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Knowledge and awareness about gallbladder stones and their complications among the general population in Saudi Arabia

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ABSTRACT

Background: Gallbladder stone disease is a common and frequently encountered biliary disorder. Most patients with gallstones are asymptomatic and do not require medical management. However, some patients experience biliary colic pain as a result of acute or chronic inflammation. Gallbladder stones can lead to a variety of problems and might be ended by a life-threatening case. To assess knowledge and awareness level about gallbladder stones and their complications among Saudi general population. *Methodology:* This is an observative cross-sectional study in Saudi Arabia. The simple size was calculated using Raosoft with confidence level of 95% and margin error of 5%. This survey information was collected by medical students using an online questionnaire containing 25 questions divided into four parts. Data were converted to the Excel and afterwards analyzed with the (SPSS) software. *Results:* The study had 1710 respondents, including females accounting for 63.6% and males accounting for 36.4%. 53.2% of participants were amongst 20-30 years old. 44.9% of participants had a family history of gallstones (15.7% were mothers, 8.5% were fathers and 9.3% were sisters). Only 5.6% of participants had high knowledge score, 61.8% had average knowledge score and 32.6% had poor knowledge score of gall bladder stones. *Conclusion:* The level of awareness of Saudi public citizenry's gallbladder-stones was poor, among the previously reported Figures in Saudi Arabia and other nationwide studies. Knowledge of gallbladder stones was significant-correlated with participant ages, sex and education levels.

Keywords: Gallbladder Stones, Gallstones, Gallstone diseases, Cholecystitis, Complications, Knowledge and awareness, Saudi Arabia.

1. INTRODUCTION

Gallstone disease is a prevalent condition of the gastrointestinal system that impacts 1.4% of adults in developed nations yearly and has a prevalence of 10% to 15 (Wang et al., 2020). Gallstone disease, an asymptomatic disease, is typically defined by chance during an ultrasonography screening. However, it also might lead to nausea, vomiting, fever, jaundice, back pain and abdominal pain (Shaddad, 2019).

Cholesterol, pigment and mixed stones are the three basic forms of gallstones. 51%–99% of the cholesterol in cholesterol gallstones is pure cholesterol. Cholesterol, calcium salts, bile acids, phospholipids and bile pigments are all present in mixed gallstones (Hayat et al., 2019). Gallstone-illness is 1 of the common public health issues in the US. The prevalence is increasing, currently; gallstones are between 10 and 20 percent of adult populations nationwide, also heavily related to gall-bladder, pancreatic and colorectal cancer occurrence. Gallstones were the second-most typical gastrointestinal discharge diagnosis in US hospitals in 2009, accounting for over 300,000 medical visits. Additionally, in the America it is estimated that around 3,000 fatalities from gallstones will occur in the female sex each year (Pak and Lindseth, 2016).

According to estimates, 6 out of 100 males and 9 out of 100 women in the US were affected by this condition (Shabanzadeh, 2018). More than 80% of people who carry gallstones are unaware they have the illness (Attili et al., 1995; Heaton et al., 1991). In 2018 a study directed to assess the knowledge level of the general population toward acute cholecystitis in Saudi Arabia in Albaha city showed that furthermost of the participants didn't have enough information if their habits and lifestyle have an important role in the disease development (Alghamdi et al., 2018).

Several studies have been punished to assess the knowledge and awareness about gallbladder stones. Alshahrani et al., (2020) report that in Najran city, Saudi-Arabia, the level of awareness toward gallstones was not satisfactory. Earlier studies have conducted on gallstones and their contributing factors in Saudi Arabian population and the result has shown that the majority of participants have moderate knowledge and awareness about gallbladder stones and their complications (Mirghani et al., 2022). Jain et al., (2013) reported that history of gallbladder stone disease is one from the important risk factors that associated with gallbladder carcinoma.

In our study, we will include more informative details about the disease that we believe was not covered by previous research in the same epidemiological area; we will assess knowledge and awareness about the signs and symptoms and when to go to the hospital. Also, knowledge about its severity and how serious the complications might be developed by the disease. Previous research has yielded intriguing results in terms of gender. This study aimed to assess and the level of knowledge and awareness regarding gallstones and their complication among the Saudi Arabian population.

2. MATERIALS AND METHODS

Study design

This article is an observational survey one was conducted in Saudi Arabia “between” February 2022-November 2022. Our paper was conducted in Saudi Arabia's citizens, women and men, 18 years old and above, from various Saudi Arabian locations.

Inclusion and Exclusion criteria

This study included people who were approved to participate, 18 years old and above, male and female. On the other hand, excluded those not approved to participate, those with incomplete data from the study and younger than 18.

Sample size

The sample size was estimated using the Raosoft calculator. In the (Kingdom of Saudi Arabia), there were 31,962,983 man and women living in Saudi Arabia in 2020. Based on a 5% margin error with a reliability rate (Cl) of 95% a minimum sample size of 384 is required.

Data collecting technique and equipment (Data collection Technique and tools)

The survey was done by data collection form of the participants, while the questionnaire containing 35 questions divided into four parts. Part one the questions asked about socio-dermographique characteristics, the questions in part two contained general information about gallbladder stones. Part three has questions about symptoms, risk factors and options for treatment of gallstones, while part four includes questions on gallstones complications knowledge. This survey information was collected by medical students by using an online questionnaire.

The questionnaire was made up of four parts. Part l included questions about information regarding the workers socio-dermographique characteristics, while parts II, III and IV, respectively, included questions asked regarding their KAP on gallbladder stones and their complications.

The analysis of four modules was done based on the scalar scoring system. There were two categories of (questions). Those questions having two possible answers were given 1 point for correct response and zero points for wrong or incertain response. The other type of questions had 3 levels of scores, 0 (poor response), 1 (faire response) & 2 (good response) to the level of Knowledge (Attitude and Practice).

KAP was classifieds into 3 levels knowledge, attitude, practice and used total KAP score to rank at every level and subsequent qualitative analysis was conducted to rank low, medium and high scores. Overall, there were 26 questions in ours survey with a total of 26 points divided into three sections.

The first section knowledge = 8 Questions, which 8/26 points (30%).

The second section attitude = 9 Questions, which 9/26 points (35%).

The third section practices = 9 Questions, which are 9/26 points (35%).

Those questions respondents who obtained KAP scores above 21 (80%) were considered as high level, while the scores between 21 and 13 (80% to 50%) were considered as medium level. A score below 13 (50%) was considered a low level.

Pilot test

The questionnaire was distributed on above 15 individuals and asked to fill it. This was done to measure the understanding of the questionnaire and the feasibility of the study. The final data of the study doesn't include the pilot data of the study.

Analyzes and entry method

All data in this study was collected by using Statistical Package for Social Sciences (SPSS 22.0) for Windows (IBM SPSS Statistics for Windows, v22.0 Armonk, NY: IBM Corp) to be statistically analyzed data. Categorical variables such as socio-demographic and professional characteristics of the participants were presented as percentages and frequencies and were shown as Mean ± Standard Deviation.

3. RESULTS

The study included 1710 participants, 63.6% of them were-women and 36.4% were males. 53.2% of participants' age range of twenty to thirty years. 97.2% of the studies sample was Saudi. 62.9% had university degree while 29.9% had high school degree. 23.9% were from the western region and 23.8% were from the regions represented by the (Table 1). As in Table 2, 44.9% of participants observed gallstones in the families (15.7% of them were their mothers, 8.5% were their fathers and 9.3% were their sister).

Table 1 Social and economic characteristics of respondents (n=1710)

Parameter		No.	%
Age	Less than 20	242	14.2
	20 - 30	909	53.2
	31- 40	326	19.1
	41 - 50	167	9.8
	51- 60	60	3.5
	More than 60	6	.4
Gender	Male	622	36.4
	Female	1088	63.6
Nationality	Saudi	1662	97.2
	Non-Saudi	48	2.8
Education level	Illiterate	10	.6
	Primary	16	.9
	Medium	46	2.7
	High school	512	29.9
	Bachelor's degree	1076	62.9

	Master's or PhD degree	50	2.9
Region	Central Region	407	23.8
	Southern area	308	18.0
	Eastern Province	272	15.9
	The northern area	314	18.4
	Western Region	409	23.9

Table 2 Family history of gallstones (n=1710)

Parameter		No.	%
Family history of gallstones	Yes	768	44.9
	No	778	45.5
	I don't know	164	9.6
If yes, choose your relationship with him	My Father	145	8.5
	Brother	108	6.3
	Mom	268	15.7
	Son	6	.4
	Daughter	5	.3
	Sister	159	9.3
	Husband	31	1.8
	Wife	46	2.7

Table 3 shows that, 26.2% of study participants chose "Storing and increasing the concentration of bile" as primary function of the gallbladder. 47.6% of participants chose that dark urine as red flag for suspected gallstones. 58.4% chose that foods rich in fats and sugars as foods increase the symptoms of gallstones.

Table 3 Respondents' knowledge about gall-stones causes, symptoms and risk factors (n=1710)

Parameter		No.	%
The primary function of the gallbladder	Secretion of hormones that help to complete the digestive process smoothly	125	7.3
	Storing and increasing the concentration of bile	448	26.2
	Bile production	441	25.8
	Acid chime equation	21	1.2
	Digest and break down fats into smaller particles	237	13.9
	I don't know	438	25.6
Red flag for suspected gallstones	Clay stool	221	12.9
	Kidney stones	504	29.5
	Dark urine	814	47.6
	Paleness	448	26.2
	Jaundice	255	14.9
	Chronic colic pain	1053	61.6
Foods increase the symptoms of gallstones	Foods rich in fats and sugars	999	58.4
	Coffee	339	19.8
	Meat	359	21.0
	Chocolate	265	15.5
	Fruits and vegetables	89	5.2

	Legumes	328	19.2
	Whole grains	82	4.8
	Fish	70	4.1
	Whole grains	56	3.3
	I don't know	409	23.9
Gallstones are a genetic disease	Yes	270	15.8
	No	1054	61.6
	I don't know	386	22.6
Gender most prone to gallstones	Men	460	26.9
	Women	697	40.8
	I don't know	553	32.3
Gallbladder removal is necessary after gallstones	Yes	972	56.8
	No	442	25.8
	I don't know	296	17.3
There is a medication available for patients who cannot undergo surgery	Yes	825	48.2
	No	269	15.7
	I don't know	616	36.0
The best intervention in the case of gallstones	By medicine	298	17.4
	By surgery	1154	67.5
	I don't know	258	15.1
Surgery usually accomplished to eliminate the gall-bladder	Laparoscopic cholecystectomy	1272	74.4
	Open surgery	98	5.7
	It is better not to have surgery	67	3.9
	I don't know	273	16.0
Causes of gallstones	Infections	428	25.0
	High triglycerides	820	48.0
	Use some medicine	488	28.5
	Obesity	673	39.4
	High cholesterol	773	45.3
	In the vein for a long time	50	2.9
	DNA	350	20.5
	Vascular problems	122	7.1
	Pregnancy	163	9.5
	Aging	149	8.7
	Tumours	99	5.8
	I don't know	394	23.0
The common age for people to have gallstones	Less than 20 years old	26	1.5
	Between 21-40 years old	740	43.3
	Between 41-60 years old	624	36.5
	Over 60 years old	51	3.0
	I don't know	269	15.7
The best way to diagnose gallstones	Clinical examinations	678	39.6
	Medical history	460	26.9
	Urinalysis	692	40.5
	Liver function check	663	38.8
	Full blood pictures	414	24.2
	X ray	543	31.8

	I don't know	339	19.8
Exercising regularly can help reduce the risk of developing gallstones?	Yes	1438	84.1
	No	231	13.5
	I don't know	41	2.4

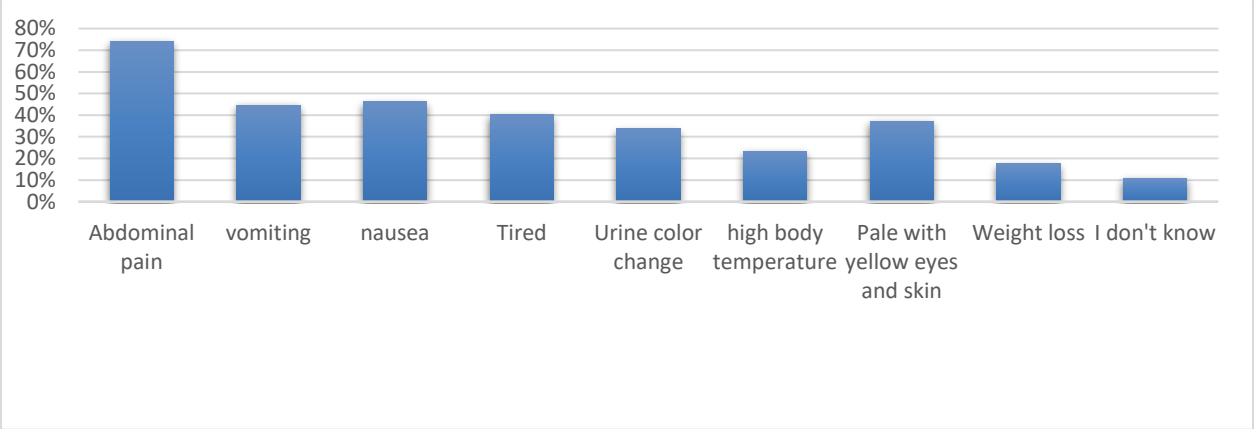

Figure 1 Respondents' knowledge of the symptoms of gall-stones (1710)

Table 4 shows that, 66.9% of study participants heard about complications of gallstones (30.5% of them heard from relative cases and 26.4% from internet). 70.5% of participants knew that cholecystitis a complication of gallstones. 64% knew that obstruction of the bile duct one of the complications of gallstones. 44.8% knew that blockage of the pancreatic duct and pancreatitis one of the complications of gallstones. 30.2% knew that intestinal obstruction a complication of gallstones. 39.1% reported that gallbladder cancer is a complication of gallstones. 53.9% reported that gallstone disease and its complications life-threatening.

Table 4 Knowledge of participants of complications of gallstones (n=1710)

Parameter		No.	%
Heard or read about the complications of gallstones	Yes	1144	66.9
	No	566	33.1
Source of information	Friends and family	434	25.4
	Internet	451	26.4
	Injured cases	521	30.5
	Social media	241	14.1
	Books and magazines	197	11.5
	Mass media (such as television, radio)	67	3.9
Cholecystitis a complication of gallstones	I agree	1205	70.5
	Disagree	89	5.2
	I don't know	416	24.3
Obstruction of the bile duct one of the complications of gallstones	I agree	1095	64.0
	Disagree	83	4.9
	I don't know	532	31.1
Blockage of the pancreatic duct and pancreatitis one of the complications of gallstones	I agree	766	44.8
	Disagree	205	12.0
	I don't know	739	43.2
Intestinal obstruction a complication of gallstones	I agree	517	30.2
	I don't agree	377	22.0
	I don't know	816	47.7
Gallbladder cancer a complication of gallstones	I agree	669	39.1
	Disagree	216	12.6
	I don't know	825	48.2

Common complications of gallstones	Bile duct inflammation	1005	58.8
	Cholecystitis and pancreatitis	982	57.4
	Gallbladder abscess	373	21.8
	Gallbladder cancer	377	22.0
	I don't know	110	6.4
Gallstone disease and its complications life-threatening	Yes	921	53.9
	No	282	16.5
	I don't know	507	29.6

Only 5.6% of participants had high knowledge score, 61.8% had average knowledge score and 32.6% had poor knowledge score of gall bladder stones as reported in Figure 2. Table 5 shows a significant association between participant's knowledge of gall bladder stones with age, gender, residence region in the kingdom and educational level (P< 0.05).

Figure 2 Knowledge score of gallstones among participants (n=1710)

Table 5 Association between participants knowledge score with socio-demographic characters (n=1710)

		Knowledge score			Total (N=681)	P value
		Good knowledge	Average knowledge	Poor knowledge		
Age	Less than 20	2	120	120	242	0.001
		2.1%	11.4%	21.5%	14.2%	
	20 - 30	50	568	291	909	
		52.1%	53.7%	52.2%	53.2%	
	31 - 40	28	206	92	326	
		29.2%	19.5%	16.5%	19.1%	
	41 - 50	8	125	34	167	
		8.3%	11.8%	6.1%	9.8%	
	51 – 60	8	34	18	60	
		8.3%	3.2%	3.2%	3.5%	
	More than 60	0	4	2	6	
		0.0%	0.4%	0.4%	0.4%	
Nationality	Saudi	94	1029	539	1662	0.723
		97.9%	97.4%	96.8%	97.2%	
	Non-Saudi	2	28	18	48	
		2.1%	2.6%	3.2%	2.8%	
Gender	Male	30	359	233	622	0.004
		31.3%	34.0%	41.8%	36.4%	
	Female	66	698	324	1088	
		68.8%	66.0%	58.2%	63.6%	

Region	Central Region	11	231	165	407	0.001
		11.5%	21.9%	29.6%	23.8%	
	Southern area	50	187	71	308	
		52.1%	17.7%	12.7%	18.0%	
	Eastern Province	17	160	95	272	
		17.7%	15.1%	17.1%	15.9%	
	Northern area	8	217	89	314	
		8.3%	20.5%	16.0%	18.4%	
	Western Region	10	262	137	409	
		10.4%	24.8%	24.6%	23.9%	
Education level	Illiterate	0	5	5	10	0.001
		0.0%	0.5%	0.9%	0.6%	
	Primary	2	10	4	16	
		2.1%	0.9%	0.7%	0.9%	
	Medium	2	26	18	46	
		2.1%	2.5%	3.2%	2.7%	
	High school	21	284	207	512	
		21.9%	26.9%	37.2%	29.9%	
	Bachelor's degree	67	705	304	1076	
		69.8%	66.7%	54.6%	62.9%	
	Master's or PhD degree	4	27	19	50	
		4.2%	2.6%	3.4%	2.9%	

4. DISCUSSION

Gallstone disease is a prevalent condition that is allied to a high-number of hospital-admissions, high expenditures of care and high rates of morbidity (Njeze et al., 2013). A gall-stone is a term for a hard crystalline deposit that develops in the gall bladder (cholelithiasis) because of mix imbalance between chemical and physical composition of bile where both genetic and environmental variables interacting together play a role have role in this commonest biliary tract disease over the world (Al-Amedy et al., 2020). Gallstones are very common, occurring in up to 20% of adults in Europe and the United States, with significant variations in prevalence worldwide based on both genetic and environmental factors (Everhart et al., 1999; Portincasa et al., 2006). Studies done in various parts of the world have shown that the awareness of patients of gallstones regarding their disease is poor (Al-Amedy et al., 2020; Mary et al., 2020). The lack of understanding is a significant issue that cause gallstone. Most Saudis are still ignorant of gallstone-disorders, because there are not enough papers in Saudi Arabia about gall stone disease awareness. This is an observative cross-sectional study in Saudi Arabia conducted among 385 of the Saudi Arabian population. The paper aimed to assess and the level of knowledge and awareness regarding gallstones and their complication among the Saudi Arabian population.

In our study, only 5.6% of participants had high knowledge score, 61.8% had average knowledge score and 32.6% had poor knowledge score of gall bladder stones. A survey questions paper was undertaken in KSA among 1540 participants found that Gall-stones are known to 88.7percent of responders, 39.9percent have such a history in their family of gallstones and 23.6% believe gall-stones are an existence condition (Mirghani et al., 2022). Another study carried out among 429 participants to assess the findings of a poll on the public citizenry's understanding toward gall-stones in Saudi-Arabia revealed that more than half of the study participants (63.3%) were aware of different aspects of gallbladder stones, most of the participants (73%) heard about gallstones and its complications and nearly 3/4 of the respondents 72.8 precent were already familiar what gallstones meant (Alkhathami et al., 2021). However, In Najran is a city in Saudi-Arabia a study based on online questionnaire was conducted among 277 adult subjects aimed to evaluate the awareness' of gall stones showed that the subjects who had good knowledge of gallstone were (58.8%), (46.9%) of relative of the subjects' families had gall-stones and 36.8% of subjects think that gallstones as a disease threatening life. Generally, based on the knowledge score the study displayed a unsatisfactory level of (knowledge) toward gallstones in Najran city, Saudi Arabia (Alshahrani et al., 2020). Similarly, In Egypt another study was conducted showed that there is poor-knowledge about gall-stone illness in pit, who could attend to laparoscopic Cholecystectomy (Mohamed et al., 2019). Also, another cross-sectional observation study was conducted among 200 patients with symptomatic gallstones; it was shocking that despite gall bladder stones

being such a common pathology, the knowledge of the patents regarding their diseases was so poor, out of the 200 patients interview by us only 13.5% demonstrated good awareness regarding their disease while the majority (86.5%) had very poor understanding of the disease (Muhammad et al., 2021). In Al-Riyadh, (Kingdom of Saudi Arabia-KSA) another study carried out among 300 participants reported; all participants have heard about gallstone, but majority of participant don't know if gallstone could be existing whether or not it had symptoms (39.3%) (Albagshi et al., 2018).

Having a good understanding of how things normally work of the bladder, results from study conducted in Saudi Arabia show that 27.8% of cases reported bile production, 27.8% reported store and concentrate bile, 6.8percent produce hormones that facilitate smooth digestion and 11.2% break down big fat droplets into smaller-droplets (Mirghani et al., 2022). Another study found that symptoms of gallstones were reported as abdominal-pain was reported by 76.6 precent, fever by 21.7 precent and pale skin by 36.7 precent, jaundice by 36.7 precent and exhaustion by 41.9 precent, nausea 40.1% and vomiting 39.8% (Mirghani et al., 2022). In Najran city, Saudi Arabia, another study reported that the changes in urine color as a symptom was higher identified with (72.6%) of subjects followed by abdominal pain with (71.1%) (Alshahrani et al., 2020). Results from another study showed that upper stomach pain was identified by nearly 59.5percent of respondents as a sign of gall-bladder-stones (Alkhathami et al., 2021). In Riyadh city, another study found that nearly 50 percent of responders are aware that abdominal pain is the most common symptoms of gallstone (47.3%) and 22% of them said that nausea and vomiting are symptoms of gall stones (Albagshi, 2018).

In Saudi Arabia a paper conducted by Mirghani et al., (2022) found that concerning Gall-stones are a genetic-condition, as according 12.7 percent of those who are aware of the risk-factors; women are more likely than males to have gall-stones, thus according 29.8 precent; and those in the age range of twenty-one to forty are most likely to have gallstones, so according 39.7%, as regard causes the majority 48.6% of participants reported high triglycerides, 46.1% high cholesterol, 38.4% obesity, 30% for medications as a cause of gallstones. Another study reported that persons who think that gallstones affected women more than men were (59%) and 13.4% assumed that gal-stones were genetic disease (Alshahrani et al., 2020). Furthermost of the subjects' rated obesity, medications and aging as the most frequent-causes of gall-stones (Alshahrani et al., 2020). Also, another study found that approx. 63percent believed that hereditary-inheritance-factors play a role in gall-stones. Additionally, 68.0 percent were aware that women are more likely than men to acquire gallstones (Alkhathami et al., 2021).

Regarding knowledge about category of foods that aggravate-gallstones-symptoms another study found that participants identified body fat and (sugars rich meals) by 49.2 percentage, 6.7 percentage café, 6.2percentage beans and 6% meats (Mirghani et al., 2022). Also, another study reported that almost 70.7% of cases knew that (fatty rich food) increases the risk to gall-stones (Alkhathami et al., 2021). In Riyadh city, another study reported that only 27.7% of participants know that fatty food could be trigger and increase the pain but, more than half of them (54.3%) don't know (Albagshi et al., 2018). In our study, 66.9% of participants heard about complications of gallstones (30.5% of them heard from relative cases and 26.4% from internet). 70.5% of participants knew that cholecystitis a complication of gallstones. 64% knew that obstruction of the bile duct one of the complications of gallstones. 44.8% knew that blockage of the pancreatic duct and pancreatitis one of the complications of gallstones. 30.2% knew that intestinal obstruction a complication of gallstones. 39.1% reported that gallbladder cancer is a complication of gallstones. 53.9% reported that gallstone disease and its complications life-threatening, another study reported that a side-effect noticed was pancreatic or gall-bladder-inflammation by 53.6% of our participants, obstacle of common bile ducts 57.9%, intestinal obstruction 19.4% and cancer of pancreas were acknowledged by 12.7% (Mirghani et al., 2022). In Najran city, another study reported that the most frequent complications of gallstones identified by participants where a prevalent bile duct blockage was the second most common condition (25.3%), followed by pancreatic and gallbladder inflammations (23.8%) (Alshahrani et al., 2020).

In Riyadh city, another study found that almost quarter of participants said that inflammation and obstructed gall bladder are complication of gall stones while (63%) of participants do not know if there are complications related to gallstones (Albagshi et al., 2018). 84.1% of our paper applicants stated that exercise can prevent gallstone formation. Another study found that 43.1% of participants identified physical examinations, liver function test 36.6%, urine analysis 34.2%, imaging 34.4%, history taking 21.5% and CBC 18.8% as a method for diagnosis (Mirghani et al., 2022). Results from another study observed that 70.7% of participants know that USG test is frequently be used to diagnose gall stones (Alkhathami et al., 2021). In Riyadh, another study reported, concerning the methods of diagnosis, most of participants don't know if gallstone could be diagnosed clinically (40.7%) while (38.3%) chose that it could be diagnosed clinically by signs and symptoms but regarding if gallstone could be diagnosed by ultrasound, we found that participants who don't know and participants whom said yes are equal (40%) for each (Albagshi et al., 2018).

Our study shows a significant association between participants' knowledge of gall bladder stones with age, gender, residence region in the kingdom and educational level. Results from another study show revealed awareness of gallbladder stones was significantly correlated with participants' age twenty to 30 years old, female and level of education of participants (Mirghani et al.,

2022). Another study demonstrated that a statistically significant association ($p < 0.05$) was discovered between awareness level and sex, nationality, ages, educational levels and monthly-income, however men scored better on awareness than women, 82.1% and 49.4%, respectively and respondents from Saudi-Arabia exhibited heightened understanding than those from other nations (Alkhathami et al., 2021). Also, in Egypt research reveals a (statistically significant) positive association between patients' ages, education and knowledge source and their degree of knowledge (Muhammad et al., 2021).

However, another study reported that the association between the overall knowledge score and the demographic information was not statistically significant ($p > 0.05$) but, there was statistically significant relative among total knowledge score and education level ($p < 0.05$) (Alshahrani et al., 2020). Moreover, results from another study demonstrated that the difference in awareness between the genders was not statistically significant, age didn't play a significant difference in the awareness of the patients regarding the disease also and education wasn't significantly related to the patient's awareness of the disease (Muhammad et al., 2021).

5. CONCLUSION

The level of (awareness among Saudi general population) about gallbladder stones in this study was poor, among the previously published-data from Saudi Arabia and outcomes from other national surveys. Knowledge of gallbladder stones was significant correlated with participant ages, sex and education levels.

Recommendations

We recommend that further educational campaigns should be inaugurated to raise awareness about gallbladder stones and associated complications.

Ethical approval

The research proposal was approved by the Regional Research and Ethics committee of Najran University, southern Saudi Arabia, with letter number (44-NU-0172).

Funding

This study has not received any external funding.

Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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