

## Awareness of Risk Factors of Hernia among Adults in Riyadh, KSA

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### ABSTRACT

**Background:** Abdominal wall hernias are a very common surgical condition affecting all ages and both genders. The main predisposing factors of hernias include pregnancy, weight lifting, constipation, weight gain as well as some chronic diseases such as Asthma Diabetes Mellitus.

**Aim of the study:** was to assess the awareness of the risk factors of abdominal hernias among adults of both genders and different BMI ranges in Riyadh population (Saudi Arabia).

**Methods:** This is a questionnaire-based cross-sectional study enrolling a total of 100 randomly selected high-risk to development Hernia Saudi adults ensuring diversity in age range and educational stages. Descriptive analysis was done using Statistical Package for Social Sciences (SPSS) 23. Awareness levels for Hernia were calculated as absolute frequencies and were reported as overall percentages.

**Results:** 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 on the risk factors and the association with hernia development. However, majority of participants (87%) suggested a correlation between hernia and heavy lifting. Moreover, more than half of the study group (65% and 62%) related pregnancy and surgery as a contributing factor for hernia. While a lack of awareness was obvious on other risk factors such as smoking, chronic, constipation prostate enlargement, asthma and DM with a knowledge score of 37%, 36%, 32%, 32% and 29% respectively.

**Conclusion:** Our study revealed lack of public knowledge on the predisposing factors for hernia among the study group of young Saudi female and male adults regardless to the age and BMI range. Despite the fact that 87% related hernia to heavy lifting, less than 65% of participants could correlate hernia to pregnancy and surgery while not more than 36% could correlate hernia with other key predisposing risk factors such as smoking, enlarged prostate, asthma, DM and chronic constipation. This indicates that proper intervention is needed to broadly raise the awareness of hernia risk factors among Saudi adults. This can be achieved by mass media awareness campaigns such as TV and radio health education programs as well as campaign at schools, universities and health centers.

**Keywords:** adult, hernia, inguinal, prospective studies, risk factors, KSA, Riyadh.

### INTRODUCTION

A hernia is defined as the protrusion of an organ or tissue through an abnormal opening. occurs when an organ or fatty tissue squeezes through a weak spot in a surrounding muscle or connective tissue called fascia. The most common types of hernia are inguinal (inner groin), incisional (resulting from an incision), femoral (outer groin), umbilical (belly button), and hiatal (upper stomach) <sup>[1]</sup>.

The abdominal wall is made up of muscles that mirror of each other from right to left. These include rectus abdominis, external oblique, internal oblique and the transversalis. Hernia is derived from a Latin word means "rupture" <sup>[2]</sup>. The definition of a hernia of the abdominal wall is an abnormal protrusion of the abdominal contents through an acquired or congenital area of weakness or defect in the wall <sup>[2]</sup>.

Abdominal wall hernias are among the most common of all surgical problems .More than 1 million abdominal wall hernia repairs are performed each year in the United States, with

inguinal hernia repairs constituting nearly 770,000 of these cases; approximately 90% of all inguinal hernia repairs are performed on males <sup>[3]</sup>. Most abdominal hernias are asymptomatic. A hernia is reducible when its contents can be replaced within the surrounding musculature, and it is irreducible or incarcerated when it cannot be reduced. A strangulated hernia has compromised blood supply to its contents, which is a serious and potentially fatal complication. Strangulation occurs more often in large hernias that have small orifices. In this situation, the small neck of the hernia obstructs arterial blood flow, venous drainage, or both to the contents of the hernia sac. Adhesions between the contents of the hernia and peritoneal lining of the sac can provide a tethering point that entraps the hernia contents and predisposes to intestinal obstruction and strangulation. Incarcerated or strangulated hernias cause pain and require immediate surgery <sup>[4]</sup>.

The time a hernia takes to develop depends on its causes, which relate to muscle weakness and

strain. Common causes include chronic coughing, damage from an injury or through surgery, and the inability of the wall of the abdomen to close properly<sup>[5]</sup>.

The main risk factors of hernia include pregnancy, weight lifting, constipation, and weight gain. The patient should seek medical attention if there is a painful or noticeable bulge on the abdomen, pubic bone or in the groin, or if there are other symptoms of hernia. The patient can feel the bulge by touching the affected area or notice it when standing upright. It may be possible to push a hernia back into the abdomen, however, this is only possible according to the type of the hernia and the size of the hernia sac content<sup>[6]</sup>. In the present study, we aim at evaluating the awareness of the predisposing factors of hernia among adults in Riyadh city in KSA.

## METHODS

### *Study design and setting*

This is an exploratory cross-sectional questionnaire-based study conducted among 100 Saudi adults aged from 16 to above 35 years in Riyadh city, Kingdom of Saudi Arabia.

Both quantitative and qualitative methods were used in this study. The questionnaire was divided into 2 sections, the first section was concerned with information of the participants, while the second section was evaluating the personal knowledge about Hernia.

### *Statistical analysis*

Data analysis was carried out using Microsoft Excel 2016 (Microsoft Corporation, Seattle, WA, USA), and the Statistical Package for Social

Sciences version 23 (SPSS Inc., Chicago, IL, USA).

Measure of Body mass index (BMI):

It is a measure of body fat based on height and weight that applies to adult men and women.

### **BMI Categories:**

Underweight = <18.5

Normal weight = 18.5–24.9

Overweight = 25–29.9

Obesity = BMI of 30 or greater

## RESULTS

### **Characteristics and demographic data of the participants**

The study enrolled 100 Saudi Arabian participants from both genders (62% Males and 38% Females). The studied population was diverse including a variety of age (youngest age group started from 16 years old and older age group was identified as “above 35”).

BMI was measured for all of the participants (healthy individuals resembled 42%, while overweight and obese patients accounted for 48% of the total sample).

The educational level of the participants varied according to the age group and social level. Stage of education included middle and high school students, college students and graduates with the contribution percentages of 7% , 17% , 71% and 15% respectively.

Table 1 summarizes the outcome of section 1 of the first part of the questionnaire which is intended to collect data on the characteristics and demographic data of the participants.

**Table 1: Socio-demographic characteristics of the studied population**

		Frequency	Percent	Valid Percent	Cumulative Percent
<b>Age</b>	16-21	21	21	21	21
	22-28	42	42	42	63
	29-35	25	25	25	88
	>35	12	12	12	100
	Total	100	100	100	
		Frequency	Percent	Valid Percent	Cumulative Percent
<b>Gender</b>	Male	62	62	62	62
	Female	38	38	37	100
	Total	100	100	100	
		Frequency	Percent	Valid Percent	Cumulative Percent
<b>BMI</b>	Underweight	10	10	10	10
	Healthy	42	42	42	52
	Over Weight	27	27	27	79
	Obese	21	21	21	100
	Total	100	100	100	
		Frequency	Percent	Valid Percent	Cumulative Percent
<b>Educational level</b>	Middle school	7	7	7	7
	High School	17	17	17	24
	Collage	61	61	61	85
	Graduate	15	15	15	98
	Total	100	100	100	

Table 2 summarizes the outcome of section 2 of the questionnaire assessing the knowledge on Hernia in the studied group as follows:

- Knowledge of hernia: 52% of the participants had a knowledge score less than 5 while 38% scored 5-7.
- Correlation between asthma and hernia: 32% of the studied group confirmed on the correlation by answering "Yes" while 34% answered "No" and the rest "34%" claimed no knowledge on the subject by choosing "I don't know".
- Association of hernia with heavy lifting: majority of the participants (87%) answered "Yes" which indicates awareness of the subject
- Correlation between Hernia and constipation: 36%, 29%, 35% of the participants answered "yes", "No" and "I don't know" respectively
- Correlation between hernia and smoking: 37%, 38%, 23% of the participants answered "yes", "No" and "I don't know" respectively
- Association of hernia with enlarged prostate: 32%, 27%, 41% of the participants answered "yes", "No" and "I don't know" respectively
- Question investigated the association of hernia with pregnancy: 65%, 13% and 22% for "yes", "No" and "I don't know" options respectively, furthermore, connotation between hernia and surgery had a similar outcome with percentages of 62, 14 and 24% for "yes", "No" and "I don't know" answers respectively.
- The last question assessed the participants' knowledge of Diabetes Mellitus effect on the emergence of Hernia; almost half of the studied group (49%) hasn't any idea about the subject while 29% answered "Yes" and the rest (22%) answered "No"

**Table 2:** Outcome of the assessment of the participants' knowledge of Hernia

Questions	Frequency	Percent	Valid Percent	Cumulative Percent
How will you evaluate your knowledge about Hernia?	0-4	52	52	52
	5-7	38	38	90
	8-9	8	8	98
	10	2	2	100
	Total	100	100	100
Do you think asthmatic patient has high chance to develop hernia?	Yes	32	32	32
	no	34	34	66
	I don't know	34	34	100
	Total	100	100	100
Do you think hernia is related to heavy lifting?	Yes	87	87	87
	no	5	5	92
	I don't know	8	8	100
	Total	100	100	100
Do you think hernia is related to constipation	Yes	36	36	36
	no	29	29	65
	I don't know	35	35	100
	Total	100	100	100
Do you think hernia is related to smoking?	Yes	37	37	37.4
	no	38	38	75.8
	I don't know	23	23	100
	Total	99	99	99
Missing Total	System	1	1	
Do you think patients with enlarged prostate have a high possibility to suffer from hernia?	Yes	32	32	32
	no	27	27	59
	I don't know	41	41	100
	Total	100	100	100
Do you think pregnancy and labor has high chance hernia?	Yes	65	65	65
	no	13	13	78
	I don't know	22	22	100
	Total	100	100	100
Do you think hernia is related to surgery?	Yes	62	62	62
	no	14	14	76
	I don't know	24	24	100
	Total	100	100	100
Do you think DM patients have a high chance to develop hernia?	Yes	29	29	29
	no	22	22	51
	I don't know	49	49	100
	Total	100	100	100

Furthermore, a cross tabulation analysis was performed in order to determine the :

- A. BMI and age (**Table 3**)
- B. BMI with Gender (**Table 4**)
- C. BMI with Education (**Table 5**)
- D. Study questionnaires outcome with BMI (**Table 6**)

**Table 3:** Participants' age cross tabulated by BMI

**BMI \* Age Crosstabulation**

Count

		Age				Total
		16-21	22-28	29-35	>35	
BMI	Underweight	0	8	2	0	10
	Healthy	5	20	16	1	42
	Overweight	11	10	4	2	27
	Obese	5	4	3	9	21
Total		21	42	25	12	100

**Table 4:** Participants' gender cross tabulated by BMI

**BMI \* Gender Crosstabulation**

		Gender		Total
		Male	Female	
BMI	Underweight	6	4	10
	Healthy	30	11	42
	Overweight	11	16	27
	Obese	15	6	21
Total		62	37	100

**Table 5:** Participants' educational level cross tabulated by BMI

		BMI * Education Crosstabulation				Total
		Middle School	High School	collage	graduate	
BMI	Underweight	0	1	6	3	10
	Healthy	0	7	29	6	42
	Overweight	3	3	17	4	27
	Obese	4	6	9	2	21
Total		7	17	61	15	100

**Table 6:** Study questionnaires cross tabulated by BMI

<b>Crosstabulation</b>						
		Yes	No	I don't know	Total	
Do you think asthmatic patients have a high chance hernia? Crosstabulation	BMI	Underweight	5	2	3	10
		Healthy	11	11	20	42
		Overweight	7	13	7	27
		Obese	9	8	4	21
	Total		32	34	34	100
BMI * Do you think hernia is related to heavy lifting? Crosstabulation	BMI	Underweight	9	1	0	10
		Healthy	40	2	0	42
		Overweight	24	0	3	27
		Obese	14	2	5	21
	Total		87	5	8	100
Do you think hernia is related to constipation? Crosstabulation	BMI	Underweight	3	3	4	10
		Healthy	20	11	11	42
		Overweight	5	9	13	27
		Obese	8	6	7	21
	Total		36	29	35	100
Do you think hernia is related to smoking? Crosstabulation	BMI	Underweight	5	5	0	10
		Healthy	14	18	9	41
		Overweight	15	5	7	27
		Obese	3	10	9	22
	Total		37	38	25	100
Do you think patients with enlargement prostate has high chance hernia? Crosstabulation	BMI	Underweight	4	2	4	10
		Healthy	14	11	17	42
		Overweight	10	6	11	27
		Obese	4	8	9	21
	Total		32	27	41	100
BMI * Do you think hernia is related to surgery? Crosstabulation	BMI	Underweight	5	0	5	10
		Healthy	26	5	11	42
		Overweight	22	3	2	27
		Obese	9	6	6	21
	Total		62	14	24	100
BMI * Do you think pregnancy and labor has high chance hernia? Crosstabulation	BMI	Underweight	6	0	4	10
		Healthy	25	10	7	42
		Overweight	22	1	4	27
		Obese	12	2	7	21
	Total		65	13	22	100
BMI * Do you think DM penitent has high chance hernia? Crosstabulation	BMI	Underweight	3	4	3	10
		Healthy	13	9	20	42
		Overweight	10	5	12	27
		Obese	3	4	14	21
	Total		29	22	49	100

## DISCUSSION

In our study, we targeted Saudi adults' population with diverse background and health conditions. The study sample included 100 adults from both genders with various weight (Body Mass Index), age groups and educational stages.

### *Risk factors of hernia and the knowledge of the study group on the correlation*

- ***Hernia and Obesity***

The rationale behind the classification of the study sample by BMI ranges and further cross-tabulation of the participants' answers with their BMI score is that many studies have reported an increased risk of hernia in obese patients. Sugerman *et al.* [7] have found a 20% risk of incisional hernia following gastric bypass surgery compared with 4% in patients who underwent a total abdominal colectomy, proctectomy, and ileoanal pouch anastomosis for ulcerative colitis, involving a much larger incision.

The study concluded that obesity appears to be a much greater risk for hernia formation than the use of steroids and hence, it was important to segment the study group to test their awareness with respect to their liability to predispose hernia.

Additional risks for hernia reported included a prior incisional hernia, type 2 diabetes mellitus wound infection, sleep apnea, and obesity hypoventilation [7].

- ***Hernia and physical pressure***

In light of the results outcome, our study revealed that the majority of participants were not able to correlate hernia to the common risk factors particularly heavy lifting (87%), pregnancy (65%) and surgery (62%). This could be due to the fact that such factors are seen to place direct pressure on the groin area which may result in inguinal hernia.

This was also suggested by a study conducted by Flich *et al.* indicating that physical effort, as a risk factor, is closely related to the appearance of inguinal hernias and that a person whose work involves lifting or other strenuous exertion has a higher risk than those whose jobs are less strenuous ( $p < 0.05$ ). Moreover, sudden increases in intra-abdominal pressures lead to reformation of diaphragmatic hernias [8].

Furthermore, another study concluded that vomiting or heavy weight lifting is a significant predictor of hiatal hernia recurrence [9].

- ***Hernia and Asthma***

Similarly, increased intra-abdominal pressure caused by excessive coughing and straining in patients with asthma may play a significant role for incisional hernia following gastric bypass operations.

However, only 32% of the study group approved the association whilst 34% did not see a connection and 34% had no background or knowledge [10].

Other activities and medical problems that increase pressure on the abdominal wall include straining on the toilet (due to long-term constipation, for example) enlarged prostate; straining to urinate [11].

In contrast, the knowledge level of the enrolled participants was poor as only 36% and 32% related hernia to constipation and prostate enlargement respectively.

- ***Hernia and smoking***

Studies of connective tissue from patients with inguinal hernia have shown that smoking may be associated with hernia formation due to a defective connective tissue metabolism. Smoking is an important risk factor for recurrence of groin hernia, presumably due to an abnormal connective tissue metabolism in smokers [12].

New findings point out that the mechanism of formation of the hernias can be related to the collagenous tissues, under activity of aggressive agents such as the tobacco, alcohol and diabetes. However, there is still the need of quantitative results that can indicate the real alterations of the tissue, mainly in the cremaster muscle [13].

However, further studies about this are recommended. The diabetes mellitus is also associated with structural alterations in different organs and tissues, indeed compromising its functions 5,7. Some authors report that patients with hernia of the abdomen wall have diabetes at 8.4% of the cases and describe that 43% smoke.

In our study, the participants could hardly correlate hernia incidence to smoking as only 37% answered agreed on the association while 38% disagreed and the rest claimed knowledge on the subject.

Furthermore, only 29% reported that DM patients might have a higher change to develop hernia, while 22% thought otherwise. Nevertheless, 49%

did not know how DM can affect hernia and if it's a risk factor in the first place.

## CONCLUSION

Our study revealed lack of public knowledge on the predisposing factors for hernia among the study group of young Saudi female and male adults regardless to the age and BMI range. Despite the fact that 87% related hernia to heavy lifting, less than 65% of participants were able to correlate hernia to pregnancy and surgery while not more than 36% could correlate hernia with other key predisposing risk factors such as smoking, enlarged prostate, Asthma, DM and chronic constipation. This indicates that proper intervention is needed to broadly raise the awareness of hernia risk factors among Saudi adults. This can be achieved by mass media awareness campaigns such as TV and radio health education programs as well as campaign at schools, universities and health centers.

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