at King Abdulaziz University Hospital, Jeddah city, Saudi Arabia.

Study instrument: a predesigned questionnaire was sent to the targeted participants. The questionnaire included items to collect data about surgeons' gender, specialty, position, work duration, institution, screening of nutritional status of their, hospitalized patients, patients screened for malnutrition, system used in nutrition screening, participation in meeting on clinical nutrition, calculation of daily energy requirement and practice in nutritional support.

Ethical considerations: ethical approval was obtained from the research ethics committee of King Abdul-Aziz University.

Data analysis: Data were analyzed using SPSS version 26. Qualitative data was expressed as numbers and percentages, and Chi-squared test (χ^2) was used to assess the relationship between variables. Ap-value of less than 0.05 was considered as statistically significant.

Results

Table 1 shows that 77.1% of the participants were males, 35.6% had the specialty of general surgery and 47.5% were consultants. Of them, 62.7% had a work duration more than 5 years and 69.5% were working in teaching hospitals (university or training and research hospital affiliated to the Ministry of Health).

Figure 1 shows that most of the participants (69.5%) were screening the nutritional status of their hospitalized patients.

Figure 2 illustrates that only 25.4% of the participants were screening all patients for their nutritional status, while 39.8% were screening only those who appear undernourished by inspection. As for the system used in nutrition screening, most of the participants (50.8%) were using multiple methods to determine the nutritional risk in the same patient.

Table 2 shows that most of the participant surgeons did not participate in meetings on clinical nutrition (61%) and only 14.4% participated in more than 2 yearly meetings. Of them (39.8%) reported that they start nutritional support in a patient with a high nutrition risk 10-14 days prior to the operation. Most of them (58.5%) reported that they do not calculate the daily energy requirement of a patient themselves as they consult a dietitian to calculate it. Most of them (59.3%) mentioned that for patients whom they give nutritional support before the operation, they give postoperative nutritional support if the patient will not be able to fulfill his nutritional needs by oral food intake. About 34% (34.7%) reported that they do not prescribe nutritional support products to patients when discharged from the hospital if the patient was given nutritional support during the hospital stay. About one third of the participant physicians (33.1%) reported that they cease the oral intake of solid food in a patient who will be undergoing a major abdominal operation at midnight before the operation day. And 30.5% reported that they cease the oral intake of clear fluids in a patient who will be undergoing a major abdominal operation at midnight before the operation day. Of them, 38.1% reported that they give standard nutritional support products to the patients at nutritional risk for those patients who will undergo a major abdominal operation for cancer.

Table 3 shows that female surgeons had a significantly higher percentage of those who were screening the nutritional status of their hospitalized patients compared to male surgeons (88.9% vs. 63.7%) ($p < 0.05$). On the other hand, there was a non-significant relationship between screening of the nutritional status of hospitalized patients and participants' specialty, position, work duration and institution ($p > 0.05$).

Figure 3 illustrates that surgeons who participated in more than 2 meetings on clinical nutrition in a year had a significantly higher percentage of those who were screening the nutritional status of their hospitalized patients ($p < 0.05$).

Table 1. Distribution of studied physicians according to their gender, specialty, position, work duration and institution (No.: 118)

Variable	No. (%)
Gender	
Female	27 (22.9)
Male	91 (77.1)
Specialty	
Cardiac surgery	1 (8)
ENT	15 (12.7)
General surgery	42 (35.6)
Neurosurgery	7 (5.9)
OBGYN	9 (7.6)
Ophthalmology	11 (9.3)
Orthopedic	13 (11)
Pediatric surge	6 (5.1)
Plastic surgery	3 (2.5)
Spine	1 (0.8)
Urology	8 (6.8)
Vascular surgery	2 (1.7)
Position	
Consultant	56 (47.5)
Resident	39 (33.1)
Specialist	23 (19.5)
How long have you been working as a surgeon?	
Less than 5 years	44 (37.3)
More than 5 years	74 (62.7)
Type of institution	
A teaching hospital (University or Training and Research Hospital affiliated to the Ministry of Health)	82 (69.5)
General hospital (State Hospital affiliated to the Ministry of Health)	36 (30.5)

Figure 1. Percentage distribution of the participants according to screening of nutritional status of hospitalized patients

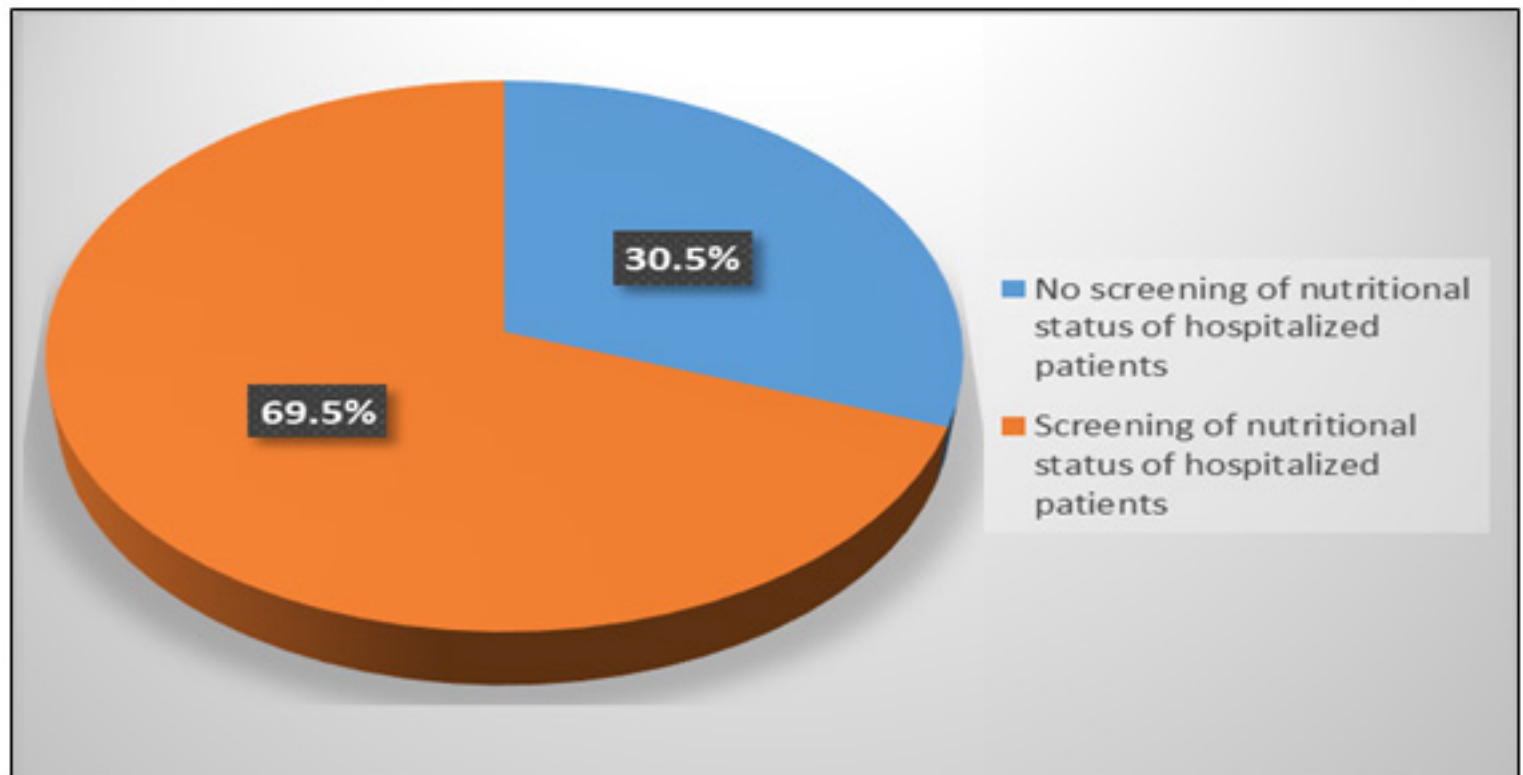


Figure 2. Percentage distribution of the participants according to patients screened for malnutrition and system used in nutrition screening

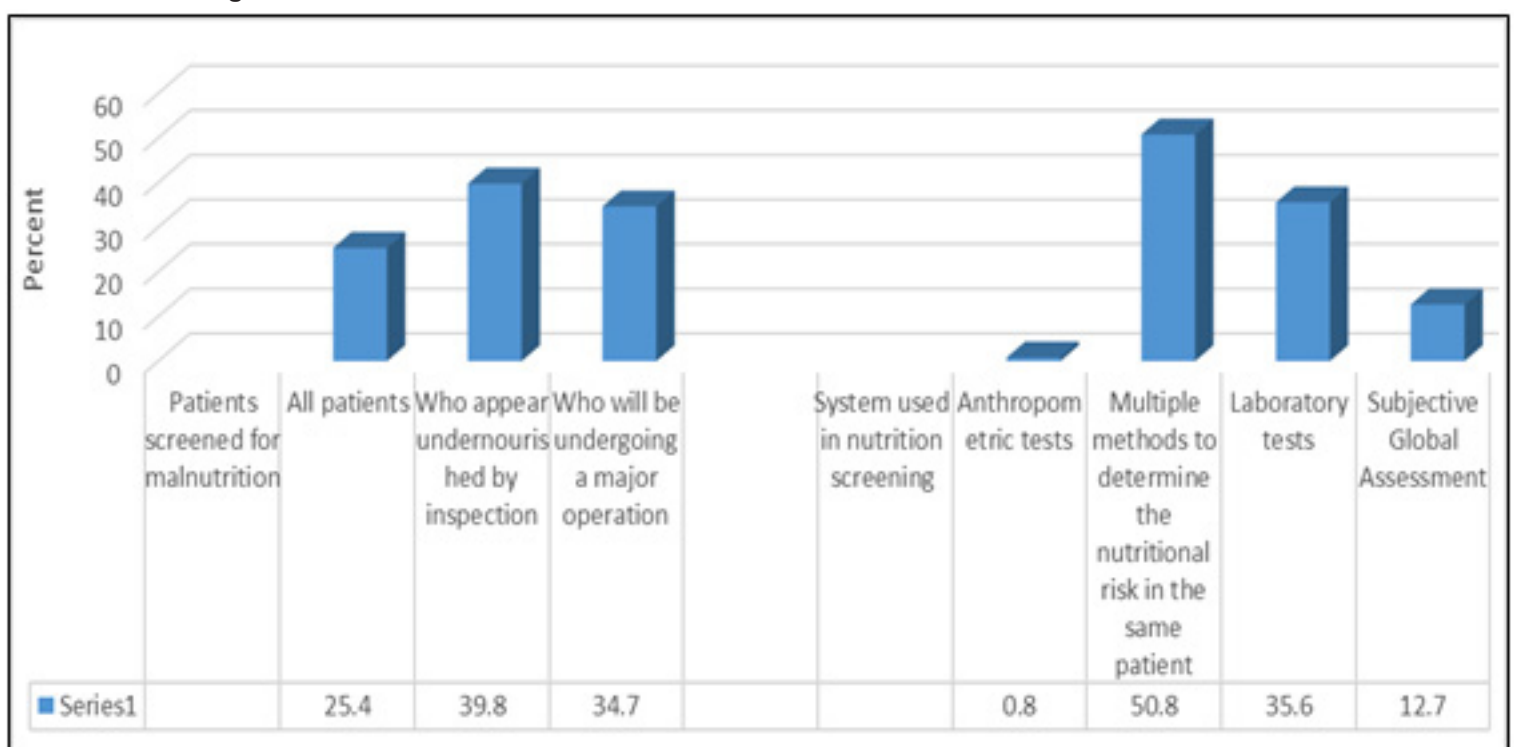


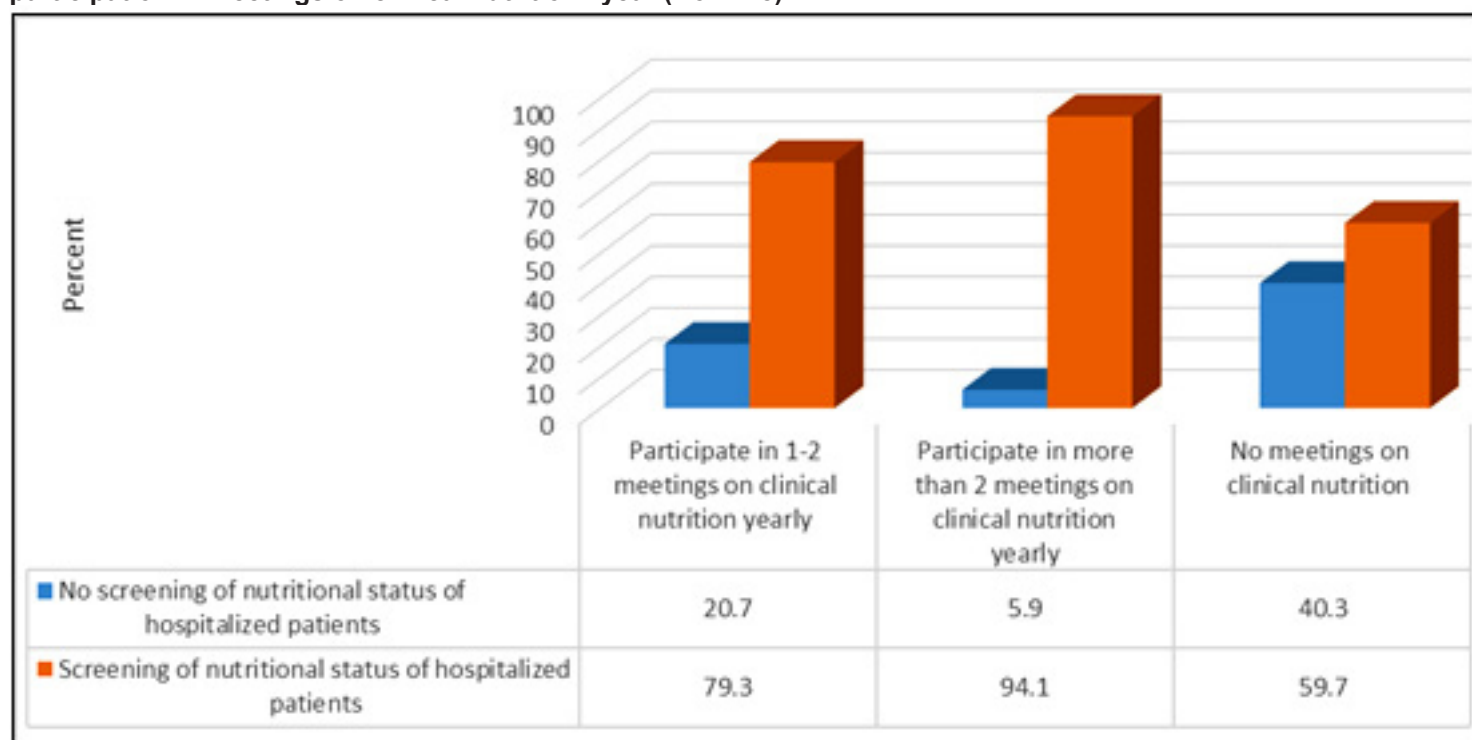
Table 2. Distribution of studied physicians according to yearly meeting on clinical nutrition, calculation of daily energy requirement and their practice in nutritional support

Variable	No. (%)
How many meetings on clinical nutrition do you participate in a year?	
1-2	29 (24.6)
More than 2	17 (14.4)
None	72 (61)
How many days prior to the operation do you start nutritional support in a patient with a high nutrition risk?	
10-14	47 (39.8)
3-4	30 (25.4)
5-7	41 (34.7)
How do you calculate the daily energy requirement of your patients?	
I do not calculate it myself, I consult a dietitian	69 (58.5)
I give 25–30 kcal/kg per day depending on the clinical situation	26 (22)
I use another formula	13 (11)
I use Harris-Benedict formula	10 (8.5)
To a patient whom I have given nutritional support before the operation	
I always give postoperative nutritional support	34 (28.8)
I do not give postoperative nutritional support	14 (11.9)
I give postoperative nutritional support if the patient will not be able to fulfill his nutritional needs by oral food intake	70 (59.3)
If you have given nutritional support to your patient during hospital stay, do you prescribe nutritional support products to him/her when discharging from the hospital?	
No	41 (34.7)
Yes, for 2 weeks	39 (33.1)
Yes, for 4–6 weeks	38 (32.2)
When do you cease the oral intake of solid food in a patient who will be undergoing a major abdominal operation?	
12 hours before the operation	22 (18.6)
6 hours before the operation	20 (16.9)
At midnight before the operation day	39 (33.1)
Not applicable	37 (31.4)
When do you cease the oral intake of clear fluids in a patient who will be undergoing a major abdominal operation?	
2 hours before the operation	18 (15.3)
6 hours before the operation	29 (24.6)
At midnight before the operation day	36 (30.5)
Not applicable	35 (29.7)
To a patient who will undergo a major abdominal operation for cancer	
I do not give nutritional support	5 (4.2)
I give immunonutrition products regardless of the nutritional risk	15 (12.7)
I give standard nutritional support products to the patients at nutritional risk	45 (38.1)
Not applicable	53 (44.9)

Table 3. Relationship between screening of the nutritional status of hospitalized patients and participants' gender, specialty, position, work duration and institution (No.: 118)

Variable	Do you screen the nutritional status of your hospitalized patients?		χ^2	p-value
	No No. (%)	Yes No. (%)		
Gender				
Female	3 (11.1)	24 (88.9)	6.21	0.013
Male	33 (36.3)	58 (63.7)		
Specialty				
Cardiac surgery	0 (0.0)	1 (100)	15.75	0.203
ENT	6 (40)	9 (60)		
General surgery	7 (16.7)	35 (83.3)		
Neurosurgery	5 (71.4)	2 (28.6)		
OBGYN	3 (33.3)	6 (66.7)		
Ophthalmology	4 (36.4)	7 (63.6)		
Orthopedic	4 (30.8)	9 (69.2)		
Pediatric surge	3 (50)	3 (50)		
Plastic surgery	1 (500)	1 (50)		
Plastic Surgery	0 (0.0)	1 (100)		
Spine	1 (100)	0 (0.0)		
Urology	2 (25)	6 (75)		
Vascular surgery	0 (0.0)	2 (100)		
Position				
Consultant	18 (32.1)	38 (67.9)	0.28	0.868
Resident	12 (30.8)	27 (69.2)		
Specialist	6 (26.1)	17 (73.9)		
How long have you been working as a surgeon?				
Less than 5 years	14 (81.8)	30 (68.2)	0.05	0.812
More than 5 years	22 (29.7)	52 (70.3)		
Type of an institution				
A teaching hospital (University or Training and Research Hospital affiliated to the Ministry of Health)	23 (28)	59 (72)	0.76	0.381
General hospital (State Hospital affiliated to the Ministry of Health)	13 (36.1)	23 (63.9)		

Figure 3. Relationship between screening of the nutritional status of hospitalized patients and frequency of participation in meetings on clinical nutrition / year (No.: 118)



Discussion

This study aimed to assess surgeons' knowledge and awareness of nutritional screening and support in Makkah province, and to define their approach to its implementation.

The present study found that only 25.4% of the participants were screening all patients for their nutritional status, while 39.8% were screening only those who appear undernourished on inspection. A previous Iranian study done by Kalantari among interns and residents found that the mean nutrition knowledge scores were reported as 50%, which is significantly lower than the scores in our study [12]. The Iranian study found that the studied nutritionists, physicians and nurses had poor knowledge, especially in clinical nutrition topics. Based on the current results, knowledge level of clinical staff is an effective factor in not paying attention to the importance of nutritional care as a part of medical care of the patients. This may mean that doctors gain knowledge through experience and practice (7).

Results of this work illustrated that females surgeons and those who participated in more than 2 meetings on clinical nutrition in a year had a significantly higher percentage of those who were screening the nutritional status of their hospitalized patients, while there was a non-significant relationship between screening of the nutritional status of hospitalized patients and participants' specialty, position, work duration and institution. In contrast, results from previous studies revealed that age, work experience and specialty are among the important factors that improve a physician's nutritional knowledge (8).

On assessing the actual practice of the participant surgeons, most of them (58.5%) did not calculate daily energy requirement and consult a dietitian and 59.3% mentioned that they give postoperative nutritional support if the patient will not be able to fulfill his/her nutritional needs by oral food intake. 34.7% did not prescribe nutritional support products to patients when discharged if given nutritional support during hospital stay and 33.1% cease oral intake of solid food in a patient who will be undergoing a major abdominal operation at midnight before the operation day.

The nutritionist or the dietitian is the most reliable person to provide nutritional advice and support in the clinical team (9). Thus, there was an obvious deficient knowledge and practice among the participants of this study. Similar deficient practice of physicians regarding the nutritional screening of patients was revealed from previous studies (10,11).

Limitations

The use of a self-administered questionnaire in this study could have a recall bias.

Conclusion

This study found that only 25.4 percent of participants screened all patients for nutritional status, while 39.8 percent screened only those who appeared undernourished upon inspection and 50.8 percent used multiple methods to assess nutritional risk. 61 percent did not attend clinical nutrition meetings, 14.4 percent attended more than two yearly meetings, and 39.8 percent began nutritional support in a patient with a high nutrition risk 10-14 days before the operation. The majority of them (58.5 percent) did not calculate daily energy requirements and did not consult a dietitian; however, 59.3 percent stated that they provide

dietitian; however, 59.3 percent stated that they provide postoperative nutritional support if the patient is unable to meet his nutritional needs through oral food intake. If patients were given nutritional support during their hospital stay, 34.7 percent did not prescribe nutritional support products to them when they were discharged. At midnight the night before a major abdominal operation, 33.1 percent of patients discontinue oral intake of solid food. 30.5 percent of patients who will undergo a major abdominal operation for cancer stop taking clear fluids orally at midnight the night before the operation, and 38.1 percent provide standard nutritional support to patients at nutritional risk who will undergo a major abdominal operation for cancer. Our findings indicated that the nutritional knowledge level of surgeons, especially in the field of clinical nutrition, is not satisfactory. Increased nutrition knowledge seems to improve nutrition practice. To improve nutritional care in hospitals effective nutrition training and continuing education for all staff has to be addressed as a priority.

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Emotional Intelligence and Burnout among Medical Students at a Public Saudi University

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Abstract

Background: Medical students' mental health is a significant problem, as research has shown that their mental health was comparable to, if not better than, the general population before attending medical school. The study aimed to examine emotional intelligence and burnout and their associated factors and identify their predictors among medical students at Imam Mohammed Ibn Saud Islamic University (IMSIU).

Methods: A cross-sectional study targeted medical students at the college of medicine of IMSIU. The invited students were requested to respond to the Maslach Burnout Inventory-Student Survey (MBI-SS) and TEI Que-SF questionnaires. Sociodemographic and personal life data were also evaluated.

Results: Out of the 350 invited medical students, 280 (80%) completed the study questionnaires. More than half (53.2 %) were females, while 66.8 % were aged between 21 and 23. Generally, the mean score of the four scales of the tool were 4.56 (Out of 6), 4.31 (Out of 6), 4.72 (Out of 8), and 4.62 (Out of 6), where higher scores mean better emotional intelligence. According to the results of the MBI-SS tool, 19.3 % of the students had a high-level burnout considering the exhaustion subscale, 76.4 % in the depersonalization subscale, and 77.5 % in the personal achievement subscale. Emotional

intelligence is negatively correlated with exhaustion and depersonalization burnout and positively related with personal achievement burnout. **Conclusion:** A significant correlation was found between medical students' emotional intelligence with burnout components, positively with academic achievement, and negatively with exhaustion and depersonalization burnout. Improving the student's ability to deal successfully with different situations (increasing emotional intelligence) is associated with a lower level of burnout and better academic achievement.

Keywords: medical students, emotional intelligence, burnout, Saudi Arabia

Introduction

The mental health of medical students has huge concerns because it has been shown that their mental health before entering medical school was the same as or even better than the general population (1–3). To be a medical student is intrinsically demanding, but no one can be denied that it can leave many students at risk for burnout (4,5). However, burnout is a psychological syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment induced by repeated exposure to workplace stressors (6). Physician burnout is connected to increased medical errors and reduced quality of patient care (7). Suicide ideation is, however, increased by burnout (8).

Furthermore, State-anxiety and depression are strongly linked to burnout. According to a recent survey, 27.9% of medical students suffer from burnout, which is linked to poor academic performance and a lack of social support (9). Studies also found that burnout among medical students may be associated with worse mental health, such as emotional intelligence (EI) and poor sleep quality (10). If EI is linked to burnout, it should be evaluated or measured as part of medical students' overall evaluation (11,12). Furthermore, these findings suggest that EI training should be prioritized in medical education curricula, especially if burnout is detected. This study examines emotional intelligence and burnout, their associated factors, and identifies predictors among IMSIU medical students.

Materials and Methods

This cross-sectional study was conducted at the College of Medicine, Imam Mohammad Ibn Saud Islamic University (IMSIU), in November 2021.

Study subjects and size

Participants in this study were undergraduate college students from different educational levels. A minimum sample of 280 participants was intended to achieve a 95% confidence level and a 5% margin of error.

The sampling technique, data collection method, and the instrument used.

This study was conducted through an electronic self-administered questionnaire distributed randomly. The study scale was adapted from multiple previous studies. A pilot study checked the validity and reliability of the study questionnaire. The questionnaire contains four demographic sections and life factors. The TEIQue-SF inventory (13) is a 30-item questionnaire designed to measure global trait emotional intelligence (trait EI) based on the complete form of the TEIQu. Also, the Maslach Burnout Inventory (14) is a 22-item survey that covers three areas: Emotional Exhaustion (EE), Depersonalization (DP), and low sense of Personal Accomplishment (PA). Each subscale includes multiple questions with frequency rating choices of Never, A few times a year or less, Once a month or less, A few times a month, Once a week, A few

times a week, or Every day. Three hundred and fifty (350) randomly invited participants were emailed and reminded to participate.

Statistical analysis plan

The quantitative data were analyzed using the Statistical Package for Social Sciences version 21 (SPSS 21.0) (15). Frequencies and percentages were used to present qualitative data, while the mean presented continuous variables. The Pearson test was used to determine the correlation between burnout and emotional intelligence. Statistical significance was defined as being lower or equal to $p = 0.05$. The data did not need to be cleaned because all of the questions in the Google form were multiple choice and had to be answered to submit, so there was no error in the database.

Ethical consideration

The study was approved by Imam Mohammad Ibn Saud Islamic University's institutional review board (IRB) project number 155-2021, dated 3 November 2021. All writing is done in accordance with the ethical principles of the Declaration of Helsinki. The survey link included a brief description of the study and a more detailed explanation on the survey's front page. Participants were told that completion of the study constituted consent. All participant consent and data were collected in complete confidence throughout the study.

Results

Of the 350 invited medical students, 280 (80%) completed the study questionnaires. Among these students, 53.2 % were females, while 66.8 % were aged 21-23. Almost all students were single (98.9 %), and 55.7 % reported a total family monthly income of more than 20,000 SR. Moreover, 32.5 % of the students reported being in their third year at the study time, while 20 % were in the first year. Furthermore, 52.1 % had a GPA of more than 4.5, while 28.9 % were between 4 and 4.49 (Table 1).

Considering being physically active, 54.3 % of the students reported practicing no physical exercise, while 21.4 % were physically active twice weekly and 9.6 % daily. Moreover, 41.8 % of the students rank their sleep quality as relatively good, 26.4 % as very good, and 23.2 % as reasonably bad. Considering smoking, 12.5 % of students reported current smoking and 1.4 % as ex-smokers, and 16.4 % reported being diagnosed with mental health disorders (Table 2).

Table 3 shows the TEIQue-SF tool's results for analyzing the participants' emotional intelligence. Generally, the mean score of the four scales of the instrument were 4.56 (Out of 6), 4.31 (Out of 6), 4.72 (Out of 8), and 4.62 (Out of 6), where higher scores mean better emotional intelligence. Moreover, no correlation was found between gender, age, or emotional intelligence. Emotional intelligence was the only factor correlated with age; the older the students, the more emotionally stable they were. Another factor affecting emotional intelligence is sleep quality, where

sleep quality is significantly positively correlated with emotional intelligence.

According to the results of the MBI-SS tool, 19.3 % of the students had a high-level of burnout considering the exhaustion subscale, 76.4 % in the depersonalization subscale, and 77.5 % in the personal achievement subscale (Figure 1). According to the results presented

in Table 4, there was a significant relationship between burnout of medical students and their emotional intelligence. Emotional intelligence is negatively correlated with exhaustion and depersonalization burnout and positively with personal achievement burnout. More stable and good emotional intelligence is associated with low exhaustion, depersonalization burnout, and better personal achievement.

Table 1: Demographic factors of the participants (N=280)

		Count	Column N %
Gender	Male	131	46.8%
	Female	149	53.2%
Age	18	4	1.4%
	19	17	6.1%
	20	44	15.7%
	21	75	26.8%
	22	70	25.0%
	23	42	15.0%
	24	20	7.1%
	25 or more	8	2.9%
Marital status	Single	277	98.9%
	Married	3	1.1%
TOTAL family monthly income	<10,000 SR	59	21.1%
	10,000-20,000 SR	65	23.2%
	> 20,000 SR	156	55.7%
Current year of study	1st year	56	20.0%
	2nd year	44	15.7%
	3rd year	91	32.5%
	4th year	50	17.9%
	5th year	39	13.9%
GPA	=<2.99	5	1.8%
	3-3.49	10	3.6%
	3.5-3.99	38	13.6%
	4-4.49	81	28.9%
	=>4.5	146	52.1%

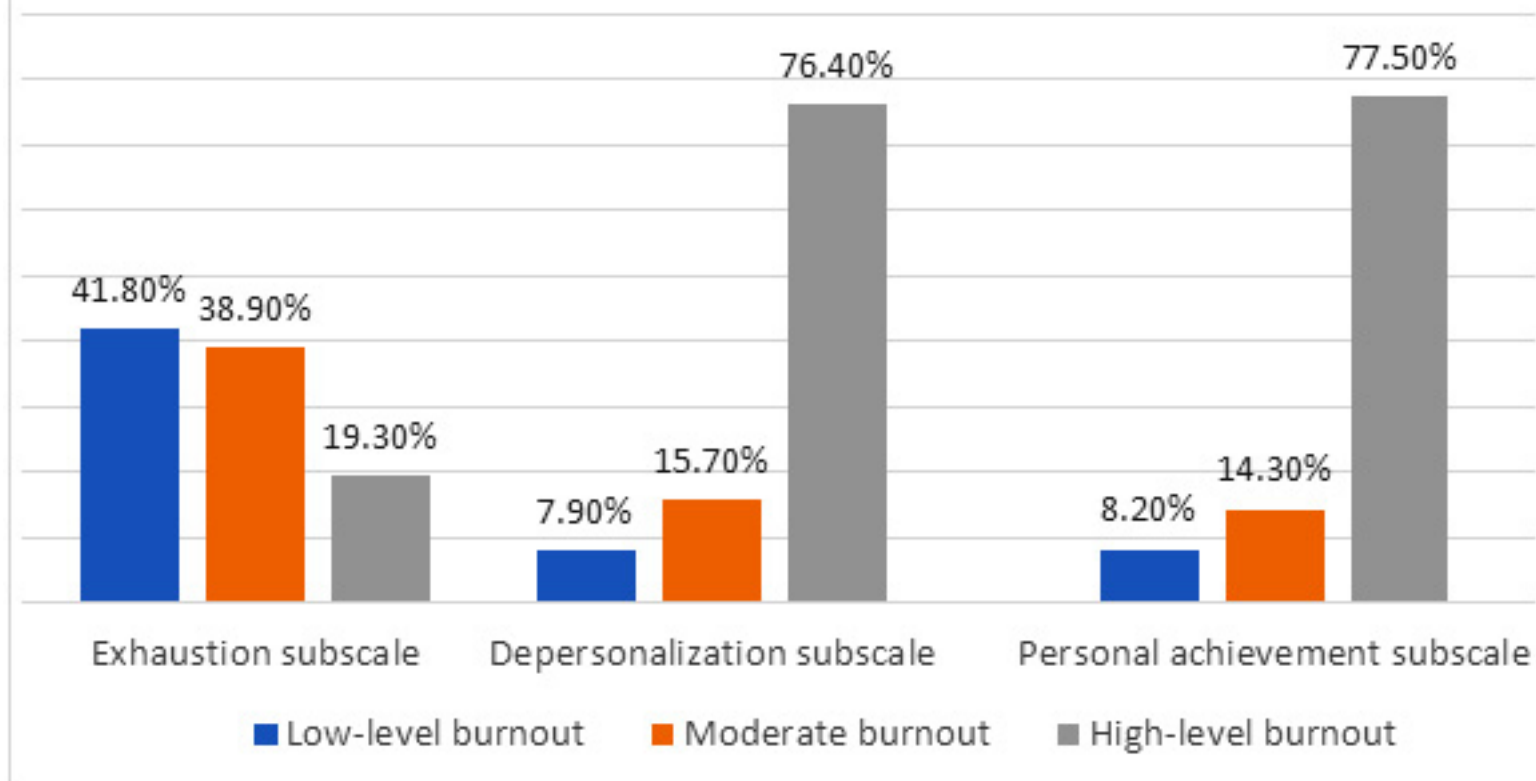
Table 2: The participants' health characteristics and habits

		Count	Column N %
Do you do physical exercise in a typical week?	Never	152	54.3%
	Twice weekly	60	21.4%
	More than twice weekly	41	14.6%
	Daily	27	9.6%
Rank your sleep quality.	Very bad	24	8.6%
	Fairly bad	65	23.2%
	Fairly good	117	41.8%
	Good	74	26.4%
Do you smoke?	Yes	35	12.5%
	No	241	86.1%
	Previous smoker	4	1.4%
Have you been diagnosed with any mental diseases?	Yes	46	16.4%
	No	208	74.3%
	I do not know	26	9.3%

Table 3: The results of Trait Emotional Intelligence Questionnaire – Short Form (TEIQue-SF) in relation to demographic factors

		Well-being	Self-control	Emotionally	Sociability
Total sample(mean)		4.56	4.31	4.72	4.62
Gender	Pearson Correlation	-.016	-.076	-.106	.110
	Sig. (2-tailed)	.784	.208	.077	.065
	N	280	280	280	280
Age	Pearson Correlation	.000	.035	.140*	.087
	Sig. (2-tailed)	.999	.561	.019	.145
	N	280	280	280	280
Current year of study	Pearson Correlation	-.020	.052	.131*	.054
	Sig. (2-tailed)	.742	.384	.029	.369
	N	280	280	280	280
GPA	Pearson Correlation	.050	.014	-.005	.047
	Sig. (2-tailed)	.403	.822	.929	.433
	N	280	280	280	280
Do you do physical exercise in a typical week?	Pearson Correlation	.087	.112	.054	.078
	Sig. (2-tailed)	.149	.062	.367	.191
	N	280	280	280	280
Rank your sleep quality	Pearson Correlation	.234**	.086	.227**	.093
	Sig. (2-tailed)	.000	.149	.000	.122
	N	280	280	280	280
Do you smoke?	Pearson Correlation	.066	.005	.012	-.044
	Sig. (2-tailed)	.271	.932	.846	.468
	N	280	280	280	280

Figure 1: The distribution of students over their burnout degree



Discussion

The study aimed to determine the association between Emotional Intelligence and Burnout and their associated factors and identify their predictors among IMSIU medical students. The results of this study showed a moderate to high level of emotional intelligence among medical students; the mean scores on four scales of the tool were 4.56 (Out of 6), 4.31 (Out of 6), 4.72 (Out of 8) and 4.62 (Out of 6). Emotional intelligence consists of the different abilities of a person to identify, understand, harness, and stabilize emotions in oneself and others. Emotional intelligence is associated with being older, consistent with previous reports (1,16–20). Being older makes students more able to deal with different situations, especially with stresses provided by their colleges (20). Students with higher emotional intelligence are more likely to have better skills in managing stressful situations in college and individual life (1,2,17,21–23).

Moreover, a high level of burnout was observed among medical students especially considering personal achievement. It is well known that medical students worldwide experience stressful situations with decreased wellness throughout their medical school life (24–27). Burnout is associated with a lower level of effectiveness in students' academic life (28–30). Moreover, depersonalization, one of the burnout factors, is associated with a significant increase in physicians reporting suboptimal patient care (31). Dyrbye et al. studied the burnout level among medical students at seven medical schools in the United States, finding that 49.6 % of medical students experienced burnout and 11.2 % reported suicidal ideation. The authors found that burnout is a predictive factor for suicidal ideation (32). Another study by

Mazurkiewicz et al. among third-year medical students found that 71 % met the criteria for burnout, suggesting that medical students faced burnout before reaching their clinical clerkships (33). Moreover, the prevalence of burnout was 27.9% among medical students; as reported in another study, where only sleep quality and exercise level were significantly associated with burnout (9).

Furthermore, a significant relationship between burnout in medical students and their emotional intelligence was found in the current study. Emotional intelligence is negatively correlated with exhaustion and depersonalization burnout and positively with personal achievement burnout. More stable and good emotional intelligence is associated with low exhaustion, depersonalization burnout, and better personal achievement. These results were consistent with the results of Blanchard C. et al., who found burnout levels and emotional intelligence scores were positively correlated ($R=0.55$, $p<.001$) (34) and the study of Bin Dahmash et al. (35). They found that emotional intelligence was negatively correlated with exhaustion burnout and depersonalization burnout but positively correlated with personal achievement, strengthening the positive influence of emotional intelligence (34). Exhaustion burnout and depersonalization burnout indicate the stress aspect of burnout and involves feelings of hopelessness, isolation, depression, resentment, impatience, irritability, and decreased personal achievement (36). As medical residents have been stressed due to the intense study and workload, exhaustion burnout is likely a sign of high-pressure levels owing to performing multiple tasks of learning and practical handling of patients, resulting in higher exhaustion burnout and depersonalization burnout (37–39). By contrast, those students with higher

emotional intelligence can better handle work-related stress and, therefore, have a negative relationship between exhaustion burnout and depersonalization burnout (40–42). Those with higher emotional intelligence tend to adjust to coping mechanisms such as problem-solving and stress management, resulting in decreased stress and anxiety in everyday life situations and a positive correlation with higher personal achievement (43).

Limitations and strengths

Research has strengths, such as establishing a link between two scales, and research at IMSIU was insufficient. Furthermore, this study had some limitations, including depending on self-reported questionnaires, which may lead to personal bias. Moreover, the dependence on a small sample size is another limitation that may affect the analysis of the study. In addition, reaching the sample was one of the difficulties in collecting the data.

Conclusions

A significant correlation was found between the emotional intelligence of medical students with burnout components, positively with academic achievement, and negatively with exhaustion and depersonalization burnout. Improving students' ability to deal successfully with different situations (increasing emotional intelligence) is associated with lower burnout and better academic achievement. The student support office should actively screen for burnout and provide the necessary support for needs of medical students.

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Perspective of Evidence-Based Medicine among Egyptian Family Physicians in Egypt

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Abstract

Objective: To assess family practitioners' attitudes toward and awareness of evidence-based medicine in Egypt.

Introduction: Evidence based medicine (EBM) is a systematic approach to medicine in which health care professionals use the best available scientific evidence to help make decisions about the care of individual patients. The use of evidence-based medicine may help plan the best treatment and improve quality of care and patient outcomes.

Methodology: This is a cross-sectional study conducted on 135 family physicians from Rural and urban family medicine centres throughout Egypt that are affiliated with Ministry of Health and the private sector by using self-administered Evidence-Based Medicine Questionnaire distributed between October and November 2020.

Results: With a 100% response rate most of the participants were females 91 (68.9%), aged between 30-39 (73.3 %), and worked in mixed urban and rural settings (53.3%). Most physicians welcomed or strongly welcomed the use of EBM (54.1% and 38.2% respectively). Moreover, 97% of the respondents agreed that EBM is useful or extremely useful.

The majority (98.5%) agreed that EBM improves patient care. . About 71% of the participants thought that the adoption of EBM will add more load on the family medicine practitioners

Conclusion: Egyptian family physicians generally have a good attitude towards EBM, however their general knowledge about it is still insufficient.

Keywords: Guidelines, Standards, Care pathways, Africa, Quality of health care

Introduction

Evidence based medicine (EBM) is “the conscientious, explicit, judicious and reasonable use of modern, best evidence in making decisions about the care of individual patients” (1).

In clinical decision-making, EBM is a paradigm that entails integrating the best available evidence with individual clinical competence (1) , as well as consideration of individual patient rights and preferences (1,2).

There are five major milestones in the application of EBM which start by specifying the problem, obtaining benchmarks from databases and published resources, followed by a critical evaluation of the information retrieved, then validating this evidence, and finally assessing the usefulness and effectiveness of such evidence in the clinical practice setting (3).

Clinicians must be in command of outstanding communication skills, as well as a clear knowledge and understanding of cultural and socioeconomic influences on patient encounters. These traits help doctors better understand their patients' wants and preferences so that they can better manage their illnesses and choose appropriate interventions. Guidelines and trustworthy clinical pathways based on strong research data can help establish professional standards (4).

Evidence-based clinical practice saves money and improves healthcare quality by bridging the gap between published best-practice standards and day to day care and at the same time it minimises ineffective and harmful therapies (5).

Furthermore, EBM aims to improve the standard of care by promoting best practices and motivating healthcare professionals to test novel approaches while moving away from ineffective ones (2).

In a large systematic review, many physicians across the world reported having weak EBM knowledge and skills. Nonetheless, they were enthusiastic about incorporating EBM into their daily practice (6).

To the best of our knowledge there is a paucity of data on EBM use among family physicians in Egypt. The study group therefore set out to survey a diverse group of Egyptian family physicians to assess their knowledge, attitude and practice of EBM.

Methods

Study design and setting:

Between October and November 2020 a self-administered questionnaire was disseminated among 135 trained and certified or board-eligible Egyptian family physicians. The latter practice medicine nationwide at various institutions such as the Egyptian Ministry of Health, Egyptian military centres, university medical centres, and in the private sector. In order for this survey to reflect actual practices, only physicians actively taking part in care of patients and who are on the current Egyptian Medical Syndicate register were included.

Data collection tool:

The questionnaire was adopted from McColl et al.1998 (7). Personal demographics and clinical work details were collected. In addition, the survey questions covered doctor knowledge of and viewpoints on using EBM, the availability of information resources, and the obstacles they faced while using EBM.

The principle investigator (MA) met with the participants at their place of work to explain the purpose of the survey and to obtain verbal consent. Participants were allowed to ask for clarifications while filling in the questionnaire. After checking for completeness, the participants were thanked for their cooperation.

Data analysis

The data collected were analysed using SPSS, version 23. Tables of frequency and proportion were used to evaluate the variables. Data analysis yielded the following topics: personal data and aspects of clinical practice, attitudes toward EBM, awareness of EBM resources, and knowledge of technical terms used in EBM.

Sufficient knowledge was considered when the participants got a total score more than 50% and a positive attitude was considered when the total score was more than 75%.

Results

We received completed questionnaires from 135 family physicians, making the completion rate 100%. Most of the participants were females 93 (68.9%). Most of the participants' age-group were between 30-39 (73.3 %) and the rest (15.6%) were above 40 years and (11.1%) were below 30 years old. Nearly half of the participants (48.9%) were seeing daily patients fewer than 20 and 38.5% were seeing between 20-49 patients. More than half of the participants were working in mixed urban and rural settings (53.3%). [Table 1].

Regarding their personal attitudes towards EBM, most physicians welcomed or strongly welcomed the use of EBM (54.1% and 38.2% respectively) and physicians felt that their colleagues' approach to EBM was welcoming in 68.1%. Moreover, 97% of the respondents agreed that EBM is useful or extremely useful. However, they showed variation in adopting EBM as 47.4% rated their practice comprising 50-74% EBM and 41.5% rated their practice comprising 75-100% EBM. The majority (98.5%) agreed that EBM improves patient care. More than half of respondents, (52.6%) felt that it is of high value for family medicine despite a lack of scientific literature. Finally, the majority (71.1%) thought that the adoption of EBM will add more workload on the family medicine practitioners. [Table 2].

Most respondents (69- 79.2%) showed that they are aware of some technical terms like relative risk, absolute risk and systematic review. However, there was a marked decrease in awareness for other terms like: odds ratio, meta-analysis, number needed to treat, CI. [Table 3]

Sufficient knowledge was considered when the participants got a total score more than 50% and a positive attitude was considered when the total score was more than 75%.

The total scores reflecting sufficient physician knowledge of EBM were 27% (Figure 1). The total scores representing physician attitudes towards EBM showed a 90% positive adoption (Figure 2).

Participants of age-group between 30-39 showed the most positive attitude and sufficient knowledge, (74.4%) and (70.3 %) respectively. Nearly half of the participants with sufficient knowledge and positive attitude were seeing daily patients fewer than 20 (45.9%) and (49.6%) respectively.

More than half of the participants with sufficient knowledge and positive attitude were working in mixed places of urban and rural populations (56.8%) and (52.1%). Only 28.9% of participants with positive attitude had sufficient knowledge. [Table 4]

There were statistically significant positive correlations between physicians' attitude towards EBM and their total knowledge of it ($P=0.020$). In addition, there were statistically significant positive correlations between physicians' age and their number of daily patients. ($P=0.015$) [Table 5]

Table 1: Socio-demographic characteristics of the participants

Items	No (n=135)	%
Age groups:		
<30	15	11.1
30-39	99	73.3
>40	21	15.6
Sex:		
Male	42	31.1
Female	93	68.9
No. of patients seen daily: No (%)		
<20	66	48.9
20-49	52	38.5
50-74	10	7.4
≥75	7	5.2
Setting:		
Rural	9	6.7
Urban	54	40
Both	72	53.3

Table 2: Assessing participant's attitude towards Evidence based medicine

Items	No (n=135)	%
How would you describe your attitude toward the current promotion of EBM?		
• Do not know	8	5.9
• Not welcoming	2	1.5
• Welcoming	73	54.1
• Strongly welcoming	52	38.5
How would you describe the attitude of most of your colleagues toward EBM?		
• Do not know	18	13.3
• Not welcoming	7	5.2
• Welcoming	92	68.1
• Strongly welcoming	18	13.3
How useful are research findings in your day-to-day management of patients?		
• Do not know	3	2.2
• Useful	88	65.2
• Extremely Useful	44	32.6
What percentage of your clinical practice do you believe is currently evidence-based?		
• 0-24	5	3.7
• 25-49	10	7.4
• 50-74	64	47.4
• 75-100	56	41.5
Practising EBM improves patient care		
• Do not know	2	1.5
• Agree	52	38.5
• Strongly agree	81	60
Evidence-based medicine is of limited value in family medicine because much of primary care lacks a scientific base:		
• Do not know	8	5.9
• disagree	71	52.6
• Agree	39	28.9
• Strongly agree	17	12.6
11-The adoption of EBM, however worthwhile as an ideal, places another demand on already-overloaded family practitioners:		
• Do not know	18	13.3
• disagree	21	15.6
• Agree	79	58.5
• Strongly agree	17	12.6

Table 3: Assessing the knowledge and understanding of some research terms

Technical terms	Don't understand but would like to		It would not be helpful to me to understand		Some understanding		Yes, understand and could explain to others	
	No	%	No	%	No	%	No	%
Relative risk	23	17	5	3.7	52	38.5	55	40.7
Absolute risk	25	18.5	7	5.2	45	33.3	58	43
Systematic review	35	25.9	7	5.2	43	31.9	50	37.0
Odds ratio	44	32.6	11	8.1	45	33.3	35	25.9
Meta-analysis	46	34.1	10	7.4	36	26.7	43	31.9
Number needed to treat	38	28.1	10	7.4	45	33.3	42	31.1
Confidence interval	55	40.7	9	6.7	40	29.6	31	23.0
Heterogeneity	50	37.0	9	6.7	45	33.3	31	23.0
Publication bias	16	11.9	41	30.4	47	34.8	31	23.0

Table 4: Socio-demographic characteristics of the participants with Sufficient knowledge (n=37) and Positive attitude (n=121)

Items	Sufficient knowledge (n=37)		Positive attitude (n=121)	
	No.	%	No.	%
Age groups:				
<30	6	16.2	13	10.7
30-39	26	70.3	90	74.4
>40	5	13.5	18	14.9
No. of patients seen daily:				
<20	17	45.9	60	49.6
20-49	15	40.5	46	38
50-74	3	8.1	9	7.4
≥75	2	5.4	6	5
Setting:				
Rural	0	0	8	6.6
Urban	16	43.2	50	41.3
Both (rural and urban)	21	56.8	63	52.1
Knowledge grade				
• Insufficient knowledge	0	0	86	71.1
• Sufficient knowledge	37	100	35	28.9

Table 5: Correlation between Total attitude, Total Knowledge, Age group and Number of patients daily

Variables		Total attitude	Total Knowledge	Age group
Total Knowledge	R	0.300*	1.00	-0.078
	P	0.020	-----	0.371
Age group	R	0.077	-0.078	1.00
	P	0.378	0.371	-----
Number of patients daily	R	0.002	-0.031	0.208*
	P	0.984	0.721	0.015

Figure 1: illustrating that 27% of participants had sufficient knowledge

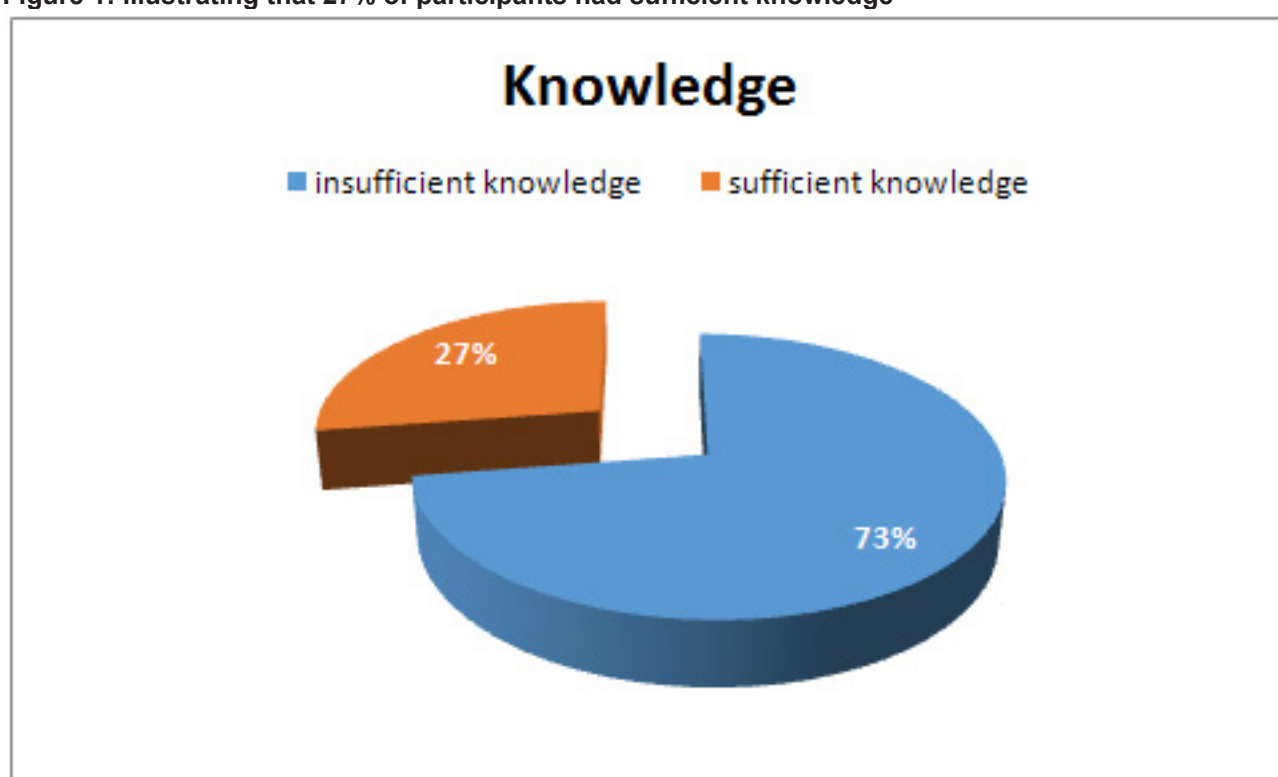
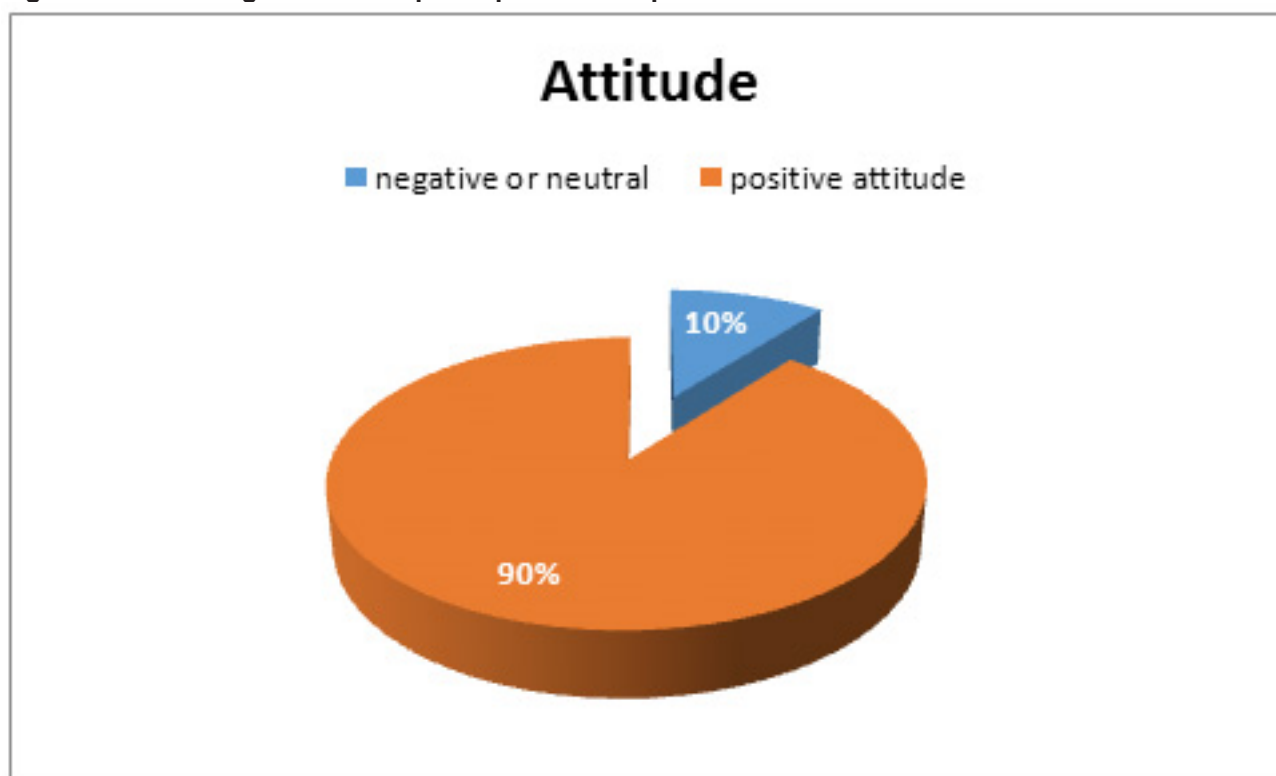


Figure 2: illustrating that 90% of participants had a positive attitude

Discussion

This self-administered questionnaire on family physicians' interpretation and use of EBM in Egypt has yielded some novel insights on this topic. Over 90% of the respondents had a positive attitude toward EBM which is similar to the outcome of two Egyptian studies on the same topic which reported a (76.4%) and (93.2%) acceptance rate respectively (2,8). This contrasts sharply with a cross-sectional study conducted in randomly selected health clinics in Malaysia among primary care doctors where only 12% of the respondents were welcoming towards EBM (9).

These differences could be due to many factors such as the length of work experience as a primary care practitioner and availability and ease of access to online reference applications. We note that differing attitudes toward EBM may be affected by the speciality and subspecialty: a study from Wuhan, China, reported that the specialisations of physicians were linked to their opinions regarding EBM where medical specialities were more amenable to use EBM than their surgical counterparts (10). Similarly in Saudi Arabia, different specialties scored differently towards such attitudes: surgeons scored the lowest while the paediatricians scored the highest (11). A systematic review on inclusion of EBM in formal training curricula found little evidence that it improves patient outcomes in the long term (12). We note however that EBM contributed to and improved knowledge and skills in the short and medium term (12) and this might explain the differences between specialties' attitudes towards EBM. It is challenging to establish the relationship between EBM training and patient outcomes because the latter may be influenced by a variety of factors in the clinical situation.

The current study showed about 98% of participants agreed that research findings are useful (moderately and/or extremely) in patient management, similar to another Egyptian study reporting an 82% response (13) and an Iranian study reporting 80% response (14).

Ninety-nine percent of our respondents agreed that practicing EBM improves patient care which is also in keeping with the 90% response from Hassan et al (13). A contrasting study from Japan reported a much lower rate of 65% (15).

The majority of our respondents agreed that EBM will add more workload to their daily activity in much the same way as their counterparts in a similar Malaysian study (16). This negative perception increases the resistance of acceptance of EBM.

Most of our respondents agreed that research findings were essential to their day-to-day management of patients as did primary care physicians in Jordan (17).

Most of the respondents in the current study (69- 79.2%) were aware of the technical terms used in EBM such as relative risk, absolute risk and systematic reviews. This was mirrored by primary care physicians in Selangor (9) yet contrasted by others from Sri Lanka where fewer than 38% understood some statistical studies such as systematic reviews and meta-analyses (4).

This study found that the participants (46%) who had the fewest patients (20 or less) on a daily basis had the best understanding of and attitudes toward EBM. Additional evidence for this comes from a research from France where 26% of participants believed that EBM practise was

was restricted by a lack of time (18) and a careful review of 56 papers where patient overload was identified as one of the barriers (6).

Conclusion

EBM is the current worldwide gold standard for clinical decision-making and patient care. Despite the fact that primary care physicians involved in the current study had limited awareness, insufficient knowledge about EBM and they did not practice it regularly, the majority of them had a positive attitude towards it. Ideally all primary care physicians should participate in an effective EBM educational and training programme that includes workshops, simulation exercises, and on-the-job training. This means that by increasing their exposure and by implementing a varied approach to training the adoption of EBM in their decision making may increase. We recommend that such an approach be an obligatory part of new doctors' curricula.

Limitations:

We acknowledge several limitations to this study. Having it based on self-reporting and self-judgment on the respondent's own knowledge and practise may compromise the objectivity of the responses and might lead to bias. Furthermore, the small sample size does not allow projections and does not allow comparing differences in practices between one institution and another.

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Type III Supracondylar humeral fracture in children treated by 3 lateral versus 2 cross K-wire fixation, Aden, Yemen

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Abstract

Background: Supracondylar fractures of humerus are the most common elbow fractures seen in children.

Objective: To describe the patients' condition and to evaluate the treatment and the outcome.

Materials and method: We retrospectively reviewed the records of 40 consecutive patients with 40 displaced, supracondylar fractures of the humerus treated between January 2019 and December 2020, in Aden.

The obtained data were sex, age, side of injury, time between injury and fixation, trial of reduction and complications.

The collected data were tabulated and statistical analysis was done by estimating rates, means and standard deviations, Fisher test was used and p-value < 0.05 was considered as statistically significant. The statistical software package SPSS version 17 was used.

Results: The total study patients were 40 patients. Twenty-one (52.5%) were males and 19 (47.5%) were females. The age of the patients ranged between 2 to 10 years and the mean age was 6.6 ± 2.1 years. Twenty-four (60%) had the fracture on the right arm, and 16 (40%) had it on the left arm.

All the patients underwent surgery within 24 hours of injury. The mean time was 8.1 ± 4.5 hours.

There were 11 (27.5%) cases of once trial reduction, 14 (35%) of twice trial reduction and 15 (37.5%) of three times trial reduction. The average removal of K-wires was 3.55 weeks. Twenty-six (65%) patients were treated by III lateral K-wires fixation and 14 (35%) were treated by crossed K-wire fixation.

Post-operatively, (17.5%) patients got neuropraxia in the crossed K-wire group (n = 14), and none in the III lateral K-wire group. Two (5.0%) patients got angulation, one in the crossed K-wire group (n = 14), and one in the III lateral K-wire group (n = 26). Cupitus varus were seen in 2 (5.0%) patients in the crossed K-wire group and 2 (5.0%) in the III lateral K-wire group. Stiffness was found in the III lateral K-wire group with 2 (5.0%) patients.

Conclusion: The delay in surgical treatment may cause a number of complications.

Key words: Treatment, supracondylar fracture, humerus, children, Aden

Introduction

Supracondylar fractures of humerus are the most common elbow fractures seen in children [1,2,3,4].

Numerous studies have reported that supracondylar humeral fractures occur with nearly equal frequency among females and males [5], accounting for approximately 10% of all fractures in children [6] and 70% of all pediatric elbow injuries [7].

Omid et al [8] reported that supracondylar fractures of the humerus accounted for 55% to 80% of total elbow fractures in children and up to two-thirds of paediatric elbow injuries requiring hospitalization.

Other studies reported that supracondylar humeral fractures were most common in the first decade of life and more in males than females [9,10,11].

Some authors, however, have found no variations among the sexes whereas others found higher incidence among females [12].

Supracondylar fractures of humerus are classified using the Gartland classification, which also serves as a treatment guide [13]. Gartland types I and IIa fractures may be managed nonoperatively whereas types IIb and III are treated operatively [14].

Objective

To describe the patients' condition and to evaluate the treatment and outcomes

Materials and Method

We retrospectively reviewed the records of 40 consecutive patients with 40 displaced, supracondylar fractures of the humerus treated between January 2019 and December 2020.

All patients received general anesthesia and underwent closed reduction of their fractures in the operating room of Alsalam and Al-Durrah hospital, in Aden.

The fractures were stabilized with III lateral K-wires fixation or with two crossed K-wire fixation. The obtained data were sex, age, side of injury, degree of swelling, time between injury and fixation, time of reduction, time of removal of K-wires and complications.

The collected data were tabulated and statistical analysis was done by estimating rates, means and standard deviations, Fisher test was used and p-value < 0.05 was considered as statistically significant. The statistical software package SPSS version 17 was used.

Results

Table 1 & Figure 1 reveal 40 patients were included in the study. Twenty-one (52.5%) of the patients were males and 19 (47.5%) were females. (Male : female ratio was 1.1 : 1). The age of the study patients ranged between 2 to 10 years and the mean age was 6.6 ± 2.1 years. Twenty-four (60%) patients had the fracture on the right arm, and 16 (40%) patients had the fracture on the left arm. Table 1 & Figure 2 also, show the degree of swelling and there were 16 (40%) moderate, 14 (35%) mild and 10 (25%) severe. Generally, all the study patients underwent surgery within 24 hours of injury: 16 (40%) cases within less than 6 hours, 19 (47.5%) cases between 6 and 12 hours and 5 (12.5%) cases between >12 and 24 hours after injury. The mean time was 8.1 ± 4.5 hours. There were 11 (27.5%) cases of once trial reduction, 14 (35%) of twice trial reduction and 15 (37.5%) of three times trial reduction.

Most supracondylar fractures of the humerus recovered at the final follow up which was between 3 to 4 months. The average removal of K-wires was 3.55 weeks. Twenty-six (65%) patients were treated by III lateral K-wires fixation and 14 (35%) were treated by crossed K-wire fixation (Table 1 & Figure 2).

Table 1: Distribution of variables of the study patients (n=40)

Variables	No	%
Sex:		
Males	21	52.5
Females	19	47.5
Male to female ratio:	1.1:1	
Mean age (years):	6.6 ± 2.1	
Age range (years):	2 - 10	
Side involved:		
Right	24	60
Left	16	40
Degree of swelling:		
Mild	14	35
Moderate	16	40
Severe	10	25
Time b/w injuries and fixation:		
Less than 6 hours	16	40
6 – 12 hours	19	47.5
> 12 - 24 hours	5	12.5
Mean timing of reduction (hours)	8.1 ± 4.5	
Trial of reduction:		
Once	11	27.5
Twice	14	35
Three	15	37.5
Range of removal time K-wires (weeks):	3 – 4	
Average removal of K-wires (weeks):	3.55	
Method of fixation:		
III lateral	26	65
Cross	14	35

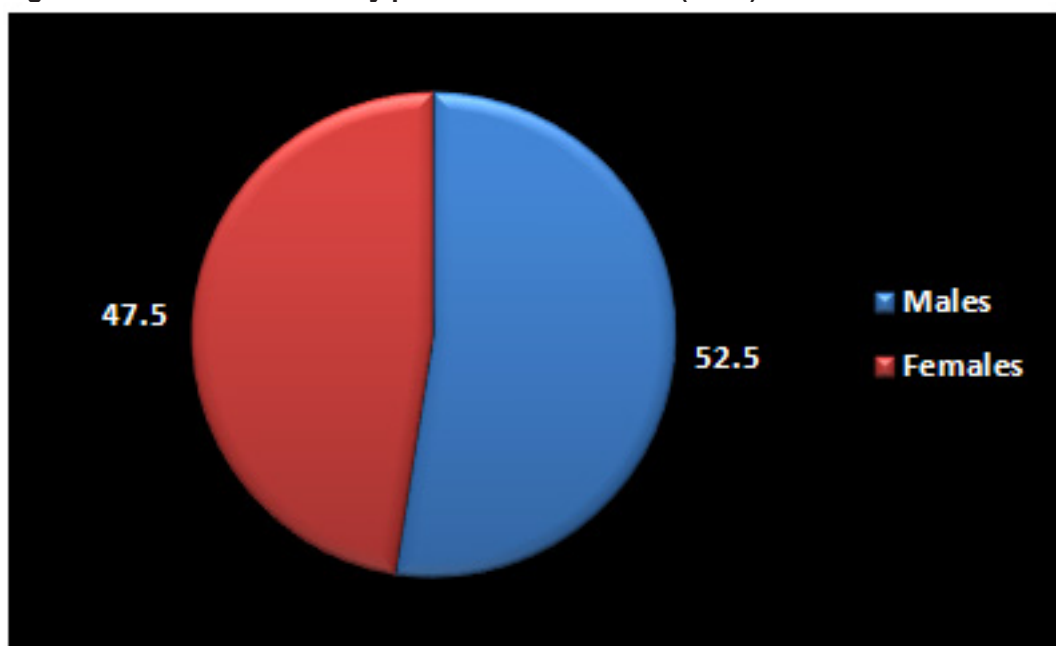
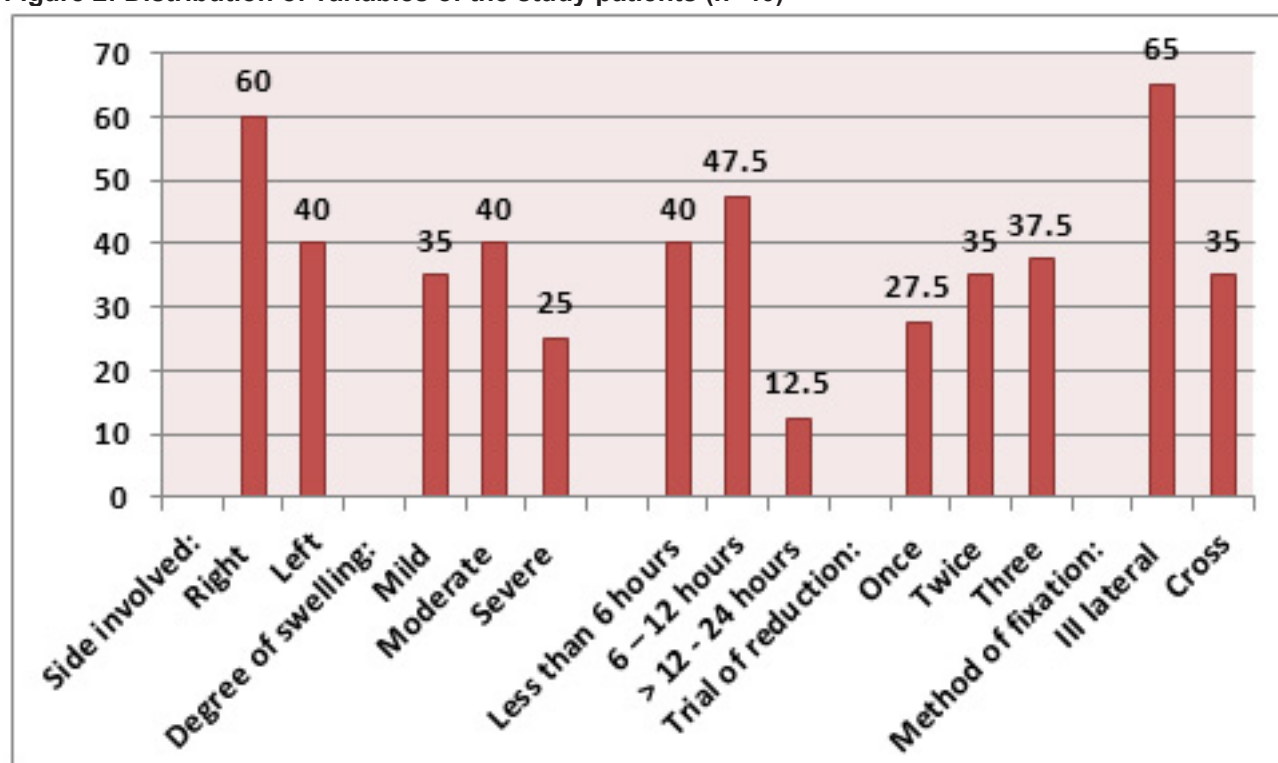
Figure 1: Distribution of study patients' related to sex(n=40)

Figure 2: Distribution of variables of the study patients (n=40)

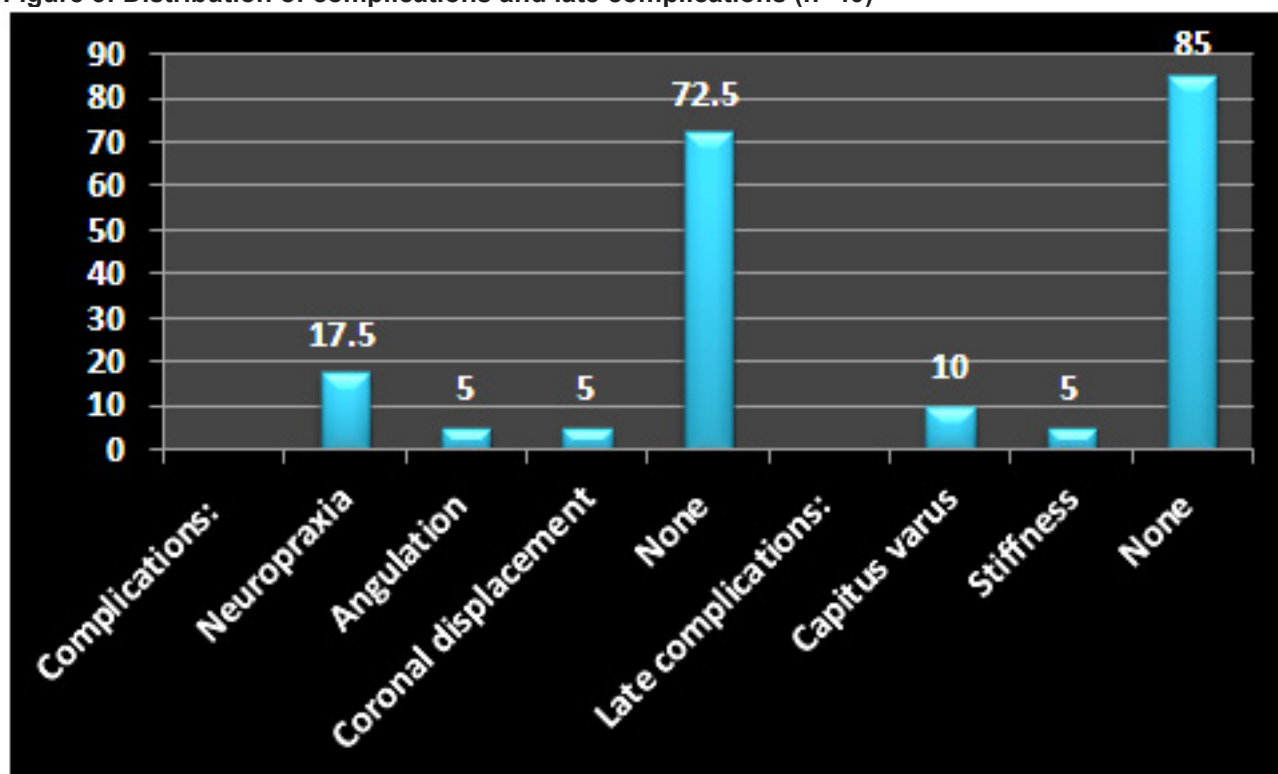
Post-operatively, 7 (17.5%) patients got neuropraxia in the crossed K-wire group (n = 14), and none in the lateral K-wire group. Two (5.0%) patients got angulation, one in the crossed K-wire group (n = 14), and one in the III lateral K-wire group (n = 26). There were 2 (5.0%) coronal displacement in the patients treated by inserting III lateral K-wires. Comparison between the two groups were found statistically significant ($p = 0.000$), as shown in Table 2 & Figure 3.

Late complications were found in 6 patients. Cupitus varus was seen in 4 patients, 2 (5.0%) in the crossed K-wire group and 2 (5.0%) in the III lateral K-wire group.

Stiffness was found in the III lateral K-wire group with 2 (5.0%) patients, Comparison between the two groups was found not statistically significant ($p > 0.05$), (Table 2 & Figure 3).

Table 2: Distribution of complications related to method of fixation (n=40)

Variables	Method of fixation		Total		P-value
	Cross No (%)	III Lateral No (%)	No (%)		
Complications:					
Neuropraxia	7 (17.5)	0 (0.0)	7 (17.5)		$P = 0.000$
Angulation	1 (2.5)	1 (2.5)	2 (5.0)		
Coronal displacement	0 (0.0)	2 (5.0)	2 (5.0)		
None	6 (15.0)	23 (57.5)	29 (72.5)		
Total	14 (35.0)	26 (65.0)	40 (100)		
Late complications:					
Cupitus varus	2 (5.0)	2 (5.0)	4 (10.0)		$P > 0.05$
Stiffness	0 (0.0)	2 (5.0)	2 (5.0)		
None	12 (30.0)	22 (55.0)	34 (85.0)		
Total	14 (35.0)	26 (65.0)	40 (100)		

Figure 3: Distribution of complications and late complications (n=40)

Discussion

Supracondylar fractures of the humerus are the most common elbow injuries in children and make up approximately 60% of all elbow injuries in the first decade of life [15]. These injuries can be one of the most difficult to treat, owing to the presence of associated immediate and late complications like compartment syndrome, neurovascular damage, Volkman's ischaemic contracture and malunion [16,17].

Oetgen et al [18] recommended in their study the necessity of early treatment in order to avoid complications, as a result, routine surgical management for any sort of fracture with displacement.

In our present study, the total study patients were 40. Twenty-one (52.5%) of the patients were males and 19 (47.5%) were females. (Male : female ratio was 1.1 : 1). The age of the patients ranged between 2 to 10 years and the mean age was 6.6 ± 2.1 years. In addition the fractures were 16 (40%) left-sided and 24 (60%) right-sided fractures. Regarding the sex, age of children and sides of fracture, our results are similar to some reported studies [19,20] and differed from the results reported in other studies [21-23]

In this study, the degree of swelling was as follows: 16 (40%) moderate, 14 (35%) mild and 10 (25%) severe. Generally, all the study patients underwent surgery within 24 hours of injury: 16 (40%) cases within less than 6 hours, 19 (47.5%) cases between 6 and 12 hours and 5 (12.5%) cases between >12 and 24 hours after injury. The mean time was 8.1 ± 4.5 hours.

Sadek et al [20] from Egypt reported similar to our finding that the operations were done within the first 24 hours after admission.

We found in our study post-operatively, 7 (17.5%) patients got neuropraxia in the crossed K-wire group (n = 14), and none in the III lateral K-wire group.

Lee et al [24] mentioned that in lateral wire fixation, divergent wires have been shown to be more stable in extension and varus loading than crossed wires but not in valgus. There are reports of clinical failures of laterally placed wires, thought to be due to poor technique in reduction and fixation [25]. Reports vary as to the loss of reduction using lateral wires. The systematic review by Brauer et al [26], observed that the probability of deformity, from loss of position, was 0.58 times lower with medial/lateral crossed wires than with lateral entry wires.

Studies have shown an increased incidence of iatrogenic nerve injury when a medial wire is used [27]. Skaggs et al [28] observed no loss of reduction when comparing two groups using crossed wires and lateral wires. There was an increased incidence of iatrogenic nerve injury in 17 out of 160 (10.6%) cases treated with a medial wire. Data pooled from 1,455 patients found that the incidence of ulnar nerve iatrogenic injury was 5.04 times higher in medial/lateral wire fixation compared to lateral entry fixation [26]. There is also concern about delayed iatrogenic nerve injury using medial wires [29].

Neural injuries can occur in 6.5% to 19% of cases of displaced supracondylar fractures and they are exceptional in non-displaced supracondylar fractures [30]. They can appear either before surgery (primary lesion) or after

reduction and fixation of the fracture (secondary lesion). Primary lesions are caused by fracture displacement, which can stretch, entrap or disrupt the nerve. Secondary lesions are caused by excessive manipulation, immobilization in hyperflexion or iatrogenic injuries by fixation [31,32].

In our study, two (5.0%) patients got angulation, one in the crossed K-wire group (n = 14), and one in the III lateral K-wire group (n = 26). Also, late complications were found in 6 patients with stiffness and cubitus varus. Cubitus varus were seen in 4 patients, 2 (5.0%) in the crossed K-wire group and 2 (5.0%) in the III lateral K-wire group. The stiffness was found in the III lateral K-wire group with 2 (5.0%) patients,

Bodycondylar angle measured after the surgery shows flexion or extension displacement of the distal fracture fragment. This angle changes during skeletal maturation. Body-condylar angle changes are related with extension degrees of the elbow [33]. Aslan et al [34] reported that the most common complication of pediatric supracondylar fractures is cubitus varus. D'Ambrosia [35] revealed that cubitus varus is very rare after an adequate reduction and is related with medial angulation of the distal fragment. Ippolito et al [36] state that varus deformity is due to the defect of the distal humeral epiphysis growth plate. Surgical intervention decreases the rate of varus deformity. Gosens and Bongers [37] reported a cubitus varus rate of 2.5 %.

Conclusion

It can be concluded that the delay in surgical treatment may cause a number of complications. The choice of surgical approach should be based on the characteristics of fracture and the experience of the surgeon in surgical treatment of displaced supracondylar fractures in children.

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Does the number of hours spent daily on social media have any correlation to the Irritable Bowel Syndrome Symptoms in Saudi Adults?

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Abstract

Objective: There is substantial evidence that links usage of social media as being marginally associated with numerous harmful effects on the human body consisting of adverse symptoms differing in their manifestation and onset of action. These include including anxiety, depression, sleep deprivation, chronic fatigue, and functional gastrointestinal disorders (FGID). This study aimed to determine the relationship between the number of hours spent daily on social media and Irritable Bowel Syndrome (IBS) symptoms in Saudi adults.

Method: This is a cross-sectional study conducted among the Saudi adult population. The method of distribution was performed by providing a self-administered, semi-structured online questionnaire containing 16 items designated as demographic information (i.e., age, gender, marital state, and residency), the prevalence of IBS, and frequency of social media usage.

Results: Eight hundred and ten participants completed the survey (59.8% females vs. 40.2% males). The most common age group was 20-29 years (58.1%). 43% of participants recorded screen time of 6 hours or more, and 75.8% had used social media for six years or more. The prevalence of

participants who were positive for IBS symptoms was 41.2%. In a multivariate regression model, female gender, associated chronic disease, and the use of Twitter were the significant independent predictors of IBS, but screen time did not predict the symptoms.

Conclusion: Consistent with the literature, there was a high prevalence of IBS among the adult population living in Saudi Arabia. This study also demonstrated that the duration of social media use and the number of hours of screen time were not independently accounted for as predictors of IBS. Further research is needed to establish the link between IBS and the use of social media in the region.

Keywords: Irritable Bowel Syndrome, social media, screen time, Saudi adults, gastrointestinal symptoms

Introduction

Social media usage has significantly increased in the past decade and is still growing in use and popularity locally and worldwide. Many social media applications and websites exist, such as YouTube, Facebook, WhatsApp, Twitter, Snapchat, Linked In, and many more. These platforms have become the primary mode of communication for many people as they provide a quick, efficient, and affordable way of communication.

The rise of social media use has been a concern in the medical field. Recent studies have shown that social media platforms are associated with psychological disorders such as depression and anxiety. Furthermore, they can affect self-esteem and sleep quality, affecting overall health [1]. According to the General Authority of Statistics of Saudi Arabia, the percentage of young people in the country who use social media has reached 98.43% [9].

The main social media applications used by Saudi society are used mainly for work, social, and leisure. YouTube is the most popular application used by Saudi society, with 92.3% actively engaging with the platform. Facebook is used largely for social, leisure, and professional purposes, and Wikipedia and Google Docs are more likely to be used for professional work rather than personal or social use. Twitter is also popular among the Saudi population. 62% of people use Twitter for social and leisure purposes. 95% of Saudis access social media at least once a week, and more than half of all users access social media every day [10].

Another concern is the use of social media by patients with functional gastrointestinal disorders (FGID) such as IBS. Irritable bowel syndrome (IBS) is a chronic condition that manifests changes in bowel movements, and abdominal pain or discomfort relieved after defecation that structural or biochemical changes cannot explain. 10-20% of adults under 50 are affected worldwide [2-3].

Diagnosing IBS can be problematic since there is no confirmatory diagnostic test. The diagnosis of IBS is based on the patient history and using the Rome criteria. Although the criteria were developed by functional gastrointestinal disorders specialists, they have made several revisions to make them clinically useful.

Rome IV criteria are currently used to diagnose IBS along with the patient history and physical examination. Patients with IBS are classified into subtypes based on their bowel habits, and this classification is useful as it helps treat symptoms.

There are four subtypes of IBS: IBS with constipation (IBS-C), IBS with diarrhea (IBS-D), mixed bowel habits (IBS-M), and unclassified IBS [7].

In Saudi Arabia, multiple studies have been conducted regarding the epidemiology of IBS in both undergraduate students and the adult population. A study in the central region based on Rome III criteria found that the prevalence was 30.5% [3].

A systemic review of Asian children that included Saudi Arabia estimated that the prevalence of IBS ranged from 2.8% to 25.7% [5].

Another cross-sectional study based on Rome IV criteria was conducted on undergraduate students from all regions across KSA and concluded that the prevalence of IBS among undergraduates was 15.8% [2].

A cross-sectional study based on Rome III criteria focused on undergraduate medical students and interns in Jeddah, Saudi Arabia, and found that the prevalence was 31.8% [6].

Furthermore, another cross-sectional study based on Rome II and Manning criteria done in Al Jouf on male students at secondary school found that the prevalence was 8.9% and 9.2% [4].

Finally, a cross-sectional study based on Rome IV criteria completed of board-certified medical doctors in Saudi Arabia found that the prevalence of IBS among physicians was 16.3% [8].

Although there are numerous studies regarding IBS prevalence, there is a lack of studies that looks for the association between social media use and IBS locally and globally.

Methods

The study design is a cross-sectional analytical study aimed at finding a relationship between hours spent daily on social media and irritable bowel syndrome symptoms in Saudi adults. The study was performed by providing a self-administered semi-structured online questionnaire that was taken from earlier research and edited to suit the objectives. Google forms is the online platform chosen to deliver the survey. The inclusion criteria are all Saudis adults who have completed all parts of the questionnaire. Submitted, written and informed consent was included in the study. The exclusion criteria are all non-Saudis citizens and the non-adult population. The participants were informed about the objectives of the study and were informed that their participation was voluntary and that confidentiality would be maintained. A 16-item questionnaire comprised demographic information, such as age, gender, marital state, and residence. The questionnaire also included questions about the prevalence of IBS and the frequency of social media usage. Participants were selected randomly. The information was collected and kept confidential. After data collection, descriptive statistics were used to define the proportion of responses for each. Results were computed and reported as numbers and percentages. The relationship between the IBS and socio-demographic characteristics was conducted using the Chi-square test. Based on the significant results, a multivariate regression analysis was subsequently performed to determine the independent factors associated with having IBS, where the odds ratio and 95% confidence interval were also reported. Statistical significance was identified at $p < 0.05$. The data analyses were performed using Statistical Packages for Software Sciences (SPSS) version 26. The Institutional Review Board approved the ethical approval of IMSIU.

Results

In total, 810 participants responded to our survey. As described in Table 1, 58.1% were aged between 20 - 29 years old, nearly 60% being females and mostly single (76.7%). Almost all (88.3%) were living in the Central region. Concerning education, 68.6% had achieved a bachelor's degree. Of them, 70.1% were continuing students, and only 12.7% were employed in the government sector. Approximately 54.4% spent 4 to less than 8 hours on work or study per day, and a half (50.4%) did not exercise regularly. Additionally, nearly two-thirds (65.4%) had a standard of 6 -7 hours sleep per day.

Table 1: Socio-demographic characteristics of participants (n=810)

Study Data	N (%)
Years of IBS diagnosis	
• Less than two years	92 (11.4%)
• 2 years to less than 4 years	81 (10.0%)
• 4 years to less than 6 years	67 (08.3%)
• 6 years to less than 8 years	37 (04.6%)
• More than 8 years	57 (07.0%)
• I don't have IBS	476 (58.8%)
Frequent experience of IBS symptoms (n=334)	
• Daily	82 (24.6%)
• Weekly	140 (41.9%)
• Monthly	71 (21.3%)
• Yearly	13 (03.9%)
• Other	28 (08.4%)
Number of hours spent in a day using mobile phone	
• 30 minutes	08 (01.0%)
• 1-2 hours	41 (05.1%)
• 2-3 hours	124 (15.3%)
• 4-5 hours	289 (35.7%)
• ≥6 hours	348 (43.0%)
Number of accounts on all social media platforms	
• 1-2 account	272 (33.6%)
• 2-3 account	169 (20.9%)
• 4-5 account	210 (25.9%)
• ≥6 account	159 (19.6%)
Number of years spent in social media	
• 1-2 years	18 (02.2%)
• 2-3 years	39 (04.8%)
• 4-5 years	139 (17.2%)
• ≥6 years	614 (75.8%)
Having business depending on social media	
• Yes	246 (30.4%)
• No	564 (69.6%)
Associated chronic disease	
• Yes	124 (15.3%)
• No	547 (67.5%)
• I don't know	139 (17.2%)
Smoking status	
• Yes	103 (12.7%)
• No	707 (87.3%)

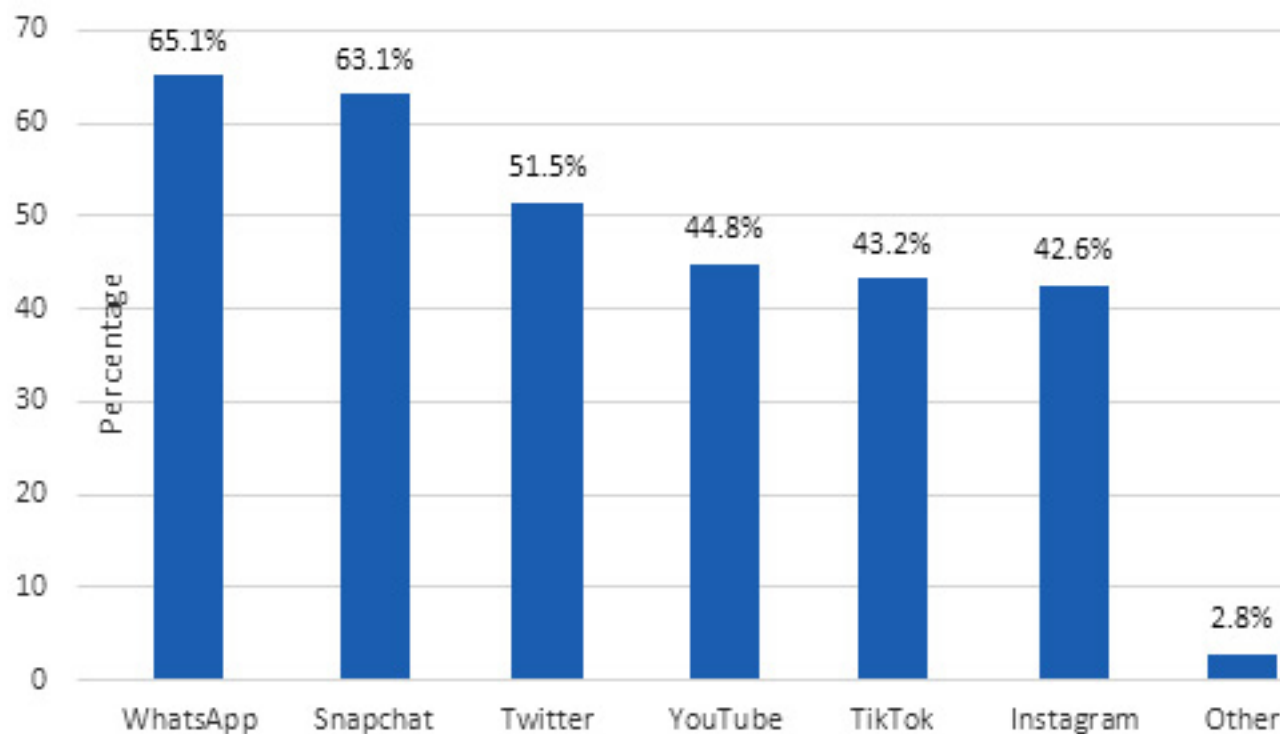
Figure 1: Most used social media platform

Figure 1 depicts the most commonly used social media platform of the respondents. It can be observed that WhatsApp was the most preferred social media platform (65.1%), followed by Snapchat (63.1%) and Twitter (51.5%).

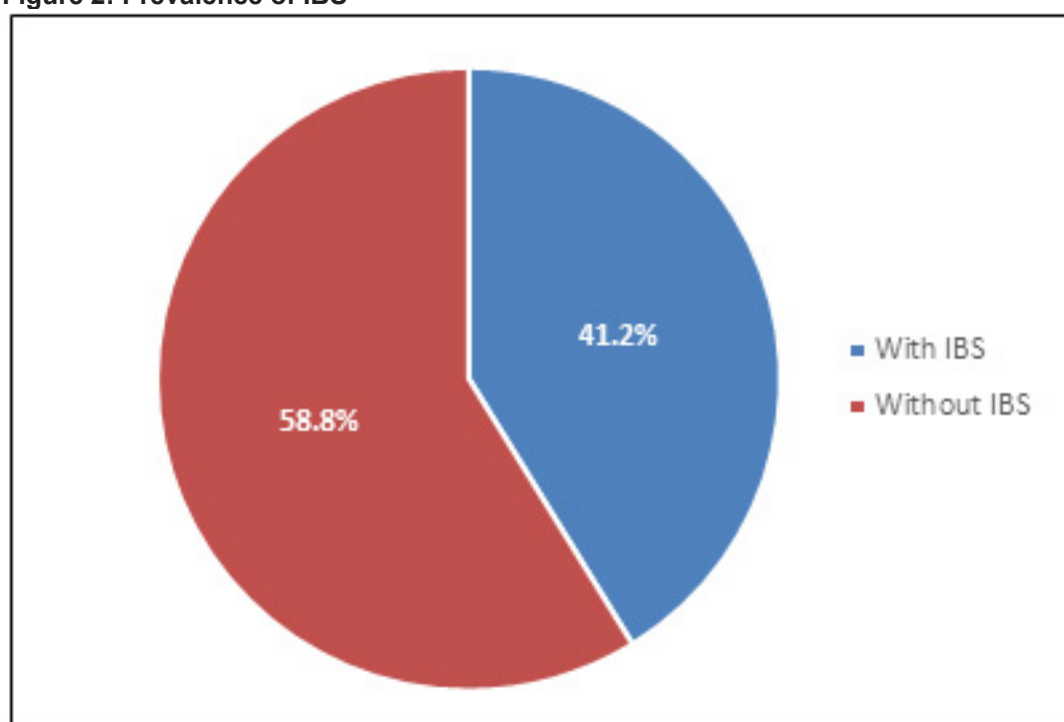
Figure 2: Prevalence of IBS

Table 2: IBS symptoms and frequent use of social media (n=810)

Study Data	N (%)
Years of IBS diagnosis	
• Less than two years	92 (11.4%)
• 2 years to less than 4 years	81 (10.0%)
• 4 years to less than 6 years	67 (08.3%)
• 6 years to less than 8 years	37 (04.6%)
• More than 8 years	57 (07.0%)
• I don't have IBS	476 (58.8%)
Frequent experience of IBS symptoms (n=334)	
• Daily	82 (24.6%)
• Weekly	140 (41.9%)
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• Other	28 (08.4%)
Number of hours spent in a day using mobile phone	
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• ≥6 years	614 (75.8%)
Having business depending on social media	
• Yes	246 (30.4%)
• No	564 (69.6%)
Associated chronic disease	
• Yes	124 (15.3%)
• No	547 (67.5%)
• I don't know	139 (17.2%)
Smoking status	
• Yes	103 (12.7%)
• No	707 (87.3%)

In Table 2, 7% of the student population reported having more than eight years of IBS. Of those who had been diagnosed with IBS, 41.9% of them experience symptoms weekly. Regarding the use of mobile phones per day, 43% of them were using the gadget for 6 hours or more. One-third (33.6%) had 1-2 accounts on all social media platforms and 75.8% had been using social media for approximately six years or more. The proportion of participants using social media for business purposes was 30.4%. The prevalence of respondents with associated chronic disease was 15.3%, and smoking participants were 12.7%.

Table 3: Relationship between IBS and the socio demographic characteristics of participants (n=810)

Factor	With IBS N (%) (n=334)	Without IBS N (%) (n=476)	P-value §
Age group			
• <30 years	266 (79.6%)	379 (79.6%)	0.995
• ≥30 years	68 (20.4%)	97 (20.4%)	
Gender			
• Male	89 (26.6%)	237 (49.8%)	<0.001 **
• Female	245 (73.4%)	239 (50.2%)	
Nature of the job			
• Student	233 (69.8%)	335 (70.4%)	0.705
• Employed	75 (22.5%)	111 (23.3%)	
• Unemployed	26 (07.8%)	30 (06.3%)	
Exercise per week			
• Yes	154 (46.1%)	248 (52.1%)	0.093
• No	180 (53.9%)	228 (47.9%)	
Sleeping hours per day			
• 4 – 5 hours	42 (12.6%)	51 (10.7%)	0.333
• 6 – 7 hours	223 (66.8%)	307 (64.5%)	
• ≥8 hours	69 (20.7%)	118 (24.8%)	
Number of hours spent in a day using mobile phone			
• ≤3 hours	56 (16.8%)	117 (24.6%)	0.007 **
• 4 – 5 hours	116 (34.7%)	173 (36.3%)	
• ≥6 hours	162 (48.5%)	186 (39.1%)	
Number of accounts in all social media platforms			
• <6 account	181 (54.2%)	260 (54.6%)	0.904
• ≥6 account	153 (45.8%)	216 (45.4%)	
Number of years spent in social media			
• <6 years	68 (20.4%)	128 (26.9%)	0.033 **
• ≥6 years	266 (79.6%)	348 (73.1%)	
Having business depending on social media			
• Yes	103 (30.8%)	143 (30.0%)	0.808
• No	231 (69.2%)	333 (70.0%)	
Associated chronic disease †			
• Yes	63 (18.9%)	61 (15.1%)	0.006 **
• No	204 (76.4%)	343 (84.9%)	
Smoking status			
• Yes	47 (14.1%)	56 (11.8%)	0.332
• No	287 (85.9%)	420 (88.2%)	
Most used social media platform *			
• WhatsApp	212 (63.5%)	315 (66.2%)	0.427
• YouTube	138 (41.3%)	225 (47.3%)	0.094
• Snapchat	228 (68.3%)	283 (59.5%)	0.011 **
• Instagram	152 (45.5%)	193 (40.5%)	0.160
• TikTok	163 (48.8%)	187 (39.3%)	0.007 **
• Twitter	199 (59.6%)	218 (45.8%)	<0.001 **
• Other	06 (01.8%)	17 (03.6%)	0.134

† Respondents who did not know of their associated chronic disease were excluded from the analysis. * Variable multiple response answers. § P-value has been calculated using Chi-square test. ** Significant at p<0.05 level.

When measuring the relationship between IBS and the socio-demographic characteristics of participants (Table 3), it was found that the prevalence of IBS symptoms was statistically significantly higher among gender females ($p<0.001$), those who used a mobile phone for 6 hours or more per day ($p=0.007$), those who had had six years or more of using social media platform ($p=0.033$), those who had an associated chronic disease ($p=0.006$), and those who used platforms such as Snapchat ($p=0.011$), TikTok ($p=0.007$) and Twitter ($p<0.001$). However, the prevalence of IBS among other criteria such as age group, nature of the job, exercise per week, sleeping hours per day, number of accounts on all social media platforms, having business depending on social media, and smoking status were not significantly different ($p>0.05$).

Table 4: Multivariate regression analysis to determine the independent significant factors associated with IBS (n=810)

Factor	AOR	95% CI	P-value
Gender			
• Male	Ref		
• Female	2.702	1.895 – 3.853	<0.001 **
Number of hours spent in a day using mobile phone			
• ≤3 hours	Ref		
• 4 – 5 hours	1.182	0.741 – 1.884	0.484
• ≥6 hours	1.208	0.833 – 1.753	0.320
Number of years spent on social media			
• <6 years	Ref		
• ≥6 years	1.199	0.810 – 1.773	0.364
Associated chronic disease †			
• Yes	1.845	1.220 – 2.790	0.004 **
• No	Ref		
Use of Snapchat	1.200	0.843 – 1.709	0.311
Use of TikTok	1.123	0.793 – 1.591	0.513
Use of Twitter	1.786	1.278 – 2.497	0.001 **

AOR – Adjusted Odds Ratio; CI – Confidence Interval.

† Respondents who did not know of their associated chronic disease were excluded from the analysis.

** Significant at $p<0.05$ level.

In a multivariate regression model (Table 4), we found that being a female, having an associated chronic disease, and using Twitter were the significant independent factors of IBS. This further indicates that compared to the males, the risk of having IBS could likely increase by at least 2.7-fold higher (AOR=2.702; 95% CI=1.895-3.853; $p<0.001$). Respondents with chronic disease were predicted to increase the risk of having IBS by at least 1.8 times higher than those without underlying conditions (AOR=1.845; 95% CI=1.220-2.790; $p=0.004$). Also, there was an increased odds of IBS among those who were regularly using Twitter by at least 1.7-fold higher (AOR=1.786; 95% CI=1.278-2.497; $p=0.001$), while the effect of gender, number of hours spent in a day using a mobile phone, number of years of using social media, use of Snapchat, use of TikTok did not significantly influence IBS after adjustment to regression model ($p>0.05$).

Discussion

This study attempted to evaluate if there is an existing relationship between social media usage/ screen time and IBS symptoms among Saudi adults. In most cases, the literature suggests a direct link between IBS and mental health disorders, including anxiety and depression [3-4, 11-12], as well as the correlation between the use of social media with anxiety and depression [13-17]. However, the association between IBS and the number of hours spent using social media has not been studied thoroughly here in Saudi Arabia. Thus, the outcome of this study would be an essential contribution to the literature. The evidence of this study revealed that although high levels of screen time and significant number of years engaging in social media activities were associated with a higher prevalence of IBS, the overall predictive effect was not significant ($p>0.05$). This is consistent with the paper conducted among American adolescents [1]. The study finds no meaningful relationship between screen time per day and the number of platforms used by adolescents with functional abdominal pain. More investigations are required to shed light on the effect of excessive usage of social media on functional gastrointestinal disorders within the general population.

The prevalence of IBS in our population was 41.2% which was within the prevalence range of the studies conducted in the USA [1], Riyadh [3], Jeddah [6], and Egypt [18], varying from 30% to 45%. However, a lower prevalence of IBS was reported in studies conducted in Al Ahsa [2] and Dammam [8], with 15.8% and 16.3%, respectively. The incidence of IBS differs by the sample population's characteristics and the methodology used in the study. Thus, interventional studies are warranted to find the possible solution for the high prevalence of IBS, given that many predictors are modifiable.

In our study, a higher prevalence of IBS was more common among females and was predicted to increase the risk by at least 2.7 times higher than their male counterparts. Similarly, respondents with associated chronic diseases and those using Twitter regularly were also the predictive factors of IBS, which could increase the chance of having IBS by at least 1.8 times higher. Several papers documented a correlation between gender and IBS, where the incidence of symptoms was significantly higher in females [2-3, 6, 8, 11, 18]. However, an article published by Lackner et al. [19] reported that social support was inversely related to IBS symptom severity, indicating that social support might be a protected factor of IBS. They further concluded that the study found links between the perceived adequacy of social support to the global severity of symptoms of IBS and its cardinal symptom. It also suggests that the mechanism by which social support alleviates pain is through a reduction in stress levels.

Similarly, a study reported in Dammam, KSA [8], found students with a family history of IBS had a higher prevalence rate of the symptoms and that engaging in regular exercise could be a preventative measure against IBS. Also, they

discovered that there was a significant relationship with anxiety but not with depression. Providing psychological support to this group of the population is imperative.

The most commonly used social media by our population was WhatsApp (65.1%), followed by Snapchat (63.1%) and Twitter (51.5%). Other social media platforms being used were YouTube (44.87%), TikTok (43.2%) and Instagram (42.6%). We also discovered a higher incidence of IBS among participants who regularly used Snapchat, TikTok, and Twitter. In a study carried out by Samuel et al. [1], YouTube (92%) and Instagram (88%) were the most commonly preferred social media platforms by American adolescents adding that social media was more often used for entertainment, reading, and productivity by children with functional abdominal pain. This indicates that the preference for social media and its effect on gastrointestinal disorders differs by age. However, more investigations are needed to determine the most commonly used social media associated with IBS.

Conclusion

Consistent with the literature, there was a high prevalence rate of IBS among the adult population living in Saudi Arabia. It is predicted that the female participants who have associated chronic diseases were significantly affected by the symptoms. However, the duration of social media use and the number of hours of screen time were not independently accounted for as predictors of IBS. Further research is needed to establish the link between IBS and the use of social media in our region.

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The Impact of the COVID-19 Pandemic on Makkah City's Health Programs Performance

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Abstract

Background: Coronavirus (Covid-19) is a viral illness caused by a recently discovered coronavirus that began in the Chinese city of Wuhan in December 2019.(1). The impact of this global pandemic affects all social, psychological, and economic aspects of society, and health(1,2). The aim of the Saudi preventive health programs for Community health services was to increase awareness and decrease preventable diseases. This study aimed to assess the impact of the COVID-19 pandemic on key performance indicators of health programs at Makkah Al-Mukarramah City.

Material and Methods: This comparative descriptive study was conducted to assess health programs' key performance indicators and statistics before COVID-19 in 2019, in comparison with 2020 and 2021. KPI and statistics of health programs collected the data including that on chronic diseases Preventive programs, age categories and healthy life programs.

Keywords: coronavirus-19, health programs, key performance indicators, preventive health, performance.

Introduction

Health programs in KSA

The Kingdom does not neglect any member of society with regard to health programs, as it has provided special care programs that suit the needs of all family members: mothers, children, and the elderly. This has an obvious and considerable beneficial influence on the overall health and safety of the community(3).

The Ministry of Health has dedicated maternal and child care programs that target children, pregnant women, and females of child bearing age. The program has five components: follow-up of pregnant women, management of high-risk pregnancies, follow-up of children under 5 years old, and a health education plan for maternal and child health care. The program's goal is to promote awareness of breastfeeding, newborn and preterm infants, and the relevance of early detection of breast cancer within the screening program.

In addition it educates parents about all health issues related to children under 5, such as dental health, nutrition, and children's health and safety in general. The program also provides services to pregnant women, starting before conception, during pregnancy, childbirth, and after childbirth(3). Moreover, the Kingdom has also established a system of fertilization units, embryos, and infertility treatment to ensure the provision of services related to it. The Kingdom is also keen on taking care of the elderly—those who have reached the age of 65 and over—and it has given the elderly a greater share in health programs. All relevant sectors work to provide a comfortable livelihood for the elderly who are unable to work, by providing financial assistance for medical devices provided by the Ministry of Human Resources and Social Development, as well as social care homes that provide them with the health care they need. It also offers homecare services to the elderly, which can be requested via the social care platform or the Ministry of Health. Because of the Kingdom of Saudi Arabia's care for the elderly, it established a "Priority" service for them to facilitate services and procedures within health institutions. It also worked to raise awareness about healthy nutrition and mental health for the elderly (4–6).

Health programs related to chronic diseases target patients with diabetes, high blood pressure, bronchial asthma, and cancer. These programs provide preventive and promotional services, curative services, identification and management of at-risk groups, and follow-up of patients(7).

The mental health program regarding promotion and education has seven elements: health counseling and advice; evaluation of medical examination; patient and family health education plan; evaluation of laboratory testing and measurements; periodic health assessment for different age groups; and evaluation of medical history as well as quality indicators (3,5,8).

On the one hand, chronic diseases and the risk factors that contribute to them, such as a lack of physical activity, unhealthy eating, and smoking, dominate Saudi society, with a high proportion of undetected and undiagnosed cases. The program is based on providing comprehensive, integrated and continuous health care services through a multidisciplinary team that includes doctors, nurses, and health educators. The initiative aims primarily to treat common diseases in society that lead to a health, psychological, social, and economic burden, such as diabetes, cardiovascular diseases, high blood pressure, hyperlipidemia, breast cancer, colon tumors, mental disorders, and osteoporosis. And the risk factors that lead to these diseases, such as being overweight, obese, eating unhealthy food, inactivity, and smoking, are the initiatives included in triage of patients by medical staff from the nurses; recording the patient's data; conducting biological and physical measurements inside the nursing station; conducting examinations and diagnostic procedures; in addition to the periodic examination method (5,7,9).

According to the Osteoporosis Control Program, the Kingdom brings together the public, patients, health care workers (HCPs), health service providers, and the government to work together to control osteoporosis and reduce the health, economic, and social burden. Key areas of focus for the KSA Osteoporosis program for Prevention and Management are education and health promotion, screening, diagnosis and treatment, post-fracture care management and secondary prevention, self-management and falls prevention, as well as research and evaluation(4).

To protect family members from genetic disorders and infectious diseases, the Kingdom of Saudi Arabia has developed the Premarital Screening Program, which provides laboratory tests and medical counseling sessions. Screening for those about to marry aims to know the presence of genetic blood disorders (sickle cell anemia and thalassemia) and infectious diseases (hepatitis B, hepatitis C, HIV/AIDS). It also aims to give medical consultation on the odds of transmitting the abovementioned diseases to the other partner/spouse or children, and to provide partners/spouses with options that help them plan for a healthy family(10).

Additionally, the National Newborn Screening Program in KSA aims at screening all newborns in the first 24–72 hours of life for diseases covered by the program for the purpose of early detection and then providing the necessary medical care as soon as possible to prevent complications. Diseases covered by the program are endocrine conditions, amino acid conditions, organic acid conditions, urea cycle conditions, fatty acid oxidation conditions, and carbohydrate conditions. Key components of the programs are screening procedures, parents' notification, referral and management, and education and training (11).

The key performance indicators of health programs that are mentioned above have monitoring and evaluating quality indicators as shown in Table 1.

Table 1

Maternal Care Program Quality indicators	<ul style="list-style-type: none"> - The percentage of women who received antenatal care for at least four visits - The proportion of mothers who received postpartum care during the first week after giving birth. - The percentage of births that took place under the supervision of trained medical staff during a specified period of time. - During a specified time period, the percentage of pregnant women referred for hospital delivery at 36-40 weeks of pregnancy was calculated. - The proportion of high-risk pregnancies referred to the hospital - The percentage of pregnant women who received the tetanus vaccine during their pregnancy during a specific time period. - The percentage of female doctors working in antenatal clinics who received antenatal care training during a specified time period. - The percentage of nurses working in antenatal clinics who received training in antenatal care during a specified period of time.
Geriatric care and Osteoporosis control programs quality indicators	<ul style="list-style-type: none"> - The percentage of elderly people who had laboratory tests done yearly, as opposed to comprehensive exams every three months. - The percentage of elderly who had laboratory investigations done yearly as in comprehensive examination / every 3 months. - The percentage of the availability of all tools and equipment required for Geriatrics Care clinic / 3 months. - The percentage of completion of the registries and forms of the Geriatrics Care clinic / month. - The percentage of elderly people dropout for 6 months or more from follow up in the geriatric clinic /every 3 months. - The percentage of elderly who had laboratory investigations done yearly as in comprehensive examination / every 3 months.
Chronic Diseases Programs Quality Indicators	<ul style="list-style-type: none"> - The percentage of NCD defaulted patients for 3months or more from follow up in the NCD clinic /every 3months. - The percentage of NCD patients who had laboratory investigations done yearly as clinical guidelines/every 3 months. - The percentage of Diabetic patients who had HbA1cdone twice yearly. - The percentage of Diabetic & Hypertension patients who had referred for fundoscopic examination once/year. - The percentage of diabetic patients who had good control in their blood sugar level / every 3 months. - The percentage of hypertensive patients who had good control in blood pressure level / every 3 months.
Comprehensive Counseling Program (mental health) Quality Indicators	<ul style="list-style-type: none"> - Availability of essential drugs for a psychiatric clinic - The percentage of the number of trained doctors from the target - The percentage of primary psychiatric care clinics that have been activated from the target - The total number of visits to the primary psychiatric clinic - The total number of cases using drug therapy - The total number of cases that do not use drug therapy - The total number of patients recorded an improvement in symptoms - Number of patients diagnosed and treated in primary mental health clinics

Table 1 (continued)

Healthy Marriage Screening Program Quality Indicators	<ul style="list-style-type: none"> - The ratio of the number of trainees to the target - The number of monthly marriage requests - The number of individuals who received health education in marriage examination clinics - Number of marriage examination certificates issued - The rate of immunization of women who are about to marry, with the triple viral vaccine - Marriage compatibility ratio - Response rate to medical advice - The number of cases of hereditary blood diseases detected - The number of hepatitis C cases detected - The number of hepatitis B cases detected - The number of HIV cases detected
National Newborn Screening Program Quality Indicators	<ul style="list-style-type: none"> - The proportion of newborns who have had newborn screening - The proportion of babies who have a newborn screening sample taken between 24 and 72 hours of birth - The quality of the blood spot sample which reflects proper collection and transport - The time taken for the sample to be received by the laboratory after being taken - The time taken by the NBS laboratory to test each sample for all of the 17 disorders specified in the NBS Program - The time taken to refer a baby with a positive screening result for diagnostic testing - The time that is required for the commencement of treatment for babies with positive test results - Percentage of loss to follow-up: <ul style="list-style-type: none"> 1-following the receipt of an invalid specimen. 2-following an out-of-range test result. - Percentage of out-of-range negatives: <ul style="list-style-type: none"> 1-Percent of babies with disease who were not identified on NBS but had a valid newborn screen 2-Percentage of babies with disease who were not identified on NBS because they did not have a valid screen
Obesity control and physical activity health programs	<ul style="list-style-type: none"> - The percentage of obesity detection that was activated from the target - Percentage of the number of people tested for early detection of obesity from the group - Obesity cases detected in the gathering as a percentage - The number of primary reception cases for primary health care cases - Percentage of workshops completed from the project's workshop plan - Percentage of the number of trainees from the planned target at the community level

Objectives

The general objectives were to study the impact of the COVID-19 pandemic on the performance of health programs in Makkah Al-Mukarramah City. Although the specific objectives were to determine the nature and extent of changes in the performance of health programs between pre-pandemic and pandemic periods, Makkah Al-Mukarramah City; to compare performance change patterns across categories of health programs, Makkah Al-Mukarramah City and to recommend priority areas and policy considerations to enable the health programs to be better prepared to meet population health needs during emergencies and crises, Makkah Al-Mukarramah City.

Method

This was a comparative study that applied descriptive statistics to the available data on key performance indicators of all health programs in Makkah Al-Mukarramah. All necessary official permissions were secured by the researcher before the start of the data collection. Confidentiality and privacy were guaranteed for all data. The percentages of key performance indicators of all health programs were calculated and tests of significance applied. Descriptive statistics (e.g., number, percentage) are summarized as appropriate.

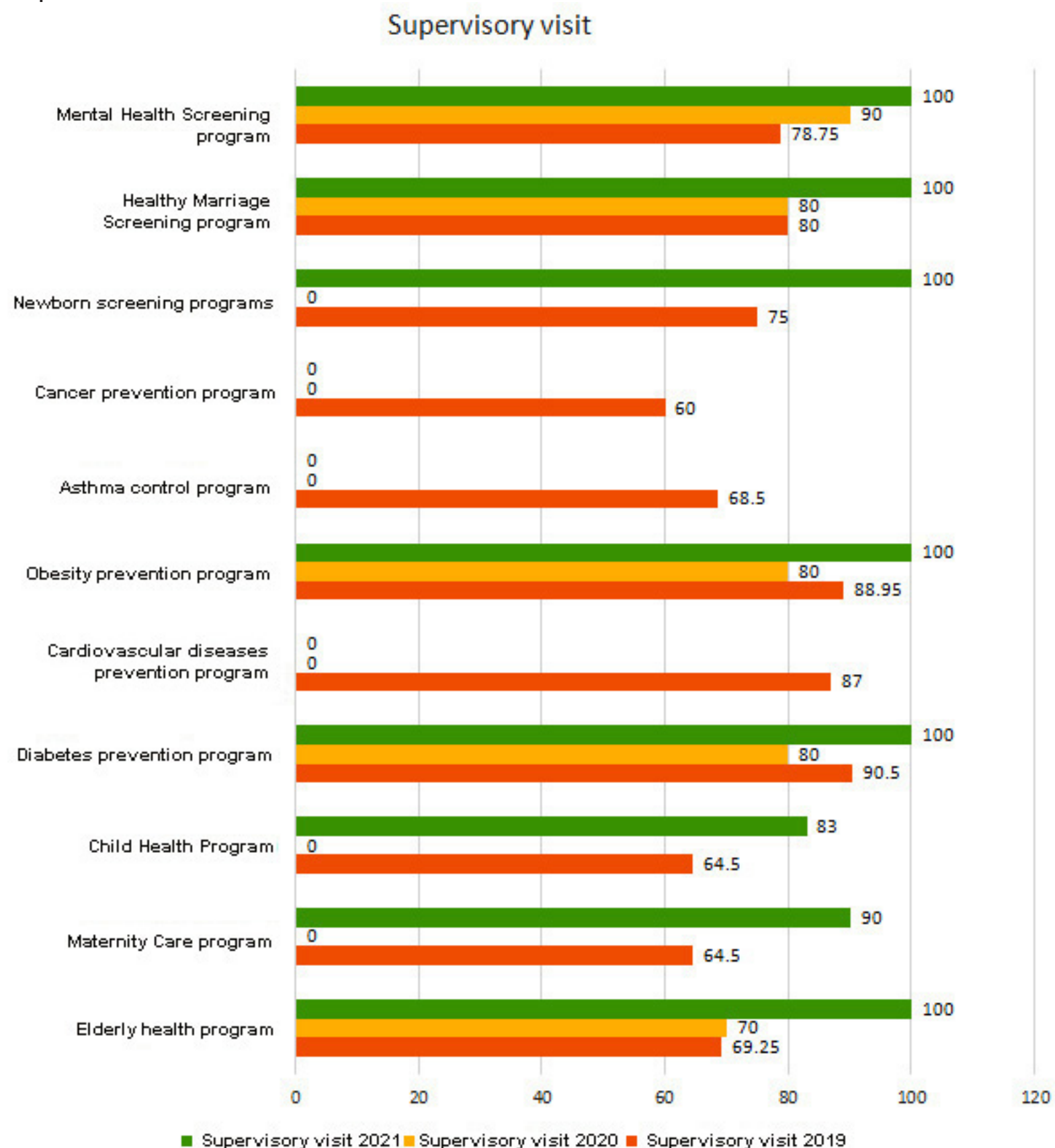
Result

Table 2

Health programs	2019 achievement percentage	2020 achievement percentage	2021 achievement percentage
Geriatric screening program	71.9	70.5	90.8
Maternity care health program	64.7	0	65.0
Child care health program	65.3	0	63.0
Diabetes control health program	84.5	60.0	97.0
Cardiovascular disease prevention health program	88.0	0	0
Obesity control and physical activity health programs	85.3	60.0	100.0
Asthma health program	71.0	58.3	0
Cancer control health program	68.3	58.3	58.3
Healthy marriage screening program	75.7	72.5	95.0
Mental health counseling program	77.7	79.2	100.0
National newborn screening program	75.5	60.0	96.7

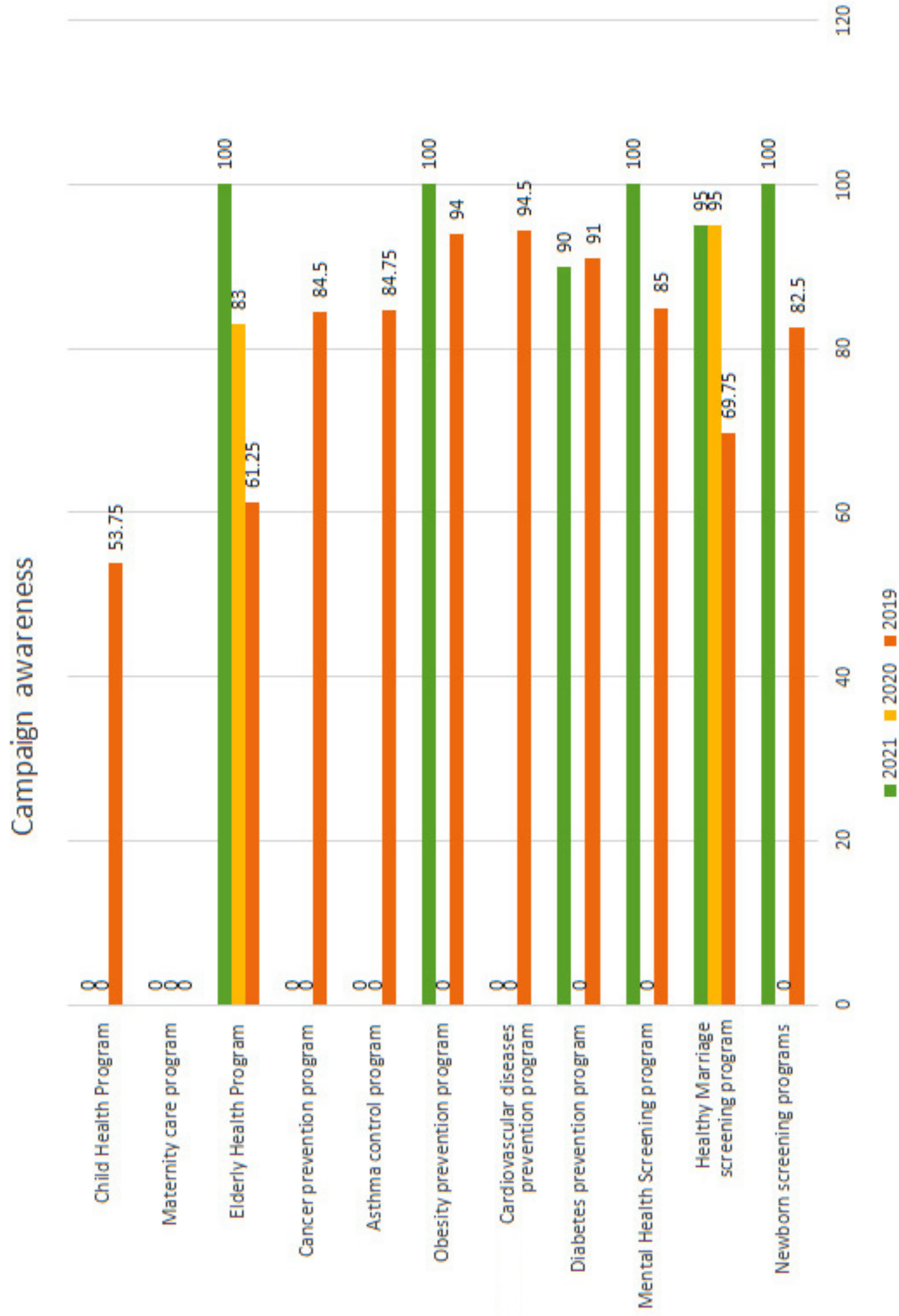
Table 2 shows the huge drop in the key performance indicators as a consequence of COVID-19 in 2020. Cardiovascular disease prevention health programs show the most drop-down level with 0% achievement percentages in both 2020 and 2021. The achievement percentages for the newborn screening program and the diabetes control health program show partial drops in 2020, with a significant recovery in 2021. On the other hand, child and maternity health programs represent a complete fall in 2020 with a high re-establishment of the achievement percentage in 2021.

Graph 1



According to Graph 1, which shows the community campaign, we found that the cancer prevention program, asthma control program, and cardiovascular disease prevention programs were the affected programs due to the COVID-19 lockdown process. Alternatively, we found that the healthy marriage program was not affected at all, while other records dropped only within 2020.

Graph 2



The second graph shows the supervisory visits that included health-care facilities and health program services. There were mostly affected in the cancer prevention program, asthma control program, and cardiovascular disease prevention program. In contrast, the high-service supervision visits included obesity prevention program, diabetes prevention program, mental health program, and healthy marriage program.

Conclusion

The Ministry of Health prioritizes preventive services, including the mentioned health programs. During the COVID-19 pandemic period, all health programs were affected due to lockdown and staff shortages, although by the end of 2021 it had improved.

Abbreviations:

NCD: Non-communicable disease
KPI: key performance indicators

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Depression, Anxiety and Stress among health care workers during the COVID-19 pandemic in Jazan city, Kingdom of Saudi Arabia

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Abstract

Background: The mental health impact of a disease outbreak is usually neglected by pandemic management with costly consequences. Early evidence shows that health workers directly involved in the diagnosis, treatment, and care of patients with COVID-19 are at risk of developing mental health symptoms. Similar adverse psychological reactions were reported among healthcare workers in previous studies during the 2003 severe acute respiratory syndrome outbreak.

Objectives: to assess the prevalence and determinants of depression, anxiety, and stress among healthcare workers at Prince Mohammed bin Nasser Tertiary Hospital in Jazan City during the COVID-19 pandemic.

Methods: This was a cross-sectional study conducted among healthcare worker at Prince Mohammed bin Nasser Hospital. A total of 352 health workers were included in the study. Data was collected through a self-administered questionnaire pertaining to socio-demographic characteristics and the depression anxiety stress scale 21-item questionnaire. Descriptive statistics were calculated for study variables, including frequency and percentage for qualitative variables and the mean and standard deviation for quantitative variables. A chi-square test was used to compare categorical data. $P \leq 0.05$ was used as an indicator of statistically significant differences.

Results: A high proportion of mild depression and anxiety was observed among those who had chronic illness (25.7%) and for those who had insufficient personal protective equipment (16.9%). Those differences were statistically significant, with a high proportion of mild stress observed among 3.4% of those who experienced the death of a relative by COVID-19.

Conclusion: There was a considerable prevalence of depression, anxiety, and stress among healthcare workers during the COVID-19 pandemic, especially among those who experienced the death of a relative from COVID-19 and those who had a chronic disease.

Keywords: depression, anxiety, stress, healthcare worker, COVID-19, Jizan, Saudi Arabia

Introduction

COVID-19, a severe acute respiratory syndrome caused by coronavirus 2 (SARS-CoV-2), was first detected in Wuhan, China, in late 2019 and spread globally. The rapid spread of the virus, transmitted primarily by human-to-human contact, drove the World Health Organization to classify it as a pandemic in March 2020. Given the virus's mode of transmission, countermeasures have been imposed to break the chain of infection, including social distancing to minimize the spread from unknown sources, quarantining to safeguard against possible infection, and isolation to limit the spread from known sources. Notably, the effect of this pandemic was not limited to physical health but also affected psychological and social wellbeing, as well as the safety of surrounding environments. For instance, mounting evidence suggests a high prevalence of depression, anxiety, stress, and trauma affecting people placed under strict measures (1). A systematic review and meta regression was done from December 2019 to June 2020, with a total sample size of 2,238,021, and the result clearly demonstrated a high prevalence of stress, anxiety, and depression within frontline healthcare workers treating COVID-19 (2). A systematic review included 46 articles with a total sample size of 61,551 hospital staff members from January 2020 to February 2021. Anxiety prevalence among healthcare worker was 26% higher for a certain age group and for women (3). The results of 24 studies from China indicate that COVID-19 had a considerable impact on the psychological wellbeing of frontline hospital staff, and nurses experienced a higher adverse effect on mental health outcomes during the pandemic (4). A cross sectional online survey was sent as a Google form to various health care workers at different departments in the hospital and found that 17.3% had depression, 26% had anxiety and 17.3% had stress, with nurses reporting the highest depression, anxiety and stress (5). Social functioning was also severely affected by the pandemic because of social distancing. In this sense, a reduced social life, loss of social routine, loneliness due to isolation, and social boycotting due to the stigma of infection are some examples of impairment in social relationships during this unprecedented time. In observing the safety measures to contain the virus, the response to this new norm may have been unique to healthcare workers. When compared with the public, healthcare workers are highly susceptible to negative psychological effects by the risk of contact with infected patients. With the lack of evidence-based practices related to COVID-19 patient management, the infection had an unusual tendency to arouse fear and subsequent ineffective psychological and social response adaptation, threatening the optimal quality of life, (6) which reflects the importance of the present study aiming to assess the prevalence and determinants of anxiety, depression, and stress among healthcare workers and related factors in the Jazan region during the COVID-19 pandemic.

Materials and Methods

Study design, setting, and participants

This work was a cross-sectional study, conducted for healthcare workers at Prince Mohammed bin Nasser Tertiary Hospital in the Jazan region of Saudi Arabia. Jazan is located in the southwest of Saudi Arabia and north of Yemen. It has a population of 1.5 million people. The study was conducted from December 2021 to April 2022 at Prince Mohammed bin Nasser Hospital. The participants were healthcare workers who spoke English and were available during the data collection period.

Sampling strategy

The minimum required sample size was calculated using the following formula, $n = Z^2 P(1-P)/D^2$, where n (calculated sample size) = 345, Z (the 95% confidence level) = 1.96, p (assumed prevalence in the population) = 50%, and $d = 0.05$.

Data was collected after getting ethical approval from the Jazan Ministry of Health research ethics committee. To prevent COVID-19 transmission to the data collectors, we used an electronic web-based questionnaire (Google form) in English. Those who could not speak and understanding English were excluded from the sample. Data was collected through emails and sent to the selected sample virtually through the hospital director to all healthcare workers.

Data collection tool

A pilot study involving 30 healthcare workers who were not included in the survey was conducted to make sure the questions and scale items were clear and understood and to determine how long it would take to complete the questionnaire. Data was collected through a self-administered questionnaire that included two parts as follows: a) the first part included demographic characteristics and other factors associated with depression, anxiety, and stress among healthcare workers during the COVID-19 outbreak, and b) the second part included the validated English version of the 21-item depression anxiety stress scale (DASS), which indicated acceptable internal consistency with Cronbach's alpha being 0.959 (7). Each of the three DASS-21 scales contained seven items divided into subscales with similar content. The depression scale assessed dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia, and inertia. The anxiety scale assessed autonomic arousal, skeletal muscle effects, situational anxiety, and the subjective experience of anxiety. The stress scale was sensitive to levels of chronic non-specific arousal. It assessed difficulty to relax, nervous arousal, impatience, irritability, and over-reactiveness. Scores for depression, anxiety, and stress were calculated by summing the scores for the relevant items with cut-off scores for conventional severity labels (i.e., normal, moderate, severe) (8).

Statistical analysis

Data was collected, entered, and coded and then analyzed and tabulated using the Statistical Package for Social Science (SPSS version 24, IB, Chicago, USA). Descriptive statistics used were frequencies and percentages for the categorical data, means, and standard deviations for the quantitative data. A chi-squared test was used to compare categorical data, and $P \leq 0.05$ was used as an indicator of statistically significant differences.

Ethical consideration

The study was approved by the IRB committee of the Jazan Hospital (H-10-Z-068) and the Ministry of Health in Saudi Arabia (IRB number.2191). Signed informed consent was obtained from all participants, and confidentiality and privacy were insured.

Results

Table 1 shows that a total of 352 healthcare workers participated in the current study. There were 275 (78.1%) aged 20–29 years, while 77 (21.9%) were aged 30 years and above. A gender majority of 261 (74.1%) were females, 337 (95.7%) were Saudi, and 236 (67%) were single. The majority of the studied sample were from applied medical science, representing 229 (65.1%) including those in lab work, radiography, nursing, social work, health education, public health, nutrition, physiotherapy, and medical information, with 44 (12.5%) physicians and 79 (22.4%) administrators. Looking at how long they had been working in healthcare, 299 (84.9%) reported fewer than five years and 27 (7.7%) reported more than 10 years. Thirty-five (9.9%) from the studied sample had a chronic disease, and the majority of the studied sample, 260 (73.9%), worked in a COVID-19 designated hospital. Eighty-nine (25.3%) had relatives die from COVID-19, and 337 (95.7%) had sufficient personal protective equipment. The DASS 21-item scale did not find severe or extremely severe depression. A high proportion of mild depression was observed among those who had a chronic disease (25.7%), those who experienced the death of a relative from COVID-19 (16.9%), and those who had insufficient personal protective equipment (26.7%). These differences are statistically significant ($P \leq 0.05$). Factors of age, gender, job title, working duration, COVID-19 designated hospitals, and access to sufficient protective equipment were not significantly associated with depression among the study sample.

Table 2 illustrates anxiety among healthcare workers according to their demographic characteristics. Among the recruited sample, a high proportion of mild anxiety was observed among those who had a chronic disease nine respondents 25.7% those who had a relative die from COVID-19 (15 respondents; 16.9%), and those who had insufficient personal protective equipment (four respondents; 26.7%) These differences are statistically significant ($P \leq 0.05$) in the collection result of mild, moderate, severe, and very severe depression because of their small number.

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Table 1: Depression in relation to sociodemographic characteristics among studied sample

Sociodemographic characteristics Total(N=352)	Normal	Mild depression	Moderate depression	P value ^Λ
Age (years)				0.249
20-29 (N= 275)	253(92.0%)	17(6.2%)	5(1.8%)	
30 and above (N= 77)	68(88.3%)	5(6.5%)	4(5.2%)	
Gender				0.692
Males (N=91)	81(89%)	7(7.7%)	3(3.3%)	
Females (N=261)	240(92%)	15(5.7%)	6(2.3%)	
Marital:				0.233
Single (N=236)	219(92.8%)	13(5.5%)	4(1.7%)	
Married(N=116)	102(87.9%)	9(7.81%)	5(4.3%)	
Nationality:				0.364
Saudi (N=337)	307(91.1%)	22(6.5%)	8(2.4%)	
Non Saudi (N=15)	14(93.3%)	0(0.0%)	1(6.7%)	
Job title:				0.000
Physician (N=44)	32(72.7%)	7(15.9%)	5(11.4%)	
Applied medical sciences *(N=229)	213(93.0%)	13(5.7%)	3(1.3%)	
Administrator (N=79)	76(96.2%)	2(2.5%)	1(1.3%)	
Working experience(years)				0.103
Less than 5 years (N=299)	276(92.3%)	17(5.7%)	6(2.0%)	
5-9 years (N=26)	20(76.9%)	4(15.4%)	2(7.7%)	
10 years and above (N=27)	25(92.6%)	1(3.7%)	1(3.7%)	
Having chronic disease:**				0.021
Yes (N=35)	28(80.0%)	4(11.4%)	3(8.6%)	
No (N=317)	293(92.4%)	18(5.7%)	6(1.9%)	
Working in Covid-19 designated hospital				0.456
Yes (N=260)	240(92.3%)	14(5.4%)	6(2.3%)	
No(N=92)	81(88.0%)	8(8.7%)	3(3.3%)	
Death of relatives due to Covid-19				0.003
Yes (N=89)	74(83.1%)	9(10.1%)	6(6.7%)	
N (N=263)	247(93.9%)	13(4.9%)	3(1.1%)	
Having sufficient personal protective equipment:				0.364
Yes (N=337)	307(91.1%)	22(6.5%)	8(2.4%)	
No (N=15)	14(93.3)	0(0.0%)	1(6.7%)	
Total (N=352)	321(91.2%)	22(6.2%)	9(2.6%)	

*Applied medical science: lab worker, radiographer, pharmacist, Nurse, social worker. Health educator, public health, , medical informatics, physiotherapist, nutrition,

** chronic disease: Diabetes, hypertension, Bronchial asthma

Λ Pearson chi square

Table 2: Anxiety in relation to sociodemographic characteristics in studied sample

Sociodemographic characteristics Total (N=352)	Studied samples N (%)		P value &
	Normal	Anxiety	
Age (years) 20-29 (N=275) 30 and above (N=77)	250(90.9%) 66(85.7%)	25(9.1%) 11(14.3%)	.184
Gender Males (N=91) Females (N=261)	83(91.2%) 233(89.3%)	8(8.8%) 28(10.7%)	0.600
Marital status : Single (N=236) Married (N=116)	217(91.9%) 99(85.3%)	19(8.1%) 17(14.7%)	0.055
Nationality: Saudi (N=337) Non Saudi (N=15)	302(89.6%) 14(93.3%)	35(10.4%) 1(6.7%)	0.642
Job title: Physician (N=44) Applied medical sciences* (N=229) Administrator (N=79)	38(86.4%) 203(88.6%) 75(94.9%)	6(13.6%) 26(11.4%) 4(5.1%)	0.205
Working experience(years) Less than 5 years (N=299) 5-9 years. (N=26) 10 years and above. (N=27)	270(90.3%) 23(88.5%) 23(85.2%)	29(9.7%) 3(11.5%) 4(14.8%)	0.684
Having chronic disease:** Yes (N=35) No (N=317)	26(74.3%) 290(91.5%)	9(25.7%) 27(8.5%)	0.001
Working in covid 19 designated hospital Yes (N=260) No (N=92)	238(91.5%) 78(84.8%)	22(8.5%) 14(15.2%)	0.066
Death of relatives due to covid 19 Yes (N=89) No (N=263)	74(83.1%) 242(92.0%)	15(16.9%) 21(8.0%)	0.017
Having sufficient personal protective equipment: Yes (N=337) No(N=15)	305(90.5%) 11(73.3%)	32(9.5%) 4(26.7%)	0.032
Total (N=352)	316(89.8%)	36(10.2%)	

*Applied medical science: lab worker, radiographer, pharmacist, Nurse, social worker. Health educator, public health, medical informatics, physiotherapist, nutrition,

** chronic disease: Diabetes, hypertension, Bronchial asthma

⌘ Fisher exact test

Table 3: Stress in relation to sociodemographic characteristics in studied sample

Sociodemographic characteristics Total (N=352)	Normal	Mild stress	Moderate stress	P value ^Λ
Age (years)				0.544
20-29 (N=275)	270(98.2%)	3(1.1%)	2(0.7%)	
30 and above (N=77)	74(96.1%)	2(2.6%)	1(1.3%)	
Gender				0.258
Males (N=91)	88(96.7%)	1(1.1%)	2(2.2%)	
Females (N=261)	256(98.1%)	4(1.5%)	1(0.4%)	
Marital status :				0.432
Single(N=236)	232(98.3%)	2(0.8%)	2(0.8%)	
Married (N=116)	112(96.6%)	3(2.6%)	1(0.9%)	
Nationality:				0.202
Saudi (N=337)	330(97.9%)	4(1.2%)	3(0.9%)	
Non Saudi (N=15)	14(93.3%)	1(6.7%)	0(0.0%)	
Job title:				0.254
Physician (N=44)	41(93.2%)	2(4.5%)	1(2.3%)	
Applied medical sciences*(N=229)	255(98.3%)	2(0.9%)	2(0.9%)	
Administrator N=79)	78(98.7%)	1(1.3%)	0(0.0%)	
Working experience(years)				0.561
Less than 5 years (N=299)	293(98.0%)	3(1.0%)	3(1.0%)	
5-9 years(N=26)	25(96.2%)	1(3.8%)	0(0.0%)	
10 years and above (N=27)	26(96.3%)	1(3.7%)	0(0.0%)	
Having chronic disease**				0.295
Yes (N=35)	33(94.3%)	1(2.9%)	1(2.9%)	
No N =317)	311(98.1%)	4(1.3%)	2(0.6%)	
Working in Covid-19 designated hospital				0.744
Yes (N=260)	255(98.1%)	3(1.2%)	2(0.8%)	
No(N=92)	89(96.7%)	2(2.2%)	1(1.1%)	
Death of relatives due to Covid-19				0.002
Yes(N=89)	83(93.3%)	3(3.4%)	3(3.4%)	
No (N=263)	261(99.2%)	2(0.8%)	0(0.0%)	
Having sufficient personal protective:				0.202
Yes (N=337)	330(97.9)	4(1.2%)	3(0.9%)	
No (N=15)	14(93.3%)	1(6.7%)	0(0.0%)	
Total (N=352)	344(97.7%)	5(1.4%)	3(0.9%)	

*Applied medical science: lab worker, radiographer, pharmacist, Nurse, social worker. Health educator, public health, , medical informatics, physiotherapist, nutrition.

** chronic disease: Diabetes, hypertension, Bronchial asthma.

^Λ Pearson chi square

Discussion

The objective of this study was to assess the prevalence of anxiety, depression, and stress and determine the factors associated with mental health among healthcare workers in Jazan City during the COVID-19 pandemic in 2021. The study was conducted from December 2021 to April 2022. The impact of COVID-19 on mental health is well documented in various countries among different populations, including health professionals. The prevalence of anxiety among all healthcare workers ranged from 22.2% to 33% in an umbrella review of 10 systematic reviews (9).

This study indicated that 8.8% of respondents reported mild to moderate depression, while 10.2% had anxiety, which is lower than the international prevalence and much lower than in a previous study done in 2020, which revealed that depression and anxiety were prevalent (55.2% and 51.4%, respectively) among healthcare workers in the Saudi Ministry of Health during the first few months of the pandemic (10).

We found that the prevalence of depression among health practitioners in Jazan City during the study period was lower when compared to the general population during the first year of the pandemic (2020) among 942 adult participants, which was 25.1% (11).

Globally, a study conducted in Nepal 2020 among healthcare workers found that 37% had symptoms of depression and 23% experienced anxiety symptoms (12).

Another study was done in Turkey during 2020 that reported a prevalence of depression (77.6%) and anxiety (60.2%) among healthcare professionals (13).

Our findings are similar to those of a study conducted among the general population of China in 2019 in which the prevalence of anxiety and depression was approximately 8.3% and 14.6%, respectively (14).

We found that male participants had slightly higher mean scores for depression (11%) than females (8%), which is contrary to a study in Turkey and Iran (5,7). On the other hand, females had higher scores for anxiety (10.7%) than males (8.8%).

Healthcare workers aged 30 years and older had more psychiatric symptoms during the pandemic than those under 30 years of age regarding anxiety, depression, and stress, similar to the study of 502 healthcare providers in the Saudi Ministry of Health in 2020 (2).

In the present study, physicians were more affected than other healthcare professionals for all psychological symptoms, similar to findings in a Jordanian study during 2019 (8), while the nurses were the most affected for other studies done in Saudi Arabia, Turkey, and China (2,5,9). Married participants reported higher concern than non-married, which is a contrast to a study conducted in Jordan in 2019 (15).

Despite no strong evidence suggesting that sociodemographic factors make a difference in psychological responses (16), healthcare providers with less effective coping abilities are prone to developing higher concern, whereas those showing resilience are relatively less affected by the pandemic (8).

A history of previous psychiatric problems was also a predictor of higher maladaptive outcomes during the severe acute respiratory syndrome outbreak (17).

This current study revealed that participants who had been working for 5–9 years were more prone to depressive symptoms, while those who had more than 10 years of experience reported more anxiety symptoms. In contrast, a Turkish study revealed that both depression and anxiety were more frequent among participants with more than 10 years' experience (13).

It is worth noting that psychological responses were significantly increased among participants with chronic diseases. Anxiety was the most commonly encountered form, which is similar to other worldwide studies (18)(19). Health practitioners' knowledge that risk factors for the severe course of COVID-19 infection include old age, chronic obstructive pulmonary disease, hypertension, diabetes mellitus, and coronary artery disease (20) may have aggravated negative feelings and increased anxiety among health practitioners with chronic diseases.

Findings in this study revealed no relation between working at COVID-19 designated centers and developing psychological outcomes. Many factors may contribute to positive feelings, such as the emergence of effective vaccines during the study period and governmental support with resources for these centers.

Significant associations between psychological responses and the death of relatives due to COVID-19 were noted among participants, and these outcomes were thought to be higher among those who transmitted the infection to their families (21).

Our study reported that participants having insufficient personal protective equipment experienced more negative outcomes, particularly anxiety, as this predictor is the most common source of anxiety (21).

Conclusion and Recommendations

Healthcare practitioners being exposed to different levels of various psychological events during the pandemic, as shown in this study and other studies, necessitates the existence of specific strategies to mitigate the mental wellbeing of those working in frontline, triage, and quarantines services. Occupational health clinics, work burnout clinics, and active roles of screening for these psychological conditions could be helpful for reducing these mental disorders.

As noted, the availability of protective equipment played a significant role in reducing anxiety.

Furthermore, giving health practitioners priority in obtaining vaccinations may have contributed significantly to alleviating the severity of psychological symptoms.

Limitation

The main limitation is the use of only one health center, but it was one of the main centers dealing with the disease.

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Awareness of cardiovascular diseases and their associated risk factors among the general population in Hail city, Saudi Arabia

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Abstract

Background: Cardiovascular diseases are one of the major health problems and the leading cause of mortality and disability globally. CVDs are responsible for 17.3 million deaths annually. Epidemiological data on the knowledge and attitude towards cardiovascular diseases and risk factors among the general population in Saudi Arabia is lacking; therefore, assessing the public awareness of cardiovascular risk factors and diseases is critical.

Methods: This is a descriptive cross-sectional study that was conducted among 1,172 participants from the general population in Hail city. Using a self-administered questionnaire, the sample was selected at random from 18-60 years olds.

Results: A total of 1,172 participants responded to the survey. Participants who responded were mostly males (69.1%) and (30.7%) were females. Participants managed to recognize that coronary heart disease (74.5%), congenital heart disease (53.4%) are types of CVDs. The overall knowledge on cardiovascular disease was poor with mean score of 12.24 out of 25.0.

Conclusion: The available data indicate poor knowledge about cardiovascular diseases and associated risk factors; it's very important to establish more widespread awareness campaigns regarding CVDs awareness.

Keywords: Myocardial infarction, Acute coronary syndrome, Survey, Cardiovascular diseases, Ha'il, Saudi Arabia

Introduction

Cardiovascular diseases are one of the most prevalent diseases and the leading cause of death in Saudi Arabia. Different studies have only focused on patients in developed countries such as the United Kingdom and the United States (1). Epidemiological data on the knowledge and attitude towards cardiovascular diseases and risk factors among the general population in Saudi Arabia is lacking; therefore, assessing the public awareness of cardiovascular risk factors and diseases is critical. The Kingdom of Saudi Arabia (KSA) has witnessed a surprising increase in cardiovascular diseases incidence and mortality (2). There are many risks for cardiovascular diseases such as high blood pressure, high cholesterol level, high blood glucose level, smoking, obesity, and lack of exercise that will increase the death rate, and it is expected that 23.3 million people will fall victim to cardiovascular diseases in the year 2030 (3). Many risk factors can contribute as a cause for cardiovascular diseases such as unhealthy diet, physical inactivity, smoking, drinking alcohol, high blood pressure, diabetes, high amounts of fat intake and overweight. Currently, cerebrovascular diseases and coronary heart diseases are within the top 10 causes of death in the Arabic world. For example, in Kuwait, congenital heart defects (CHDs) are the major reason of mortality and morbidity, and cardiovascular diseases (CVDs) have been reported to represent 46.0% of all mortalities. In Saudi Arabia, CVDs are estimated to account for 42% of the total mortalities and CHDs are ranked as the second highest cause of death (4). One of the foremost techniques generally employed for prevention and management of cardiovascular diseases has been educating patients and the public. Although this method does not assure change on how people behave, it's generally considered as a critical step in improving the public lifestyle to adapt to more healthy options.

Methods

Study design, setting, population and sampling

This descriptive cross-sectional study was conducted in Hail city, Saudi Arabia, from April 2 to May 26, 2022. Hail is a northern city with a recently updated population of 935,000. The minimum sample size was determined using the online sample size calculator, considering a population of 935,000 people, a confidence level of 95%, and a 0.03 margin of error, the estimated minimum sample size required is 1066 and the total number of participants was 1172.

Study procedure and ethical issues

The study was ethically approved by the Ethics Committee of Hail University, College of Medicine. Those who agreed to take part in the study were given the questionnaires, which were completed anonymously and collected after completion. Confidentiality was maintained. The questionnaire was translated into Arabic and reverse translated. The accuracy and meaning of the translated version checked both forwards and backwards, and it was

discussed before finalized. It was adapted from previously validated published studies (4, 5).

A literature review of previous studies regarding CVDs knowledge was conducted to identify potential items for the study instrument. Based on the literature search, the study questionnaire was adapted from validated surveys that were previously used.

Scoring of knowledge of participants

The questionnaire was composed of nine questions regarding knowledge of CVDs risk factors, six questions regarding types of CVDs, five questions regarding knowledge on signs and symptoms of stroke, and five questions regarding knowledge on signs and symptoms of myocardial infarction (MI), totaling a number of 25 questions. These questions were equally scored (one point for correct answers and zero for incorrect ones). We classified who obtained 13 or more correct responses as having "moderate to good knowledge", and those who scored 12 or less were classified as having "poor knowledge".

Results

1172 participants responded to the survey. The age of participants was (44.3%) aged 18-24, (20.8%) aged from 25-34, (16.8%) aged from 35-44, and (18.0%) aged between 45-60. The participants who responded were mostly males (69.1%) and (30.7%) were females. Most of the participants had college educational level (59.9), while (24.1%) had postgraduate education and (15.8%) had high school or less. Regarding the employment status, (35.6%) are students, (46.7%) are employees while (17.5%) are unemployed. (22.7%) are currently smokers while (4.6%) were previously smokers, but the majority were non-smokers (72.5%). As for exercising, (39.8%) reported exercising one to two times per week, (17.9%) reported exercising three to five times per week, (8.0%) reported exercising 5 times or more per week, while (34.2%) didn't practice exercising. As for eating healthy food only (8.7%) of the participants claimed they are always doing it and (66.1%) are eating healthily sometimes, while (25.0%) rarely eat healthily. (56.7%) perceived their lifestyle as stressful and (22.1%) perceived it as very stressful while (21.0%) reported their lifestyle as free of stress. When asked for their cardiovascular diseases history, (84.7%) denied any issues and (10.3%) had history of cardiovascular diseases; only (4.9%) didn't know. As for family history of cardiovascular diseases (36.8%) had a positive family history and (55.2%) had a negative family history while (7.8%) didn't know for sure (Table 1).

Table 1: Frequency of the Socio-demographic Characteristics of the Sample: (N=1172)

Category		Count	Column N %
Age	18-24	520	44.4%
	25-34	244	20.8%
	35-44	197	16.8%
	45-60	211	18.0%
Gender	MALE	811	69.2%
	FEMALE	361	30.8%
Educational level	High school or less	186	15.9%
	University	703	60.0%
	Postgraduate studies	283	24.1%
Employment status	STUDENT	418	35.7%
	EMPLOYEE	548	46.8%
	UNEMPLOYED	206	17.6%
Are you a smoker?	Yes	267	22.8%
	No	851	72.6%
	Previously smoker	54	4.6%
How many days do you do at least 30 minutes of exercise?	1-2 times a week	467	39.8%
	3-5 times a week	210	17.9%
	5 times or more a week	94	8.0%
	I do not exercise	401	34.2%
How often do you eat healthy food?	Always	102	8.7%
	Rare	294	25.1%
	Sometimes	776	66.2%
How do you describe your lifestyle?	Free from stress	247	21.1%
	Stressful	666	56.8%
	Very stressful	259	22.1%
Do you have a history of cardiovascular disease?	Yes	121	10.3%
	No	994	84.8%
	I do not know	57	4.9%
Have any of your immediate family members been diagnosed with a cardiovascular disease?	Yes	432	36.9%
	No	648	55.3%
	I do not know	92	7.8%

Concerning the types of cardiovascular diseases, participants managed to recognize coronary heart disease (74.5%), congenital heart disease (53.4%) as types of CVDs, but the majority thought stroke, peripheral arterial disease, rheumatic heart disease, and deep vein thrombosis / pulmonary embolism aren't related to CVDs.

As for risk factors for CVDs, the participants successfully identified (72.8%) smoking, (51.4%) physical inactivity, (64.3%) obesity, (52.1%) stress, and (57.7%) high levels of bad cholesterol as risk factors for CVD. Interestingly, more than half of the people couldn't identify (49.0%) high blood pressure as well as (33.7%) diabetes mellitus as risk factors.

Regarding signs and symptoms of myocardial infarction, only (65.7%) recognised chest pain and (59.8%) shortness of breath correctly. It's worth mentioning that women were more aware of pain in neck or jaw and feeling weak, dizziness, or faint as signs and symptoms of myocardial infarction more than men ($p = 0.03$) and ($p = 0.035$) respectively.

Regarding symptoms of stroke, the overall, 59.2, 65.6, 43.1, 51.9 and 37.8% knew that sudden numbness / weakness in head, arm, or leg, sudden poor vision, sudden confusion, trouble talking and understanding others, sudden dizziness, difficulty walking or imbalance and severe headache with unknown cause respectively, were symptoms of stroke (Table 2).

Table 2: Assessment of knowledge about the types of CVD and risk factors, as well as symptoms of both myocardial infarction and stroke according to gender: (N=1172) (continued next page)

Category	Question	Answer	Male	Female	Total	p-value
Types of Cardiovascular disease	Coronary heart disease	Yes	603 (74.4%)	270 (74.8%)	873 (74.5%)	.802
		No	3 (7.8%)	31 (8.6%)	94 (8.0%)	
		I don't know	145 (17.9%)	60 (16.6%)	205 (17.5%)	
	Stroke	Yes	179 (22.1%)	61 (16.9%)	240 (20.5%)	.093
		No	217 (26.8%)	111 (30.7%)	328 (28.0%)	
		I don't know	415 (51.2%)	189 (52.4%)	604 (51.5%)	
	Peripheral arterial disease	Yes	178 (21.9%)	67 (18.6%)	245 (20.9%)	.414
		No	171 (21.1%)	81 (22.4%)	252 (21.5%)	
		I don't know	462 (57.0%)	213 (59.0%)	675 (57.6%)	
Riskfactors for cardiovascular disease	Rheumatic heart disease	Yes	363 (44.8%)	161 (44.6%)	524 (44.7%)	.996
		No	84 (10.4%)	37 (10.2%)	121 (10.3%)	
		I don't know	364 (44.9%)	163 (45.2%)	527 (45.0%)	
	Congenital heart disease	Yes	437 (53.9%)	189 (52.4%)	626 (53.4%)	.267
		No	194 (23.9%)	77 (21.3%)	271 (23.1%)	
		I don't know	180 (22.2%)	95 (26.3%)	275 (23.5%)	
	Deep vein thrombosis& pulmonary embolism	Yes	300 (37.0%)	158 (43.8%)	458 (39.1%)	.089
		No	51 (6.3%)	21 (5.8%)	72 (6.1%)	
		I don't know	460 (56.7%)	182 (50.4%)	642 (54.8%)	
	Family history of cardiovascular disease	Yes	402 (49.6%)	177 (49.0%)	579 (49.4%)	.747
		No	128 (15.8%)	52 (14.4%)	180 (15.4%)	
		I don't know	281 (34.6%)	132 (36.6%)	413 (35.2%)	
	Smoking	Yes	582 (71.8%)	271 (75.1%)	853 (72.8%)	.355
		No	32 (3.9%)	16 (4.4%)	48 (4.1%)	
		I don't know	197 (24.3%)	74 (20.5%)	271 (23.1%)	
	Unhealthy diet	Yes	388 (47.8%)	181 (50.1%)	569 (48.5%)	.756
		No	85 (10.5%)	35 (9.7%)	120 (10.2%)	
		I don't know	338 (41.7%)	145 (40.2%)	483 (41.2%)	
	Lack of exercise	Yes	419 (51.7%)	183 (50.7%)	602 (51.4%)	.951
		No	199 (24.5%)	91 (25.2%)	290 (24.7%)	
		I don't know	193 (23.8%)	87 (24.1%)	280 (23.9%)	
	Obesity	Yes	525 (64.7%)	229 (63.4%)	754 (64.3%)	.901
		No	14 (1.7%)	6 (1.7%)	20 (1.7%)	
		I don't know	272 (33.5%)	126 (34.9%)	398 (34.0%)	
	Stress	Yes	417 (51.4%)	194 (53.7%)	611 (52.1%)	.637
		No	166 (20.5%)	75 (20.8%)	241 (20.6%)	
		I don't know	228 (28.1%)	92 (25.5%)	320 (27.3%)	
	High levelsof LDL cholesterol	Yes	468 (57.7%)	208 (57.6%)	676 (57.7%)	.997
		No	44 (5.4%)	20 (5.5%)	64 (5.5%)	
		I don't know	299 (36.9%)	133 (36.8%)	432 (36.9%)	
	High blood pressure	Yes	401 (49.4%)	173 (47.9%)	574 (49.0%)	.814
		No	37 (4.6%)	15 (4.2%)	52 (4.4%)	
		I don't know	373 (46.0%)	173 (47.9%)	546 (46.6%)	
	Diabetes mellitus	Yes	287 (35.4%)	108 (29.9%)	395 (33.7%)	.176
		No	96 (11.8%)	49 (13.6%)	145 (12.4%)	
		I don't know	428 (52.8%)	204 (56.5%)	632 (53.9%)	

Table 2: Assessment of knowledge about the types of CVD and risk factors, as well as symptoms of both myocardial infarction and stroke according to gender: (N=1172) continued...

Symptoms of myocardial infarction	Pain in the neck, jaw or back	Yes No I don't know	349 (43.0%) 65 (8.0%) 397 (49.0%)	150 (41.6%) 15 (4.2%) 196 (54.3%)	499 (42.6%) 80 (6.8%) 593 (50.6%)	.030**
	Feeling weak, light-headed or faint	Yes No I don't know	330 (40.7%) 44 (5.4%) 437 (53.9%)	173 (47.9%) 23 (6.4%) 165 (45.7%)	503 (42.9%) 67 (5.7%) 602 (51.4%)	.035**
	Chest pain or discomfort	Yes No I don't know	519 (64.0%) 10 (1.2%) 282 (34.8%)	249 (69.0%) 3 (0.8%) 109 (30.2%)	768 (65.7%) 13 (1.1%) 391 (33.2%)	.237
	Pain or discomfort in arms or shoulder	Yes No I don't know	188 (23.2%) 138 (17.0%) 485 (59.8%)	97 (26.9%) 67 (18.6%) 197 (54.6%)	285 (24.3%) 205 (17.5%) 682 (58.2%)	.233
	Shortness of breath	Yes No I don't know	475 (58.6%) 45 (5.5%) 291 (35.9%)	226 (62.6%) 14 (3.9%) 121 (33.5%)	701 (59.8%) 59 (5.0%) 412 (35.2%)	.292
Symptoms of Stroke	Sudden numbness/ weakness in face, arm, or leg	Yes No I don't know	485 (59.8%) 36 (4.4%) 290 (35.8%)	209 (57.9%) 18 (5.0%) 134 (37.1%)	694 (59.2%) 54 (4.6%) 424 (36.2%)	.801
	Sudden confusion, trouble talking and understanding others	Yes No I don't know	526 (64.9%) 22 (2.7%) 263 (32.4%)	243 (67.3%) 8 (2.2%) 110 (30.5%)	769 (65.6%) 30 (2.6%) 373 (31.8%)	.680
	Sudden poor vision	Yes No I don't know	348 (42.9%) 49 (6.0%) 414 (51.0%)	157 (43.5%) 10 (2.8%) 194 (53.7%)	505 (43.1%) 59 (5.0%) 608 (51.9%)	.058
	Sudden dizziness, difficulty walking or loss of balance	Yes No I don't know	426 (52.5%) 79 (9.7%) 306 (37.7%)	182 (50.4%) 35 (9.7%) 144 (39.9%)	608 (51.9%) 114 (9.7%) 450 (38.4%)	.772
	Severe headache	Yes No I don't know	303 (37.4%) 164 (20.2%) 344 (42.4%)	140 (38.8%) 71 (19.7%) 150 (41.6%)	443 (37.8%) 235 (20.1%) 494 (42.2%)	.898

** Statistically significant association between gender in knowledge.

The overall knowledge on cardiovascular diseases was determined to be low with mean score of 12.24 out of 25.0. The women's knowledge of signs and symptoms of myocardial infarction was better than men ($p = 0.006$) (Table 3).

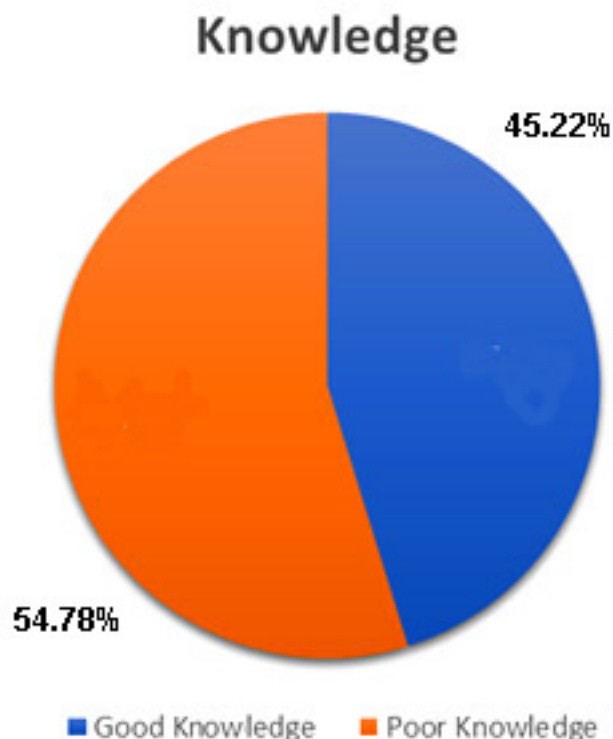
Table 3: Comparison of public mean knowledge scores for types of cardiovascular disease, their risk factors, symptoms of both myocardial infarction and stroke, as well as the total CVD knowledge according to gender: (N=1172)

Category	Male (N = 811) Mean \pm SD	Female (N = 361) Mean \pm SD	Total (N = 1172) Mean \pm SD	p-value
Knowledge about CVD types (out of 6)	2.54 \pm 1.12	2.50 \pm 1.13	2.53 \pm 1.12	.670
Knowledge about CVD risk factors (out of 9)	4.79 \pm 1.44	4.77 \pm 1.50	4.78 \pm 1.46	.831
Knowledge about symptoms of myocardial infarction (out of 5)	2.29 \pm 1.06	2.47 \pm 1.04	2.35 \pm 1.05	.006**
Knowledge about symptoms of stroke (out of 5)	2.57 \pm 1.13	2.57 \pm 1.09	2.57 \pm 1.12	.951
Total CVD knowledge (out of 25)	12.20 \pm 2.35	12.34 \pm 2.49	12.24 \pm 2.39	.361

** Statistically significant association between gender in knowledge score.

Good knowledge was observed in (45.22%) of the participants of our study while (54.78%) had poor knowledge in cardiovascular diseases (Figure 1).

Figure 1



Discussion

The overall results in the study have demonstrated a lack in the overall knowledge about cardiovascular diseases in the general public of Hail city, Saudi Arabia. About 45.22% of the public have good knowledge overall, while 54.78% have less than the adequate level of knowledge. Awareness about the types of CVDs was relatively good compared to risk factors and the signs and symptoms of myocardial infarction and stroke. Only 20.5% and 20.9% have recognized stroke and peripheral

arterial disease respectively as types of CVDs, which was also seen in a similar study in Cameroon (5). On a positive note, a strong number from different parts of the globe have identified coronary artery disease as a type of CVDs (4, 5). Regarding the signs and symptoms of myocardial infarction and stroke, over two thirds of the participants were able to correctly identify the major symptoms for myocardial infarction and stroke, including chest pain and sudden numbness in the arm respectively. Ideally, it's best for the community to have a better awareness towards more characteristic features of myocardial infarction such as radiating pain to the arm and shoulder. Chest pain was the highest identified symptoms (65.7%), which is higher than other cities, for example, Riyadh, Kuwait and Buea (4, 5, 6). The awareness about stroke manifestation was found to be low in this study with nearly less than half of participants correctly pointing out the major symptoms of stroke. Therefore, not being aware of such symptoms for both myocardial infarction or stroke could lead to a delay in seeking professional medical help in such diseases where time is a strong prognostic factor.

As for risk factors, the community of Hail city have an adequate knowledge regarding them, some of whom had more than 50% answered correctly and going as high as 75.1% in correctly identifying smoking as a risk factor, except for Diabetes Mellitus, which was surprisingly low. Paradoxical results about Diabetes Mellitus being a risk factor was seen in many studies (4, 5, 6, 7, 8, 9, 10). A decent number of participants knew smoking, unhealthy diet and physical inactivity were CVDs risk factors, which is in line with studies from Riyadh and Kuwait (4, 6).

Regarding the demographic characteristics, the majority were college students and almost three-quarters of them have reported not being a smoker, which is a positive note to point out in the community. With that being said, in this study we unfortunately witnessed a worrisome high number of participants reporting living a stressful lifestyle. Stress shouldn't be ignored as it has shown a strong association with heart diseases according to WHO. Strong countermeasures should be taken against stress as it will help the community in improving their daily life and nonetheless help in reducing heart diseases. Two-thirds have reported eating healthy sometimes, the reasoning for that was due to low income, which was believable since the majority are unemployed, and this is yet to be investigated in future studies.

Conclusion

The available data indicates poor knowledge about cardiovascular diseases and the associated risk factors. It is very important to establish more widespread awareness campaigns and effective prevention strategies to minimize the risk of CVDs mortality in the coming years. There is need for increasing awareness among the population utilizing community-based education programs. Poor knowledge among Saudi people on risk factors for cardiovascular diseases, which are major health challenges in Saudi Arabia, requires more research and health campaigns targeting awareness of cardiovascular diseases and the risk factors, especially in the young generation.

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Prevalence and Awareness of Varicose Veins (VV) among Teachers and the General Population of Taif City, Saudi Arabia

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Abstract

Background: The prevalence of Varicose Veins (VV) varies among individuals in different occupations with high prevalence reported among teachers due to long standing periods. Besides standing for long periods, several risk factors of VV were mentioned in the literature but with discordance between the studies about the significance of some of these factors. The research on the general population and teachers' awareness of VV, is limited in Taif city, Saudi Arabia.

Aim: This study aimed to investigate the prevalence and awareness of VV among teachers and the general population of Taif city and find out the correlation and differences between teachers and other Taif residents with VV along with socio-demographic characteristics.

Methods: A cross-sectional web-based study was conducted in Taif, Saudi Arabia. A self-administered questionnaire was used to collect the participants' socio-demographic characteristics, employment status, medical history, awareness, and knowledge about VV. SPSS was used to analyze the results. Chi-square test and unpaired t-test at a 0.05 level of significance were used to assess the association of different factors and the participant's diagnosis with VV.

Results: A total of 1,754 individuals (993 females) participated in the study. The most frequent age groups were 25-29 years (22.6%) and 40-44 years (20.5%). Most participants (85.6%) had a university degree or higher. More than half of the participants (58.4%) were in the education field. The prevalence of VV among all participants was 10% and 13.1% among the teachers. The Chi-square test indicated that the significant risk factors of VV among the participants were being a female ($p < 0.001$), older age ($p < 0.001$), lower educational level ($p < 0.001$), smoking ($p < 0.001$), lower exercise level ($p < 0.001$), long duration of standing at work ($p = 0.002$), being a teacher ($p < 0.001$), having received prior hormonal treatment ($p = 0.002$), family history with VV ($p < 0.001$), longer duration of household chores ($p < 0.001$), and being at menopause ($p < 0.001$). Unpaired t-test results indicated that those with higher BMI, number of pregnancies, and number of children had a significantly higher prevalence of VV.

Conclusion: The prevalence of VV in the current study is comparable to previous studies. Many significant modifiable VV risk factors were identified. The participants' awareness and knowledge about VV causes, symptoms, and prophylactic measures were not adequate in some aspects. Increasing the general population's awareness about VV using simple methods is warranted in an attempt to reduce the prevalence of VV and its complications.

Keywords: Varicose veins, teachers, Saudi Arabia

Introduction

Varicose veins (VV) or varices are defined as palpable, distended, often with tortuosity of subcutaneous veins for more than three millimeters in diameter (computed in an upright posture), which present mainly in the lower limb including great saphenous and small saphenous veins, tributaries of saphenous, and other superficial leg veins(1). Advanced age, female sex, pregnancy, family history of VV, chronic constipation, increased height, obesity, deep vein thrombosis, arteriovenous shunting, and congenital valvular dysfunction are considered risk factors for VV(1–3). In addition, occupation-related factors were mentioned in several studies including standing for long hours and heavy lifting (4,5).

Patients with VV are often asymptomatic. Despite that, VV can cause various symptoms, including swelling, aching, throbbing, leg fatigue, and night cramps, but the cosmetic issue remains the main concern of the patient.(6,7). At the global level, several studies have estimated the prevalence of VV. In the United States, VV disease occurred in 23% of adults with a higher incidence in women(2,3). Another study done in Brazil showed the VV prevalence was 47.6% (8). Another Russian study reported the VV prevalence as 29% among the population (9). Locally, a study was performed in Riyadh city that calculated the VV prevalence as 47.6% among female adults(10). Also, a study on school teachers in Abha showed the VV prevalence to be 42%, with a high prevalence among females, while 5% of VV patients were unaware of their illness(11).†

In the Kingdom of Saudi Arabia (KSA), several studies have estimated the prevalence of VV and the awareness of this illness, but most of this research was directed to selected populations. In addition, no study compared the prevalence of VV between the general population and school teachers who are considered at a high-risk occupation to develop VV(11–13). Moreover, the research in the general population and teachers' awareness of VV is limited. Such research is particularly important as many of the VV risk factors are modifiable which means that the individual awareness of these factors may reduce his/her risk of having VV. Furthermore, unawareness of VV symptoms may delay the seeking of treatment which can cause serious consequences such as hemorrhage, progressive skin changes that can lead to ulceration(14), and blood clots(15).

In view of the above, this study aimed in to investigate the prevalence and awareness of varicose veins (VV) among teachers and the general population of Taif city and find out the correlation and differences between teachers and other Taif residents with VV along with their socio-demographic characteristics.†

Methods

This was a cross-sectional, observational, survey-based study conducted in Taif city, Saudi Arabia, from July 2021 to October 2021. Study ethical approval was obtained from Taif University's Institutional Research Board.

2.1 Study instrument

An electronic structured self-administered questionnaire was constructed using Google Forms. The questionnaire link was distributed to school teachers and the general population of Taif city. The enrolled participants were males and females aged between 25 and 60 years, excluding pregnant females.

The questionnaire included a brief introduction describing study objectives and emphasized the confidentiality of the participants. Participants were informed that completing the questionnaire represents consent to participate in the study.†

The questionnaire was developed based on two previously validated questionnaires used in studies assessing the prevalence of VV among 366 nurses in Riyadh, Saudi Arabia, and VV awareness among 50 dental students in Tamil Nadu, India(16).

The first part of the questionnaire gathered data on the socio-demographic characteristics of the participants, including gender, age, marital status, educational level, and nationality. The second part collected information about the participants' behavior and health, including exercise, smoking habits, weight, height, comorbidities, gravidas/parities numbers, and hormonal therapy and contraceptive pills. Additionally, the participants were asked about work hours, hours of standing and sitting, and lifting heavy objects. Also, the participants were asked if they had previously been diagnosed with VV. Finally, the questionnaire evaluated the participants' awareness of VV, including the knowledge source, signs/symptoms, etiology, and preventive methods.

2.2 Sample size

The sample size required for this study was calculated using the calculation equation. The minimum sample size was estimated to be 384 from the general population and 376 from schoolteachers with a confidence level of 95% (CI-95%) and a 5% margin error. However, the number of participants involved in this study was 1,754. A simple random sampling method was used in this study.

2.3 Statistical analysis

Data analysis was conducted using SPSS version 28. Descriptive statistics were used to present the data, where numerical data were presented as mean and standard deviation with a 95% confidence interval. In contrast, categorical data were presented as count and percentage. Chi-square test and unpaired t-test at a 0.05 level of significance were used to assess the association of different factors and the participant's diagnosis with VV.†

Results

A total of 1754 individuals (993 females) participated in the study (Table 1). About one-fifth of the participants (22.6%) were aged 25-29 years old, and another fifth (20.5%) were aged 40-44 years old. The nationality of 97.3% of the participants was Saudi, and the majority of the participants were married (72.1%). Most participants (85.6%) had a university degree or higher. Regarding smoking status, 82.9% of the participants were smokers, and 3.9% were past smokers.

Employment data of the participants were collected. The majority of the study sample was employed (84.5%). More than half of the participants (58.4%) were in the education field. A high percentage of the participants (60%) work 4 to 8 hours per day, and the period of standing at work ranges from 1 to 3 hours (35.8%), 4 to 6 hours (34.2%), and 7 hours or more (4.4%).

The most common disease among the participants was diabetes mellitus (8.2%), followed by hypertension (5.4%). About one-tenth of the participants (9.4%) have received hormonal therapy. Female-specific medical history was also collected, and it was found that 18% of female participants use contraceptives, and 16.8% are in menopause. The majority of the female participants gave birth either naturally (41.8%), cesarean (14.1%), or both (16.1%). About half of the female participants (46.9%) reported working 1 to 3 hours on household chores, and 72.8% said they had help doing chores.

As shown in Figure 1, 176 participants (10%) said they had been diagnosed with VV, and 491 participants (28.0%) said that at least one of their family members had been diagnosed with VV.

Table 2 presents the participants' knowledge about VV. More than half of the participants' (64.7%) knowledge source was a doctor. Regarding the main reason for VV, standing for an extended period was the most reported reason (60.8%), and about a fifth of the participants (19.8%) did not know the main reason. The most known symptoms of VV among the participants were bluish lumps in the leg (54.6%), swelling in the ankle and foot (25.8%), and heaviness in the legs (22.9%). Avoiding standing for long periods as a prophylactic measure against VV was recognized by 58.9% of the participants. Thirteen participants (0.7%) believed that VV could not be prevented.

The prevalence of VV among the different subgroups was studied and compared to identify patients' characteristics and lifestyles that could significantly increase the risk of developing VV, as shown in Table 3 and Table 4.

The prevalence of VV among females (15.9%) was significantly higher ($p < 0.001$) than that among males (2.4%).

Regarding participant's age groups, the highest prevalence of VV was reported among patients aged 55 years and more (21.1%) and those aged 50 to 54 years (15.2%), which is significantly higher ($p < 0.001$) than the rates reported among younger patients (2.5% to 12.3%). The prevalence among widowed and divorced patients (30.8%

and 12.8%, respectively) was significantly higher ($p < 0.001$) than that reported among single (2.9%) and married (11.6%) participants.

In addition, educational level was found to significantly affect VV prevalence, where the prevalence among participants with primary education (39.1%) and non-educated participants (20.0%) was significantly higher ($p < 0.001$) compared to participants with intermediate, secondary, and University or higher education (10.7%, 8.9%, and 9.7% respectively).

Smokers reported a significantly higher ($p < 0.001$) prevalence of VV (11.3%) compared to non-smokers (3.9%) and past smokers (2.9%).

Weekly exercising was also found to significantly affect the prevalence of VV, where the prevalence among participants who do not exercise (12.3%) was significantly higher ($p = 0.021$) than the prevalence among participants who exercise for less than 150 minutes weekly (8.6%) and those who exercise for more than 150 minutes weekly (7.7%).

Long duration of standing at work (4 hours or more) was associated with a significantly higher prevalence rate of VV ($p = 0.002$), where the prevalence of VV among participants who stand for one to three hours at work, those who stand for four to six hours, and those who stand for seven or more hours daily was 7.8%, 13.9%, and 14.1%, respectively.

A significantly higher rate of VV was reported among teachers ($p < 0.001$) compared to other participants (6.1%), $p < 0.001$.

Patients who had previously received hormonal treatment reported a significantly higher prevalence of VV (17.1%) compared to those who have not received hormonal therapy (9.3%), $p = 0.002$.

Participants with a family history of VV reported a significantly higher prevalence of the disease (19.3%) compared to those with no family history (6.4%), $p < 0.001$.

Longer duration of household chores (7 hours or more) was associated with a significantly higher prevalence of VV (31.1%) compared to shorter durations (11% to 18.1%), $p < 0.001$.

Women in menopause reported a higher prevalence of VV (29.3%) compared to other women (13.2%), $p < 0.001$.

Patients with VV reported a significantly higher mean \pm SD BMI (29.8 ± 5.2 kg/m²) compared to those without VV (27.4 ± 6.0 kg/m²), $p < 0.001$.

In addition, the mean \pm SD number of pregnancies reported among women with VV (5.2 ± 2.8 pregnancies) was significantly higher than that among women without VV (3.2 ± 2.8 pregnancies), $p < 0.001$. Similarly, the mean \pm SD number of children of women with VV (4.2 ± 2.3 children) was significantly higher than that among women without VV (2.6 ± 2.3 children), $p < 0.001$.

On the other hand, participants' nationality, number of working years, number of daily working hours, number of sitting and rest hours at work, lifting heavy things regularly at work or home, employment status, and using contraceptives were found to have no significant effect on the prevalence of VV ($p > 0.05$). More details are provided in Table 1.

Table 1: Baseline Characteristics of participants (n=1754)

Study variables	Frequency	Percent (%)
Age (years)		
25 to 29 years	397	22.6
30 to 34 years	152	8.7
35 to 39 years	201	11.5
40 to 44 years	359	20.5
45 to 49 years	268	15.3
50 to 54 years	282	16.1
55 to 60 years	95	5.4
Gender		
Male	761	43.4
Female	993	56.6
Nationality		
Saudi	1707	97.3
Not Saudi	47	2.7
Marital Status		
Divorced	78	4.4
Married	1265	72.1
Single	385	21.9
Widowed	26	1.5
Educational Level		
Intermediate	28	1.6
Not educated	10	0.6
Primary	23	1.3
Secondary	192	10.9
University or higher	1501	85.6
Are you a smoker?		
Yes	1454	82.9
Past Smoker	68	3.9
No	232	13.2
For how long do you exercise weekly?		
I don't exercise	746	42.5
Less than 150 minutes	723	41.2
More than 150 minutes	285	16.2

Figure 1 Varicose veins history among study participants

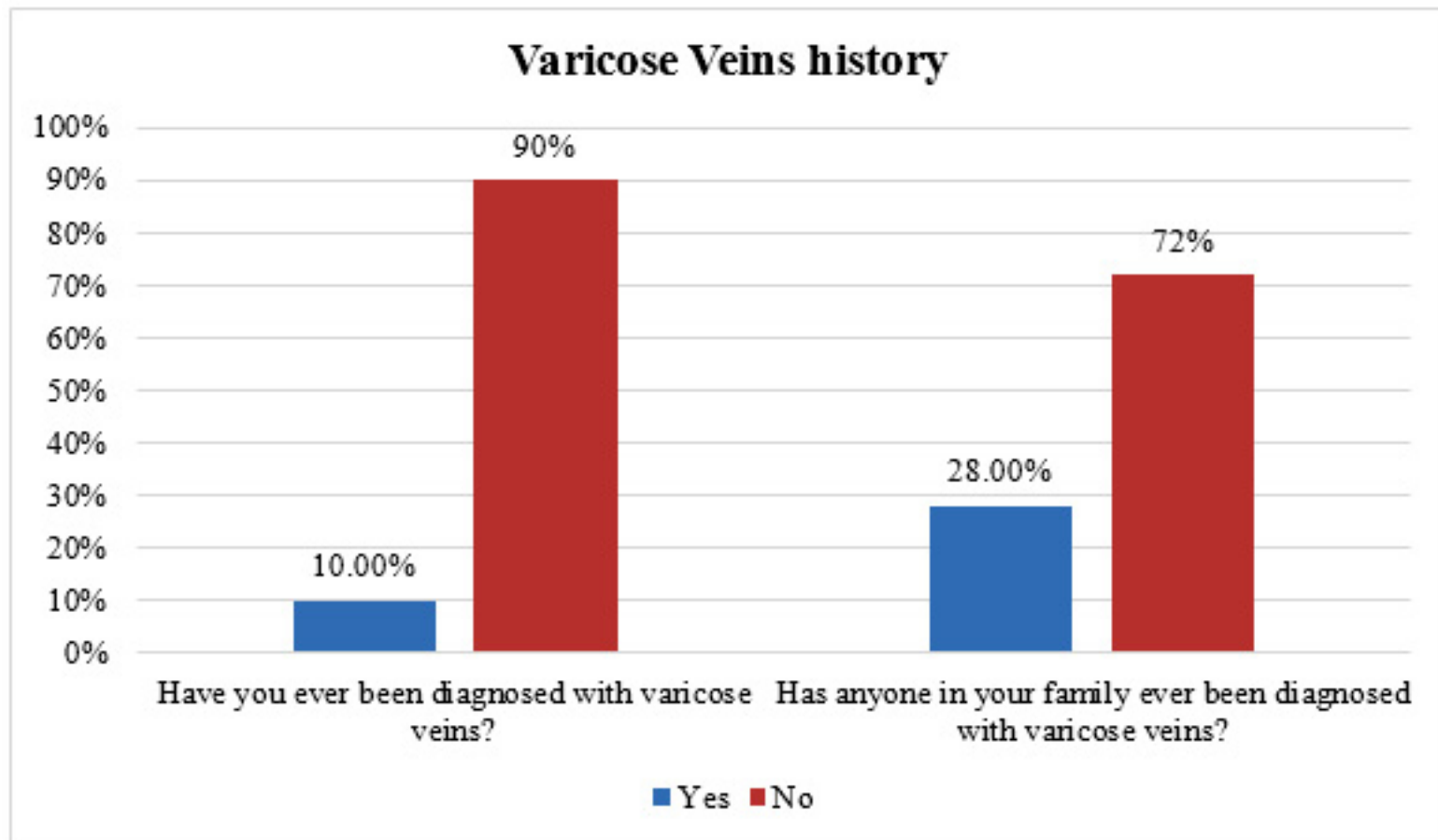


Table 2: Participants' knowledge about varicose veins (n=1754)

Study variables	Frequency	Percent (%)
What is the source of your knowledge of varicose veins?		
Doctor	1135	64.7
Varicose veins patient	155	8.8
Friends/ colleagues	117	6.7
Social media	91	5.2
Medical books and journals	69	3.9
Other	64	3.6
Family member with VV	53	3.0
Medical campaigns	41	2.3
What do you think is the main reason for varicose veins?		
Standing for a long period	1066	60.8
I don't know	347	19.8
Obesity	201	11.5
Hereditary	86	4.9
Aging	46	2.6
Previous injury	8	0.5
What do you think are the symptoms of varicose veins?		
Bluish lumps in the leg	962	54.8
Swellings in the ankle and foot	453	25.8
Heaviness in legs	402	22.9
Skin discoloration around the varicose veins	321	18.3
Feeling of discomfort	289	16.5
Leg pain and itching	247	14.1
Ulcer around the varicose area	103	5.9
I don't know	378	21.6
What do you think are the prophylactic measures against varicose veins?		
Avoid standing for long periods	1033	58.9%
Exercise to strengthen leg muscles	857	48.9%
Maintaining a healthy body weight	745	42.5%
Elevating legs while resting or sleeping	420	23.9%
Wearing compression stockings	283	16.1%
The disease can't be prevented	13	0.7%
I don't know	279	15.9%

Table 3: Patients' characteristics that could impact the prevalence of varicose veins (n=1754)

Have you ever been diagnosed with varicose veins?		Yes		No		Total	P-value
		Count	%	Count	%		
Gender	Female	158	15.9	835	84.1	176	<0.001
	Male	18	2.4	743	97.6	1578	
Age (years)	25 to 29	10	2.5	387	97.5	397	<0.001
	30 to 34	11	8.0	141	92.8	152	
	35 to 39	16	12.0	185	92.0	201	
	40 to 44	43	7.2	316	88.0	359	
	45 to 49	33	12.3	235	87.7	268	
	50 to 54	43	15.2	239	84.8	282	
	55 to 60	20	21.1	75	78.9	95	
Nationality	Saudi	172	10.1	1535	89.9	1707	0.725
	Not Saudi	4	8.5	43	91.5	47	
Marital Status	Divorced	10	12.8	68	87.2	78	<0.001
	Married	147	11.6	1118	88.4	1265	
	Single	11	2.9	374	97.1	385	
	Widowed	8	30.8	18	69.2	26	
Educational Level	Intermediate	3	10.7	25	89.3	28	<0.001
	Not educated	2	20.0	8	80.0	10	
	Primary	9	39.1	14	60.9	23	
	Secondary	17	8.9	175	91.1	192	
	University or higher	145	9.7	1356	90.3	1501	
Are you a smoker?	Yes	165	11.3	1289	88.7	1454	<0.001
	Past Smoker	2	2.9	66	97.1	68	
	No	9	3.9	223	96.1	232	
For how long do you exercise weekly?	I don't exercise	92	12.3	654	87.7	746	0.021
	Less than 150 minutes	62	8.6	661	91.4	723	
	More than 150 minutes	22	7.7	263	92.3	285	
Number of working years	1 to 5	9	5.8	145	94.2%	154	0.051
	11 to 15	18	9.7	167	90.3	185	
	16 to 20	18	10.1	161	89.9	179	
	21 to 25	27	10.1	241	89.9	268	
	26 to 30	34	17.1	165	82.9	199	
	6 to 10	25	11.6	190	88.4	215	
	> 30	12	11.4	93	88.6	105	
Number of daily working hours	4 to 8 hours	118	11.2	935	88.8	1053	0.298
	Less than 4 Hours	4	5.5	69	94.5	73	
	More than 8 hours	21	11.7	158	88.3	179	
How many hours do you stand at work	1 to 3 hours	49	7.8	579	92.2	628	0.002
	4 to 6 hours	83	13.9	516	86.1	599	
	7 or more	11	14.1	67	85.9	78	
How many hours of sitting and rest at work?	1 to 3 hours	115	11.1	917	88.9	1032	0.911
	4 to 6 hours	25	10.3	217	89.7	242	
	7 or more	3	9.7	28	90.3	31	
Does your job require heavy lifting on a regular basis?	Yes	11	10.3	96	89.7	107	0.815
	No	132	11.0	1066	89.0	1198	
Are you a teacher?	Teacher	130	13.1	866	86.9	996	<0.001
	Other	46	6.1	712	93.9	758	
Are you employed	Employed	146	9.9	1336	90.1	1482	0.552
	Unemployed	30	11.0	242	89.0	272	

Table 3: Patients' characteristics that could impact the prevalence of varicose veins (n=1754) (continued)

Have you ever been diagnosed with varicose veins?		Yes		No		Total	P-value
		Count	%	Count	%		
Have you received any hormonal treatment?	Yes	28	17.1	136	82.9	164	0.002
	No	148	9.3	1442	90.7	1590	
Has anyone in your family been diagnosed with varicose veins?	Yes	95	19.3	396	80.7	491	<0.001
	No	81	6.4	1182	93.6	1263	
Are you aware of varicose veins?	Yes	101	16.3	518	83.7	619	<0.001
	No	75	6.6	1060	93.4	1135	
Does anyone help you with household chores?	Yes	119	16.5	604	83.05	723	0.440
	No	39	14.4	231	85.6	270	
Household chores hours	1 to 3 hours	55	11.8	411	88.2	466	<0.001
	4 to 6 hours	62	18.1	280	81.9	342	
	7 or more	32	31.1	71	68.9	103	
	None	9	11.0	73	89.0	82	
Does your work at home require carrying heavy things regularly?	Yes	39	18.2	175	81.8	214	0.296
	No	119	15.3	660	84.7	779	
Do you use contraceptives?	Yes	32	17.9	147	82.1	179	0.427
	No	126	15.5	688	84.5	814	
Did your period stop (menopause)?	Yes	49	29.3	118	70.7	167	<0.001
	No	109	13.2	717	86.8	826	
Type of previous delivery	Both	34	21.3	126	78.8	160	<0.001
	Cesarian	17	12.1	123	87.9	140	
	Natural	98	23.6	317	76.4	415	
	No previous pregnancy	9	3.2	269	96.8	278	

*Chi-square test at a 0.05 level of significance.

Table 4: Factors affecting the prevalence of varicose veins

Have you ever been diagnosed with varicose veins?	Yes		No		Total	P-value*
	Mean	SD	Mean	SD		
BMI (kg/m ²)	29.78	5.15	27.43	5.98	1754	<0.001
Number of pregnancies	5.21	2.84	3.22	2.83	993	<0.001
Number of children	4.16	2.25	2.58	2.29	993	<0.001

*Unpaired t-test at a 0.05 level of significance.

Discussion

Prevalence among the general population

One-tenth of the study participants reported that they were diagnosed with VV. A similar percentage (11%) was reported by Al-Ghamdi et al., who studied the prevalence of VV among the general population in Saudi Arabia (17). Compared with the findings of studies conducted in the Middle East, the prevalence of VV in the current study was lower than that reported in an Iraqi study that assessed the VV among different occupational backgrounds (19.5%)(18). Likewise, a higher prevalence of VV was observed among Women of Childbearing Age Attending a Primary Health Care Unit in Cairo, Egypt (51.1%)(19).

VV risk factors

In line with several other studies(12,20,21), the current study results indicated that being a female can significantly increase the risk of having VV compared to males. The researchers attribute this association to the female sex hormones, progesterone, and estrogen, which affect the vascular smooth muscle(22). The hypothesis of hormonal involvement in the increased risk of VV can be supported by this study's results, as those who received hormonal treatment before reported a significantly higher prevalence of VV.

Moreover, the number of pregnancies and children was significantly associated with a higher prevalence of VV among females. So, it may contribute to the greater predominance of VV in females. The association between the number of pregnancies and VV is supported by the findings of a systemic review and meta-analysis conducted by Ismail L. et al. that analyzed nine studies enrolling 17,109 women(23).

Another well-known risk factor of VV that the current study confirmed is older age(21,24–26). Age-related increases in the risk of VV can be linked to calf muscle weakness, a decline in vein matrix components(27), and a decrease in physical activity(28).

The heritability component for VV predisposition has been proposed for decades(24,29–31). Among the participants of this study, those with a family history of VV had a significantly higher prevalence of VV. Similarly, a significant relationship was observed in a study conducted in India, where out of 216 VV patients, 132 patients had a family history of VV(32). However, reporting VV family history is subject to bias(33), which casts doubt on the credibility of such findings and warrants more studies in this area.

Despite having many non-modifiable risk factors, a healthy lifestyle can decrease the risk of developing VV. A significant increase was observed in the prevalence of VV in those who do not exercise regularly compared to those who exercise more or less than 150 minutes per week. Several studies have assessed the protective role of regular exercise against VV. In line with this study, Abelyan G et al. reported that regular exercise in the form of walking for five days or more weekly might decrease

the odds of having VV(34). On the contrary, there was no significant correlation between exercise and the development of VV in the study of Yun et al. (35). This contradiction may be attributed to the differences in the definition of regular exercise among these studies.

However, regular exercise can lead to weight loss and a decrease in BMI, which was found to be a significant risk factor for VV in this study. Obesity can lead to systemic inflammation, which is a proposed cause of VV(36). This can be supported by the research that declares VV as the most advanced disease among obese patients(37) and the established significant correlation between the BMI value and VV clinical severity (38).

Similar to obesity, smoking can cause systemic inflammation in addition to venous endothelial injury and increase the risk of VV(36). In accordance with this, in the current study, the smokers reported a significantly higher VV prevalence than non-smokers and past smokers. Likewise, a study conducted on a sample of the Egyptian population reported 2.53 times higher odds of lower limb VV for smokers than ex-smokers/non-smokers(39).

In literature, standing for long periods is the most mentioned risk factor for VV(17,37,39–42). In the current study, the duration of standing for 4 hours or more was significantly associated with a higher prevalence of VV. A threshold of 3 to 4 hours of standing was mentioned in a systemic review that assessed the relationship between lower limb VV and occupational constraints among working adults(41). In a more in-depth analysis of the correlation, a cross-sectional conducted in Dhulikhel hospital reported that the odds of having VV increase 27 times for every hour increase in standing time per day(40).[†]

The participants' knowledge about VV

More than half of the participants were aware that standing for long periods is the main reason for VV, and about one-fifth did not know the main reason. As it is a modifiable risk factor, the significant role of standing for long periods should be more known.

The participants' knowledge about the VV symptoms was not satisfactory regarding bluish lumps in the leg. VV symptoms were known by less than one-third of the participants. As VV can get worse if not treated and the VV symptoms may vary from one patient to another, the awareness of all VV symptoms may lead the patient to seek treatment earlier and prevent the VV complications(14).

In light of these results, educational campaigns are warranted. These campaigns should be targeted to spread knowledge about the VV risk factors and how to improve them. Several easy-to-apply prevention methods were mentioned in the literature, including regular exercise for 15–20 mins a day, uplifting leg regularly, maintaining an ideal weight, and consuming a healthy diet including high fiber and low salt diet(37).[‡] As a guideline for such campaigns, the structured teaching program implemented in Chennai, India, can be followed as it was found to be

highly effective in improving the participating teachers' knowledge about VV prevention and management.

According to the current study results, it is worth noting that easy-to-understand language should be used in addressing the general population as VV is more prevalent in the lower education class. Additionally, as doctors were the main source of information about VV for the participants in this study, healthcare professionals should activate their roles in increasing awareness about VV and its risk factors.

Prevalence among teachers

Even though a school teachers' job is a stressful profession with a large workload(43), to date, only a few studies have been done to assess the schoolteachers' health. In terms of VV, of which school teachers may have many of its risk factors, the studies that have addressed this problem are much fewer.

Teaching involves a long duration of standing with limited free time to exercise, which are both proven risk factors for VV. Among the current study participants, school teachers had a significantly higher VV prevalence than other professions. However, the prevalence is lower than the one reported among teachers in Abha, Saudi Arabia (13.1% vs. 42%)(11). Likewise, Ilyas et al. reported a 37.8% prevalence among teachers in Lahore, Pakistan(44).

Regarding participants with different occupations, the nurses in Riyadh, Saudi Arabia, had a lower prevalence of VV (11%)(16). Similarly, the observed prevalence among traffic police in Nepal was 12%(45). On the other hand, female hairdressers had a much higher prevalence of VV (47.7%)(46). The common contributor between these occupations is long-standing hours. Such high rates can be reduced by trying to improve other risk factors like smoking and BMI and minimize the periods of standing as much as possible.

Limitations

The study data results are based on a self-administered questionnaire, which may result in recall and social desirability bias. Additionally, only those interested in the topic participated in the study, which may result in a selection bias. However, the enrolled sample size is much larger than the minimum required sample size which might minimize the effect of such limitations.

Conclusion

The current study results are consistent with previous studies regarding the prevalence of VV among the general population; the higher prevalence among school teachers, and the VV significant risk factors. We recommend education programs for the general population about the risk factors and how to prevent the development of VV. Additionally, the risk of VV can be minimized by improving work conditions for those who have to work standing for long hours, especially school teachers.

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Awareness of cast complications among fracture patients in Aseer region, Saudi Arabia

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Abstract

Background: A fracture is a break in the bone that is either partial or entire. The use of a plaster cast to immobilize damaged bones causes a progressive loss of motion range and muscular strength as well as skin and circulation complications. There is much research on prevalence of complications of casts but there has been no study done on awareness or prevalence of cast complications.

Objective: The objective was to determine the prevalence of awareness of cast complications among fracture patients.

Methods: This cross sectional study was conducted in Aseer region of Saudi Arabia. Sample size of 350 was calculated by self-made questionnaire. Quantitative analysis was done on Social Package of Statistical Sciences.

Results: Results showed a lack of awareness of cast complications; only half of the respondents knew that gypsum casts may cause skin ulcers (50.0%) and joint stiffness (48.0%). Most respondents were unaware that a cast may cause skin burns (74.3%) and ischemia (61.7%).

Conclusion: It is concluded that most of the participants were not aware of the complication of cast, so it is necessary to provide information of those patients who have fractures and will go for a cast so that we can diagnose complications and treat on time.

Key words: fracture patients, cast complications, Saudi Arabia

Introduction

A fracture is a break in the bone that is either partial or entire. Whenever a fracture occurs, it can be open or closed. A complex fracture is an open fracture; a serious wound exposing the bone through skin, or the bone pierces through all the skin. Although the bone is usually shattered, the skin may stay unchanged. Fractures go by many different names. Transverse, Spiral, Oblique, Compression, Comminuted and Segmental fractures are some of the most prevalent types which may occur (1).

Bone fractures often trigger serious functional impairments and are a major contributor to the manifestations of disability and disease load in all parts of the world. However not particularly evaluated as bone fractures, unintended accidents and transportation traumas both had a 20% to 17% decline in age-standardized DALY (disability-adjusted life years) percentages from 1990 to 2015, according to the Global Burden of Disease Study 2015. Considering significant reductions in age-standardized injury burden, overall rate of advancement for such sources of DALYs has indeed been comparably moderate, resulting in small alterations in the proportion of the total burden owing to injuries over the past two decades(2).

The independent contribution of pathophysiologic mechanisms to injury-related fractures varies by gender and ethnicity throughout the age spectrum. Males had a greater fracture frequency until about the age of 62, when it began to split in women from around age of 45. Hospitalization data for automobile traffic-related fractures is skewed. Ambulatory fractures were likely multifactorial in all populations during the average lifespan, contributing to 8.8 percent and 2.5 percent of all fractures, respectively(3,4).

The surgeon should address the difficulties in establishing appropriate stabilization in addition to the problems associated with inadequate formability while treating the musculoskeletal damage. External fixation with fine-wire fixators and a ring frame may remain a possibility in fracture with severe bone attrition to facilitate soft-tissue repair, especially in weight-bearing regions or around movable joints. Plating is yet another option for internal fixation in open lower - limb fractures. However it is potentially infectious and may impair osseous blood flow. Nevertheless, plating has been used as an adjuvant to support intra - medullary nailing in the current therapy of open tibial fractures(5).

The use of a plaster cast to immobilize damaged bones causes a progressive loss of motion range and muscular strength. As a culminate, it is fair to expect that a shorter time of immobilization in a plaster cast will result in a better functional status. Several investigations have demonstrated that early mobilization resulted with the same radiographic results as standard plaster cast stabilization in displaced or mildly displaced distal radius fractures. Reduced distal radius fractures can also be treated with plaster cast removal at three weeks or with physical bracing without endangering the fracture location. Furthermore, there is some dispute about the impact on functional outcomes(6).

Hook splints position is critical because incorrect position might result in excessive discomfort, malreduction, and tissue disintegration. Plaster cast soft tissue issues are the second leading iatrogenic reason for recommendation to surgery, following fractures. Poor splinting procedures are frequent, with one research finding that 93% of individuals had inadequate splinting(7). A cast can be excessively tight or too loose and the patient should be advised to notify any such situation in order for the cast to be changed. Casting problems must be logged and reported, and the practitioner should not ignore them. The recognition of these issues is critical to their management(8).

Tissue deterioration, extreme pain, skin conditions, pressure sores, compartment syndrome, soft tissue infections, cast saw burns, non-union, malunion, prolonged union, limb edema, and partial paralysis can all result from inadequate pre-, intra-, and post-casting treatment. A survey of individuals with casts found that 25% of them had cast-related problems. A prospective study found that several patients wearing casts visit emergency rooms owing to issues such as a damp cast, a broken, tight or loose cast, and soreness(9,10).

Casting is repeatedly alluded to as a conservative therapy, however clinicians and clinicians-in-training must keep in mind that this alternative is not without risks. Moreover, the goal of this research is to advise the patient and family or caregivers about the complications of cast immobility. Such communication will diminish the presumption that these procedures are risk-free and will assist the patient and family/caregiver to notice the warning indications of difficulties.

Location of fracture	Children and adolescents	Adult	Elderly
Skull and Facial	21.5%	14.3%	4.2%
Lower extremity	37.5%	48.5%	66.9%
Upper extremity	30.2%	22.7%	15.1%
Neck and trunk	10.8%	14.%	13.5%

Methodology

It was a cross-sectional study which was done in Aseer Region of Saudi Arabia. The population included in this study were those patients or caregivers of those patients who had any type of fracture and any type of cast that was applied for the treatment. All age groups and both genders were included. Patients who had open reduction or internal fixation and those who did not reside in Aseer region were excluded. Non probability convenient sampling technique was used for data collection and sample of 350 participants was collected by a custom-designed questionnaire and survey through Google forms was done on those who met our inclusion and exclusion criteria. Data was entered in SPSS version 25. Mean and standard deviation was used for quantitative while frequency and percentage were used for qualitative variables. Graphs were formulated afterwards and prevalence of awareness of cast complication among fractured patients in Aseer Region was assessed.

Results

The study enrolled 350 participants; 61.4% were male. Age groups ranged from < 18 years to 80 years, and most respondents (39.1%) being aged 18-25 years. Socio-demographic details of the study sample are shown in Table 1.

Table 2 shows the clinical data of the study sample. A total of 15.4% reported having chronic disease. One-third (33.4%) had hand injury, one-fourth (25.1%) had ankle and foot injury, and the remaining reported injuries were in different body parts. Duration of Gypsum cast ranged from one week (5.4%) to more than six weeks (16.0%), and most respondents reported a cast duration of three weeks (22.6%) and four weeks (20.9%) (Table 2).

A total of 30.9% had complications related to gypsum cast. The analysis of perceived knowledge of gypsum cast related complications revealed that 21.1% perceived their knowledge as weak. Only 38.3% reported being informed about complications of treatment with a gypsum cast by the treating team.

The study questionnaire included seven main questions testing knowledge of the most frequent complications of gypsum cast. Responses are summarized in Table 4. Awareness of gypsum cast complications was lacking in most questions. Only a half of the respondents knew that gypsum casts may cause skin ulcers (50.0%) and joint stiffness (48.0%). Most respondents were not aware that a cast may cause skin burn (74.3%) and ischemia (61.7%). In addition, nearly a half (48.0%) responded with "I do not know" to the question about complications of gypsum cast that they know. An illustration of self-reported gypsum complications is shown in Figure 1.

Independent samples t-test for the sex category and analysis of variance for the age category showed that there was no difference in the mean score of knowledge of gypsum cast complications between male and female respondents ($t = -1.09$, $P = .28$) and between different age groups ($F = 1.09$, $P = .39$).

Table 1. Socio-demographic details of the study sample (n = 350).

Variables	Frequency	Percent
Sex		
Male	215	61.4
Female	135	38.6
Age group (years)		
< 18	104	29.7
18-25	137	39.1
26-40	71	20.3
41-60	32	9.1
61-80	6	1.7

Table 2. Clinical data of the study sample (n = 350).

Variables	Frequency	Percent
Do you suffer from chronic diseases?		
No	296	84.6
Yes	54	15.4
Type of orthopedic injury		
Hand injury	117	33.4
Ankle and foot injury	88	25.1
Leg injury	55	15.7
Forearm injury	36	10.3
Elbow injury	21	6.0
Knee injury	16	4.6
Humerus injury	10	2.9
Shoulder injury	7	2.0
Duration of cast		
One week	19	5.4
Two weeks	50	14.3
Three weeks	79	22.6
Four weeks	73	20.9
Five weeks	32	9.1
Six weeks	41	11.7
> Six weeks	56	16.0

Table 3. Information about gypsum cast treatment and its complications (n = 350).

Statements	Frequency	Percentage
Self-reported assessment of knowledge of gypsum cast related complications		
Weak	74	21.1
Good	92	26.3
Very good	99	28.3
Excellent	85	24.3
Were the complications of treatment with a gypsum cast and ways to prevent them explained by the treating physician or the technician applying the gypsum cast?		
No	216	61.7
Yes	134	38.3
Have you had any complications as a result of the cast treatment?		
No	242	69.1
Yes	108	30.9

Figure 1. Self-reported complications of Gypsum cast (n=350).

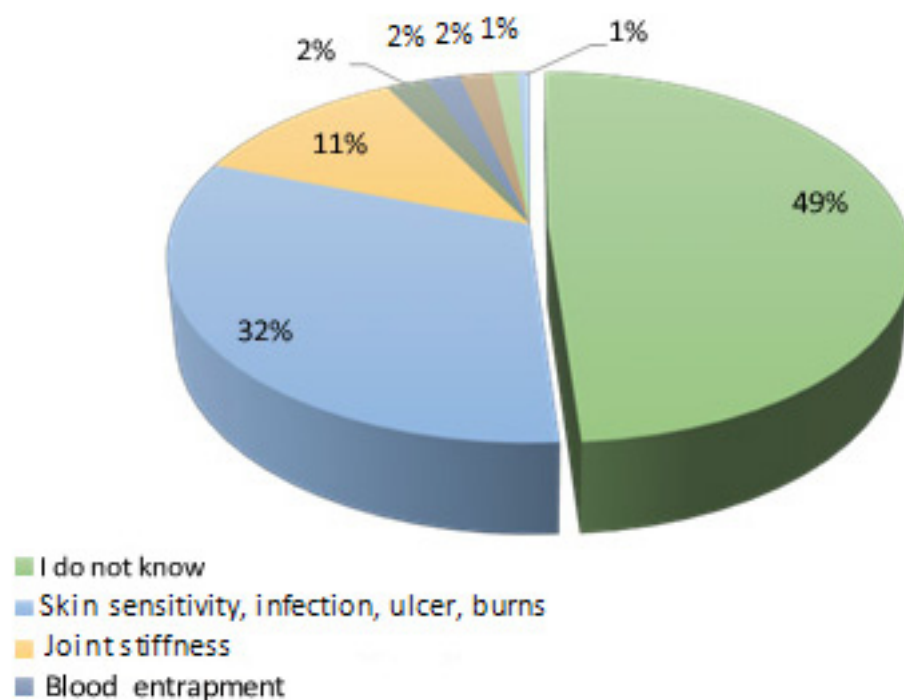


Table 4. Knowledge about different gypsum cast complications (n=350).

Complications	Frequency	Percent
Skin ulcer		
No	175	50.0
Yes	175	50.0
Skin burns		
No	260	74.3
Yes	90	25.7
Lack of blood perfusion to the cast area		
No	216	61.7
Yes	134	38.3
Joint stiffness		
No	182	52.0
Yes	168	48.0
Hypertension and damage to the peripheral nerves		
No	241	68.9
Yes	109	31.1
Skin infection/allergy		
No	211	60.3
Yes	139	39.7
Failure to stabilize the broken bone		
No	174	49.7
Yes	176	50.3

Table 5. Knowledge about gypsum cast complications in different study groups (n=350)

Category	Mean \pm SD	t or F value	P value
All subjects	2.83 \pm 2.19		
Sex			
Male	2.73 \pm 2.73	-1.09	.28
Female	2.99 \pm 2.99		
Age group (years)			
< 18	2.60 \pm 2.05	1.04	.39
18-25	3.09 \pm 2.23		
26-40	2.65 \pm 2.17		
41-60	2.78 \pm 2.37		
60-80	3.50 \pm 2.81		
SD: standard deviation; t: independent samples t-test; F: one-way analysis of variance.			

Discussion

This study was designed to know the awareness of cast complications following fractures. According to results of our study only half of the respondents knew that gypsum casts may cause skin ulcers (50.0%) and joint stiffness (48.0%). Most respondents were not aware that a cast may cause skin burn (74.3%) and ischemia (61.7%). In addition, nearly a half (48.0%) responded with "I do not know" to the question about complications of gypsum cast they know. This percentage is clearly telling us that awareness of cast complications is low and it is a responsibility for healthcare professionals to briefly describe the complications before applying cast to avoid severe complication.

The most prevalent age for fracture according to literature is 9.20% in children and adolescents, 32.20% in adults and 58% in the elderly (3). In comparison our study shows that the percentage of participants who had fractures and had cast application was, children and adolescent 29.7%, adults 68.5% and elderly 1.7% which is not supported by the previous literature.

The most prevalent sites of fracture are forearm and hand 37.4%, ankle 13.8%, tibia and fibula 7.7%, and other areas like spine, ribs, face and skull 41.1%(11). Our study shows that one-third (33.4%) had hand injury, one-quarter (25.1%) had ankle and foot injury, and the remaining reported injuries were in different body parts. Casts do not come devoid of risks and problems; and the chance of complications increases when casting is done by inexperienced practitioners. Specific methods and materials of appropriate cast and splint placement are indicated to reduce complications and morbidity in individuals who are at a high incidence of casting and splinting issues. The comatose multi trauma patients, the patient with diabetes and hypertension, the patient with a history of trauma, the intellectual and developmental disabilities patient, and the patient with spasticity are all

at significant risk(12). In relation to this, our study tells us that 15.4% of participants suffered from chronic diseases like HTN, Diabetes, Hyperthyroidism, Asthma, Multiple sclerosis and history of orthopedic injuries and almost thirty percent develop complications after cast application. Also gypsum cast was used in those participants who were included and cast application was done by trained physicians.

Whenever casts are applied to immobilize bones after a fracture, significant problems might occur. A custom-designed survey was used to interview 109 patients of more than eighteen years from three Western Australian hospital systems. The retrieval of seven areas of information, particularly pain, edema, cast care, itchiness, neurological signals, vascular indications, and exercise or rest, was employed to assess patients' comprehension of cast care and potential consequences. Patient memory of knowledge on cast care and potential problems was less than 60%. The availability of written material was strongly connected with a greater knowledge of potential consequences(13). In relation our study included 350 participants of the age group of 0 to 80 years and our result also significantly correlates with this study as almost 55-60% participants overall had awareness regarding cast complications.

Soft-tissue injuries secondary to casting occur frequently, and can occur at any time during the casting period (14). Including all patients, the predicted risk of cast-related cutaneous or neurological problems was 8.9 every 1,000 casts administered. The whole pre - intervention sample had a rate of 13.6 every 1,000 castings, which reduced to 6.6 in the post - intervention group. In the heel-only group, the rate remained 17.1 per 1,000 lower extremity casts administered prior to intervention and 6.8 after treatment(15). In contrast, our study included those who had cast related complications but did not ask the frequency of complications separately.

The most noticeable effect of casting and splinting is compartment syndrome. It is a phenomenon of elevated pressure within a tight area that impairs blood circulation and tissue perfusion, resulting in hypoxia and possibly irreversible harm to the soft tissues inside that area, and most individuals are unaware of how to evaluate problems(16). In relation to this our study results show that only 38.3% of respondents had awareness about this complication.

Thermal damage to the skin as well as ulceration can develop as a result of the casting and splinting procedure. Skin breakdown was the most frequent cause, often induced by focus point stress from a creased, balconette, or underpadded region over a bony prominence or underpinning soft tissue, and clients who suffered from this type of injury were unaware prior to and after applying cast; that may also pertain to research, that only half of the participants were cognisant(17).

Individuals were unaware of the bacterial and fungal infections, as well as the pruritic dermatitis that can occur underneath a splint or cast. An exposed wound is more vulnerable to infection, but the wet, warm environment of a splint or cast might be excellent for infection. Furthermore, joint stiffness is an unavoidable side effect of immobilisation(16). In contrast our study did not ask about bacterial or fungal infection but joint stiffness related to cast was one of our variables which showed that 48.0% participants had awareness of this.

Conclusion

Patient comprehension and awareness of cast care and possible complications was 51%. The availability of basic information was significantly associated with a greater knowledge of potential consequences. The findings suggest that there is a need to develop proper information guidelines regarding cast complications for the patients and caregivers.

Limitations and Recommendations

- Sample size of this study was small so there should be a large sample size because a larger sample size would have shown more clear results.
- It is recommended to conduct a study like this on a larger scale including more hospitals and more regions.
- Adding more variables like socioeconomic status and level of education of participants is recommended to conduct further studies because these variables were relatable to awareness.

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Progesterone Aids in Alleviation of Nicotine Withdrawal Symptoms: A Systematic Review

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Abstract

Background: A systematic review of studies on progesterone's usage in the cure of nicotine craving was undertaken. Progesterone is a steroid hormone that influences the reproductive system as well as γ -Aminobutyric acid type A (GABAA) receptors, glycine, kainite, and nicotinic receptors. It is thought that progesterone might help with nicotine withdrawal symptoms in addicted people.

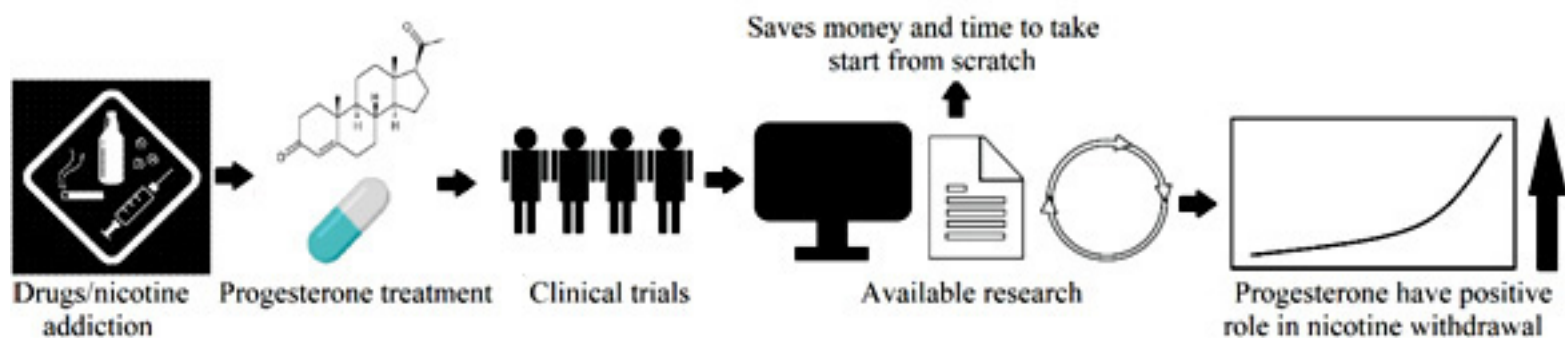
Method: Two authors completed the literature search independently using the Boolean search approach and searching key terms (i.e. progesterone AND treat*, drug addiction AND withdrawal, smok*, nicotine), screened the title, abstract and full-text for data extraction during June 2021. A search in the PubMed, NIH, Elsevier, Scopus, Web of Science, Google Scholar, and Science Direct databases was performed. The review included seven (7) articles out of seventy-eight (78) downloaded articles that met the inclusion criteria. Microsoft Excel and IBM SPSS were used for statistical analysis.

Results: These studies included 147 males and 377 females, out of which 46 were pregnant. The average age ranged between 18 and 45 years. The participants included those who had smoked 10-25 cigarettes/day for a year. The carbon monoxide measuring over 10ppm signifies recent smoking was found in 10% (n=12) participants who were given 400mg progesterone, 11% (n=14) for the 200 mg progesterone, and

13% (n=16) for the placebo groups. The progesterone prescription of 400 mg/day was effective in decreasing cravings to smoke, while the 200 mg dose helped with improving cognitive performance. Females in the progesterone group exhibited significantly lower smoking craving scores than females in the placebo group. A significant difference has been observed in 7-day PPA at week 4 among women i.e. "PRO: 18 (35.3%) vs. PBO: 9 (17.3%), Odds Ratio: 2.61 (95% confidence interval) and $p=0.041$ ", but not among men i.e. "PRO: 13 (23.2%) vs. PBO: 12 (21.1%), 1.13 (0.47, 2.76) and $p=0.782$ ". There was some evidence that PRO delayed relapse in women (Days to Relapse; PRO: 20.5 ± 29.6 vs. PBO: 14.3 ± 26.8 , $p=0.03$) but not in men (PRO: 13.4 ± 25.9 vs. PBO: 13.3 ± 23.8 , $p=0.69$). Nearly half of the females who smoke before pregnancy can quit smoking during pregnancy. However, 40-52% reverts within 2 weeks while 70-80% resumes smoking within a year of childbirth.

Conclusion: In the majority of instances, 200mg was administered, and favorable outcomes were obtained. Although there were no major side effects observed, a few moderate side effects such as breast tenderness were reported in a few individuals. As a result, progesterone therapy helps to alleviate nicotine withdrawal symptoms, lowers smoking intensity, and treats smoking addiction in both men and women.

Keywords: progesterone, prescription, treatment, drug addiction, withdrawal, smoking, nicotine

Graphical abstract (adapted from Rasheed et al., 2022):**Introduction**

The drug addiction has become one of the most serious problems in the contemporary world. Addiction is a lot like other diseases which disrupt the normal and healthy function of an organ in the body but can be preventable and curable in many cases. If left untreated, they can last a lifetime and may lead to death (Alfaifi & El-Setouhy, 2022). Drug addiction remains a substantial problem in the world specially nicotine addiction which is responsible for more than 480,000 deaths per year in the United States. Nicotine is a chemical found in tobacco and cigarettes. Nicotine addiction continues to be the main cause of preventable death in developed countries (Lynch and Sofuoglu, 2010). All the societies are trying hard to resolve it but they have very little success as yet.

Although nicotine use has leveled off in recent years, Perkins (2001) suggest that cigarette smoking is on the rise in young women and teen girls. Women appear to respond less favorably to smoking cessation treatments (Scharf & Shiffman, 2004), despite maintaining their nicotine addiction with lower levels of nicotine intake than men (Zeman et al., 2002). The mechanisms of these gender differences in nicotine addiction are not clear and may include the influence of cyclic changes in levels of the gonadal hormone progesterone across the menstrual cycle and at different hormone transition phases (i.e., adolescence, pregnancy, menopause).

Progesterone is a steroid hormone synthesized in the ovaries, as well as in the adrenal glands. Cyclic changes in progesterone take place during the menstrual cycle, which is divided into four phases: menstruation, follicular, ovulatory, and luteal. During the follicular phase, women have low progesterone levels that are comparable to those in men, less than 1 ng/ml (Pearson et al., 2000). Women have higher progesterone levels than men during the luteal phase of the menstrual cycle (2–28 ng/ml), and especially high levels during pregnancy (9–200 ng/ml; Buffet et al., 1998). The high levels of progesterone and progesterone metabolites fall rapidly and dramatically within 2 weeks following childbirth (Cunningham et al., 2005).

Progesterone have well documented actions on brain functioning, including interactions with multiple neurotransmitter systems affecting the brain reward circuit (Jackson et al., 2006). Cumulative evidence from preclinical and clinical studies suggest that gonadal hormones, especially progesterone, may protect females during initiation and maintenance of tobacco addiction, and may have therapeutic use for tobacco addiction,

especially in female smokers (Allen et al., 2008; Sofuoglu et al., 2009; Sofuoglu et al., 2010). In the brain, progesterone binds to intracellular progesterone receptors found in the hypothalamus and many other brain regions (Brinton et al., 2008).

Progesterone itself or through its active metabolites, allopregnanolone and pregnanolone, interact with many other receptors in the brain including the GABAA, glycine, kainate, sigma1, and nicotinic receptors (Chesnoy-Marchais, 2009; Romieu et al., 2003;). Allen et al. reported that among women trying to quit smoking, those who were assigned to quit during the follicular phase of their menstrual cycle relapsed faster to smoking than those who quit during the luteal phase (Allen et al., 2008). Since the luteal phase of the menstrual cycle is characterized by higher progesterone levels, these findings support the contribution of progesterone to smoking relapse and warrant further studies aiming to better characterize progesterone's role in smoking relapse.

Significance of the research

Although multiple studies have demonstrated the influence of sex and menstrual cycle phase on nicotine withdrawal severity, smoking behavior, and treatment outcomes (Steinberg and Cherek, 1989; Perkins et al., 2000; Snively et al., 2000; Carpenter et al., 2006), but there exists a research gap on association exogenous administration of progesterone with nicotine addiction both in males and females. To fulfill this research gap, a systematic review was conducted of studies on progesterone used to treat nicotine addiction. Progesterone has many unique features as a relapse prevention intervention in postpartum women; it is a natural hormone commonly used by obstetricians and nurse practitioners/midwives, and is safe and well tolerated in this population, including those who are breastfeeding (Goletiani et al., 2007). It is postulated that progesterone can aid in symptoms of nicotine withdrawal in addicted population.

Objective

To investigate whether progesterone aids in alleviation of nicotine withdrawal in addicted population.

Methodology

Ethical review statement

No data was collected from human subjects directly by the authors, however, the research was conducted in adherence to the Declaration of Helsinki.

Data collection

A search in the PubMed, NIH, Elsevier, Scopus, Web of Science, Google Scholar and Science direct database was performed. The search was performed during June 2021 with the relevant keywords i.e. progesterone, treatment, drug addiction, withdrawal, smoking, nicotine. Seventy-eight (78) research articles were downloaded but after checking the inclusion criteria, only seven (7) research articles on progesterone having an association with nicotine withdrawal were selected. Inclusion criteria were specified in advance (Figure 1).

Inclusion Criteria

1. Progesterone and nicotine withdrawal studies of human.
2. Randomized controlled trials, and controlled trials or observational studies with comparators, were included.
3. Original research articles published in PubMed recognized journal.
4. Research articles published since 2009.

Exclusion Criteria

1. Progesterone and nicotine withdrawal studies on animals.
2. Research articles published before 2009.
3. Articles not written in English.

Limitation

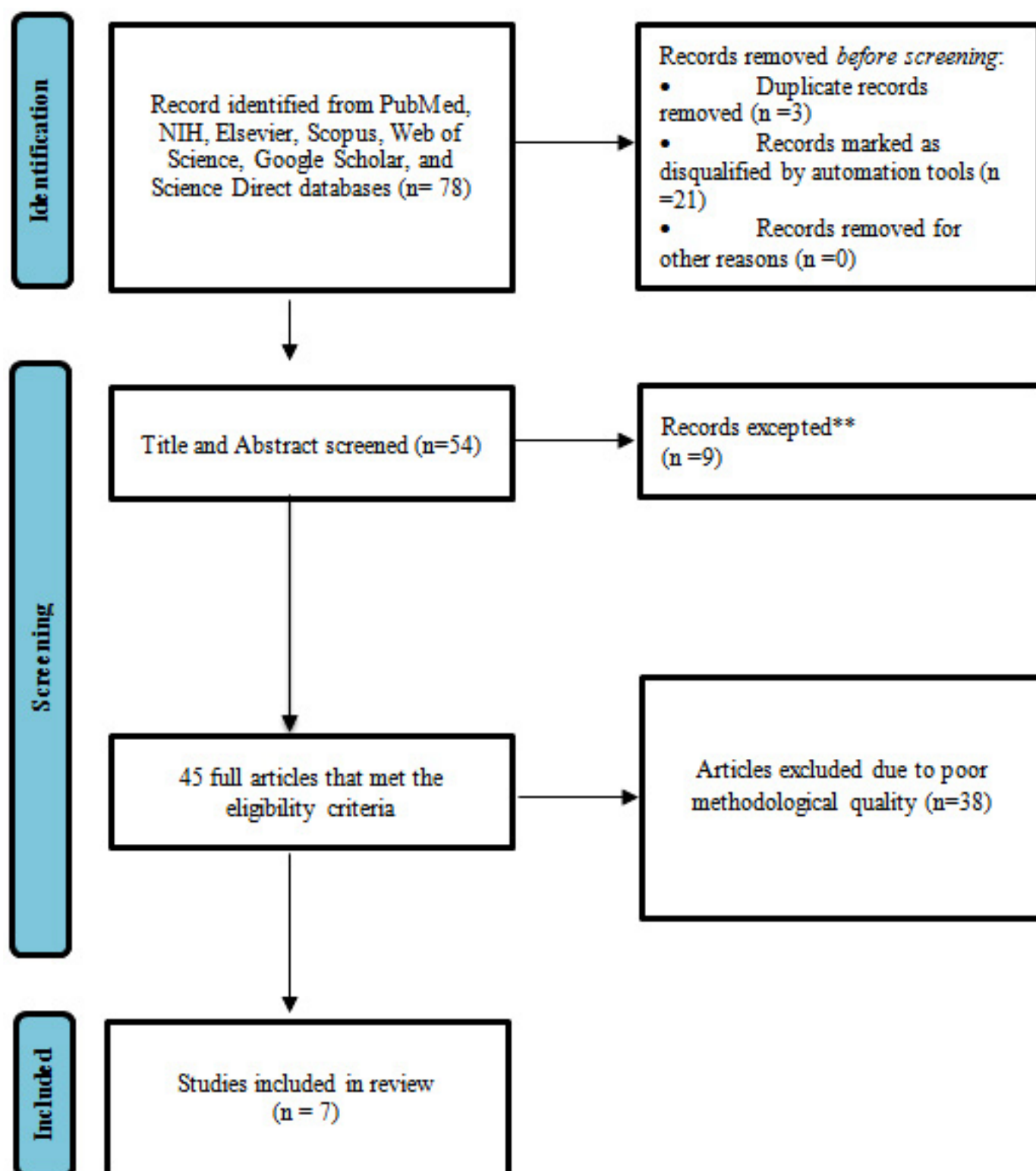
Current research has the following limitations.

1. Studies conducted on human.
2. The search was restricted to publications since 2009.
3. Electronic medical databases for data collection.
4. Ethical approval was not required for this systematic review of published papers.

Statistical analysis

Statistical analysis was implemented through Microsoft Excel (version 2016) and IBM SPSS (version 25) for Windows.

Figure 1. PRISMA flowchart illustrating the study process for systematic review of progesterone effects on nicotine withdrawal. **Records excluded due to unavailability of sufficient data. 7 studies were selected for this review after screening for eligibility



Results

The study conducted by Sofuoglu et al. (2009) was double-blind, placebo-controlled, crossover study. Both physiological and subjective outcomes were measured. Physiological outcomes were systolic and diastolic blood pressure and heart rate while Drug Effects Questionnaire, Brief Questionnaire on Smoking Urges (BQSU), Nicotine Withdrawal Symptom Checklist (NWSC) and Profile of Mood States (POMS), measured the subjective outcomes. Progesterone did not affect the response of nicotine on the physiological measures as compared to placebo ($p > 0.05$ for heart rate, systolic blood pressure and diastolic blood pressure). In case of subjective outcomes progesterone significantly enhanced the “bad effect” ($p < 0.05$) and lowered “drug liking” ($p < 0.05$). BQSU showed a significantly higher total score and score for “urge to smoke for stimulation” in placebo group as compared to the treatment group. POMS and NWSC scales did not show significant differences between the two groups (Table 1).

In another study by Sofuoglu et al. (2011), the effects of 200mg progesterone, 400mg progesterone and placebo were compared. Heart rate and diastolic blood pressure were significantly lower in 200mg progesterone, 400mg progesterone groups as compared to placebo in males. Women showed a significantly lower blood pressure values for 400mg progesterone as compared to placebo. Alveolar carbon monoxide levels indicating recent smoking were significantly lower in 400mg progesterone group (10%) and 200mg progesterone group (11%) as compared to placebo (13%). However, the results were not significant. Saliva cotinine levels and number of cigarettes smoked were also not significant between the 200mg, 400mg and placebo groups. Cognitive performance, measured by Digit Symbol Substitution Test (DSST) showed significantly higher scores in 200mg group as compared to 400mg and placebo groups (Table 1).

In the study by Saladin et al. (2015), plasma ovarian hormone levels in freely cycling female smokers were correlated self-reported abstinence and carbon monoxide levels < 10 ppm. They showed that one standard deviation unit increase in progesterone increased the odds of abstinence by 20% and one SD increase in progesterone to estradiol was associated with 13% increased odds of abstinence (Table 1).

Allen et al. (2016) compared the abstinence at weeks 4 and 12 and relapse rate among the postpartum females who took 200 mg progesterone twice daily and those who took placebo. They found that at week 4, 75% of the women in the treatment group and 68.2% of the females in the placebo group remained abstinent. At 12 weeks, 54.2% of the females in the progesterone group and 40.9% of the women in the control group achieved abstinence (Table 1).

Forray et al. (2017) reported that the women who took progesterone 200mg twice daily were 1.8 times more likely to attain abstinence during eight weeks and took longer to revert back to smoking as compared to placebo group (10 vs 4 weeks). However, these results were not statistically significant. The craving rate reduced by 10% per week, in the progesterone group as compared to the placebo group (Table 1).

Tosun et al. (2020) studied the effect of 200mg twice-daily progesterone tablets on self-reported 7-day point prevalence abstinence, prolonged abstinence urine cotinine levels and breath carbon monoxide levels. They concluded that women in the treatment group had 2.6 times higher chance of achieving 7-day point prevalence abstinence at week 4 as compared to placebo group. All other outcomes were not significantly different between treatment and placebo groups in both males and females (Table 1).

Allen et al. (2020) compared the puff volume between the females taking progesterone and those taking placebo in a double blind, counterbalanced, cross over randomized trial. They concluded that the cumulative puff volume was significantly lower in the progesterone group (1186 ml vs 1486 ml) ($p = 0.01$). The average puff volume and number of puff was also lower in the progesterone group but the results were not statistically significant (Table 1).

Table 2 and Figure 2 summarizes the impact of progesterone from the selected studies and it has been found that five out of seven researches have tested 200mg of progesterone (figure 2a). Figure 2b shows that six in seven studies have reported positive effects of progesterone i.e. aids in alleviation of nicotine withdrawal symptoms. Furthermore, it was noted that only a single study has observed general adverse symptoms, two reported breast tenderness while four did not found any adverse effects.

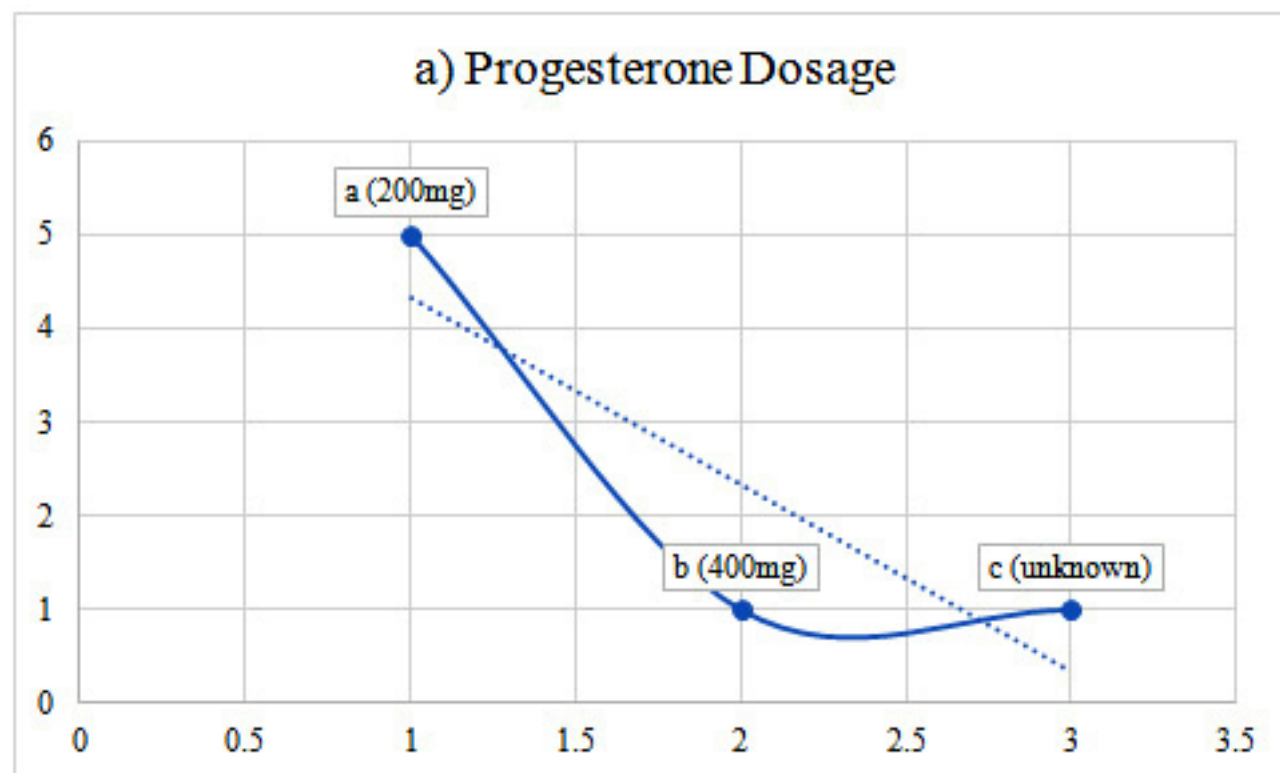
Table 1. Association between progesterone administration and nicotine withdrawal symptoms

Authors	Population	Age	Gender	No. of cigarette smoked/day	Days cigarettes left	Progesterone dosage	Results	Adverse effects
Sofuoglu et al., 2009	12	30-40	6 males & 6 females	15-20	No smoking on experimental day	1 dose of 200 mg progesterone	Progesterone treatment enhanced nicotine's effect in suppressing urges for smoking,	Opposite effects on the aversive and pleasurable effects of nicotine, simultaneously enhancing ratings of "bad effect" while attenuating "drug liking."
Sofuoglu et al., 2011	64	30-35	34 males & 30 females	15-18	The first 3 days of treatment period, smokers abstained from smoking	200 or 400 mg/day progesterone or placebo given in two separate doses	Progesterone at 400 mg/day was associated with reduced urges for smoking but did not change ad lib smoking behavior. Progesterone treatment also attenuated urges for smoking and some of the subjective effects from smoking.	Unknown
Saladin et al., 2015	108	18-45	108 females	≥10/ 17±7.3	Smoked for at least the past 6 months	Varenicline tablets, placebo patches (tablets) and nicotine patches	Increasing levels of progesterone may have a dominant role in the hormonal milieu of free cycling women and that this dominance may yield benefits as they attempt to quit smoking	Unknown
Allen et al., 2016	46	18-35	46 females	10-15	Unknown	200mg twice a day	A higher prevalence of abstinence at week 4 in the PRO group was observed. Less depressive symptoms were reported	Fatigue, nausea, breast tenderness, spotting, weight gain; 10/46 participants reported daily vaginal bleeding
Forray et al., 2017	41	18-42	41 females	≤10	32 weeks	200 mg twice daily	There was a 10% greater decline per week in craving ratings in the progesterone group compared to placebo	No serious adverse events occurred
Tosun et al., 2019	216	18-60 (male), 18-50 (female)	113 males & 103 females	≥5	7 days	200 mg twice daily	200mg twice daily of oral micronized progesterone may be effective for smoking cessation in women, but not in men.	Unknown
Allen et al., 2020	43	18-40	43 females	≥5	Midnight of the experimental day	200 mg twice daily	Progesterone administration has the potential to reduce smoking intensity after overnight abstinence in women of reproductive age.	Breast tenderness

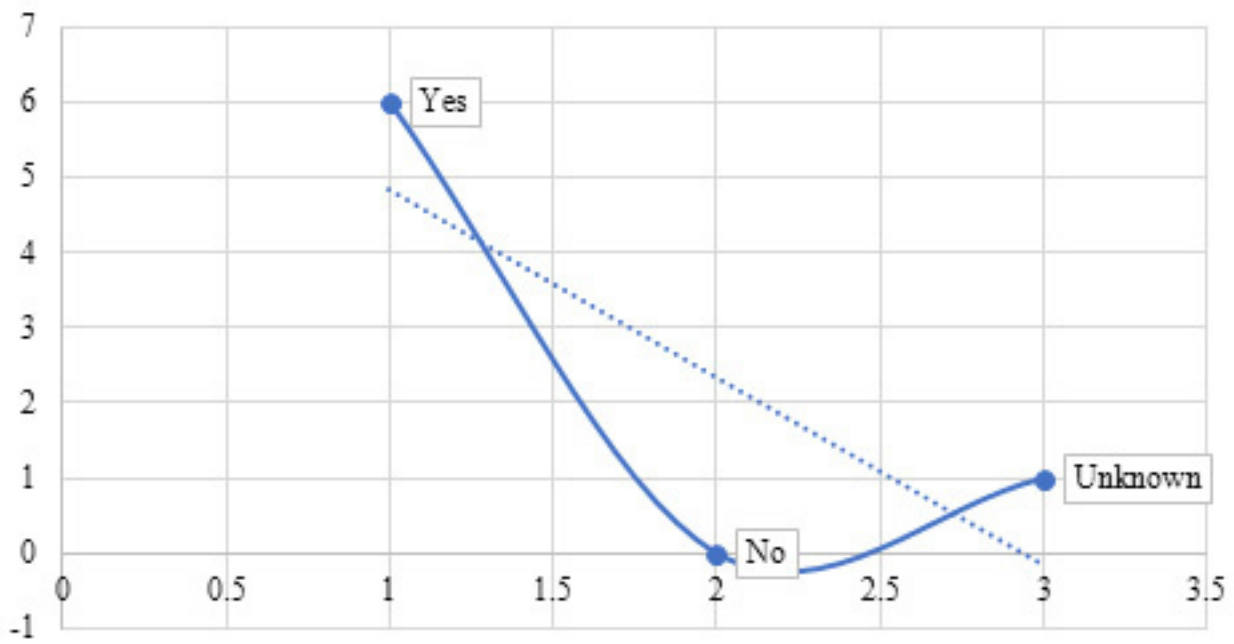
Table 2. Summary of the progesterone dosage and its effects

	Frequency	Percent	Valid Percent		Cumulative Percent
Progesterone dosage	200mg	5	71.4	71.4	71.4
	400mg	1	14.3	14.3	85.7
	Unknown	1	14.3	14.3	100.0
	Total	7	100.0	100.0	
Positive effects	Positive	6	85.7	85.7	85.7
	Unknown	1	14.3	14.3	100.0
	Total	7	100.0	100.0	
Adverse effects	Adverse effect	1	14.3	14.3	14.3
	Unknown	3	42.9	42.9	57.1
	Breast tenderness	2	28.6	28.6	85.7
	None	1	14.3	14.3	100.0
	Total	7	100.0	100.0	

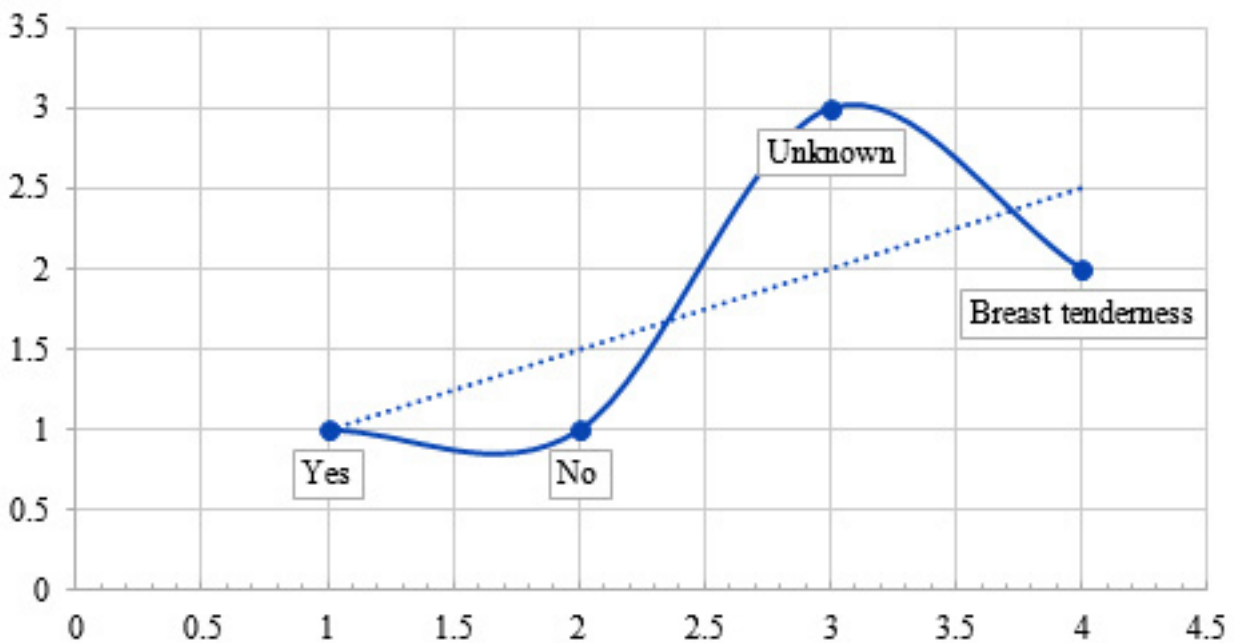
Figure 2a) dosage of progesterone used in the selected studies; b) positive impacts of progesterone in alleviation of nicotine withdrawal symptoms; c) adverse effects of progesterone on patients.



b) Positive Effects



c) Adverse Effects



Discussion

The pathophysiology of nicotine addiction

Several neurobiological models involving many neurotransmitters have been described to explain the pathophysiology of nicotine addiction and withdrawal. Most of these studies have been conducted in animal models. Nicotine has been shown to exert its effects by binding to nicotinic acetylcholine receptor (nAChR). This receptor consists of 16 subunits (Arneric et al., 1995; Wonnacott, 1997). The subunits that are present in the nervous system are $\alpha 2$ - $\alpha 8$ and $\beta 2$ - $\beta 4$ among which $\beta 2$ contains highest affinity for nicotine (Picciotto et al., 1995).

Dopamine plays the central role in the positive reinforcement effects of nicotine. Dopamine is an integral part of reward circuit and the presence of nAChRs in the dopaminergic neurons causes nicotine addiction. Dopamine is released when nicotine binds to nAChRs in the mesolimbic system specifically in ventral tegmental area (Nisell et al., 1994). Several other neurotransmitters also regulate the release of dopamine by dopaminergic neurons in response to nicotine. This is due to the presence of nAChRs in several pathways, which converge on the dopaminergic neurons in the ventral tegmental area that in turn projects to the nucleus accumbens. These pathways include the following;

1. Nicotinic AChRs are present on the presynaptic glutamatergic afferents, which release glutamate. Glutamate in turn activate VTA neurons by NMDA receptors to release dopamine in nucleus accumbens (Shelly et al., 2000).
2. Many nAChR containing cholinergic efferents from pedunculo pontine nucleus synapse upon the VTA neurons and cause dopamine release from VTA neurons.
3. The role of serotonergic system in mediating the positive reinforcement of nicotine has not been well described. Nicotinic ACh receptors are also present in the Raphe nucleus and hippocampus that directly project to nucleus accumbens. The neurons mediate their addictive effects by releasing serotonin.
4. The neurotransmitter gamma-aminobutyric acid (GABA) also controls the release of dopamine from ventral tegmentum (Kalivas et al., 1993). GABA releasing neurons inhibit the release of dopamine from VTA (Walaas & Fonnum, 1980; Yim & Mogenson, 1980). In addition, many inhibitory GABAergic interneurons are also present in the VTA and nucleus accumbens that inhibit dopamine release (Kalivas et al., 1993).
5. Nicotine also stimulates opioid release in nucleus accumbens (Houdi et al., 1991; Pierzchala et al., 1987). Nicotine causes the release of ligands that occupy the μ -opioid receptors (Davenport et al., 1990).

Role of Progesterone in the treatment of different diseases

Progesterone is produced in the ovaries and the adrenal glands. It undergoes cyclical changes in the menstrual cycle. Lower levels are present during the follicular phase and they increase during luteal phase of menstrual

cycle and pregnancy (Buffet et al., 1998). Progesterone has been used in the treatment of several reproductive and non-reproductive diseases like ovarian failure, premenstrual symptoms, amenorrhea, dysfunctional uterine bleeding, menopausal symptoms, and for contraception (de Lignieres, 1999). Its use in traumatic brain injury and seizures is being investigated (Herzog, 2008; Stein, 2008). Progesterone as an oral drug has a lower bioavailability because it undergoes first pass metabolism and is absorbed poorly (Lynch, 2013). Many synthetic progesterone derivatives have been developed to overcome this but they have side-effects like fluid retention, androgenic effects and dyslipidemia (Goodman et al., 1996). Micronized progesterone has been developed to overcome these side effects and increase the bioavailability.

Role of Progesterone in Nicotine Withdrawal

Progesterone is not only a reproductive hormone but it is also involved in neural signaling. Progesterone and its metabolites act upon many neurotransmitter receptors which have been described above. Many of these are involved in neurobiology of nicotine addiction like GABA, glycine, sigma1, kainate, serotonin3, and nicotinic cholinergic receptors (Cyr et al., 2000; Romieu et al., 2003; Smith et al., 2007). The main effect of progesterone on nicotine reward circuit is through GABA (Lynch, 2013). GABA as described above is an inhibitory neurotransmitter in many areas of central nervous system including the dopaminergic pathways involved in reward circuit. Progesterone stimulates GABA release that in turn inhibits the nicotine reward circuitry (Lynch, 2013). In a study by Allen et al. (2008), it was observed that the women who gave up on smoking during the follicular phase of the menstrual cycle were more prone to relapse than those who quit smoking during the luteal phase. These findings, in addition to the fact that changes in reward circuit have been observed during different phases of the menstrual cycle, led to the hypothesis that progesterone may help in nicotine withdrawal since its levels are higher during the luteal phase (Dreher et al., 2007).

Although progesterone has been shown to be protective against nicotine withdrawal, it also reduces smoking intensity (Schiller et al., 2012). In addition, progesterone is also helpful in preventing smoking initiation and as a treatment of smoking addiction. In general, progesterone also reduces drug-taking behavior. This may be due to the effect of progesterone on reward pathway. Many preclinical studies have demonstrated this effect (Lynch et al., 2010). However, Sofuoglu et al., 2011 showed that 400mg progesterone decreased the urge to smoke in abstinent smokers but did not change the ad lib smoking behavior. This may be due to underlying psychological factors that may be reinforcing the smoking behavior. Another bias may be due to the enrolment of the participants who were not already seeking treatment for smoking cessation (Sofuoglu et al., 2011).

Tosun et al. removed this bias by including those patients who were willing to quit smoking and scores ≥ 7 on Likert scale. They also included males in their study. The results

showed that progesterone was superior in achieving 7-day point prevalence abstinence at week 4 in females only. Seven-day point prevalence abstinence at weeks 8 and 12 was not significantly higher in the progesterone group in both males and females. This study only included premenopausal females who have variations in the endogenous levels of progesterone (Tosun et al., 2019). In the study by Saladin et al, premenopausal women who were attempting to quit smoking by using either transdermal nicotine patches or varenicline were recruited. The levels of endogenous ovarian hormone were associated with 7-day point prevalence abstinence in varenicline treated and transdermal nicotine patches treated female smokers. The effects of varenicline and nicotine patches may mask the effect of progesterone in nicotine withdrawal (Saladin et al., 2015).

Allen et al., 2016 found a higher abstinence rates at week 4 and 12, however, the results were not statistically significant. They included the women in their postpartum period who might have avoided smoking due to breast feeding. This may have resulted in higher abstinence rates in the placebo group as compared to the other studies. The results are also less generalizable as they have been validated on a specific sub-group of patients (Allen et al., 2016).

Conclusion

In the majority of instances, 200mg was administered, and favorable outcomes were obtained. Although there were no major side effects observed, a few moderate side effects such as breast tenderness were reported in a few individuals. Hence, the review suggests that progesterone therapy helps to alleviate nicotine withdrawal symptoms, lowers smoking intensity, and treats smoking addiction in both men and women.

Areas of Further Research

Although smoking is much prevalent in men also, only two studies included males in the randomized control trials. Majority of progesterone involved only the female participants. Most of the studies showed that progesterone is superior to placebo in achieving abstinence and lesser relapse rates but the results are not statistically significant in most cases. This may be due to small sample sizes in most studies. Inclusion of males in larger trials after establishing the safety of progesterone in male participants is required to study the universal effects of progesterone in smoking withdrawal. Another thing to be noted is that the abstinence rate also decreases in long term. Maximum rate is observed in week 4 with the rate decreasing over time up to week 12. Oral contraceptive pills containing progesterone should also be evaluated for the treatment of smoking withdrawal and prolog abstinence rates. Smoking is also related to psychological stress and depression. Almost all of the studies used different tools to assess self-reported abstinence, cognitive functions, and withdrawal symptoms. The role of depression and stress as a cause of lower abstinence rates and relapse of smoking over long term should be evaluated as a confounding factor.

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Can probiotics be used as an adjuvant therapy for diabetes - hope or hype? Narrative review of the literature

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Abstract

Diabetes is a metabolic disorder that is characterized by inadequate insulin secretion by the pancreas or the lack in ability of the existing insulin to function properly. So, diabetes forms a fertile media for many diseases and embodies a risk to human-being's health. Unfortunately, the incidence of diabetes is increasing every year. Over decades, several strategies have been tried by specialists to control diabetes, some of which are medical and herbal.

Although diabetes mellitus represents a growing global epidemic disease, at the moment there is no absolute solution at the molecular level that targets the disease. Despite the fact that bacterial functions, such as gut barrier stability and butyrate production, are crucial for preserving normal blood sugar and insulin levels, a growing body of evidence suggests that some naturally occurring gut bacteria are underrepresented in the intestinal tracts of people with type 2 diabetes (T2D) {Sharma, 2019 #8}.

In fact, we need to look at the possibility of using probiotics in the outpatient clinic. Probiotics have been demonstrated to be helpful for patients with diabetes mellitus, particularly at the cellular level, based on clinical trials and animal research, as well as their

high tolerability. In preclinical investigations and human trials {Kocsis, 2020 #7}, probiotics have shown that they can lower insulin and fasting blood glucose levels in people with diabetes. Recently, probiotics have been used to treat a range of ailments, such as autoimmune conditions, allergic reactions, and inflammation. However, there was a lot of heterogeneity in these trials. Examples include the kind of species used, how many probiotics are used, and the level of effectiveness.

In our review, we focused on reviewing the role of using probiotics as an adjuvant therapy for lowering blood levels of sugar and troubled metabolism of our body sugar.

Keywords: probiotics; diabetes; type 2 DM; inflammation; adjuvant therapy.

Introduction

Currently, 90–95 percent of all people with diabetes worldwide have diabetes mellitus (DM) type 2. One in five people are diagnosed with the chronic progressive disease type 2 diabetes. Patients with insulin resistance and relative insulin insufficiency are included in this percentage (1). The percentage of diabetic patients was found to be 7 million of the population are diabetic and almost around 3 million have pre-diabetes (Garcia-Garcia, 2020 #9).

As a result of hyper-insulinemia, insulin resistance and deficiency, and obesity, DM usually presents with other devastating illnesses such as dyslipidemia, hypertension, and cardiovascular (CVD) consequences (4). Also, the elevated lipid profiles among diabetic patients can lead to severe CVD disease and death (5). Also, hepatic and renal disease has been recorded (6).

There are some well established management strategies. It includes weight loss by lowering caloric intake and glycemic index in diet and increasing physical activity as the first line for patients with type 2 DM (7).

Moreover, other strategies for lowering lipid parameters in diabetic patients have been advocated. They include using antioxidants, agents that lower the cholesterol, and mineral supplements (8). In recent times, limited studies (mainly on animals) have also concluded that expenditure of probiotics can improve the metabolic profiles (9). But these effects were noticed on animals and non-diabetic models.

Additionally, recorded data illustrating the effects of probiotics on serum lipid profiles are contradictory. Intake of a probiotic containing *Lactobacillus acidophilus*, fructo-oligosaccharide, inulin and mannitol for 8 weeks resulted in decreased serum triglycerides (TAG), total cholesterol (TC) and LDL-C levels as well as increased HDL-C concentrations in hypercholesterolemic pigs (10). A study conducted on a healthy pregnant women showed decreased serum TAG and VLDL-C levels following consumption of probiotic food containing heat-resistant *Lactobacillus sporogenes* and 0.04 g inulin as prebiotic per one g after nine weeks (11).

The enzymatic deconjugation of bile acids (12), assimilation of cholesterol in the gastrointestinal tract, production of short chain fatty acids (SCFA), carbon disulfide, and methyl acetate, and conversion of cholesterol into coprostanol in the gut could all contribute to the positive effects of probiotics and probiotics on lipid profiles (13).

There are no obvious trials studying the effects of daily usage of probiotic on lipid profiles in diabetic patients. Although, some clinical trials on human samples using various probiotics have shown a mixed result. Some of these studies found no effect (14), while other studies have found obvious evidence of probiotics on lowering blood glucose (15).

We aim in the current review to inspect the effects of regular expenditure of probiotics and their effect on lipid profiles in patients with T2DM.

Methods

We conducted a thorough literature search till April 2022 using PubMed dataset. We used the subheadings and the following keywords accordingly, "Probiotics; Bifidobacterium; bifidum, Fructo-oligosaccharide; Lactobacillus acidophilus; Microbiota; Diabetes; Glucose; Review

History of probiotics

Live, non-pathogenic organisms are considered probiotics. Health advantages can be conferred on the host when consumed in the proper dosages. Probiotics and humans have a long history of interaction. They are frequently utilised commercially as a functional food and are well recognised as "health-friendly bacteria." Probiotics have become significantly more popular as a result of the growing body of clinical research demonstrating their positive effects. Numerous in vivo and in vitro experimental studies have shown that probiotics can prevent and treat a variety of diseases, including ulcerative colitis and diarrhoea brought on by antibiotics. Additionally, a number of recent studies have suggested that probiotics may be effective in treating a wide range of metabolic, lifestyle, and diet-related illnesses, such as obesity, type 2 diabetes, metabolic syndrome, and irritable bowel syndrome. The most popular probiotic strains are those of *Bifidobacterium*, *Lactobacillus*, and *Saccharomyces boulardii*.

Pathophysiology

The effect of probiotics on glucose metabolism could be mediated in a variety of ways. According to several researchers, oxidative damage and antioxidative activity play an essential role in the etiology of diabetes (16, 17). The capability of probiotics has been established in earlier experiments (18). In diabetic rats, Yadav et al. discovered that probiotics reduced oxidative damage by preventing lipid peroxidation and boosting the antioxidant content of glutathione, superoxide dismutase, catalase, and glutathione peroxidase (19). Secondly, probiotics have been shown to have anti-diabetic effects against insulin resistance by boosting natural killer T (NKT) cells in the liver. By regulating TNF-expression and decreasing NF- κ B binding activity, probiotic therapy decreased insulin resistance and inflammation (20). Furthermore, probiotics may improve glucose metabolism by boosting glioclazide bioavailability, blocking or delaying glucose absorption in the intestine, and altering autonomic nervous system activity (21, 22).

Probiotics are live microorganisms that have a significant impact on healthy and diseased cases (23, 24). They have been investigated for their potential health advantages in terms of immune system function and diarrhea prevention (25, 26). Probiotics have also been shown in animal models to lower blood glucose levels by improving inflammation and preventing cell death (27).

Evidence of probiotic use for diabetic patients

Ten articles using varied methodologies and comparative groups were examined. The conclusive evidence is still debatable and questionable. The majority of studies used animal models and showed no statistically significant difference between actual results and projected results. These results, however, cannot be regarded as conclusive evidence for the beneficial role of probiotics in the treatment of diabetes because of variations in the groups tested in each trial. Zheng 2019 conducted a systematic review and meta-analysis study (28) which concluded that probiotics and synbiotics have a positive impact on diabetic patients, according to a study that looked at sixteen randomized control trials with a total of 1060 cases. All inflammatory markers were decreased (hs-CRP and MDA with the P-value equal to 0.000 for both), and oxidative stress was increased as follows (TAC with the P-value equal 0.006, NO with the P-value equal 0.001, GSH with the P-value equal 0.000). These findings concurred with those of Tabrizi et al (29).

An update of Meta-Analysis by Liang et-al 2021 (30) discovered that using various probiotic supplements raised insulin resistance and decreased FBS. This study, involved 818 diabetes individuals from 8 different nations, age, body mass index (BMI), and the length of time a probiotic supplement was taken, to show its effectiveness. On HbA1c, Jafarabadi et al. 2021 provided insight. Probiotics were discovered to have a P-value of 0.01 for lowering HbA1c, FBG, and insulin levels. Probiotics with selenium can lower fasting blood sugar (FBS), insulin concentration, and insulin resistance with P-values of 0.004, 0.002, and 0.001 correspondingly, according to an RCT by Amirani et al. 2022 done on 60 cases evaluating the effect of probiotic and selenium vs. placebo, where insulin sensitivity was significantly increased with P-value 0.002. Another SR and MA study by Pan et al (31) found that probiotics can reduce fasting serum insulin (P-value 0.00001) but, fasting plasma glucose wasn't reduced (p-value 0.09). Other systematic reviews and meta-analyses (32-35) support the role of probiotics in patients with diabetes especially at cellular level. We summarized some of these studies in Table 1.

Table 1: GDM; gestational diabetes mellitus, T2DM; type 2 diabetes mellitus, CRP; C - reactive protein, NO; nitric oxide, FBG; fasting blood glucose.

ID	Disease	Number of patients treated	Design	Main outcomes	Main finding
Zheng 2019	Diabetic patients	1060 cases were randomly distributed into probiotic and/or synbiotic (n = 533) or into control (n = 527) groups.	Systematic review and meta-analysis	Inflammatory markers in diabetic patients	Probiotics and synbiotics had a positive effect on serum hs-CRP and MDA levels, which were significantly decreased And increased oxidative factors like TAC, NO, and GSH.
Liang 2021	Cases with type 2DM	818 of cases from 8 countries	An update of MA	glycemic, lipid, blood pressure and inflammatory biomarkers	Probiotics improve glycemic and inflammatory markers in diabetic patients especially those with age less than 50 and BMI less than 30
Jafarabadi 2021	Diabetic patients	-	Update of evidence	Glycemic control	HbA1c and insulin level could be decreased when using probiotic supplements rather than foods
Ding 2021	Patients with type 2DM	423 diabetic patients	SR&MA	Inflammatory markers in diabetic patients	Probiotics can improve inflammatory biomarkers and glucose level in patients with T2DM. Probiotics could be used as adjuvant therapy for T2DM
Pan 2017	Patients with GDM	830 Patients with GDM	SR&MA	Gestational DM	Probiotics could reduce serum insulin but not FBG
Amirani 2022	GDM	60 cases with GDM divided into 30 in the intervention group and 30 in the control group	Randomized control trial	Glycemic control and lipid profile in patients with GDM	Probiotics and selenium can reduce both FBS and insulin. Also, can increase insulin sensitivity in patients with GD

Limitations

The research featured used various approaches, which may have resulted in information bias. Some trials reviewed synbiotics instead of probiotics alone, and there was non-uniformity in the comparisons made across the investigations of the different groups. Furthermore, many routing factors, such as impaired nutritional condition (36) unquestionably affect outcomes and complications in diabetic patients. It is also difficult to establish clinical practice recommendations due to the wide diversity of probiotic strains, time spent using probiotics, and daily doses used in the studies (28).

Recommendations

While, no definite conceptual proof of the effect of probiotic therapy on diabetic patients has been properly demonstrated, the cause-effect association that may be created by the supplementations, as an example, was not visible in the most critical investigation till now. Furthermore, records that could explain the biological mechanics of such supplements are unavailable.

Due to the relatively recent approval of probiotics in clinical practice, the database, which includes biological agents with various action mechanisms, is still in its early years in global literature. More clinical trials, as presented in this review, are needed to address concerns about probiotic bacterial species, treatment course, and daily dosage of therapy (37). Neither the included studies nor the evaluation of the impact of active probiotics on the regulation of gut hormones profiled changes in gut microbiota (38). Consuming live bacteria, particularly those present in fermented foods, may improve the harmony between intestinal permeability and barrier performance. A current focus of scientific and medical research is the microbiome (39). A larger panel of stool and serum surrogate markers should be used in well-designed RCTs to uncover explanations and processes.

In order to design an effective study that will produce more meaningful results to resolve the controversy and aim for more reliable and high-quality evidence, we also advise prospective analysis and trials enroll a significant case sample with strict details and more comparison groups than are currently used.

Conclusions

Probiotic usage appears to be beneficial for people with DM; nevertheless, further prospective interventional research, mostly using human models, is required to fully understand the impact of probiotic use in diabetic patients. Even if the majority of the cited research demonstrated a statistically significant reduction in patients' levels of diabetes and improvement in other inflammatory outcomes, a conclusive connection from the available data is still debatable. Each case should receive a unique, interdisciplinary assessment, and decisions should

be made while modifying the molecular and cellular mechanism of action in humans.

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Perspective of caregivers towards early signs of memory decline in their elderly relatives among the Saudi population

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Abstract

Objectives: World aging poses a big challenge with the rise of people with cognitive impairment. We aim in this study to understand the perspective of the caregivers towards the early signs of memory decline and cognitive impairment in their elderly relatives; we also aim to understand the impact of culture on their perspective.

Methods: This is a cross-sectional, descriptive study with a quantitative approach. It was approved by the Institutional Review Board prior to data collection, using a survey containing 41 items of collected data from 101 caregivers. We obtained signed written informed consent from each subject.

Results: A sample of 101 participants enrolled in this study, of whom about 60.4% (n=61) were males and 39.6% (n=40) were females. The mean age of the elderly relatives of the caregivers was (73.5±10.0) years and mean years of education was (6.5±7.5) years. Significant differences between males and females were found in terms of driving and using public transportation as this might alert the caregiver about early signs of memory decline ($X^2=6.785$, $p=0.009$).

Conclusion: Some cultural perspective could be identified that could help earlier detection of cognitive impairment in elderly people who rely largely on their caregivers. Caregivers are the first people to encounter the early changes in the behavior of the demented elderly; understanding their perspective can help providing more efficient health care.

Key words: dementia, caregivers, perspective, memory decline, culture

Introduction

The percentage of the elderly population in Saudi Arabia is increasing. In 2016, the number of people over 60 years old was estimated to be 1.3 million and by the end of 2050 it is predicted to surge over 10 million, representing 25% of the total population of Saudi Arabia [1,2]. Besides, life expectancy in Saudi Arabia is expected to increase up to 82 years by 2050 [1]. With the rise in life expectancy, the risk of developing cognitive impairment is expected to increase accordingly [3]. In addition, the number of elderly with dementia worldwide is expected to become 63 million in 2030 and 114 million in 2050 [4]. The cultural diversity and the demographic changes in patient populations impact the provision of health care and diagnosing diseases earlier [5].

There are no studies in the literature about the perspective of the caregivers and the impact of their cultural differences in the early diagnosis of dementia in the Kingdom of Saudi Arabia. Knowing the perspective of caregivers and the cultural differences along with the demographic variables in the Kingdom may help us in detecting the very early stages of dementia contributing to a very good cost-effective screening [6].

Knowing that the first encounter with the early signs of cognitive impairment and dementia is mostly by the caregiver, it's important to understand their perspective and how culture impacts their understanding of the early signs of cognitive impairment and dementia. This is what we're trying to investigate in this study. We also hope to change these misconceptions to seek help once the caregivers recognize any abnormal change in their relatives. Conceptions of dementia, and the stigma and attributions that the society has may influence a range of illness behaviors, including self-care, help-seeking, and treatment compliance [6]. Understanding cultural conceptualizations of dementia and caregiving can help health providers work more effectively with elders and their caregivers. We argue that understanding the perspective of caregivers and their cultural differences will help us improve the quality of the health care provided to the elderly population and in diagnosing cognitive impairment and dementia earlier in the Kingdom of Saudi Arabia.

An American study that was published in September 2008 asked the participants to describe the earliest changes in the lives and relationships they noticed in their parents, or spouse, brought on by cognitive impairment. They reported taking on new responsibilities in an intense caregiving process [7]. Other research was done to help to understand cultural conceptualizations of dementia and caregiving among Vietnamese American caregivers so it can support health providers to work more effectively with elderly people and their caregivers [6].

A Palestinian study published in 2011 found that because of some cultural values, Palestinian women with cancer tend to keep their illness as a secret and thus remain undiagnosed, and this is due to the embarrassment and

the community stigma related to women exposing their bodies to strangers. This is how culture can impact the effectiveness of health care provided to the community as the gender preference and religious practice may build some cultural barriers. However the study also suggests that in some areas of the Middle East some of the population depend largely on herbal medications and use them rather than going to a doctor and this delays the diagnosis of the disease and reduces the effectiveness of the health care provided [8].

Another American study found that cultural traditions and values affected the caregiving and help seeking in the immigrants of different nationalities, demonstrating their views of the early signs of dementia. Most of them see it as a natural part of aging rather than a sign of cognitive impairment and dementia [9].

In this study we aim to understand the perspective of Saudi caregivers on the early signs of memory decline in their elderly relatives and the impact of culture on their understanding of it by using a validated questionnaire.

Methods

This is a cross-sectional, descriptive study with a quantitative approach. It was approved by the Institutional Review Board at King Saud University (IRB number E-19-4418) prior to data collection. We obtained signed written informed consent from each subject after they had a chance to ask questions about the study. The survey collected data from 101 caregivers of elderly with cognitive impairment. The study took place in the geriatric outpatient clinic for elder care at King Khalid university hospital, Riyadh city, the Kingdom of Saudi Arabia. We started our study in September 2019 and it ended in May 2020. Collecting data started on the 22nd of February 2020 and was completed on the 6th of March 2020.

The participants were told that the study was designed to understand the perspective of the caregivers toward their elderly relatives' early signs of memory decline and understanding the effect of culture and demographic variations on the early diagnosis of the demented elderly. Inclusion criteria were being a caregiver for a 65 year old or above, from Saudi Arabia and receiving care at King Khalid University Hospital while participating in the study. All caregivers under the age of 18 years who didn't have a relative above 65 years old; were excluded from our study. We have used a validated, modified questionnaire (by modifying Bristol activities of daily living Arabic version scale which is used to assess cognitive impairment in elderly patients) in our modified questionnaire.

We aimed to measure the perspective of the caregivers of the early signs and alerting behaviors of memory decline and cognitive impairment in their elderly relatives. It consists of 41 items, and it includes the background and the demographic characteristics for the caregiver such as sex, age, relationship to the care recipient, formal education, and their occupation. For their relatives

it included questions about sex, age, the last job of the relative, history of volunteer work, type of residence and the average income. In order to detect culture and demographic variations of early cognitive impairment and dementia we have asked in our modified questionnaire about doing Muslim prayer 5 times a day, praying Muslim prayer Jumma (this variable was for males elderly only); attending weddings, social visits, preparing a complex meal for 4 people or more and mode of transportation.

The caregivers generally completed the questionnaire within 8-12 minutes and were given an oral debriefing, thanked for their participation, and were dismissed; there were no ethical considerations.

Data Analysis

The gathered data was analyzed using the Statistical Package of Social Sciences (SPSS) (v. 26, IBM Corp, IL, Chicago, USA). Descriptive statistics and Chi-square analysis were used to analyze participants' baseline characteristics and their responses to the study questionnaire. A significance level of ($\alpha \leq 0.05$) was used as a statistical significance threshold.

Results

In our study, we gave a questionnaire to 101 caregivers who live in Saudi Arabia and were 18 years or above, all of whom had to be a caregiver to a relative who is 65 years of age or above.

The results presented in Table (1) show the socio-demographic characteristics of the study participants. A sample of 101 participants enrolled in this study, of whom about 60.4% ($n=61$) were males. The mean age of the elderly relatives of the caregiver was (73.5 ± 10.0) years and mean years of education was (6.5 ± 7.5) years.

The results presented in Table (2) show the descriptive statistics of what caregivers think may alert them to their relatives' memory decline. The results showed that there

were no significant differences between male caregivers and female caregivers in feeding ($X^2=0.180$, $p=0.672$), dressing ($X^2=0.697$, $p=0.404$), going to the toilet by themselves ($X^2=0.068$, $p=0.694$), incontinence ($X^2=0.236$, $p=0.627$), bathing ($X^2=0.012$, $p=0.913$), ambulation ($X^2=0.048$, $p=0.827$), ability to use landline phone ($X^2=2.969$, $p=0.085$), shopping ($X^2=0.100$, $p=0.752$), food preparation ($X^2=0.000$, $p=0.997$), housekeeping ($X^2=0.021$, $p=0.884$), laundry ($X^2=0.398$, $p=0.528$), responsibility for own medication ($X^2=0.982$, $p=0.322$), and ability to handle finance ($X^2=2.669$, $p=0.102$). However, significant differences between males and females were found in terms of driving and using public transportation as it might alert the caregiver about early signs of memory decline ($X^2=6.785$, $p=0.009$).

The results shown in Table (3) represent the descriptive statistics of what caregivers think may have caused their relatives to not be able to do daily activities as they used to. The results revealed that there were no significant differences between males and females in ability to handle finance ($X^2=3.707$, $p=0.295$), responsibility for own medication ($X^2=4.843$, $p=0.184$), mode of transportation ($X^2=1.851$, $p=0.604$), housekeeping ($X^2=4.689$, $p=0.196$), food preparation ($X^2=4.156$, $p=0.245$), shopping ($X^2=0.798$, $p=0.850$), ability to use landline phone ($X^2=1.071$, $p=0.784$), actively supervise kitchen management or meal preparation ($X^2=3.525$, $p=0.318$), care for his/her appearance ($X^2=1.243$, $p=0.743$), social visits ($X^2=2.140$, $p=0.544$), weddings ($X^2=4.316$, $p=0.229$), pray five times a day ($X^2=2.634$, $p=0.452$), pray Juma ($X^2=5.259$, $p=0.154$), hobbies ($X^2=3.019$, $p=0.389$), volunteer ($X^2=1.683$, $p=0.641$), online shopping and bills ($X^2=4.494$, $p=0.213$), social media usage ($X^2=4.001$, $p=0.261$), knowing his/her disease ($X^2=1.318$, $p=0.725$), and appropriate medication to match disease ($X^2=2.149$, $p=0.542$). However, significant statistical differences were found in laundry ($X^2=9.065$, $p=0.028$) and preparing a complex meal for 4 people or more ($X^2=7.952$, $p=0.047$).

Table 1. Socio-demographic characteristics of the study participants (n= 101)

Variable	F (%)
Gender	
Male	61 (60.4)
Female	40 (39.6)
Age (M \pm SD)	73.5 \pm 10.0
Years of Education (M \pm SD)	6.5 \pm 7.5

Table 2. Descriptive statistics of what caregivers think that may alert them to their relatives' memory decline (n=101)

Variable	Male (n=61)	Female (n=40)	χ^2	P
Feeding on their own Yes No	27 (44.3) 34 (55.7)	16 (40) 24 (60)	0.180	0.672
Dressing by themselves Yes No	28 (45.9) 33 (54.1)	15 (37.5) 25 (62.5)	0.697	0.404
Going to the toilet by themselves Yes No	26 (42.6) 35 (57.4)	16 (40) 24 (60)	0.068	0.794
Incontinence Yes No	28 (47.5) 31 (52.5)	17 (42.5) 23 (57.5)	0.236	0.627
Bathing by themselves Yes No	22 (36.1) 39 (63.9)	14 (35) 26 (65)	0.012	0.913
Ambulation Yes No	18 (29.5) 43 (70.5)	11 (27.5) 29 (72.5)	0.048	0.827
Ability to use landline phone Yes No	32 (52.5) 29 (47.5)	14 (35) 26 (65)	2.969	0.085
Shopping Yes No	21 (34.4) 40 (65.6)	15 (37.5) 25 (62.5)	0.100	0.752
Food Preparation Yes No	25 (41) 36 (59)	16 (41) 23 (59)	0.000	0.997
Housekeeping Yes No	22 (36.1) 39 (63.9)	15 (37.5) 25 (62.5)	0.021	0.884
Laundry Yes No	22 (36.1) 39 (63.9)	12 (30) 28 (70)	0.398	0.528
Using their own transportation or public transportation Yes No	39 (63.9) 22 (36.1)	15 (37.5) 25 (62.5)	6.785	0.009
Responsibility for their own medications Yes No	41 (67.2) 20 (32.8)	23 (57.5) 17 (42.5)	0.982	0.322
Ability to handle personal or family finance Yes No	39 (63.9) 22 (36.1)	19 (47.5) 21 (52.5)	2.669	0.102

Table 3. Descriptive statistics of what caregivers think may cause their relatives to not be able to do daily activities as they used to (n=101)

Variable	Male (n=61)	Female (n=40)	χ^2	p
Ability to handle personal or family finance			3.707	0.295
1. Age	28 (45.9)	25 (62.5)		
2. Mood change or depression	3 (4.9)	3 (7.5)		
3. Memory decline or Alzheimer	28 (45.9)	11 (27.5)		
4. Other	2 (3.3)	1 (2.5)		
Responsibility for own medications			4.843	0.184
1. Age	23 (37.7)	23 (57.5)		
2. Mood change or depression	2 (3.3)	2 (5)		
3. Memory decline or Alzheimer	35 (57.4)	14 (35)		
4. Other	1 (1.6)	1 (2.5)		
Using own transportation or public transportation			1.851	0.604
1. Age	33 (54.1)	24 (60)		
2. Mood change or depression	3 (4.9)	4 (10)		
3. Memory decline or Alzheimer	17 (27.9)	8 (20)		
4. Other	8 (13.1)	4 (10)		
Laundry			9.065	0.028
1. Age	40 (65.6)	29 (72.5)		
2. Mood change or depression	1 (1.6)	3 (7.5)		
3. Memory decline or Alzheimer	7 (11.5)	7 (17.5)		
4. Other	13 (21.3)	1 (2.5)		
Housekeeping			4.689	0.196
1. Age	38 (62.3)	31 (77.5)		
2. Mood change or depression	1 (1.6)	1 (2.5)		
3. Memory decline or Alzheimer	10 (16.4)	6 (15)		
4. Other	12 (19.7)	2 (5)		
Food preparation			4.156	0.245
1. Age	39 (63.9)	30 (75)		
2. Mood change or depression	3 (4.9)	4 (10)		
3. Memory decline or Alzheimer	10 (16.4)	4 (10)		
4. Other	9 (14.8)	2 (5)		
Shopping			0.798	0.850
1. Age	42 (68.9)	29 (72.5)		
2. Mood change or depression	3 (4.9)	3 (7.5)		
3. Memory decline or Alzheimer	11 (18)	5 (12.5)		
4. Other	5 (8.2)	3 (7.5)		

Table 3. Descriptive statistics of what caregivers think may cause their relatives to not be able to do daily activities as they used to (n=101) ...continued

Ability to use landline phone			1.071	0.784
1. Age	34 (55.7)	24 (60)		
2. Mood change or depression	4 (6.6)	4 (10)		
3. Memory decline or Alzheimer	22 (36.1)	11 (27.5)		
4. Other	1 (1.6)	1 (2.5)		
Preparing a complex meal for 4 people or more	42 (68.9)	30 (75)	7.952	0.047
1. Age	2 (3.3)	4 (10)		
2. Mood change or depression	5 (8.2)	5 (12.5)		
3. Memory decline or Alzheimer	12 (19.7)	1 (2.5)		
4. Other				
Actively supervise kitchen management or meal preparation			3.525	0.318
1. Age	37 (60.7)	29 (72.5)		
2. Mood change or depression	5 (8.2)	5 (12.5)		
3. Memory decline or Alzheimer	9 (14.8)	3 (7.5)		
4. Other	10 (16.4)	3 (7.5)		
Care for his/her appearance			1.243	0.743
1. Age	33 (54.1)	23 (57.5)		
2. Mood change or depression	14 (23)	8 (20)		
3. Memory decline or Alzheimer	13 (21.3)	7 (17.5)		
4. Other	1 (1.6)	2 (5)		
Social visits			2.140	0.544
1. Age	30 (49.2)	21 (52.5)		
2. Mood change or depression	15 (24.6)	13 (32.5)		
3. Memory decline or Alzheimer	12 (19.7)	5 (12.5)		
4. Other	4 (6.6)	1 (2.5)		
Attending weddings			4.316	0.229
1. Age	30 (49.2)	23 (57.5)		
2. Mood change or depression	19 (31.1)	9 (22.5)		
3. Memory decline or Alzheimer	8 (13.1)	2 (5)		
4. Other	4 (6.6)	6 (15)		
Pray 5 times a day			2.634	0.452
1. Age	19 (31.1)	14 (35)		
2. Mood change or depression	2 (3.3)	3 (7.5)		
3. Memory decline or Alzheimer	37 (60.7)	19 (47.5)		
4. Other	3 (4.9)	4 (10)		
Jumah prayer			5.259	0.154
1. Age	24 (39.3)	16 (45.7)		
2. Mood change or depression	2 (3.3)	1 (2.9)		
3. Memory decline or Alzheimer	33 (54.1)	13 (37.1)		
4. Other	2 (3.3)	5 (14.3)		

Table 3. Descriptive statistics of what caregivers think may cause their relatives to not be able to do daily activities as they used to (n=101) ...continued

Doing hobbies			3.019	0.389
1. Age	37 (60.7)	22 (55)		
2. Mood change or depression	9 (14.8)	8 (20)		
3. Memory decline or Alzheimer	12 (19.7)	5 (12.5)		
4. Other	3 (4.9)	5 (12.5)		
Volunteering			1.683	0.641
1. Age	45 (73.8)	27 (67.5)		
2. Mood change or depression	5 (8.2)	5 (12.5)		
3. Memory decline or Alzheimer	8 (13.1)	4 (10)		
4. Other	3 (4.9)	4 (10)		
Shopping and paying online			4.494	0.213
1. Age	34 (55.7)	25 (62.5)		
2. Mood change or depression	3 (4.9)	2 (5)		
3. Memory decline or Alzheimer	19 (31.1)	6 (15)		
4. Other	5 (8.2)	7 (17.5)		
Social media usage			4.001	0.261
1. Age	36 (59)	27 (67.5)		
2. Mood change or depression	4 (6.6)	4 (4)		
3. Memory decline or Alzheimer	15 (24.6)	22 (21.8)		
4. Other	6 (9.8)	12 (11.9)		
Knowing his/her diseases			1.318	0.725
1. Age	28 (45.9)	14 (35)		
2. Mood change or depression	2 (3.3)	2 (5)		
3. Memory decline or Alzheimer	29 (47.5)	22 (55)		
4. Other	2 (3.3)	2 (5)		
Medications for disease match			2.149	0.542
1. Age	25 (41.7)	19 (47.5)		
2. Mood change or depression	0 (0)	1 (2.5)		
3. Memory decline or Alzheimer	34 (56.7)	19 (47.5)		
4. Other	1 (1.7)	1 (2.5)		

Discussion

The results indicate that the cultural differences in the Kingdom of Saudi Arabia impact the perspective of the caregivers towards the early signs of cognitive decline in their elderly relatives. Our findings show that the caregivers think that their relatives inability to pray 5 times a day (55.5%) is due to memory decline rather than aging. This can help us in understanding that the inability to perform daily religious activities is an alerting behavior to the caregivers towards their elderly relative's cognitive function.

The findings also demonstrate that the gender of the relative has an effect on the perspective of the caregiver towards the early signs and alerting behavior of cognitive impairment and dementia. The analysis shows that the caregivers consider not being able to drive or use public transportation as an alerting behavior in their elderly male relatives (63.9%) but they don't consider it as an alerting behavior in their elderly female relatives (37.5%) and we think this is largely to the fact that females haven't started driving until recently in the Kingdom of Saudi Arabia (Table 2). This suggests that the perspective of the caregivers differs due to the cultural and geographic variations in the Kingdom of Saudi Arabia between the two genders.

It is clear that culture has a significant effect when it comes to early diagnosis and providing more effective health care [6]. Also, knowing what may alert the caregiver to any early sign of memory decline is crucial as an early diagnosis may be fundamental in maximizing the impact of the intervention and treatment [10]. Demographic and background characteristics of the caregivers themselves may also affect the diagnosis and treatment of patients with signs of memory decline [11].

We believe that the findings suggest a relation between the culture and the way the caregiver thinks about their elderly's habits and their alerting behaviors and how that may alert the caregiver that there is something wrong. This can help in understanding how to use the perspective of the caregiver to provide more effective health care to the elderly. This could be by designing scales that are culturally based and that would help in earlier diagnosis of cognitive impairment and dementia in the Kingdom of Saudi Arabia.

However, some limitations should be noted; the primary limitation to the generalization of these results is the limited sample size. This is probably due to the limited geographic area that we covered. Another limitation was the lack of enough literature about the impact of Arabic culture and religion on the perspective of the caregivers and their impact on the effectiveness of the health care provided. Finally, respondent fatigue was one of the earliest limitations that we had and this was largely due to the 41 item questionnaire that we used.

We recommend that the health care system develop a scale or tool that is culturally based to improve the health care of the elderly populations of the Kingdom of Saudi Arabia. It would help in reaching a better outcome and high-quality care for the elderly patients. Having a scale that is designed according to the perspective of caregivers themselves can help us provide more efficient health care and improve the screening process for cognitive impairment and dementia.

Conclusion

Some cultural perspective could be identified that could help earlier detection of cognitive impairment in elderly people who rely largely on their caregivers.

Caregivers are the first people to encounter the early changes in the behavior of the demented elderly; understanding their perspective can help provide more efficient health care.

Our recommendation is to conduct more research about the nature of daily activities of the elderly population in the Kingdom of Saudi Arabia and the perspective of their caregivers since there are many differences in our culture than other cultures.

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Awareness of Degenerative Cervical Myelopathy Among Medical Students in Aseer region, Saudi Arabia

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Abstract

Background: Cervical myelopathy is the most common cause of acquired spinal cord compromise. The concept of degenerative cervical myelopathy (DCM), defined as symptomatic myelopathy associated with degenerative arthropathic changes in the spine axis, is being introduced. Patients with DCM visit many doctors due to a variety of symptoms, mainly orthopedics, neurosurgeons, neurologists, or physiotherapists.

Aim: This study aims to assess awareness and perception of Degenerative Cervical Myelopathy among medical students in Aseer region, Saudi Arabia.

Methods: A descriptive cross-sectional survey was conducted in Aseer region, Southern Saudi Arabia targeting all medical students and interns at the College of Medicine. An online questionnaire was initiated by the study researchers after intensive literature review and expert's consultation. The final questionnaire was published using the social media platforms from 1st of September to 3rd of September, 2022. The questionnaire was uploaded online by the researchers and their friends, or relatives till no more new answers were obtained.

Results: A total of 380 medical students and interns completed the study survey. Students' ages ranged from 18 to 30 years with mean age of 22.6 ± 2.1 years old. Exactly 235 (61.8%) students were females and 212 (55.8%) were in their clinical study years. Exactly 106 (27.9%) students had good awareness level regarding DCM while 274 (72.1%) had poor awareness level. The most reported source of information was internet (46.3%), followed by lectures (33.9%), social media (30%), textbook (18.9%), and workshop (15.5%).

Conclusion: In conclusion, the current study showed that medical students' awareness regarding DCM was poor especially among male students and others who had not been taught about the disease. Also, the internet was the most prominent source of students' information rather than study lectures.

Keywords:

Degenerative cervical myopathy, myopathy disorders, medical students, Awareness, Saudi Arabia.

Introduction

Degenerative cervical myelopathy (DCM) is the most frequent non-traumatic, progressive spinal cord dysfunction with an estimated incidence of 2% (1). DCM features include neck and radicular pain, fine motor dysfunction, gait instability, and bladder dysfunction and unclear common diagnostic criteria (2). Among neglected cases, DCM may result in partial cervical spinal cord injury (SCI). This clinicopathological disorder is due to acquired stenosis of the cervical spinal canal where superimposed congenital stenosis secondary to osteoarthritic degeneration may or may not be associated or ligamentous aberrations of the spinal column. This disorder can be attributed to osteoarthritis of the knee or hip. DCM can lead to progressive disability and paralysis due to chronic spinal cord compression and non-traumatic spinal cord injury (3, 4).

Patients with DCM visit many doctors due to a variety of symptoms and these are mainly orthopedics, neurosurgeons, neurologists, and physiotherapists (5). Surgical decompression of the encroached spinal cord is suggested among cases with moderate/severe, or progressive symptoms. Treatment goals of enabling earlier and/or preventative treatment have now been defined as a priority research need (6).

In its early stages, DCM is usually underdiagnosed or misdiagnosed as carpal tunnel syndrome or peripheral neuropathy, till patients have serious weakening of upper and lower limb function which influences the consideration of incomplete cervical SCI. Given that DCM is a progressive but preventable neurological condition, the delayed diagnosis and late referral for evaluation of surgical decompression, can lead to poorer neurological outcomes (7).

In Saudi Arabia, a study was conducted to find out the pattern of degenerative cervical spine disease at King Abdulaziz university hospital. The most common degenerative cervical spine changes were found at C 5-6 levels. The younger patients tended to have higher cervical spine level involvement. The mean duration of symptoms was 41 months. The younger patients tended to present more with weakness and numbness. 35 (29.1%) of patients were found to have lost reflexes and 17 (14.1%) had exaggerated reflexes (8). The current study aimed to assess awareness and perception of Degenerative Cervical Myelopathy among medical students in Aseer region, Saudi Arabia.

Methodology

A descriptive cross-sectional survey was conducted in Aseer region, Southern Saudi Arabia, targeting all medical students and interns at College of Medicine. Students who refused to participate or students with incomplete survey answers were excluded from the study. An online questionnaire was initiated by the study researchers after intensive literature review and

expert's consultation. Questionnaire validity, clarity and applicability were assessed independently by a panel of 3 experts with all modifications done till achieving the final version of the questionnaire. The final questionnaire was published using social media platforms from 1st of September to 3rd of September, 2022. Participants were encouraged to participate in this study by clarifying the degree of confidentiality for their data and the significance of this research to the community. The questionnaire of this study included students' demographic data (Age, Gender, academic year, GPA, and workshop regarding neurological disorders). Part 2 covered participants' awareness of DCM. The last section covered source of students' information regarding the disorder. All questions had one correct answer. The questionnaire was uploaded online by the researchers and their friends, or relatives till no more new answers were obtained.

Data analysis

The data were collected, reviewed and then fed into Statistical Package for Social Sciences version 21 (SPSS: An IBM Company). All statistical methods used were two tailed with alpha level of 0.05 considering significance if P value was less than or equal to 0.05. Overall awareness level regarding DCM was assessed through summing up discrete scores for different correct awareness items. The overall awareness score was categorized as poor level if students' score was less than 60% of the overall score and good level of awareness was considered if the students' score was 60% or more of the overall score. Descriptive analysis was done by prescribing frequency distribution and percentage for study variables including student's personal data, academic year, GPA, training regarding neurological disorders and awareness items, while student's overall awareness level and source of information were graphed. Cross tabulation for showing distribution of student's overall awareness level by their personal data and source of information was carried out with Pearson chi-square test for significance and exact probability test if there were small frequency distributions.

Results

A total of 380 medical students and interns completed the study survey. Students' ages ranged from 18 to 30 years with mean age of 22.6 ± 2.1 years old. Exactly 235 (61.8%) students were females and 212 (55.8%) were at their clinical study years (4th to 6th year) while 98 (25.8%) were interns. As for student's GPA, it was less than 3.5 out of 5 among 144 (37.9%), 3.5-4.4 among 175 (46.1%), and 4.5-5 among 61 (16.1%). A total of 60 (15.8%) had attended a workshop for neurological disorders and 117 (30.8%) has been taught about Degenerative Cervical Myelopathy (Table 1).

Table 2. Medical students' awareness regarding Degenerative Cervical Myelopathy, Saudi Arabia. A total of 42.4% know that DCM is a spinal cord disorder, and only 19.5% know the correct prevalence of that disorder. Exactly 36.6% of the students know that DCM is most reported in the ages i 40-50 years. As for symptoms of DCM, the most

reported were neck pain (69.5%), limb weakness (60.8%), Paresthesia (52.1%), imbalance (46.6%), and clumsy gait (40.3%). Paresthesia was reported as an early sign among cases with DCM by 32.4% students, and 69.7% know that MRI is the best imaging modality to diagnose DCM. Additionally, 36.6% of the students know that 'Snake eyes' is the featured sign for DCM with MRI. As for the average time to diagnose DCM from first presentation, 37.4% of the students reported after 1 month, 32.9% reported after 1 year and only 10.3% said after 2 years. A total of 80.5% of the students think that time to diagnosis affects disease prognosis and 33.2% think surgery improves patients' symptoms. Also, 66.8% of the students were aware that DCM may be asymptomatic with cord compression for years.

Figure 1. Overall awareness level regarding Degenerative Cervical Myelopathy among medical students, Saudi Arabia. Exactly 106 (27.9%) of the students had good awareness level regarding DCM while 274 (72.1%) had poor awareness level.

Figure 2. Source of information regarding Degenerative Cervical Myelopathy among medical students, Saudi Arabia. The most reported source of information was internet (46.3%), followed by lectures (33.9%), social media (30%), textbook (18.9%), and workshop (15.5%).

Table 3. Factors associated with medical students' awareness regarding Degenerative Cervical Myelopathy. Exactly 32.3% of female students had overall good awareness level regarding DCM compared to 20.7% of male students with recorded statistical significance ($P=.014$). Also, 35% of students who were taught about Degenerative Cervical Myelopathy had good awareness level regarding the disease versus 24.7% of others who did not ($P=.038$). Additionally, 35.2% of students who gained their information from the internet had good awareness level versus 33.3% of those who gained it from lectures and 15.3% of others who reported in a workshop ($P=.003$).

Table 1. Personal data of medical students, Saudi Arabia

Personal data	No	%
Age in years		
18-20	65	17.1%
21-24	229	60.3%
25-30	86	22.6%
Gender		
Male	145	38.2%
Female	235	61.8%
Academic phase		
Pre-clinical	70	18.4%
Clinical	212	55.8%
Intern	98	25.8%
GPA		
< 3.5	144	37.9%
3.5-4.4	175	46.1%
4.5-5	61	16.1%
Attended workshop for neurological disorders		
Yes	60	15.8%
No	320	84.2%
Was taught about Degenerative Cervical Myelopathy		
Yes	117	30.8%
No	263	69.2%

Table 2. Medical students' awareness regarding Degenerative Cervical Myelopathy, Saudi Arabia

Awareness items		No	%
DCM is classified as?	Spinal cord disorder	161	42.4%
	Cervical vertebrae disorder	92	24.2%
	Brain stem disorder	32	8.4%
	Cervical muscles disorder	95	25.0%
What is the prevalence of DCM	0.01%	74	19.5%
	0.1%	120	31.6%
	3.1%	121	31.8%
	4.5%	58	15.3%
	5.1%	7	1.8%
Most reported age for DCM	< 40 years	96	25.3%
	40-50 years	139	36.6%
	> 50 years	145	38.2%
Symptoms might be present in DCM	Clumsy gait	153	40.3%
	Neck pain	264	69.5%
	Falls	122	32.1%
	Imbalance	177	46.6%
	Loss of bowel / urinary control	139	36.6%
	Erectile dysfunction	92	24.2%
	Paresthesia	198	52.1%
	Limb weakness	231	60.8%
	Loss of dexterity	72	18.9%
These are the early signs among cases with DCM?	Paresthesia	123	32.4%
	Limb weakness	76	20.0%
	Incontinence	37	9.7%
	Neck pain	144	37.9%
What is the best imaging modality to diagnose DCM?	MRI	265	69.7%
	CT	33	8.7%
	X-Ray	25	6.6%
	Myelography	48	12.6%
	Ultrasound	9	2.4%
What is the featured sign for DCM with MRI?	Snake eyes appearance	139	36.6%
	Neck shadow	127	33.4%
	Muscle spasms	77	20.3%
	Brain edema	37	9.7%
What is the average time to diagnose DCM from first presentation?	1 week	57	15.0%
	1 month	142	37.4%
	1 year	125	32.9%
	2 years	39	10.3%
	5 years	17	4.5%
Do you think time to diagnosis affects disease prognosis	Yes	306	80.5%
	No	74	19.5%
What effect is surgery likely to have on patients' symptoms?	Improve	126	33.2%
	Stabilize	218	57.4%
	Worsen	36	9.5%
DCM may be asymptomatic with cord compression for years	Yes	254	66.8%
	No	126	33.2%

Figure 1. Overall awareness level regarding Degenerative Cervical Myelopathy among medical students, Saudi Arabia

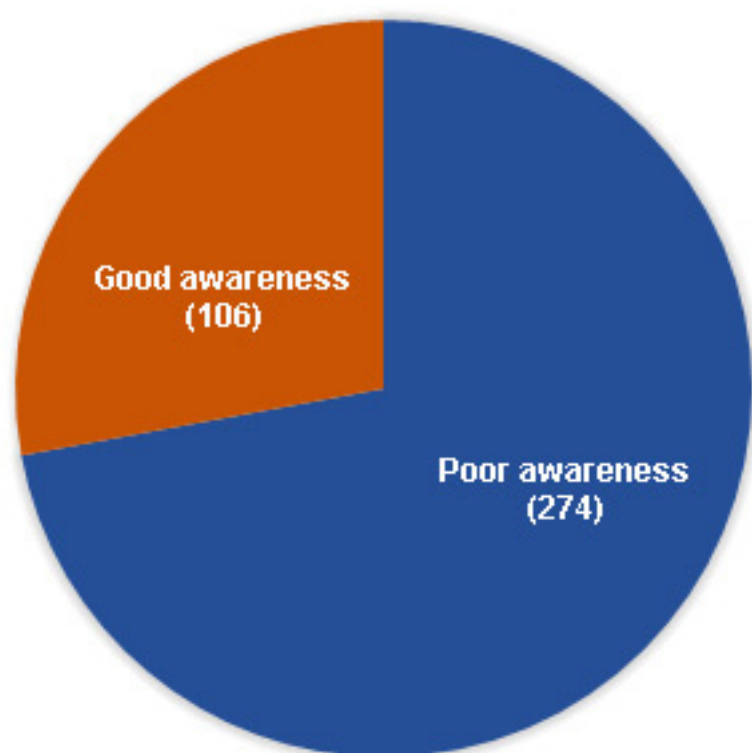


Figure 2. Source of information regarding Degenerative Cervical Myelopathy among medical students, Saudi Arabia

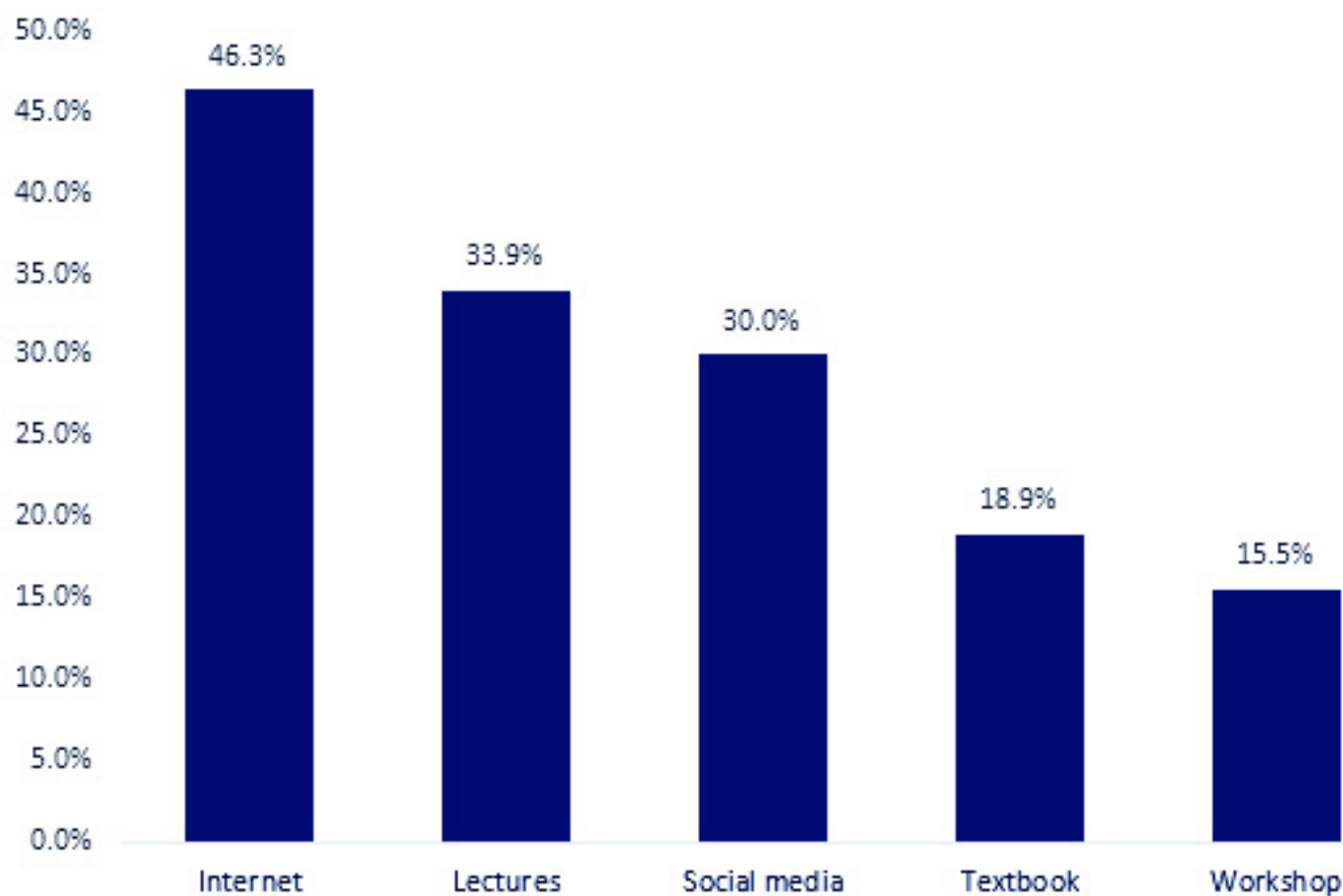


Table 3. Factors associated with medical students' awareness regarding Degenerative Cervical Myelopathy

Factors	Awareness level				p-value
	Poor		Good		
	No	%	No	%	
Age in years					
18-20	48	73.8%	17	26.2%	.840
21-24	166	72.5%	63	27.5%	
25-30	60	69.8%	26	30.2%	
Gender					
Male	115	79.3%	30	20.7%	.014 *
Female	159	67.7%	76	32.3%	
Academic phase					
Pre-clinical	54	77.1%	16	22.9%	.576
Clinical	151	71.2%	61	28.8%	
Intern	69	70.4%	29	29.6%	
GPA					
< 3.5	100	69.4%	44	30.6%	.531
3.5-4.4	127	72.6%	48	27.4%	
4.5-5	47	77.0%	14	23.0%	
Attended workshop for neurological disorders"					
Yes	43	71.7%	17	28.3%	.934
No	231	72.2%	89	27.8%	
Was taught about Degenerative Cervical Myelopathy					
Yes	76	65.0%	41	35.0%	.038 *
No	198	75.3%	65	24.7%	
Source of information regarding DCM					
Lectures	86	66.7%	43	33.3%	.003 **§
Workshop	50	84.7%	9	15.3%	
Textbook	52	72.2%	20	27.8%	
Internet	114	64.8%	62	35.2%	
Social media	78	68.4%	36	31.6%	

P: Pearson X2 test

§: Exact probability test

* P < 0.05 (significant)

Discussion

DCM is mostly a neglected condition in medical education which has repercussions for clinical practice. Though, student interest in undertaking private study suggests future teaching interventions will be well-received (9). More effort is vital to characterize the format of DCM teaching and awareness that is most effective and to subsequently improve future health care staff has the ability for case identification and proper management (10, 11).

The current study aimed to detect the level of medical student' awareness regarding degenerative cervical myopathy, to assess the perception of medical students

about degenerative cervical myopathy, to identify the factors affecting medical students' awareness and perception of degenerative cervical myopathy, and to know about the sources of information regarding degenerative cervical myopathy among medical students. The study results showed that about one-fifth of the medical students were knowledgeable regarding DCM. Higher awareness was reported among female students who were taught about Degenerative Cervical Myelopathy and those who got their information from the internet and lectures. The surprising finding was that most of the students (nearly half of them) had their information from internet which is questionable for medical students but on the other hand lectures were the second highest reported source. This may be explained by that some of the students still in their

pre-clinical years with no lectures are interested in the disorder under study. Similar findings were reported by Brannigan JF et al (12) in UK where most students (72%) had not learned about DCM. Also, a total of 350 students (47%) reported conducting private study on DCM. Modal student self-rating of their own knowledge of DCM was 'terrible' (47%). Also, Waqar M et al (9) found that students and junior trainees had poor knowledge regarding DCM knowledge score. There is a scarcity of articles describing awareness and perception regarding DCM in the literature. DCM issue is a collection of 20 articles written by 46 researchers and surgeons with world-class expertise in the field. The compiled articles form three broad topic areas, which are meant to summarize the current knowledge on the topic. Few articles describe the epidemiology, pathobiology, and natural history of DCM.

Study limitations

Using an online survey increased the likelihood for selection bias which may affect the sample representative of the whole population and validity. Also, information bias might also be present since some questions might be over- or underestimated by the students (those in their pre-clinical academic years).

Conclusion and Recommendations

In conclusion, the current study showed that medical students' awareness regarding DCM was poor especially among male students and others who were not taught about the disease. Also, internet was the most prominent source of students' information rather than study lectures. Awareness level for disease nature, prevalence, and diagnosis age were the most questionable among students. Researchers recommend that health education campaigns and involvement of more lectures should be considered in medical students teaching curricula.

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Impact of prolonged use of facemask in COVID-19 pandemic on the health of the population of Jeddah, Saudi Arabia

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Abstract

Background: Face masks have become a crucial part of everyday life across the globe since COVID-19 was declared a pandemic.

Objectives: To study the impact of prolonged use of facemasks on the health of the population of Jeddah, Saudi Arabia

Method: This was a cross sectional study; the non-probability convenient sampling method was used to collect data on 248 subjects via online-Google form questionnaire. The questionnaire provided information on the personal, sociodemographic characteristics, and clinical aspects of the studied subjects. Statistical analysis: data were analyzed using SPSS version 23. The Chi square test of significance was used. The level of significance was 0.05.

Results: Respiratory tract infection (RTI) is common in Saudi Arabia. About 25% of the subjects did not use facemasks. Almost all the subjects who used facemasks knew how to wear them and the reason for their use, and were worried about catching RTI. A minority of the studied subjects didn't know the association between chronic diseases and RTI.

Males significantly felt more than females that wearing facemasks would make them embarrassed, and would affect critically their social communication. The majority of the studied subjects did not want to wear a mask when they had flu, and they thought that others should protect themselves. Facemasks interfere with

smoking habits and practicing exercise. Wearing masks was associated with a feeling of difficulty of breathing when walking, causing headache, skin problems and sore throat. Also the majority could not handle wearing masks for 3 hours straight. About 60% of the subjects felt uncomfortable when they sit with people who do not wear masks. The females significantly felt that the surgical mask is better than the cloth mask, compared to males. The majority prefer to wear one mask only, and use it several times.

Conclusion: Respiratory tract infection is common in Jeddah city. A great proportion of the subjects do not wear facemasks in public places, particularly when they have flu. Wearing of facemasks is associated with several clinical adverse effects. The knowledge about types and use of the facemasks is deficient in a great proportion of the population. These points will help the health care planners when they design health education programs to educate the public about use of facemasks and the ways to avoid physical side effects

Keywords: Face Masks, Jeddah, Covid-19 pandemic, respiratory symptoms.

Introduction

The government of Saudi Arabia was among the first countries in the world to take quick and serious precautions introducing decisive social distancing measures early before the first case of COVID-19 was confirmed in the Kingdom (1-3). Community face masking is possibly of great value in reducing COVID-19 transmission. Their use, however, is deeply connected to social and cultural practices and has acquired a variety of personal and social meanings (2).

Acute lower respiratory tract infection is a major health problem that affects more than 15% of the total population of Saudi Arabia each year. The epidemiology of respiratory viruses in Saudi Arabia is proposed to be affected mainly by the presence and mobility of large numbers of foreign workers and the gathering of millions of Muslims in Mecca during the Hajj and Umrah seasons (4).

Face masks overturn these assumptions by allowing the wearer to look like an entirely different person. If unnoticed, these masks break the link between facial appearance and personal identity, with clear implications for applied face recognition (5).

Facemasks serve primarily as a dual preventive purpose; protecting oneself from getting viral infection and protecting others (6,7). Correct and consistent mask use is a critical step everyone can take to prevent getting and spreading COVID-19. Masks work best when everyone wears them, but not all masks provide the same protection. When choosing a mask, one needs to look at how well it fits, how well it filters the air, and how many layers it has (8).

The prevalence of chronic obstructive pulmonary disease in Saudi Arabia is 4.2% among the general population and 14.2% among smokers (9).

Mental Health has become a very serious personal, social and economic threat, especially in light of the COVID-19 pandemic and the negative ripple effect it has brought onto millions of people world-wide (10). Lower accuracy and lower confidence in one's own assessment of the displayed emotions indicate that emotional reading was strongly irritated by the presence of a mask (11-15). The CDC recommends that if not fully vaccinated for COVID-19, additional precautions may be required such as wearing a cloth face mask in public places to reduce the risk of catching or spreading the COVID-19 virus (16).

Some have expressed concern that these measures may affect the cardiopulmonary system by increasing the work of breathing, altering pulmonary gas exchange and increasing dyspnea, especially during physical activity, and particularly among asthmatics (17-24).

Feelings of anxiety or panic, when covering the mouth and nose might affect breathing. This can cause symptoms like feeling dizzy or sick, which may be associated with the wearing of a mask (21,23).

The appropriate use, storage and cleaning or disposal of masks is essential to make them as effective as possible (25). WHO and UNICEF advise that children aged 12 and over should wear a mask under the same conditions as adults (26,28).

The claim that the prolonged use of face masks can cause oxygen deficiency, carbon dioxide intoxication, dizziness, or other health challenges is not grounded in science (29-30).

Skin problems can develop beneath a mask. Common problems include acne breakouts, excessive dryness, and irritated skin (31).

Wearing a face mask can cause symptoms of a sore throat. Whether a wearer will get a sore throat from wearing a mask depends on several factors, most of which the wearer has control over. (32)

Face mask "air hunger" —the feeling that the wearer cannot get enough air, is a common sensation, often exacerbated by anxiety and stress. (33)

Methodology

This was a cross sectional study; the non-probability convenient sampling method was used to collect data through online-Google forms.

Sample size: Using the G*Power statistical power analysis to calculate the sample size; it was found that the minimal sample size according to Effect size = 0.3, alpha = 0.05, and Power = 95%, and 5 degrees of freedom the minimal sample size according to alpha 5%, and beta 20%, and 5 degrees of freedom was 385.

Thus the present study enrolled 416 adult subjects from Jeddah city, in Saudi Arabia.

Information on the studied subjects was collected using a structured questionnaire which provided information on personal and socio-demographic information; medical history, and pattern of use of Face mask, and possible health effects associated with its use.

Statistical analysis: Data was analyzed using SPSS version 23. The Chi Square test of significance was used to assess the different associations. The level of significance was 0.05.

Results

Table 1 reveals that the majority of the subjects were from the central region, They were mainly Saudis (95%), with educational level of university or more (68.5%). The majority were non-smokers (75.2%) and living mainly in cities (96.2%). Table 2 reveals that 18% of the subjects had respiratory tract infection in the past 5 years. Over 75% of the subjects have used facemasks to prevent RTI. Almost 90% of the subjects think that wearing a mask would reduce the RTI. Almost all the subjects knew why

they wear facemasks and over 94% knew how to wear the facemask. About one fifth of the subjects knew that chronic diseases make the subject susceptible for RTI. About 70% of the subjects were worried about catching RTI.

Table 3 reveals that males significantly felt that facemasks cover their faces and make it difficult for others to see how they feel and it might increase the likelihood that others would misinterpret how they felt, moreso than females. Also males feel more embarrassed than females regarding the wearing of masks, and they felt that they would be criticized by others ($p < 0.05$). The majority did not want to wear facemask when they had flu, and they thought that others should protect themselves. Almost 80% of the subjects felt difficulty of breathing when walking while wearing facemasks. Table 4 shows that only 40% of the subjects could handle to wear a mask for 3 hours straight. About 60% of the subjects felt uncomfortable when they sit with people who didn't wear masks. The females significantly felt that the surgical mask was better than the cloth mask compared to males ($p < 0.05$). A greater proportion of males were smokers compared to females and felt that wearing masks in public places reduced their desire to smoke ($p < 0.05$). About 61% of the subjects practiced exercise; the majority were males ($p < 0.05$). However, only a minority (13%) agreed that a

facemask should be worn while exercising. Wearing a mask, caused changes in the performance of exercise in 18% of the subjects. About two thirds of the subjects used the mask multiple times, particularly among females ($p < 0.05$). Table 5 shows that a minority of the subjects (12.7%) agreed that wearing two masks was better than one. About two thirds of the subjects felt that it was risky to wear two masks at the same time. And 6% of the subjects agreed that children with chronic health problem should wear masks. About one fifth of the subjects believed that wearing masks affected their concentration particularly males ($p < 0.05$). Greater proportions of the subjects believed that wearing masks may cause headache, and difficulty of breathing (35% and 65%, respectively). A greater proportion of females believed that wearing a mask might cause skin problems while a greater proportion of males believed that wearing masks may cause sore throat ($p < 0.05$). Table 6 reveals that a greater proportion of the subjects who wore facemasks, were more knowledgeable about the reason for wearing a facemask, and believed that facemasks reduce the risk of getting RTI ($p < 0.05$). Getting RTI's in the last 5 years was significantly more prevalent among those who wore masks ($p < 0.04$). Those who wore facemasks felt more embarrassed compared to those who didn't ($p < 0.05$).

Table 1: Distribution of studied subjects by gender and sociodemographic characteristics

Variable	Categories	Gender		Total	X2 (p- value)
		Female	Male	N %	
		N %	N %		
Area of residence	Central region	25 11.5%	20 10.1%	45 10.8%	4.637 ^a .327
	Eastern region	4 1.8%	7 3.5%	11 2.6%	
	Northern region	7 3.2%	10 5.1%	17 4.1%	
	Southern region	10 4.6%	16 8.1%	26 6.3%	
	Western region	172 78.9%	145 73.2%	317 76.2%	
Nationality	Non-Saudi	8 3.7%	11 5.6%	19 4.6%	847a. 358
	Saudi	210 96.3%	187 94.4%	397 95.4%	
Educational level	Less than University	61 28.0%	70 35.4%	131 31.5%	2.614a .106
	More than University	157 72.0%	128 64.6%	285 68.5%	
Occupational level	Non-Worker	119 54.6%	83 41.9%	202 48.6%	6.666a .010
	Worker	99 45.4%	115 58.1%	214 51.4%	
Smoking habit	Non-Smoker	192 88.1%	121 61.1%	313 75.2%	40.490a .000
	Smoker	26 11.9%	77 38.9%	103 24.8%	
Your living area is	City	211 96.8%	189 95.5%	400 96.2%	.500a .480
	Village	7 3.2%	9 4.5%	16 3.8%	

Table 2: Distribution of studied subjects by gender and sociodemographic characteristics

Variable	Categories	Gender				Total		X ² (p- value)
		Female		Male		N %		
		N	%	N	%			
Have you had a respiratory infection in the past five years?	No	175	80.3%	166	83.8%	341	82.0%	.891 ^a .345
	Yes	43	19.7%	32	16.2%	75	18.0%	
Have you ever worn a face mask in public places to prevent you from catching a respiratory infection?	No	51	23.4%	51	25.8%	102	24.5%	.313 ^a .576
	Yes	167	76.6%	147	74.2%	314	75.5%	
Do you think that wearing a mask would reduce the risk of respiratory infection? *	No	19	8.7%	19	9.6%	38	9.1%	.097 ^a .756
	Yes	199	91.3%	179	90.4%	378	90.9%	
Do you know the reason for wearing a mask?	No	3	1.4%	4	2.0%	7	1.7%	.260 ^a .610
	Yes	215	98.6%	194	98.0%	409	98.3%	
Do you know the correct way to wear a mask?	No	15	6.9%	9	4.5%	24	5.8%	1.041 ^a .308
	Yes	203	93.1%	189	95.5%	392	94.2%	
Do you have chronic diseases that make you more susceptible to respiratory infections?	No	179	82.1%	160	80.8%	339	81.5%	.117 ^a .733
	Yes	39	17.9%	38	19.2%	77	18.5%	
Do you worry about catching a respiratory infection?	No	61	28.0%	60	30.3%	121	29.1%	.271 ^a .603
	Yes	157	72.0%	138	69.7%	295	70.9%	

Table 3: Distribution of studied subjects by gender and sociodemographic characteristics

Variable	Categories	Gender				Total		X ² (p- value)
		Female		Male		N %		
		N	%	N	%			
Wearing a face mask covers my face, and will make it difficult for others to see how I feel	No	122	50.0%	82	41.4%	204	49.0%	8.789 ^a .003
	Yes	96	44.0%	116	58.6%	212	51.0%	
Wearing a face mask may increase the likelihood that others will misinterpret how I feel:	Agree	86	39.4%	104	52.5%	190	45.7%	7.150 ^a .007
	Disagree	132	60.6%	94	47.5%	226	54.3%	
Wearing a mask makes me feel embarrassed	No	210	96.3%	178	89.9%	388	93.3%	6.836 ^a .009
	Yes	8	3.7%	20	10.1%	28	6.7%	
Wearing a face mask when symptoms appear and then going out to public places may expose me to criticism of others	Agree	0	0.0%	1	0.5%	1	0.2%	8.646 ^a .013
	No	145	66.5%	105	53.0%	250	60.1%	
	Yes	73	33.5%	92	46.5%	165	39.7%	
It is important to wear a face mask to protect others from catching the flu	No	25	11.5%	23	11.6%	388	11.5%	.002 ^a .962
	Yes	193	88.5%	175	88.4%	368	88.5%	
You do not need to wear a face mask if you have the flu, other people should take care of themselves and avoid getting sick	No	185	84.9%	161	81.3%	346	83.2%	.934 ^a .334
	Yes	33	15.1%	37	18.7%	70	16.8%	
Have you noticed difficulty breathing while walking or exercising while wearing a face mask?	No	50	22.9%	36	18.2%	86	20.7%	1.430 ^a .232
	Yes	168	77.1%	162	81.8%	330	79.3%	

Table 4 : Distribution of studied subjects by gender and sociodemographic characteristics

Variable	Categories	Gender				Total		X ² (p-value)
		Female		Male		N	%	
		N	%	N	%			
Can you handle wearing a mask for 3 hours straight	No	129	59.2%	125	63.1%	254	61.1%	683 ^a .408
	Yes	89	40.8%	73	36.9%	162	38.9%	
Do you feel uncomfortable when you sit with people who do not wear masks	No	86	39.4%	77	38.9%	163	39.2%	.014 ^a .907
	Yes	132	60.6%	121	61.1%	253	60.8%	
Do you find that the surgical mask is better than the cloth mask	No	70	32.1%	89	44.9%	159	38.2%	7.244 ^a .007
	Yes	148	67.9%	109	55.1%	257	61.8%	
Are you a smoker?	No	86	39.4%	125	63.1%	318	76.4%	37.175 ^a .000
	Yes	25	11.5%	73	36.9%	98	23.6%	
If yes, did you find wearing a mask in public places reduced your desire to smoke	No	54	24.8%	76	8.4%	76	38.4%	36.698 ^a .000
	Yes	22	10.1%	59	29.8%	81	19.5%	
Do you exercise	No	107	49.1%	54	27.3%	318	76.4%	20.804 ^a .000
	Yes	111	50.9%	144	72.7%	255	61.3%	
Should a mask be worn while exercising	No	187	5.8%	175	88.4%	362	87.0%	.623 ^a .430
	Yes	31	14.2%	23	11.6%	54	13.0%	
Have you noticed any changes in your exercise performance before and after wearing the mask	No	185	84.9%	156	8.8%	341	82.0%	2.591 ^a .107
	Yes	33	15.1%	42	21.2%	75	18.0%	
Do you wear the same mask multiple times.	No	113	51.8%	49	24.7%	162	38.9%	32.018 ^a .000
	Yes	105	48%	149	75%	254	61.1%	

Table 5 : Distribution of studied subjects by gender and sociodemographic characteristics

Variable	Categories	Gender				Total		X ² (p-value)
		Female		Male		N	%	
		N	%	N	%			
Wearing two masks is better than one:	No	195	89.4%	168	84.8%	363	87.3%	1.976 ^a .160
	Yes	23	10.6%	30	15.2%	53	12.7%	
Are there risks from wearing multiple masks? (Two masks at the same time)	No	71	32.6%	77	38.9%	148	35.6%	1.808a .179
	Yes	147	67.4%	121	61.1%	268	64.4%	1.808a .179
Should children with health problems wear a mask?	No	49	22.5%	50	25.3%	99	23.8%	.441a .507
	Yes	169	77.5%	148	74.7%	317	76.2%	.441a .507
Does wearing a mask cause poor concentration	No	183	83.9%	131	66.2%	314	75.5%	17.730 ^a .000
	Yes	35	16.1%	67	33.8%	102	24.5%	
Does wearing a mask cause headaches	No	142	65.1%	126	63.6%	268	64.4%	.102 ^a .749
	Yes	76	34.9%	72	36.4%	148	35.6%	
Does wearing a mask cause skin problems	No	122	56.0%	147	74.2%	269	64.7%	15.172 ^a .000
	Yes	96	44.0%	51	25.8%	147	35.3%	
Does wearing a mask cause throat pain	No	205	94.0%	168	84.8%	373	89.7%	9.451a .002
	Yes	13	6.0%	30	15.2%	43	10.3%	
Does wearing a mask cause difficulty breathing	No	81	37.2%	64	32.3%	145	34.9%	1.067 ^a .302
	Yes	137	62.8%	134	67.7%	271	65.1%	

Table 6 Significant differences between subjects who wear masks and those who do not

Variable		Wear a mask				Total		X ² P
		No		Yes		N %		
		N	%	N	%			
Have you had a respiratory infection in the past five years?	No	90	88.2%	251	79.9%	341	82.0%	3.58
	Yes	12	11.8%	63	20.1%	75	18.0%	0.050
Wearing a mask would reduce the risk of infection	No	21	20.6%	17	5.4%	38	9.1%	21.36
	Yes	81	79.4%	297	94.6%	378	90.9%	0.000
Do you know the reason for wearing a mask	No	6	5.9%	1	0.3%	7	1.7%	14.41
	Yes	96	94.1%	313	99.7%	409	98.3%	<0.000
Wearing a face mask when symptoms appear and then going out to public places may expose me to criticism of others	No	73	71.6%	177	56.4%	250	60.1%	11.12
	Yes	28	27.5%	137	43.6%	165	39.7%	<0.004

Discussion

KSAs started introducing decisive social distancing measures early, before the first case of COVID-19 was confirmed in the Kingdom (1). Community face masking is possibly of great value in reducing COVID-19 transmission. Their use, however, is deeply connected to social and cultural practices and has acquired a variety of personal and social meanings (1,2). The present study aimed at investigating the use of face mask and its impact on the health of the Saudis in Jeddah city. Regardless of the type, setting, or who wears the facemask, it serves primarily a dual preventive purpose; protecting oneself from getting viral infection and protecting others. Therefore, if everyone wears a facemask in public, it offers a double barrier against COVID-19 transmission (6). In the present study just over 75% of the subjects did wear facemasks when they went to public places. The Saudi Ministry of Health (MOH) has made the public aware of the virus transmission patterns and the importance of quarantine and curfew (3). In the present study, the majority of the subjects knew the reason for wearing masks and their importance in reducing the risk of RTI, particularly among those who wore face masks. Acute lower respiratory tract infection is a major health problem that affects more than 15% of the total population of Saudi Arabia each year. This is proposed to be affected mainly by the presence and mobility of large numbers of foreign subjects and the gathering of millions of Muslims in Mecca during the Hajj and Umrah seasons (4). In the present study, 18% of the subjects had respiratory tract infection in the past 5 years. Wearing facemasks allows the wearer to be unidentifiable. If unnoticed, these facemasks break the link between facial appearance and personal identity, with clear implications for applied face recognition (5). In the present study compared to females, males significantly felt that facemasks cover their faces and made it difficult for others to see how they feel and it might increase the likelihood that others would misinterpret how they felt. Males, also, may feel more embarrassed than females, and they felt that they would be criticized by others, particularly those who wore facemasks.

Correct and consistent facemask use is a critical step everyone can take to prevent getting and spreading COVID-19. This is in line with the present study. Masks work best when everyone wears them, but not all masks provide the same protection. Masks need to fit well, filter the air well, and should have several layers (8). In the present study a greater proportion of females knew the correct way to wear a mask. The prevalence of chronic obstructive pulmonary disease in Saudi Arabia is 4.2% among the general population and 14.2% among smokers (8). This prevalence rate is in line with findings from the present study.

Lower accuracy and lower confidence in one's own assessment of displayed emotions indicate that emotional reading was strongly irritated by the presence of a mask. We further detected specific confusion patterns, mostly pronounced in the case of misinterpreting disgusted faces as being angry, plus assessing many other emotions (11).

The CDC recommends avoiding contact with anyone if they are ill with the flu or other respiratory infection. Generally, the best way to prevent this is by taking precautions such as getting vaccinated, washing hands regularly and avoiding people who are sick (16). In the present study that the majority of participants did not want to wear a mask when they have a respiratory infection, and they think that others should protect themselves. Some have expressed concern that the use of masks may affect the cardiopulmonary system by increasing the work of breathing, altering pulmonary gas exchange and increasing dyspnea, especially during physical activity. The effects on work of breathing, blood gases, and other physiological parameters imposed by face masks during physical activity are however small. For people with very mild or well-controlled asthma, wearing a face mask should not be an issue. For those who have trouble breathing, or severe or poorly controlled asthma with frequent flare-ups, or for those with COPD who are coughing and experiencing significant breathlessness, then it is possible that wearing a face mask could cause discomfort, especially during very heavy exercise (17). This is in line with the present study. Masks should not be worn during vigorous physical activity because of the risk of reducing your breathing capacity. It is recommended to keep at least 1 metre away from others, and if exercising indoors, ensure there is adequate ventilation (19). This is in line with the present study.

It is recommended that everyone makes wearing a mask a normal part of being around other people during times of infection. The appropriate use, storage and cleaning or disposal of masks is essential to make them as effective as possible.

Tobacco compromises lung function, and COVID-19 primarily affects the lungs. Smoking tobacco is also a known risk factor for severe disease from many respiratory infections, including coronaviruses and SARS. Smoking also impairs the immune system and previous studies have established that tobacco use is linked with poorer outcomes for people with TB and pneumonia (23). In the present study a greater proportion of males were smokers compared to females and felt that wearing masks in public places reduces their desire to smoke ($p < 0.05$).

WHO and UNICEF advise that children aged 12 and over should wear a mask under the same conditions as adults, in particular when they cannot guarantee at least a 1-metre distance from others and there is widespread transmission in the area (26). This is in line with the present study.

Greater proportions of the subjects believe that wearing masks may cause headache, and difficulty of breathing (35% and 65%, respectively). Greater proportions of females believe that wearing mask may cause skin problems while a greater proportion of males believe that wearing masks may cause sore throat ($p < 0.05$).

This is in line with previous studies (30 – 33)

Limitations

There are some limitations to this study. As this study is cross-sectional, the causal relationship remains unknown, and we do not know if the effects of these variables on wearing of masks acceptance of COVID-19 vaccine during the COVID-19 pandemic will persist in the long term. It is also a non-probability convenient sample, and its generalization to the population may be defective; however, it is an exploratory study.

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Conclusion

Respiratory tract infection is common in Jeddah city. A great proportion of the subjects do not wear facemasks in public places, particularly when they have flu. Wearing of facemasks was associated with several clinical adverse effects. The knowledge about types and use of the facemasks is deficient in a great proportion of the population. These points will help the health care planners when they design health education programs to educate the public about use of facemasks and the ways to avoid physical side effects

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Acute Hemolytic Anemia Following Semaglutide Injection: A Case Report

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Abstract

Background: Drug-induced immune hemolytic anemia is a serious adverse reaction that may result from drug administration, especially in cases of glucose-6-phosphate dehydrogenase (G6PD) deficiency.

Objective: To report a case of acute hemolytic anemia in a 30-year-old Saudi male after receiving Semaglutide injection.

Case Report: A 30-year-old Saudi male with G6PD deficiency presented to the Emergency Department of Aseer Central Hospital, Abha City, Saudi Arabia with acute onset of yellow discoloration of the eyes, palpitation, mild backache, fatigue, and dark urine. The symptoms started one day after receiving the second dose of Semaglutide injection. He looked pale and the sclera were slightly icteric. Laboratory investigations showed high serum levels of liver enzymes and the total bilirubin. The RBCs count as well as the hemoglobin and the hematocrit were low, while reticulocyte count was high. The diagnosis was acute hemolytic anemia, most probably triggered by a recent Semaglutide injection. Following the discontinuation of Semaglutide, his clinical condition improved.

Conclusions: G6PD deficiency should be considered in all clinical settings, and the hemolytic conditions that can possibly be precipitated by drugs not well known to cause hemolysis. Screening of newborn infants to early detect G6PD deficiency early is highly recommended, especially in those with positive family history of G6PD.

Key Words: Semaglutide, Hemolytic anemia, G6PD deficiency, Case report.

Introduction

Drug-induced immune hemolytic anemia is a serious adverse reaction that may result from drug administration and immunization against the drug and/or red blood cells. The reactions are characterized by an abruptly or gradually increased red blood cells destruction through antibody-mediated complement activation (complement-mediated intravascular hemolysis) and antibody-mediated phagocytosis (Fc-mediated extravascular hemolysis), respectively. A large number of drugs have successively been described to cause immune hemolytic anemia (1).

Glucose-6-phosphate dehydrogenase (G6PD) deficiency is an X-linked genetic deficiency estimated to affect more than 400 million people world-wide. It puts stress on red blood cells (RBCs), which may be further augmented under certain pathophysiological conditions and drug treatments. Individuals with G6PD deficiency are mostly asymptomatic under normal circumstances. Under normal circumstances, G6PD deficiency does not cause immediate harm to patients. However, when they become exposed to certain hemolytic drugs the results can range from mild hemolytic anemia to multi-organ failure and mortality (2).

The gold standard for the diagnosis of G6PD deficiency is quantitative spectrophotometry. However, the most widely used G6PD diagnostic in the field is the qualitative fluorescent spot test, presumably due to its low price. Several qualitative G6PD lateral flow assays have been introduced to the market over the last years that are suitable for diagnosis at the point of care and show better operational characteristics than the fluorescent spot test (3).

Smits and Van Raalte (4) noted that one of the newer anti-hyperglycemic drug classes receiving such scrutiny on safety are the glucagon-like peptide-1 (GLP-1) receptor agonists (GLP-1RAs). The glucagon-like peptide-1 receptor agonist (GLP-1RA). Semaglutide is the most recently approved agent of this drug class, and the only GLP-1RA currently available as both subcutaneous and oral formulation. These agents are based on the gut-derived incretin hormone GLP-1, which is a potent stimulator of insulin, while suppressing glucagon secretion (5).

Here, we report a 30-year-old Saudi male who experienced acute hemolytic anemia after receiving Semaglutide injection.

Case Report

On February 23rd, 2022, a 30-year-old Saudi male presented to the Emergency Department of Aseer Central Hospital, Abha City, Saudi Arabia with acute onset of yellow discoloration of the eyes, palpitation, mild backache, fatigue, and dark urine. The symptoms started one day after receiving the second dose of Semaglutide injection (0.25 mg SC). The first dose was received one week earlier. He received Semaglutide for body weight reduction.

The patient was diagnosed with G6PD deficiency at the age of two years. Since then, he has been strictly avoiding eating any beans or any other legumes. The patient denied receiving any medications other than Semaglutide, or recent consumption of any beans. He did not have abdominal pain, itching, fever, change in color of stools, bleeding from any site, or exposure to a recent trauma. He had no history of blood transfusion, allergy, or surgery. There is no history of alcohol intake or drug abuse. There is no history of traveling abroad or contact with a sick patient. He has a positive family history of G6PD deficiency (his brother).

On examination, the patient was pale and the sclera were slightly icteric. Results of chest, and heart examinations were unremarkable. The liver and spleen were not palpable. Body mass index was 32 kg/m², temperature was 36.9°C, heart rate was 103/min, respiratory rate was 18/min, and SpO₂ was 97%.

Abdominal ultrasound showed no abnormal findings. The details of laboratory findings are in Table (1).

The diagnosis for our G6PD case was acute hemolytic anemia, most probably triggered by a recent Semaglutide injection. Therefore, he was advised to avoid any possible triggers that may exacerbate hemolysis, and to stop receiving any further dose of Semaglutide. The patient was started on antioxidants and vitamin supplements. Blood transfusion was not necessary.

Following the discontinuation of Semaglutide, his clinical condition improved, and there were no further episodes of hemolysis. During the follow-up visit two weeks later, his hemoglobin level was 11.9 g/dL, and his serum levels of ALT, AST and LDH were within the normal ranges (48 U/L, 35 U/L, and 298 U/L, respectively). After a month, his hemoglobin increased to 13.2 g/dL and the total bilirubin became 1.6 mg/dL.

Table 1: Results of laboratory investigations at presentation

Investigations	Value
Liver function tests	
• Alanine transaminase (ALT)	66 U/L†
• Aspartate aminotransferase (AST)	40 U/L†
• Lactate dehydrogenase (LDH)	336 U/L†
• Alkaline phosphatase (ALP)	71 U/L
• Serum albumin	4.2 mg/dL
• Total proteins	7.4 mg/dL
• Total bilirubin	8.6 mg/dL†
• Direct bilirubin	0.7 mg/dL†
Hematological findings	
• WBCs	$5.1 \times 10^3/\mu\text{L}$
• RBCs	$3.79 \times 10^6/\mu\text{L}‡$
• Reticulocytes	2.8%†
• Platelet count	$314 \times 10^3/\mu\text{L}$
• Hemoglobin	10.7 g/dL‡
• Hematocrit	40.5%‡
• Mean corpuscular volume (MCV)	88.9 fL
• Mean corpuscular hemoglobin (MCH)	32 pg
• Mean corpuscular hemoglobin concentration (MCHC)	35.9 g/dL
• Prothrombin time (PT)	12.3 sec
• Activated partial thromboplastin time (APTT)	28.6 sec
• International Normalized Ratio (INR)	0.85
Pancreatic function tests	
• Lipase	151 U/L
• Amylase	68 U/L
• Fasting blood glucose	95 mg/dL
• HbA1c	4.9%
Kidney function tests	
• Creatinine	0.9 mg/dL
• Urea	22 mg/dL
• Blood urea nitrogen (BUN)	9 mg/dL
Serum electrolytes	
• Chloride	104 mEq/L
• Sodium	140 mmol/L
• Potassium	3.61 mEq/L
• Calcium	9.7 mg/dL
• Magnesium	2.03 mg/dL

‡ Low levels

† High level

Discussion

After receiving the second dose of Semaglutide for body weight reduction, our G6PD-deficiency patient developed symptoms suggestive of acute hemolytic anemia, with jaundice, palpitation, mild fatigue, and dark urine. Serum levels of ALT, AST and LDH as well as the total bilirubin level were all high. The RBCs count as well as the hemoglobin and the hematocrit were low, while reticulocyte count was high

Our patient was fully aware of being a case of G6PD deficiency, with a strongly positive family history of the same condition affecting his brother. Therefore, he has been strictly avoiding eating beans or any other legumes. He denied any history of blood transfusion, allergy, surgery, or drug abuse.

Fathy et al. (6) stated that symptoms of hemolytic anemia can be fatigue, confusion, light headedness, dizziness, weakness, pale skin, or even in some cases heart failure. An important clue in defining that hemolysis is the cause of the anemia, is an increased reticulocyte count that is not preceded by any bleeding or recent correction of iron or other nutrient deficiency. Indicators of RBCs destruction may occur, such as elevated lactate dehydrogenase enzyme and bilirubin levels. Common markers of hemolysis include bilirubin, lactate dehydrogenase, and reticulocytes are increased (2).

Hassan et al. (7) noted that G6PD deficiency is an inherited, sex-linked, metabolic disorder characterized by an enzyme defect that leads to premature destruction of RBCs when exposed to certain medications or chemicals, or consumption of beans. The severity of associated symptoms varies greatly, depending upon the form of the disorder that is present. Some people may have no symptoms at all, but when symptoms are present, they may include fatigue, pale color, shortness of breath, rapid heartbeat, jaundice or yellow skin, dark urine and enlarged spleen. Other rare manifestations may include hemoglobinuria, shock and renal failure.

The responsible gene in G6PD deficiency has been mapped to Xq28. In females, the disease traits on the X chromosome can be masked by the normal gene on the other X chromosome. Since males only have one X chromosome, if they inherit a gene for a disease present on the X, it will be expressed. Men with X-linked disorders transmit the gene to all their daughters, who are carriers, but never to their sons. Women who are carriers of an X-linked disorder have a 50% percent risk of transmitting the carrier condition to their daughters, and a 50 percent risk of transmitting the disease to their sons (8).

The observed high levels of serum ALT, AST and LDH in our patient are most probably due to the acute hemolytic anemia, not due to Semaglutide-related hepatotoxicity. It has been reported that in large clinical trials, serum enzyme elevations were not more common with Semaglutide therapy than with placebo or comparator agents, and no instances of clinically apparent liver injury were reported.

Treatment with Semaglutide is often associated with improvements in serum aminotransferase levels (and hepatic steatosis) making them possible treatments for nonalcoholic fatty liver. There have been no published case reports of hepatotoxicity due to Semaglutide and the product label does not list liver injury as an adverse event (7).

Our patient was not diabetic. His HbA1c was 4.9%. However, he received the weekly subcutaneous injections of Semaglutide for weight reduction since he was obese, with body mass index 32 kg/m². Pancreatitis did not occur after receiving Semaglutide, since he had normal levels of serum lipase and amylase, as well as fasting blood glucose. Moreover, his kidney function was not affected, as indicated by the normal levels of serum creatinine, urea and BUN.

It has been reported that the Semaglutide is somewhat special among GLP-1RAs given that it is the only drug available as both subcutaneous injection and as an oral formulation (9). It provides a beneficial effect on body weight, blood pressure and lipid profile (10). However, partly due to the widespread presence of GLP-1 receptors, several adverse effects have been observed, of which pancreatitis was initially flagged as a safety alert (11).

There are many published lists of known and suspected hemolytic drugs which proved to be unsafe for G6PD deficient patients, such as some anti-malarial drugs (12), and the fixed-dose combination of isosorbide dinitrate plus hydralazine (13).

However, the definitive determination of drug-induced hemolytic anemia is difficult (14). Therefore, the susceptibility of G6PD-deficient populations to certain drug treatments and the subsequent potential risks of hemolysis remain important public health issues to be investigated. Assessing the hemolytic potential of newly developed compounds prior to human testing is crucial for creating safe alternatives for G6PD deficient populations (2).

Conclusions

This case highlights the importance of considering the presence of G6PD deficiency in all clinical settings, and the conditions that can possibly be precipitated by drugs not well known to cause hemolysis. Screening of newborn infants to early detect G6PD deficiency is highly recommended, especially in those with positive family history of G6PD. Further studies are needed to confirm the pathophysiology of hemolytic anemia associated with Semaglutide administration.

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Family Members Involvement in Patient Care: Are They Invited?

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Abstract

Introduction: Health care providers are expected to gain vital information regarding the patient, illness, and relationships from family members and the social network through therapeutic conversation, particularly when a patient is in a position where he/she cannot provide reliable or complete information.

This review aimed to provide simple advice and tips for healthcare providers regarding the engagement of family members in developing an optimal nursing and medical healthcare plans for their relative patients during hospitalization and after being discharged

Conclusions: The involvement of family members within a patient's social network is essential for the development of an appropriate medical and nursing care plan. There is a pressing need to effectively use information obtained from family therapy interviews. Keeping an open communication channel with close family members during patient hospitalization is beneficial to the patient, family members and to healthcare providers. This will also offer a mutual understanding and a better adherence to the agreed healthcare plan. Furthermore, many aspects of medicine, including primary healthcare can be improved by family therapy.

Key Words: Family-Oriented Patient Care, Healthcare Providers, Communication Skills, Family Therapy

Introduction

Research has shown that family members and close individuals within the social network can provide an improved understanding of the patient, which is critical in optimal treatment planning and delivery. Health care providers (e.g., physicians, nurses, respiratory therapists, etc.) are expected to gain vital information regarding the patient, illness, and relationships from family members and the social network through therapeutic conversation (Haine-Schlagel & Walsh, 2015).

This review aims to provide simple advice and tips for healthcare providers regarding the engagement of family members in developing an optimal nursing and medical healthcare plans for their relative patients.

Healing Elements of Therapeutic Conversation

The healing elements of therapeutic conversation are imperative to the success of therapy interviews. Seikkula & Trimble (2005) outlined “actions that support dialogue in conversation, shared emotional experience, creation of community, and creation of new shared language” among the vital elements of therapeutic conversation. Each of the stated elements is essential as conversations enable therapists to understand the “reciprocal relationships” between patients and the rest of nature, including social networks (Clayton & Saunders, 2012).

An in-depth understanding of the nature of patients’ relationships with outer elements helps in the development of a suitable care plan. To facilitate conversation, therapists are required to perform the stated actions that support dialogue. The first action concerns the creation of a shared language. Therapists should seek information using techniques that make the telling of relevant stories an easy task. Also, healthcare professionals should listen “compassionately and intently,” and engage in reflective dialogue connecting the collective contributions of participants as opposed to focusing on single utterances. The stated strategies facilitate a shared language that increases understanding of the illness among all participants, particularly the patient and health care provider (Seikkula & Trimble, 2005).

Moreover, Seikkula & Trimble (2005) noted that a shared language generates communal feelings as each participant is vested in the recovery of the patient following participation in open dialogue. Further, when participants experience feelings of togetherness, the resulting familiarity enables the sharing of the “not-yet-said”. Creating communities encourages the sharing of experiences that participants otherwise cannot share with unfamiliar therapists. To enrich conversation, the attention of therapists is drawn to the role of “shared experience of emotion” that can be created by responding to “odd or frightening psychotic” utterances from patients with similar manner and disposition as comments from family members. In addition, healthcare providers should inform

family members that all contributions of the team will be utilized in the improvement of the care process to inspire in-depth conversation.

The emotions of participants also impact the interview process as clues to the nature of relationships within the social network. A healthcare provider can establish the emotions of participants by remaining vigilant of changes in body language, including “tears in the eye, constriction in the throat, changes in posture, and facial expression”. Shared language, feelings of togetherness, and a common experience of emotion help care professionals to gain an improved understanding of the medical conditions ailing patients (Seikkula & Trimble, 2005).

The Therapist’s Inner Conversation

In family therapy, the therapist’s inner conversation is a challenging practice that can be identified as a “negotiation between the self of the therapist and his role.” (Rober, 1999). This definition is based on a recognition of the influence of therapist’s ideas, thoughts, and imagination on therapy processes.

Notably, Rober (1999) argued that the outer and inner conversations of a therapist are influenced by the utterances of patients and family members. Given the influence of both the internal and external environments, attaining a balance between the inner and outer conversations is a challenging task for professionals in care settings, intensive care units (ICU) included.

Rober (1999) noted that patients often seek therapy with a story to tell. The therapist’s role involves gaining insight into the story to improve understanding of the medical condition. Patients can engage in ‘selectivity,’ whereby particular aspects of the story are shared, and others are left in obscurity. The questions a therapist asks to generate information about the story originate from inner conversations within him or herself. Put differently, the content of the outer talk with family members informs the therapist’s inner conversation. Therefore, inner conversations should generate as many ideas as are discussed in the outer conversation. Consequently, therapists are cautioned against prioritizing particular ideas, as a result of inherent ideologies, to generalize the patient’s condition.

Therapists ought to be flexible and entertain “multiple views” while conversing internally. Further teachings regarding the utilization of inner conversations included that a therapist should refrain from acting unless inner conversation aligns with the context of each session (Rober, 1999).

Essentially, the inner conversations should be used to develop techniques through which a therapist can promote healing in spite of contrasting agendas and realities. The primary challenge concerns striking a balance between the inner and outer conversations such that inner processes facilitate rather than inhibit healing conversations. Also,

therapists should maintain flexibility and deliberate on multiple ideas as presented in outer conversations as opposed to selective prioritization of concepts based on personal ideas, thoughts, emotions, and imaginations (Rober, 2017).

Hypothesizing, Circularity, and Neutrality

Hypothesizing, circularity, and neutrality are inspiring concepts for family therapy. Healthcare providers are inspired to continually evaluate therapy processes for bias and apply corrective measures given the subjective nature of humans. Hypothesizing involves the formulation of a supposition regarding the family being interviewed, based on information available at any particular point during therapy. For instance, a healthcare provider can form a hypothesis using the information provided before initial contact with a family. The initial hypothesis, such as a child's mental illness occurring due to an ineffective relationship with parents, can be redefined as a healthcare provider acquires additional information through interactions with the family (Cecchin, 1987).

Selvini et al. (1980) wrote that a valid hypothesis should be systemic, which implies the inclusion of all components of a family and the "total relational function". A hypothesis forms the basis of an effective family interview session. After generating a hypothesis, a healthcare provider should engage in circularity.

Selvini et al. (1980) defined circularity as the ability to seek complete information regarding the patient and illness based only on feedback from the family rather than personal thoughts or ideas. Health care providers should remain free of cultural and linguistic frameworks that can inhibit the objective consideration of information generated by the family interview. Therefore, one should refrain from judgement, from prioritizing one ideology or conclusion as more correct than others to achieve neutrality. Instead, therapy should invoke the curiosity and inventiveness of a therapist to support the evaluation of alternatives without particular attachment to any one ideology. Through effective hypothesizing, circularity, and neutrality, therapists can develop an appropriate treatment approach suited to the unique needs of the patient and family members involved.

Open Dialogue

Seikkula (2011) stated that the open dialogue approach to treating severe mental illnesses, such as schizophrenia, is both a challenging and troublesome concept. Open dialogue concerns the involvement of the patient and other significant persons within the social circle in therapy. The individuals help both the patient and healthcare providers to have an in-depth understanding of the causes, effects, and potential treatment options for the medical condition in question. Open dialogue mobilizes the "psychological resources of both the patient and the family members".

Seikkula (2011) explained that the initial meeting is arranged within 24 hours of contact with a psychotherapist or care facility. The patient is invited to the meeting alongside other significant persons from the social circle, including friends and family members. The primary challenge concerns moderating the meeting by initiating the conversation. The healthcare provider in charge is expected to ask a question, to which other participants are required to provide answers, ask other questions, and contribute without straying from the content being discussed.

Healthcare providers must ensure that answers are adapted to what other participants say so as not to interrupt dialogue. The exchange can discuss multiple issues but should end within the recommended length of "90 minutes". Markedly, the therapy meeting can generate critical insights for health care providers to understand the patient and aid in the development of a family-centred treatment. However, open dialogue approaches can be perceived as troublesome for failing to establish the appropriate number of individuals, family, and friends that should be involved in the therapy meetings to assure success (Pavlovic et al., 2016).

Seikkula (2011) failed to provide an estimation of the number of participants that should be involved to generate adequate data for use in developing a treatment approach. The open dialogue method is troublesome for assuming that the family members and friends of patients are naturally willing to participate in care processes for the sake of the patient. The possibility that a health care provider and patient can fail to interest family members or friends to attending therapy meetings exists. Further, a patient can have one family member or friend in the social network, in which case, the resources available for the health care provider to formulate appropriate care methods are limited. While open dialogue approaches to therapy are critical in developing appropriate care plans by providing immediate help, involving social networks, and ensuring care continuity, the assumption regarding the willingness of social networks to participate in care can be troublesome.

Engaging Families in Intensive Care Units

Each of the concepts discussed above by the authors of this review demonstrate effective techniques for involving families in the development and execution of suitable nursing care plans during the authors' practice. The importance of utilizing open dialogue and applying the healing elements of therapeutic conversations have been learned by the authors. The information is imperative considering the need to provide constant support for patients throughout recovery in ICU. Open dialogue is characterized by the scheduling of the first therapy meeting 24 hours after a patient seeks help. In the case of ICU, the family members of a patient can be involved immediately after the patient's arrival in the hospital. The primary concern is ensuring that the family receives adequate information regarding the patient's condition

as well as addressing any emerging issues. The initial meeting incorporates the opinions, ideas, and thoughts of close associates from family and friends.

According to Seikkula (2011) and Pavlovic et al. (2016), healthcare providers can use the information generated from the initial interaction to understand the illness by examining relationships between the patient and the social networks. The conversation should be steered in such a way that all contributions build on the utterances of other participants progressively. However, a primary challenge lies in the failure of research to define who is the proper family member to be engaged, their own views and understanding of the illness, in addition to the appropriate number of individuals that can participate in the initial meeting.

Therefore, healthcare providers are challenged with ensuring that family members attend the meeting with the help of patients where possible. Obstacles can emerge if the identified family members are unavailable. Furthermore, ICU nurses should apply the healing elements of therapeutic conversation while engaging families. The components include "steering effective dialogue in conversation, creating shared emotional experience, cultivating feelings of togetherness, and establishing a new shared language" (Seikkula & Trimble, 2005).

The healing elements of therapeutic conversation are essential when addressing the mental health of patients and family members within ICU settings. The stated elements enable an in-depth analysis of "reciprocal relationships" between patients and the rest of nature, including social networks. Key lessons for family therapy in an ICU situation concern the creation of the experience of emotion by encouraging sharing while remaining aware of the feelings that utterances evoke in participants. Shared language is also necessary for cultivating feelings of togetherness among health care providers and family members, towards the complete recovery of the patient. Togetherness and emotional experience are especially vital when providing updates to family members, whether the information contains encouraging or discouraging content (Clayton & Saunders, 2012).

Besides delivering information, healthcare providers ought to consider the thoughts of family members as well. Each participant needs to perceive the commitment of health care providers and other concerned persons to the patient's healing. As a result of shared emotions, language, and togetherness, healthcare providers can create collaboration as family members will be willing to share information regarding the illness that they would otherwise not share.

Hypothesizing, circularity, and neutrality also significantly influence ICU nursing roles. Teachings on the stated ideologies establish the importance of addressing personal ideas, thoughts, and imaginations that can influence care processes by relying primarily on information generated from family interviews. Selvini et al. (1980) confirmed that

therapists form hypotheses consciously or unconsciously regarding patients and related illnesses. Suppositions are formulated using available information at any given point in the care process. Hypotheses can be utilized to facilitate rather than inhibit care processes. To ensure success, it is important to formulate hypotheses that incorporate all components of a family. Next, circularity should be engaged, whereby inner conversations (Rober, 1999) and actions (Selvini et al., 1980) are informed by information from the family interview as opposed to personal thoughts. Moreover, therapists should separate themselves from cultural and language models that inhibit the utilization of information from family interviews in the development and execution of care plans for critically ill patients. Circularity helps in the achievement of neutrality. ICU nurses should recognize the incapacity to always act and reason objectively. Their commitment concerns refraining from the prioritization of one ideology or conclusion as more correct than others. Instead, curiosity and a need to invent should prompt one to evaluate alternatives without particular attachment to one belief or action. Neutrality is critical while working with inter-professional teams to develop and execute optimal care plans. Andersen (1987) stated that ICU nurses should work with a reflective team to evaluate conversations with family members and establish relationships with the environment and patterns of behaviour and develop an effective care plan.

The engagement of families within ICU settings also requires consideration of inner conversations. Inner conversations are identified as a compromise between the self of health care providers and their roles in the interview process (Rober, 1999). It has been observed that negotiations between the self and professional role are a challenging task. Limiting personal ideas, thoughts, and imaginations from an intensive interview requires deliberate efforts. Since ICU nurses are involved in the care of patients and their families, they are required to seek adequate information about the patient and relations with social networks and make objective decisions regarding an appropriate care approach. Rober (1999) cautioned that barriers, such as lack of a shared language, can cause family members to withhold information selectively and inhibit information seeking. The creation of a shared language and emotions, as taught by Seikkula and Trimble (2005), is, thus, critical.

Also, Rober (1999) cautioned against the prioritization of particular ideas and issues. Instead, ICU nurses are expected to investigate and consider multiple ideas as presented during the interviews. Before making a decision, the ICU nurses should be sensitized to make sure that inner conversations align with the context of each session. Inner conversations are instrumental in handling patients and family members with heightened distress levels as a result of critical illness. Research had indicated the need to provide emotional support for family members as a means of reducing distress and increasing care satisfaction levels (Carlson et al., 2015). By using the strategies outlined above to align inner conversations with care processes, the quality and safety of care can be improved.

Learning Priorities

Inner conversations appear as a key priority area considering the need to maintain a balance between inner deliberations and personal ideologies and perceptions with the context of external conversations with families (Rober, 1999; Rober, 2017). Further readings and research in therapeutic conversations involving both patients and their families are likely to enhance the ability to recognize and address the influences of personal thoughts on inner conversations. Key areas of focus will embrace attending to patient process, processing patient's story, addressing personal experience (thoughts and emotions), and managing the therapeutic process (Rober et al., 2008). Consequently, confidence in holding objective inner conversations will increase.

Open dialogue seems like a troublesome idea particularly, when family members are unavailable or are unwilling to participate in care processes. The authors of this review need additional information that can be acquired through interactions with colleagues, and inter-professional teams. The key concern is to achieve the knowledge and skills necessary to interest family members to attend the first therapy meeting with the help of the patient whenever possible. Engaging a substantial number of relevant family members is likely to generate adequate information to inform care processes.

Furthermore, personal communication and inter-professional team management skills should be improved. Communication is key in the effective execution of each of the family engagement concepts discussed above. For instance, organizing and managing an open dialogue session with family members and other key individuals within the patients' social circles imply the need to utilize essential communication skills such as active listening, cultural awareness, non-verbal cues, written communication, relaying and developing ideas, as well as inspiring trust (Boyle & Anderson, 2015; Dithole et al., 2017).

Slatore et al. (2012) emphasized the need for the stated communication skills. As ICU nurses interact with patients and family members in biopsychosocial information exchange, the sharing of power and responsibility occurs. Therapeutic alliances emerge to enhance the recovery of the patient. Their commitment toward improving personal communication skills to develop the ability to execute therapeutic conversation, thus, is validated. Further, communication skills will be instrumental in advancing inter-professional team management skills.

Researchers have confirmed the need for inter-professional collaborations to effectively execute and utilize information from family therapy interviews (Andersen, 1987; Rober, 1999; Seikkula & Trimble, 2005). By improving personal skills in the areas outlined in this section, the ability to engage families will increase significantly.

Conclusions

The involvement of family members within a patient's social network is essential for the development of an appropriate medical and nursing care plan. There is a pressing need to effectively use information obtained from family therapy interviews. Keeping an open communication channel with close family members during patient hospitalization is beneficial to the patient, family members and to healthcare providers. This will also offer mutual understandings and a better adherence to the agreed healthcare plan.

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