

# Knowledge about inguinal hernia among the Saudi Population

Mohammad E. Mahfouz (1)

Alia M. AlShalawi (2)

Abdulrahman A. Alzahrani (3)

Sara H. Alqaidi (4)

Rawan N. Al-Holaifi (2)

(1) Assistant Professor of surgery, College of Medicine, Taif University & Chairman of surgery departments, King Abdulaziz Specialist Hospital, Taif, Saudi Arabia.

(2) Medical Intern, College of Medicine, Taif University, Taif, Saudi Arabia

(3) Emergency Medicine Resident, Emergency Department, King Fahad Medical City, Riyadh, Saudi Arabia

(4) MBBS, Neurosurgery department, King Fahad Hospital, Madinah, Saudi Arabia

## Corresponding author:

Alia Mohammed AlShalawi.

College of Medicine, Taif University, Taif, Saudi Arabia

Phone number: +966551788115

Email: Amam-1013@hotmail.com

Received: January 2020; Accepted: February 2020; Published: March 1, 2020.

Citation: Mohammad E. Mahfouz, Alia M. AlShalawi, Abdulrahman A. Alzahrani, Sara H. Alqaidi, Rawan N. Al-Holaifi.

Knowledge about inguinal hernia among the Saudi Population. World Family Medicine. 2020; 18(3): 12-19.

DOI: 10.5742MEWFM.2020.93770

## Abstract

**Background:** Inguinal hernias are the most common type of hernias and are a common health problem, which is most commonly treated surgically to avoid the risk of complications.

**Aim:** assessing the knowledge and awareness about causes, risk factors, and proper management of an inguinal hernia among the population of the Kingdom of Saudi Arabia (KSA).

**Methods:** A cross-sectional study was done from May to August 2017. 1,119 people participated in this study. The electronic online questionnaire was published through social media in all regions of Saudi Arabia. It consisted of socio-demographic data, Past medical and surgical history, Questions related to risk factors. Awareness score was calculated for all participants, depending on validated answers from many surgical international references to the answers chosen by the participants. The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS) program version 21.

**Results:** 50.9% show a good awareness level, 45.3% of them were Saudi, those who were significantly younger  $p=0.000$  with a mean age of  $28 \pm 9$  compared with 49.1% show a poor awareness level (mean age  $31 \pm 11$ ). Variables found to have a statistically significant relationship with awareness level were age, marital status, occupation, number of children and educational level ( $p=0.005$ ).

**Conclusion:** The majority of participants in our study were not fully aware of the causes and management of a hernia. Age, marital status, education level, number of children and occupation play a significant role in their awareness. More educational programs about inguinal hernias are needed.

**Key words:** Inguinal hernias, Awareness, Knowledge, Saudi Arabia, Hernia.

## Introduction

Hernias are a common public health issue; inguinal hernias are the most common among them. One of the most frequently performed operations worldwide is inguinal hernia repair [1]. A hernia is defined as a tissue, or an organ bulge or a protrusion through the weakened abdominal area. Although there are different types of hernias, they are usually related to the abdomen with approximately 75% of all hernias occurring in the inguinal region [2].

Regarding risk factors, males are more at risk to have an inguinal hernia than females [3]. Some patients who have suffered from an inguinal hernia on one side in the past tend to develop another on the other side; positive family history, obesity, and smoking are all known as potential risks for an inguinal hernia [1,4,5]. Multiple pregnancies in female patients and patients who are actively engaged in sport are at more risk to develop inguinal hernias, but they can occur in those who do not fit these categories [6,7].

The major cause of indirect hernias is congenital according to the age of the patient. They happen due to bulging of abdominal contents into an open processus vaginalis. In general, any conditions that contribute to increasing intra-abdominal pressure may be a risk for a hernia. Direct hernias occur due to weakness in the Hesselbach's triangle, especially the transversalis fascia [8].

Most important complications of an inguinal hernia are incarceration and strangulation [4,9]. Intraoperative complications are nerve injury of the vas deferens, blood supply of the testis, and hemorrhage. Early postoperative complications may be either local such as hematoma formation, scrotal swelling including testis and skin and primarily wound infection, or systemic such as respiratory and cardiac conditions [10].

Different approaches are used in the treatment and prevention of a hernia. These include truss, medications, and surgery. Surgery is the treatment of choice for hernia today; there are two main methods for surgery: open surgery and laparoscopy. Different methods are used in inguinal hernia repair, such as herniotomy which is defined as removal of hernial sac, and herniorrhaphy (herniotomy, with inguinal canal posterior wall repair). This method is used for smaller hernias, indirect hernia, and for healthy tissues [11]. Hernioplasty (herniotomy, with posterior wall reinforcement) can be performed using a synthetic mesh which is used for larger abdominal defects. One of the most common inguinal hernia repair procedures is Lichtenstein tension-free mesh repair [12].

Hernia prevention can be achieved by preventing muscle weakness that allows a hernia to occur, cessation of smoking, avoiding a persistent cough, maintaining a healthy body weight, avoiding straining during urination or bowel movements, and avoiding lifting too heavy weights [13].

As Abdulwahab Alkhar's study revealed lack of public knowledge on the predisposing factors for hernia among the study group of young Saudis in Riyadh. Overall results showed that only 48% of the respondents could relate hernia to the key underlying risk factors while 22% denied the correlation and 30% claimed no knowledge of the risk factors, and the association with hernia development [14].

Studies concerning the knowledge of the population in the Kingdom of Saudi Arabia about hernia and its causes, management, and prevention have been reported rarely. So, the aim of this study was to assess the knowledge and awareness of the population about causes, risk factors and proper management of an inguinal hernia in the Kingdom of Saudi Arabia.

## Methodology

**Study setting and time frame:** A cross-sectional study was conducted between May 2017 and August 2017.

**Sampling methodology:** The study was done to assess the knowledge and awareness of the Saudi population about causes, risk factors and proper management of an inguinal hernia in KSA. The inclusion criteria were Saudi, from all education levels, all regions and for adults from any age group, all genders, who live in KSA and have fluency in the Arabic language. There were no exclusion criteria. The target sample was at least 350 subjects from all regions of the Kingdom of Saudi Arabia (KSA). According to the response to the online survey, 1,119 responses were collected.

**Study instrument:** An open and close-ended structured questionnaire was administered to the public as an electronic copy through Social media. We put open questions for age, weight and height to calculate the body mass index (BMI), close-ended questions included multiple choice for risk factors, causes, complication, management, and prevention with most common answers with the ability to select more than one answer, to assess the knowledge and awareness of population. The questionnaire included filter questions to the persons who had a history of hernia.

Each questionnaire had four sections comprised of the person's demographic information, past history, diagnostic criteria, and symptoms and signs, followed by the knowledge and awareness section. The questionnaires provided information about the past history of persons, assessed the most common risk factors widespread in the sample, determined the most common symptoms of hernias, what are the causes of the hernia from their point of view, determined the type of management, whether drug management or non-drug management and which type of management would be used if they had a hernia and the most common complications in their opinions. Finally, to determine the most effective preventive method in their point of view.

Statistical analysis: Data were analyzed by a biostatistician using Statistical Package for the Social Sciences (SPSS) program version 21 developed by International Business Machines (IBM®) Corporation. Statistical tests were descriptive analysis where quantitative data was expressed as mean and standard deviation (Mean  $\pm$  SD), and qualitative data were expressed as numbers and percentages, and the Chi-square ( $\chi^2$ ) test was used to test the relationship between variables. A p-value of  $<0.05$  was considered as statistically significant.

## Results

This study was applied on 1,119 subjects from the Saudi population during the period between May 2017 and August 2017. Most of them were females 874 (78.1%) and 245 (21.9%) were males and the mean age of the participants was (29  $\pm$  10 years). The age and other Socio-demographic data of participants are summarized in Table 1. Different educational levels were noticed in the participants of our research, most of them were university graduated 845(76.3%).

According to the questionnaire given to the participants, 50.9% showed a good awareness level and they were significantly younger ( $p=0.000$  with a mean age of 28  $\pm$  9) compared with 49.1% who showed a poor awareness level (mean age 31  $\pm$  11) (Figure 1). Socio-demographic data of both are shown in Table 2. Variables found to have a statistically significant relationship with awareness level were age, nationality, residency, marital status, occupation ( $p=0.000$ ), and educational level ( $p=0.004$ ). No significant difference in awareness level was noticed between male and females who participated in this study.

About 79 % of all participants in our research thought that they are not fully aware and oriented about causes, management, and prevention of a hernia, and they suggest more educational programs to the Saudi population about this common health problem. Most statistically significant questions found to affect the awareness level were those about causes of a hernia; both who had a good and poor awareness level chose abdominal muscles weakness as a most common cause of a hernia ( 625(18.8%) of our participants), while the rest most commonly chose causes are weight lifting sports, pregnancy, and delivery, abdominal surgeries, respectively; other causes are shown in Table 3. Most of the participants chose pain in the affected area as the most common presenting complaint, while the most participants chose treatment of choice is surgery in 803(71.8%); other chosen symptoms and treatments are shown in the same Table.

Awareness of treating hernia by surgical mesh was noticed in 506 (45.2%) of participants, and to assess the knowledge and awareness of hernia prevention we allowed participants to choose more than one method of prevention which is shown in Table 3.

## Discussion

Population knowledge, perceptions, and views must be elicited to provide appropriate prevention methods, as hernia complications are considered life-threatening conditions. In this study, 50.9% of our participants are fully aware of hernia causes, management, and prevention. Age, marital status, educational level, occupation, number of children and frequency of pregnancy were significantly associated with awareness level.

The relation between awareness level and the age of participants was significant in our study. 23.2% who have good awareness level were between 18-24 years old; this may be because we included university students most. In another study which aimed to assess the awareness of females about breast cancer, they found that younger women had higher scores in relation to other participants [15].

In our study, we observed that there is a significant relationship between good awareness and marital status and we found that 26.5% of participants who had good awareness level were singles. Another study conducted in Jeddah to assess the awareness about breast cancer found that single females had better knowledge than others [16].

There is a significant relationship between awareness level and education; 39.5% who had a good awareness level were highly educated. Another study that aimed to assess the knowledge of Breast cancer showed that women with Low education level seem to be associated with poor awareness level about breast cancer which inversely influenced their breast cancer screening behaviors (15). Other research conducted in Al-Qassim region about diabetes mellitus knowledge showed an association between level of education, and awareness of DM [17].

Our result showed that field workers (health care) who had a good awareness level (124, 11.1%) was higher than non-field workers (70, 6.3%). While the field worker did not have a better awareness level compared to the unemployed who had a good awareness level (376,33.6%). This can be accounted for by the fact that the majority of our sample were unemployed (675 out of 1119). This is consistent with Ahmad Alakeel research (2017), where their sample was students and unemployed (367, 36.4%), (273, 27.1%) respectively [18].

In our study we observed that there is a significant relation between good awareness level and number of children. Those who have no children had a higher awareness score than others (218, 23.6%). That is because 46% of the participants were single and as we discussed before 26.5% have a good awareness level score. To our knowledge, no previous research has studied the relationship between number of children and the awareness level about hernia. In contrast, previous research done about awareness of parents about antibiotic use among children in Riyadh, found no significant differences in awareness level

Table 1: Sociodemographic data (n = 1119)

Variables		n	%
Age groups (years)	18-24	467	41.7%
	25-39	393	35.1%
	40-59	211	18.9%
	<18	43	3.8%
	+60	5	0.4%
Age (Mean $\pm$ SD) *		29 $\pm$ 10	
Gender	Female	874	78.1%
	Male	245	21.9%
Nationality	Saudi	995	88.9%
	Non-Saudi	124	11.1%
Residency	Middle	316	28.2%
	North	301	26.9%
	West	250	22.3%
	East	141	12.6%
	South	111	9.9%
Marital status	Married	568	50.8%
	Single	524	46.8%
	Divorced	19	1.7%
	Widow	8	0.7%
No. of children	None	409	44.2%
	<4	277	29.9%
	4-6	204	22.1%
	>6	35	3.8%
Education level	University	845	76.3%
	Secondary school	191	17.2%
	Higher education	41	3.7%
	Less than secondary school	31	2.8%
House Type	Apartment	439	39.9%
	Old house	77	7.0%
	Villa	585	53.1%
Occupation	Unemployed	675	60.3%
	Field work	269	24.0%
	Non-field work	175	15.6%

Figure 1: Awareness level about hernia among the participants (n= 1119)

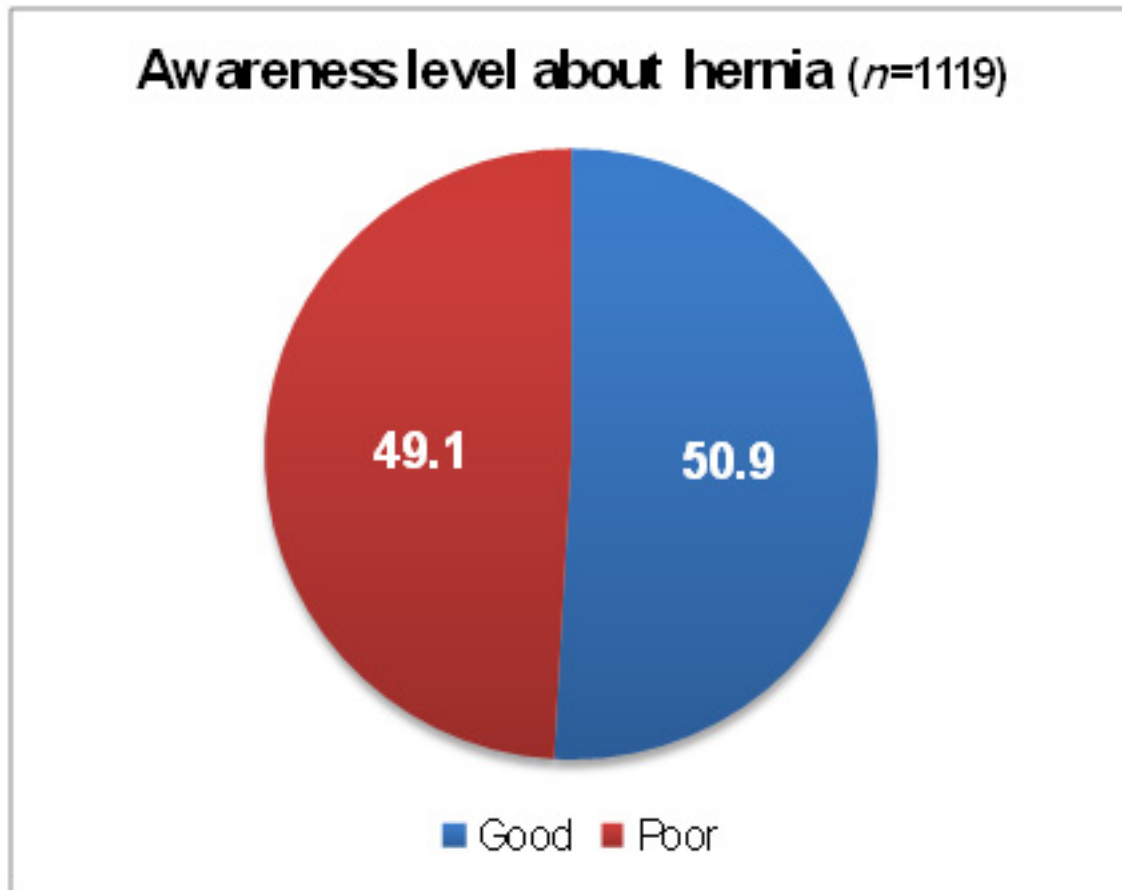


Table 2: Relationship between awareness level and sociodemographic data (n = 1119)

Variables		Awareness level				P. value
		Good		Poor		
		n	%	N	%	
Age groups (years)	18-24	260	23.2%	207	18.5%	0.002 <sup>†</sup>
	25-39	201	18%	192	17.2%	
	40-59	88	7.9%	123	11%	
	<18	21	1.9%	22	2%	
	+60	0	0%	5	0.4%	
Marital status	Married	261	23.3%	307	27.4%	0.004 <sup>†</sup>
	Single	297	26.5%	227	20.3%	
	Divorced	9	0.8%	10	0.9%	
	Widow	3	0.3%	5	0.4%	
No. of kids	None	218	23.6%	191	20.6%	0.005 <sup>†</sup>
	<4	135	14.6%	142	15.4%	
	4-6	89	9.6%	115	12.4%	
	>6	9	1%	26	2.8%	
Education level	University	438	39.5%	407	36.7%	0.008 <sup>†</sup>
	Secondary school	105	9.5%	86	7.8%	
	Less than secondary school	7	0.6%	24	2.2%	
	Higher education	19	1.7%	22	2%	
Occupation	Unemployed	376	33.6%	299	26.7%	0.000 <sup>†</sup>
	Field work	124	11.1%	145	13%	
	Non-field work	70	6.3%	105	9.4%	

Table 3: Response of the studied participants to the questionnaire items about hernia (n = 1119)

Variable		n	%
What are the causes of the hernias in your opinion?	Abdominal muscles weakness	625	18.8%
	Weight lifting sports	464	14.0%
	Pregnancy and delivery	438	13.2%
	Abdominal surgery	388	11.7%
	Congenital	371	11.2%
	Obesity	351	10.6%
	Chronic constipation	313	9.4%
	Chronic cough	247	7.4%
	Smoking	123	3.7%
Do you think that surgery has a role in causing the hernia?	Yes	640	57.2%
	No	479	42.8%
What do you think is the treatment of choice for the hernia?	Surgery	864	77.2%
	Lifestyle modification	200	17.9%
	Medications	55	4.9%
What do you think is the complication after treating the hernia surgically?	Recurrence	406	36.3%
	None	283	25.3%
	Inflammation of the incision	247	22.1%
	Chronic pain or uncomfortable feeling in the affected area	183	16.4%
Have you heard that inguinal hernia repair is better to be done by surgical mesh?	Yes	570	50.9%
	No	549	49.1%
For prevention of the hernia	Lifting the subjects in right way	821	44.5%
	Go to doctor if have one or more of (cough, dysuria, constipation, swelling of abdomen or part of it)	807	43.7%
	Stop smoking	219	11.9%
Do you think that there is enough awareness about the prevention and management of hernia?	No	957	85.5%
	Yes	162	14.5%
Awareness level	Good	570	50.9%

found no significant differences in awareness level regarding the number of children ( $p$ -value > 0.05) [19]. Another study attempted to assess awareness level of parents of children with disabilities about human rights of their children and found that the number of children in the family has an impact on awareness level of the parents with children with disability. Parents having two children are more aware compared with other parents. Further, parents having more than three children are found to be least aware [20].

The majority of participants agreed that abdominal muscle weakness is the most common cause of hernia while smoking was the least likely chosen cause. A Comprehensive Review about Etiology of Inguinal Hernias done in 2017 showed that high intra abdominal pressure (as in coughing, straining and jumping) [21], old age, male gender, connective tissue disorder, patent processus vaginal, are risk factors for developing a hernia. It also showed that higher BMI is a protective factor for a hernia and it showed that smoking is not confirmed to be a risk factor for developing an inguinal hernia.

Regarding heavy lifting as a risk factor for developing hernia, research done in 2015 mentioned that its remains controversial. A recent systematic review showed data concerning the relationship between repeated heavy lifting, occasional heavy lifting, or a single strenuous lifting episode and the development of a groin hernia to be inconclusive [22]. Of note, there is no increased incidence of inguinal hernias in weightlifters [23]. While it includes other risk factors for inguinal hernias: family history and previous hernia.

In our research, we discussed whether surgery has a role in causing a hernia. The majority of participant answered yes (640 = 57.2%). Other studies include, low surgical volumes, surgical inexperience, poor surgical techniques, peritoneal dialysis and history of open appendectomy as risks for IH [24].

Regarding surgical complications the most common chosen complication in our study was recurrence. Other complications included chronic pain in the area, infection, and inflammation of the incision. Other studies include complications as hematoma or wound seroma, wound infection (4), testicular complications [25], and complications related to the mesh, for example, erosion, infection, and contraction.

In our study (570=50.9%) of participants thought that mesh repair is better to be used in hernia surgery. A Cochrane meta-analysis done in 2002 compared mesh repair without mesh repair and strongly supported the superiority of prosthetic mesh repairs over sutured repairs, reporting a 50 to 75% lower risk of hernia recurrence, an earlier return to work and a lower risk of chronic post-herniorrhaphy groin pain [26].

Based on IH prevention, (821=44.5%) of participants think that lifting objects in a correct way is a safer and effective way to prevent IH and least preventive method chosen by both was smoking cessation. Based on another review, IH cannot be prevented in patients who are physically demanding [27], in which risk will decrease after repair [28].

### Limitations

Limitations of our study could be the difficulty of generalizing our findings, as the target population didn't cover the whole Saudi population as it was an online survey.

## Conclusion

In conclusion, according to the participant's knowledge, the most common causes are abdominal muscle weakness and the commonest risk factors are previous abdominal surgery, and overweight. More than half of the participants believe surgical intervention is the treatment of choice. The majority of participants in our study were not fully aware of the causes and management of a hernia. This indicates their need for educational programs about a hernia.

**Funding:** None

**Conflicts of interest:** no conflicts related to this work

### Consent for publication

Informed consent was obtained from all the participants

**Ethical approval:** The Research Ethics Committee of Taif University approved the study. There was no contact with the participants because an electronic survey was used.

### Acknowledgment

The authors are highly thankful to their dearest supervisor for his technical support during this research work and for Nouf Mohammed Abdullah Almohaimel, Sukainah Ahmad Omer AlSubaiei, Yasmeen Essa Gillan, Rawan Nasser M. AlHunaki and Adalah Basel Alqalalweh for collecting our data.

## References

1. Al-Mulhim AS. Laparoscopic versus open inguinal hernia repair in overweight patients (A prospective study). APJHS. 2014;1 (4):524-7
2. Evers BM. Small bowel. In: Sabiston DC, Townsend CM, eds. Sabiston Textbook of Surgery: The Biological Basis of Modern Surgical Practice. 18th ed. Philadelphia, Pa.: Saunders/Elsevier; 2008:873-916.
3. Nicks BA. Hernias. Medscape website. <http://emedicine.medscape.com/article/775630-overview#aw2aab6b2b3>. Updated April 21, 2014. Accessed April 23, 2014.
4. National Institute of diabetes and digestive and kidney disease. Inguinal Hernia. 2014 (<https://www.niddk.nih.gov/health-information/digestive-diseases/inguinal-hernia>)(Accessed 2017-6-13)
5. Simons MP, Aufenacker T, Bay-Nielsen M, ouillot L, Campanelli G, Conze J, et al. European Hernia Society guidelines on the treatment of inguinal hernia in adult patients. Hernia. 2009;13(4):343-403.

6. Lechner M, Fortelny R, Öfner D, Mayer F. Suspected inguinal hernias in pregnancy—handle with care!. *Hernia*. 2014; 18.3: 375-9.
7. Meyers WC1, Foley DP, Garrett WE, Lohnes JH, Mandlbaum BR. Management of severe lower abdominal or inguinal pain in high-performance athletes. *The American journal of sports medicine*. 2000; 28.1: 2-8.
8. Onuigbo WIB, Njeze GE. Inguinal Hernia. A Review. *Journal of Surgery and Operative Care*. 2016; 1(2): 1-13.]
9. P. Misiakos E, Bagias G, Zavras N, Tzanetis P, Patapis P, Machairas A. Strangulated Inguinal Hernia. *INTECH*. 2014;10.5772-379.
10. Ray DG. Complications of groin hernia repair: their prevention and management. *Journal of the National Medical Association*. 1978; 70(3):195-8.]
11. Bhattacharjee PK. Surgical options in the inguinal Hernia: which is the best. *Indian Journal of Surgery*.2006;68(4):191-200
12. Kamtoh G, Pach R, Kibil W, Matyja A, Solecki R, Banas B, et al. Effectiveness of mesh hernioplasty in incarcerated inguinal hernias. *Videosurgery and Other Miniinvasive Techniques*. 2014; 9(3): 415–9.
13. Bland W. Inguinal Hernia in Groin. *WebMD*, 8 Sept. 2017. [www.webmd.com/digestive-disorders/tc/inguinal-hernia-prevention](http://www.webmd.com/digestive-disorders/tc/inguinal-hernia-prevention).
14. Abdulhaq A, Alkhars A, Albakheit HA, Al-Anazi, FA, Alharbi SM, Alsomali AH, et al. Awareness of Risk Factors of Hernia among Adults in Riyadh, KSA. *Egyptian Journal of Hospital Medicine*.2018;71(3):2780-7
15. Webster P, Austoker J. Women's knowledge about breast cancer risk and their views of the purpose and implications of breast screening- a questionnaire survey. *J Public Health* .2006, 28:197-202.
16. Radi SM. Breast cancer awareness among Saudi females in Jeddah. *Asian Pacific journal of cancer prevention*. 2013; 14.7: 4307-12.]
17. Hassan MA; Alzohairy MA, Mohammad A, Hasan M. Awareness of diabetes mellitus among Saudi non-diabetic population in Al-Qassim region, Saudi Arabia. *Journal of Diabetes and Endocrinology*. 2011; 2(2): 14-19.]
18. Alakeel A, Aljlayl K, Alfaryan K, Alshamari W, Aljubair A, ALSaqabi O. An Assessment of Knowledge Towards Inguinal Hernia Among General Population of Riyadh City. *IJSER*.2017;8(7): 715-42
19. Alhawaj AH , Al-Dossari FS, AIMudaiheem NR , ALMusaad MN ,Alharbi MD ,Alkhalaf HA, et al. Awareness level of parents about antibiotics given to children in Riyadh Region 2017. *Egyptian Journal of Hospital Medicine*. 2017; 69(1):1706-12
20. Perna S. Assessment of Awareness Levels of Parents—A Multivariate Approach. *Sociology and Anthropology*.2015; 3(1): 58-72.]
21. Cobb WS, Burns JM, Kercher KW, Matthews BD, Norton HJ, Heniford BT, et al. Normal intraabdominal pressure in healthy adults. *Journal of Surgical Research*. 2005, 129(2): 231-5.]
22. Svendsen SW, Frost P, Vad MV, Andersen JH. Risk and prognosis of inguinal hernia in relation to occupational mechanical exposures — a systematic review of the epidemiologic evidence. *Scand J Work Environ Health*. 2013;39:5-26.
23. Ruhl CE, Everhart JE. Risk factors for inguinal hernia among adults in the US population. *American journal of epidemiology*. 2007; 165 (10): 1154-61.]
24. Lau H, Fang C, Yuen WK, Patil NG. Risk factors for inguinal hernia in adult males: a case-control study. *Surgery*. 2007; 141:262-6
25. Poelman MM, van den Heuvel B, Deelder JD, Abis GSA, Beudeker N, Bittner RR, et al. EAES Consensus Development Conference on endoscopic repair of groin hernias. *Surg Endosc*. 2013;27: 3505-19
26. Scott NW, McCormack K, Graham P, Go PM, Ross SJ, Grant AM. Open mesh versus non-mesh for repair of femoral and inguinal hernia. *Cochrane Database Syst Rev*. 2002;4:CD002197
27. Vad MV, Frost P, Rosenberg J, Andersen JH, Svendsen SW. Inguinal hernia repair among men in relation to occupational mechanical exposures and lifestyle factors: a longitudinal study. *Occup Environ Med*. 2017;74(11):769-75
28. Vad MV, Frost P, Svendsen SW. Occupational mechanical exposures and reoperation after first-time inguinal hernia repair: a prognosis study in a male cohort. *Hernia*. 2015;19:893–900.