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THE BURDEN OF HERNIAS: RISK FACTORS AND PREVALENCE ASSESSMENT IN SAUDI ARABIA

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Abstract

Background: Hernias, characterized by the protrusion of an organ through a body wall, are a prevalent surgical condition with various types including inguinal, incisional, femoral, umbilical, and hiatal. Predisposing factors range from lifestyle choices such as weightlifting and smoking to non-modifiable factors like age and family history. Despite the global prevalence of hernias and the significant number of annual surgeries, there is a lack of data specific to the Saudi population. **Objective:** This study aims to determine the prevalence of hernias. It also investigates the factors that associated with a hernia in Saudi Arabia. **Methodology:** An observational, cross-sectional study was conducted across various regions of Saudi Arabia from July 2024 to November 2024. A structured questionnaire was used to collect data from adult participants recruited via social media platforms. The sample size was calculated to ensure a 95% confidence level and a 5% margin of error. Data were analyzed using SPSS software. **Results:** Data were collected from 767 participants, revealing a predominantly young population with a mean age of 29.5 years. Notably, 9.8% reported a hernia diagnosis, primarily inguinal (33.3%) and umbilical (28%). A significant 21.1% had a family history of hernias, suggesting potential genetic or environmental links. The analysis indicated significant associations between hernia diagnosis and factors such as age, marital status, occupation, and smoking status. Despite a low hernia prevalence, the findings underscore the need for targeted health interventions, particularly given that over half of the diagnosed participants experienced pain or discomfort. **Conclusion:** In conclusion, this study highlights the relatively low prevalence of hernias in the Saudi population, with significant associations identified for various demographic and lifestyle factors.

Keywords: Hernias, Prevalence, Risk Factors, Saudi Arabia, Inguinal Hernia, Femoral hernia, Umbilical Hernia, Incisional Hernia, Epidemiology.

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Introduction:
A hernia is the protrusion of an organ or part of an organ through a typical body wall [1]. 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) [2]. The main predisposing factors of hernias include pregnancy, weightlifting, constipation, obesity, smoking, and some chronic diseases, such as asthma and diabetes mellitus. Nonmodifiable risk factors, such as older age, gender, and family history [3,4].

Hernia surgeries make for 7.5% of all surgical procedures [5]. Every year, more than 20 million hernia operations are done throughout the world [6]. Inguinal hernias accounts for 80% of hernia procedures [7]. Men are more likely than women to have inguinal hernias, according to a number of studies [8]. For example, a Moscow study discovered that this condition afflicted 14.6% of women and 31.2% of males [9]. Abdulmajeed' et al. study in 2017 emphasized a noteworthy prevalence of abdominal hernias at 11.7%, showing a higher occurrence in females (63.4%) than in males (36.6%). Para-umbilical hernias were found to be the most prevalent type (33.9%), with inguinal hernias coming in at 27.3% and umbilical hernias at 20.8%. The research highlighted obesity, past abdominal surgery, abdominal injury, positive family history of hernia, and multiple pregnancies as primary risk factors for hernia formation. These results highlight the complex factors contributing to the development of hernias, including genetics and environmental factors [10].
In 2018, a study conducted on hernia risk factor awareness in 105 participants, finding that 60% were male and 40% were female. Most of the attendees were young adults, mainly ranging from 18 to 35 years old, showcasing different educational achievements. Although the research offered insights into the awareness of hernia risks among specific demographics, the limited sample size and lack of demographic diversity may limit the findings' applicability to larger populations [11].
A research project carried out in eastern Ethiopia between October and December 2022 included 403 adult surgical outpatients and discovered a 10.2% occurrence of external abdominal wall hernias, mostly found in the epigastric region. The study identified constipation, extended cough, previous abdominal surgery, and heavy lifting as major risk factors linked to hernia formation in this particular demographic. Nevertheless, the study may have limited generalizability due to its regional focus and single-center design, affecting its relevance to various geographic and demographic settings [12].
A study concocted in 2023 by Sultan et al. showed a 9.2% hernia rate, mainly found in older men and overweight individuals. Yet, umbilical hernias were not included in the research, which may have affected the overall evaluation of hernia epidemiology. Even with these restrictions, the research helps in grasping hernia prevalence patterns and highlights the significance of taking demographic and clinical factors into account in hernia treatment approaches [13].

The goal of this study was to determine the prevalence and risk factors of hernia among Saudi population in 2024 because there has been inadequate number of studies on these topics in Saudi Arabia; the findings of the study clarify this common healthcare problem and may also assist medical authorities in determining the areas of uncertainty around this prevalent surgical condition.

Objectives:
The purpose of this study was to establish Prevalence and how common incisional, femoral, umbilical, and inguinal hernias are in Saudi Arabia. It also focused on determining and assessing risk factors that associated with a hernia, such as age, sex, body mass index, degree of physical fitness, and other variables.

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Materials and Methods:

Study Design and Setting:
This observational, cross-sectional study took place in various regions of Saudi Arabia for six months, starting in July 2024 and ending in December 2024. Through the utilization of a structured questionnaire developed by the authors, situated in the Middle East, Saudi Arabia offered a varied geographic and demographic setting for this research.

Subject: Participants, recruitment and sampling procedure:
The study sample was comprised of male and female adults residing in Saudi Arabia who were above the age of eighteen. Each participant provided informed consent and willingly agreed to participate, showing their alignment with the study's objectives. The recruitment plans involved using different social media platforms such as X, Snapchat, Instagram, WhatsApp, Facebook, and more. This method aimed to ensure that the sample for the research in Saudi Arabia was diverse and inclusive, representing different demographic groups and regions in order to increase participation and enhance the credibility and significance of the study. During the recruitment process, ethical considerations were maintained to ensure participants' autonomy and confidentiality were respected.

Sample size:
From July 2024 to November 2024, the data collection phase began.
The sample size was estimated using the following formula with a 95% confidence level and 5% margin of error:
n = (Z^2 * P(1-P)) / d^2
Where:
- n = Calculated sample size
- Z = Z-value for 95% confidence level (1.96)
- P = Estimated prevalence (0.50)
- d = Maximum acceptable error (0.05)
Plugging in the values:
n = (1.96)^2 * 0.50 * (1 - 0.50) / (0.05)^2
n = 384 participants
The calculated minimum sample size was 384 participants.

Inclusion and Exclusion Criteria:
The research included Saudi Arabian citizens aged 18 and above, residing in any region of Saudi Arabia, who willingly completed the study's questionnaires. Non-Saudi individuals and individuals under 18 years old were excluded from the selection criteria.

Method for data collection, instrument, and score system:
The self-administered version of the questionnaire in English and Arabic has been collected and modified after an extensive search and literature review on the topics that talked about hernias and their contributing variables [9,10,12,14,15].
The final version of the questionnaire consisted of (20) Questions classified into (5) main sections.
Section 1 starts with a brief description of the study and the consent question. Section 2 includes demographics, such as nationality, age, gender, marital status, occupation, and residential area. Section

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3 includes medical and lifestyle information such as body mass index, chronic diseases, smoking, and physical activity. In section 4 the participants were asked about their hernia, what type they had, family history. Section 5, Impact and management, Participants were asked whether they had ever sought medical treatment, the type of treatment received, whether the procedure was surgical, how many operations were performed, and the impact of the hernia on daily life.

Pilot test:
The pilot study was carried out over a 3-week period, and our questionnaire was distributed to 30 participants, and we asked them to complete it. This test is done to determine the clarity and simplicity of our study. The data that was used in the pilot study was excluded from the final data of the study. Based on the outcome of the pilot study, some adjustments were made to enhance its effectiveness.

Analyzes and entry method:
Data was entered on the computer using the "Microsoft Office Excel Software" Windows (2021). The collected data was subsequently transmitted to the Statistical Package of Social Science Software (SPSS) application, version 25 (IBM SPSS Statistics for Microsoft Windows, Version 25.0.) for statistical analysis.

Results:

Table (1) displays various demographic parameters of the participants with a total number of (767). Participants are reported to have a mean age of 29.5 and most of them (26.2%) are 18-21 years indicating that they are a young population. Gender is even (52% males, 48% females). Most everything else around him is exactly as he's always known, except for many the participants; they were single (64.5%) and may or may not be a good indicator of broader social trends or a cultural dynamic specific to this context. Interestingly though, the occupation data show that over half (52.3%) of the respondents, is students, implying that the populace was more involved in education. The participants across the region are geographically distributed and the southern region host most, 45.5%, followed by other regions. Significant variability within heights and weights are observed, with means consistent with a broad, diverse body composition among participants.

Table (1): Sociodemographic characteristics of participants (n=767)

Parameter		***No.***	***Percent (%)***
Age (Mean:29.5, STD:11.6)	18 to 21	201	26.2
	22 to 23	161	21.0
	24 to 30	154	20.1
	31 to 40	100	13.0
	41 or more	151	19.7
Nationality	Saudi	692	100.0
	Non-Saudi	0	0
Gender	Female	368	48.0
	Male	399	52.0
Marital status	Single	495	64.5
	Married	254	33.1
	Divorced	11	1.4
	Widowed	7	.9
Occupation	Student	401	52.3

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	Employed	216	28.2
	Self-Employed	15	2.0
	Unemployed	104	13.6
	Retired	31	4.0
Residential region	Northern region	25	3.3
	Southern region	349	45.5
	Central region	133	17.3
	Eastern region	43	5.6
	Western region	217	28.3
Height (Mean:165.8, 9.5)	157 cm or less	171	22.3
	158 to 162	126	16.4
	163 to 168	171	22.3
	169 to 173	140	18.3
	174 cm or more	159	20.7
Weight (Mean:70.2, STD:18.5)	55 kg or less	179	23.3
	56 to 65	160	20.9
	66 to 76	165	21.5
	77 to 89	134	17.5
	90 or more	129	16.8

As shown in figure 1, The smoking habit of the total sample of 767 people is presented in the figure. Overall, 631 participants (82.3%) stated they do not and 40 (5.2%) said they are ex-smokers. 12.5% said that they currently smoke, a smaller proportion of 96 individuals.

Figure (1): **smoking habit** ***among participants (n= 767)***

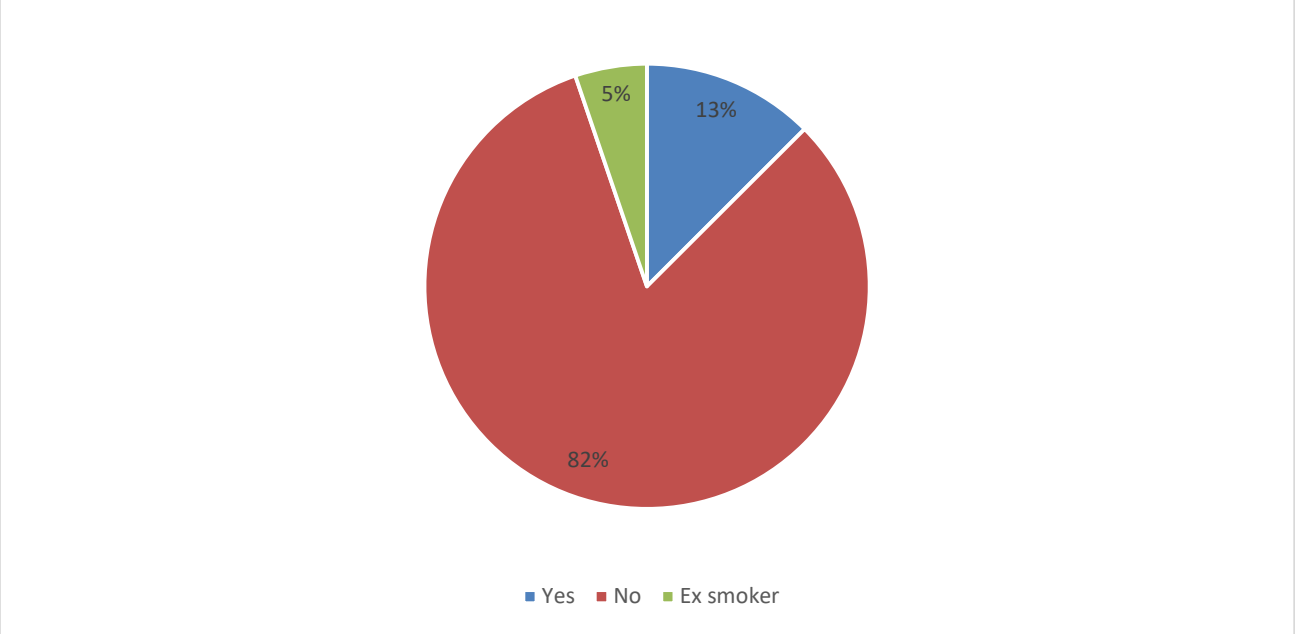

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Table 2 presents data on medical and living conditions or lifestyle in a sample of 767 people with significant insights in the prevalence of chronic diseases, smoking habit and exercise frequency as well as past health conditions. Of notable interest is that a relatively healthy population, as surmised by the fact that 79.7% reported no history of chronic diseases. Asthma and diabetes mellitus were reported most often by those who had a chronic condition; the prevalence rates for them were 5.9% and 6.0%, respectively. Giving that the smoking prevalence is 12.5%, most participants (82.3%) are nonsmokers, a sign of good health in public health. Yet, exercise frequency shows a worrisome twist, 44.1% of respondents claimed never having exercised, carrying potential ill effects for future health. Additional, 37.4 % of participants also reported that they suffered from constipation and 22.2 % from heavy lifting, indicating the need for targeted health interventions.

Table (2): Parameters related to* medical and lifestyle information *(n=767).

Parameter		***No.***	***Percent (%)***
Do you have a history of any of the following chronic diseases? (Check all that apply) *	Asthma	45	5.9
	Diabetes mellitus	46	6.0
	Hypertension	41	5.3
	Chronic obstructive pulmonary disease (COPD)	14	1.8
	None	611	79.7
	Other	50	6.5
Do you smoke?	Yes	96	12.5
	No	631	82.3
	Ex smoker	40	5.2
How frequently do you exercise?	Never	338	44.1
	3 - 1 times a week	303	39.5
	4 - 5 times a week	67	8.7
	6 - 7 times a week	34	4.4
	Less than 2 weeks	16	2.1
	2 or more weeks	8	1.0
	Daily	1	.1
Have you ever experienced any of the following conditions? (Check all that apply) *	Pregnancy (for females)	107	13.9
	Constipation	287	37.4
	Heavy lifting	170	22.2
	Abdominal injury	36	4.7
	Previous abdominal surgery	104	13.6
	Chronic cough	60	7.8
	None	308	40.2

Results may overlap

As shown in figure (2), According to sample of 767 individuals, only a small number has been diagnosed with a hernia. Specifically, 75 participants (9.8%) have been diagnosed with a hernia, while the rest 692 (90.2%) participant has never been diagnosed with the condition.

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Figure (2): Illustrates history of hernia among participants.

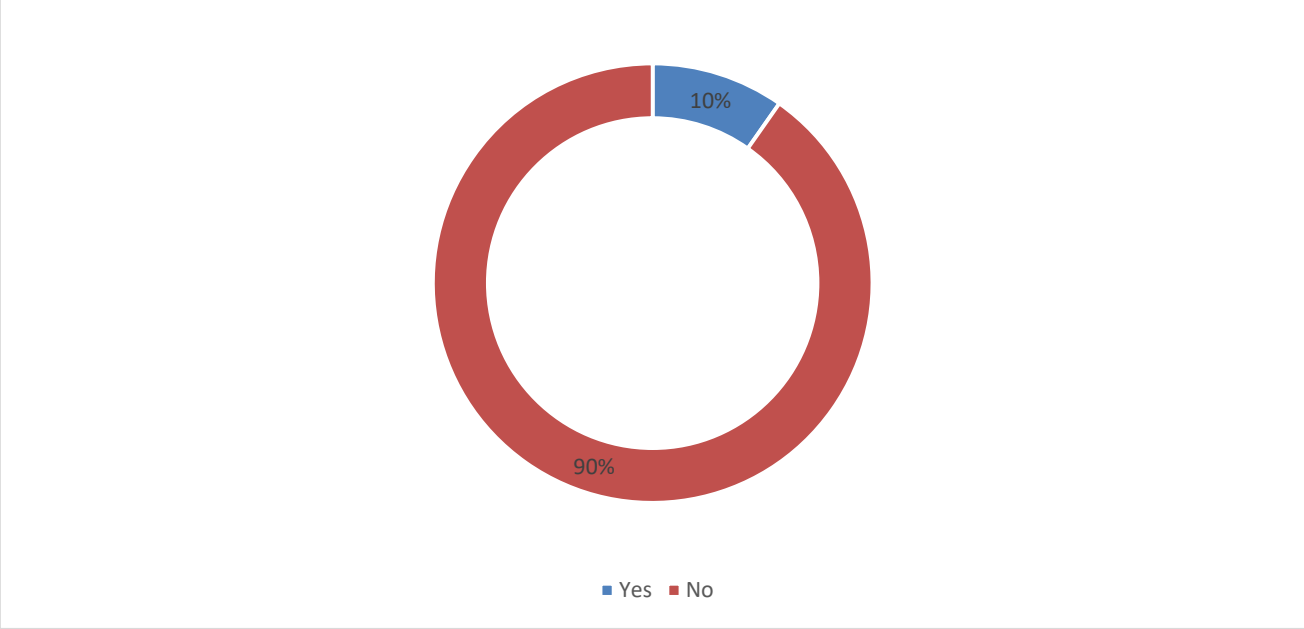

Table 3 presents significant data as to prevalence and treatment and its impact on daily life of the 767 participants, specifically regarding the history of the family and personal history of hernia. Conversely, 21.1% of the participants complained of a family history of hernias, which might indicate their presence is genetically or environmentally related. Furthermore, 9.8% of respondents had been diagnosed with a hernia, which is a relatively low number judging by the high amounts (90.2%) of individuals that hadn't been diagnosed. Inguinal hernias were most prevalent among those diagnosed, constituting 33.3% and umbilical hernias 28%. A majority (81.3%) sought medical treatment, but surgical repair was the most frequent intervention, used by 73.3% of participants. In addition, the effect was significant on daily life with more than half (56.0%) rating pain or discomfort.

Table (3): participants'* family history, personal history, impact and management of hernia *(n=767).

Parameter		***No.***	***Percent (%)***
Do you have a family history of hernias?	Yes	162	21.1
	No	523	68.2
	Not sure	82	10.7
Have you ever been diagnosed with a hernia?	Yes	75	9.8
	No	692	90.2
If yes, what type of hernia were you diagnosed with? (Check all that apply) * (n=75)	Inguinal (inner groin)	25	33.3
	Incisional (resulting from an incision)	3	4.0
	Femoral (outer groin)	9	12.0
	Umbilical (belly button)	21	28.0
	Hiatal (upper stomach)	11	14.7

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	Other	13	17.3
Have you sought medical treatment for your hernia? (n=75)	No	14	18.7
	Yes	61	81.3
If yes, what type of treatment did you receive? (Check all that apply) * (n=75)	Watchful waiting/monitoring	7	9.3
	Medication	7	9.3
	Surgical repair	55	73.3
	Other	14	18.7
If Surgical Repair, how many hernia surgeries have you had? (n=75)	One	44	58.7
	Two	9	12.0
	Three or more	7	9.3
	No surgical repair	15	20.0
If you have had a hernia, how has it impacted your daily life? (Check all that apply) * (n=75)	Pain or discomfort	42	56.0
	Difficulty in lifting objects	20	26.7
	Limitation in physical activities	25	33.3
	Interference with work or daily tasks	5	6.7
	Emotional or psychological stress	11	14.7
	Other	14	18.7

****Results may overlap***

Table (4) shows that being diagnosed with hernia has statistically significant relation to age (P value=0.0001), marital status (P value=0.0001), occupational status (P value= 0.0001), residential region (P value=0.0001), height (P value=0.002) and smoking status (P value=0.0001). It also shows statistically insignificant relation to gender, weight, and exercise.

Table (4): Relation between being diagnosed with hernia and sociodemographic characteristics.

Parameters		***Have you ever been diagnosed with a hernia?***		***Total (N=767)***	***P value****
		No	Yes		
Gender	Female	335	33	368	0.468
		48.4%	44.0%	48.0%	
	Male	357	42	399	
		51.6%	56.0%	52.0%	
Age	18 to 21	196	5	201	0.0001
		28.3%	6.7%	26.2%	
	22 to 23	150	11	161	
		21.7%	14.7%	21.0%	
	24 to 30	139	15	154	
		20.1%	20.0%	20.1%	
	31 to 40	87	13	100	
		12.6%	17.3%	13.0%	
	41 or more	120	31	151	
		17.3%	41.3%	19.7%	
Marital status	Single	471	24	495	0.0001

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		68.1%	32.0%	64.5%	
	Married	210	44	254	
		30.3%	58.7%	33.1%	
	Divorced	10	1	11	
		1.4%	1.3%	1.4%	
	Widowed	1	6	7	
		0.1%	8.0%	0.9%	
Occupational status	Student	380	21	401	0.0001
		54.9%	28.0%	52.3%	
	Employee	196	20	216	
		28.3%	26.7%	28.2%	
	Freelancer	12	3	15	
		1.7%	4.0%	2.0%	
	Unemployed	85	19	104	
		12.3%	25.3%	13.6%	
	Retired	19	12	31	
		2.7%	16.0%	4.0%	
Residential region	Northern region	13	12	25	0.0001
		1.9%	16.0%	3.3%	
	Southern region	326	23	349	
		47.1%	30.7%	45.5%	
	Central region	112	21	133	
		16.2%	28.0%	17.3%	
	Eastern region	36	7	43	
		5.2%	9.3%	5.6%	
	Western region	205	12	217	
		29.6%	16.0%	28.3%	
Height	157 cm or less	164	7	171	0.002
		23.7%	9.3%	22.3%	
	158 to 162	103	23	126	
		14.9%	30.7%	16.4%	
	163 to 168	153	18	171	
		22.1%	24.0%	22.3%	
	169 to 173	127	13	140	
		18.4%	17.3%	18.3%	
	174 cm or more	145	14	159	
		21.0%	18.7%	20.7%	
Weight	55 kg or less	166	13	179	0.128
		24.0%	17.3%	23.3%	
	56 to 65	145	15	160	
		21.0%	20.0%	20.9%	
	66 to 76	141	24	165	
		20.4%	32.0%	21.5%	
	77 to 89	125	9	134	

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		18.1%	12.0%	17.5%	
	90 or more	115	14	129	
		16.6%	18.7%	16.8%	
Smoking status	No	581	50	631	0.0001
		84.0%	66.7%	82.3%	
	Ex-smoker	35	5	40	
		5.1%	6.7%	5.2%	
	Yes	76	20	96	
		11.0%	26.7%	12.5%	
Exercise	Never	306	32	338	0.688
		44.2%	42.7%	44.1%	
	1 to 3 times a week	269	34	303	
		38.9%	45.3%	39.5%	
	4 - 5 times a week	63	4	67	
		9.1%	5.3%	8.7%	
	6 - 7 times a week	30	4	34	
		4.3%	5.3%	4.4%	
	Less than 2 weeks	16	0	16	
		2.3%	0.0%	2.1%	
	2 or more weeks	7	1	8	
		1.0%	1.3%	1.0%	
	Daily	1	0	1	
		0.1%	0.0%	0.1%	

P value was considered significant if ≤ 0.05.

Table (5) shows having a family history of hernia has statistically significant relation to gender (P value=0.011), age (P value=0.001), marital status (P value=0.0001), occupational status (P value=0.010), and residential region (P value=0.011). It also shows statistically insignificant relation to height, weight, smoking status, exercise.

Table (5): Having a family history of hernia in association with sociodemographic characteristics.

Parameters		***Do you have a family history of hernias?***		***Total (N=767)***	***P value****
		No or unknown	**Yes**		
Gender	Female	276	92	368	0.011
		45.6%	56.8%	48.0%	
	Male	329	70	399	
		54.4%	43.2%	52.0%	
Age	18 to 21	166	35	201	0.001
		27.4%	21.6%	26.2%	
	22 to 23	135	26	161	
		22.3%	16.0%	21.0%	
	24 to 30	127	27	154	
		21.0%	16.7%	20.1%	

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	31 to 40	76	24	100	
		12.6%	14.8%	13.0%	
	41 or more	101	50	151	
		16.7%	30.9%	19.7%	
Marital status	Single	414	81	495	0.0001
		68.4%	50.0%	64.5%	
	Married	174	80	254	
		28.8%	49.4%	33.1%	
	Divorced	11	0	11	
		1.8%	0.0%	1.4%	
	Widowed	6	1	7	
		1.0%	0.6%	0.9%	
Occupational status	Student	335	66	401	0.010
		55.4%	40.7%	52.3%	
	Employee	162	54	216	
		26.8%	33.3%	28.2%	
	Freelancer	10	5	15	
		1.7%	3.1%	2.0%	
	Unemployed	78	26	104	
		12.9%	16.0%	13.6%	
	Retired	20	11	31	
		3.3%	6.8%	4.0%	
Residential region	Northern region	17	8	25	0.011
		2.8%	4.9%	3.3%	
	Southern region	267	82	349	
		44.1%	50.6%	45.5%	
	Central region	103	30	133	
		17.0%	18.5%	17.3%	
	Eastern region	30	13	43	
		5.0%	8.0%	5.6%	
	Western region	188	29	217	
		31.1%	17.9%	28.3%	
Height	157 cm or less	128	43	171	0.160
		21.2%	26.5%	22.3%	
	158 to 162	93	33	126	
		15.4%	20.4%	16.4%	
	163 to 168	142	29	171	
		23.5%	17.9%	22.3%	
	169 to 173	111	29	140	
		18.3%	17.9%	18.3%	
	174 cm or more	131	28	159	
		21.7%	17.3%	20.7%	
Weight	55 kg or less	145	34	179	0.549
		24.0%	21.0%	23.3%	

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	56 to 65	127	33	160	
		21.0%	20.4%	20.9%	
	66 to 76	124	41	165	
		20.5%	25.3%	21.5%	
	77 to 89	103	31	134	
		17.0%	19.1%	17.5%	
	90 or more	106	23	129	
		17.5%	14.2%	16.8%	
Smoking status	No	498	133	631	0.506
		82.3%	82.1%	82.3%	
	Ex-smoker	34	6	40	
		5.6%	3.7%	5.2%	
	Yes	73	23	96	
		12.1%	14.2%	12.5%	
Exercise	Never	260	78	338	0.522
		43.0%	48.1%	44.1%	
	1 to 3 times a week	238	65	303	
		39.3%	40.1%	39.5%	
	4 - 5 times a week	55	12	67	
		9.1%	7.4%	8.7%	
	6 - 7 times a week	29	5	34	
		4.8%	3.1%	4.4%	
	Less than 2 weeks	14	2	16	
		2.3%	1.2%	2.1%	
	2 or more weeks	8	0	8	
		1.3%	0.0%	1.0%	
	Daily	1	0	1	
		0.2%	0.0%	0.1%	

****P value was considered significant if ≤ 0.05.***

Discussion:

The present study aimed to assess the burden of hernias in Saudi Arabia by investigating the prevalence and associated risk factors among a sample of 767 participants. Results showed a fairly modest prevalence of hernias, at 9.8 percent, of which the most common type diagnosed was inguinal. This prevalence closely follows findings of [16], who reported hernia prevalence of 9.2% for older men and overweight persons, not including umbilical hernias, which may skew actual epidemiological interpretation of hernias in the region [16]. Our demographic analysis in our study showed a mostly young population mean age of 29.5 years, compared to other studies that report higher prevalence in older populations. For example, as described in a study by [16] the awareness of hernia risk factors was lower among younger people (i.e., less than 40years), indicating that age may be associated with both the occurrence of hernia and its recognition [16].

We also found significant associations between hernia diagnosis and demographic factors, such as age, marital status, occupational status, all having a P value of 0.0001 or less. Findings from [17] have shown that lifestyle factors and comorbidities such as tobacco use and diabetes mellitus are involved in structural remodeling in the inguinal region, thus enhancing the incidence of inguinal hernias [17].

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Relatively healthy lifestyle of our sample can be suggested by the facts that the proportion of the nonsmokers is high (82.3%) and the prevalence of chronic diseases is low (79.7%). These findings are consistent with observed in [18] that obesity is a major risk factor for inguinal hernias and that lifestyle interventions may be important to prevent [18].
In addition, 21.1 percent of participants reported a family history of hernias, which may indicate a genetic or environmental link to the condition the study also found. This result was in accordance with [19] whose findings that genetic predisposition may significantly contribute to hernia development, in familial settings, [19]. In addition, the vast majority of diagnosed individuals (81.3%) went on to receive medical treatment and surgical repair was the most common intervention (73.3%). This is consistent with [20] that most hernias will tend to occur due to complications such as strangulation or incarceration in a surgical intervention [20]. In our study, the impact of hernias on daily life was also very heightening; more than half of the diagnosed had pain or discomfort, which is consistent with [21], who noted the considerable quality of life implications for patients undergoing surgical treatment for hernias [21].
Our study gives us information about lifestyle factors, which we found out that 44.1% of respondents never ever exercise, which is a contributory factor for future health complicacies such as hernia. The work of [22] to the effect that the development of inguinal hernias is associated with a sedentary lifestyle is confirmed by this finding, with a higher involvement in the theory being the obese person [22]. Research [23] also corroborates the association between physical activity and hernia risk as being weightlifting and heavy lifting are known significant risk factors for hernia development. Interestingly, our study did not observe a significant association of hernia diagnosis with smoking status compared to prior findings that established smoking as a risk factor for hernias because of damage to connective tissue [24].
While our study is an important advance in the epidemiology of hernias in Saudi Arabia, it has some limitations as well. There is reliance on self-reported data which may generate bias because participants may under or may misreport their health status and lifestyle. In addition, the cross-sectional design is limited in ability to establish causality between identified risk factor and hernia development. The temporal relationships between lifestyle factors and hernia incidence could be further clarified by future longitudinal studies. In addition, the recruitment of participants through social media may have yielded a non-representative sample of the population including older adults depending on the use of these social media.

Conclusion:
Finally, this study shows the relatively low prevalence of hernias in the Saudi population, with various demographic and lifestyle associated. The results highlight that targeted health interventions, specifically focusing on lifestyle choices like exercise and smoking, are needed to minimize future risk of health from hernias, and to better public health. The insights needed from this study can be used by medical officers to inform strategies designed to increase alertness and prevention of hernias which will therefore improve health outcomes in the Saudi population.

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Ethical approval:

After fully explaining the study and emphasizing that participation is optional, each participant gave

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their informed consent. The information gathered was safely stored and utilized exclusively for study.

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Conflict of interests:

The authors declare no conflict of interest.

Informed consent:

Written informed consent was acquired from each individual study participant.

Data and materials availability:

All data associated with this study are present in the paper.

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