

ORIGINAL ARTICLE

Frequency of Gallbladder Stones Among Patients Underwent Abdominal Ultrasound in a Tertiary Hospital in Sana'a City, Yemen.

Hameed M. Aklan¹, Abdullah A. S. A. Esmail², Abdulrahman A. Al-Sadeq³, Gebreel A. Eissa⁴, Osamah A. Hassan⁵, Abdullah A. Al-Mikhla⁶, Husni Ahmed Abdullah Al-Goshae⁷

¹ Dr. Hameed Aklan. Radiology Department, Faculty of Medicine and Health Sciences, University of Science and Technology, 15201, Sana'a, Yemen.

² Dr. Abdullah Ahmed Saeed Ali Esmail. General Practitioner, University of Science and Technology, 15201, Sana'a, Yemen.

³ Dr. Abdulrahman Ahmed Al-Sadeq. General Practitioner, University of Science and Technology, 15201, Sana'a, Yemen.

⁴ Dr. Gebreel Ahmed Eissa. General Practitioner, University of Science and Technology, 15201, Sana'a, Yemen.

⁵ Dr. Osamah Abdulsalam Hassan. General Practitioner. University of Science and Technology, 15201, Sana'a, Yemen.

⁶ Dr. Abdullah Al-Mikhla. Assistant Professor of Community Medicine, University of Science and Technology, 15201, Sana'a, Yemen.

⁷ Prof. Dr. Husni Ahmed Abdullah Al-Goshae. Professor of Neuroscience, International Medical School (IMS), management and Science University (MSU), Shah Alam, 40100, Selangor, Malaysia.

ABSTRACT

Introduction: The Gallbladder stone (GBS) disease is most commonly asymptomatic that may lead to several complications such as ascending cholangitis and obstructive jaundice. In this study the frequency of gallbladder stones among patients referred for abdominal ultrasound at the University of Science and Technology hospital (USTH), Sana'a – Yemen, have been estimated during the period between January and June 2013.

Methods: This study is a record-based and conducted at the radiology department in USTH, on cases underwent abdominal ultrasound during the period from January – June 2013. Information were collected from abdominal ultrasonography reports. **Results:** In this study 4935 patients' records are included. Of them, 2541 were males and 2394 were females. The frequency of patients with GBS was 5.53%. Multiple stones were observed in 3.57% of patients and 4.34% patients had large stones with size ≥ 5 mm. Females had significantly higher frequency of GBS (8.0%: 191/2394) than males (3.2%: 82/2541) ($P < 0.001$). It was found that, no significant difference between males and females in harboring small stones (< 5 mm) ($P = 0.251$). However, significantly higher frequency of large GBS (≥ 5 mm) was found among females compared to males ($P < 0.001$). The frequencies of GBS, small size of GBS and large size of GBS have significantly increased with increasing age ($P < 0.001$). **Conclusion:** In this study it was found that females had significantly higher frequency of GBS than males. No significant difference between males and females in harboring small stones. There was a significantly higher frequency of large GBS was found among females compared to males. The frequencies of GBS, small size of GBS and large size of GBS have significantly increased with increasing age.

Keywords: Gallbladder stones, Prevalence, Yemeni patients

Corresponding Author:

Husni Ahmed Abdullah Al-Goshae, PhD

Email: husni_ahmed@msu.edu.my

Tel: +60172041861

INTRODUCTION

Gallbladder stone is formed by a concentration of crystalline deposited inside the gallbladder from the bile components (1). Gallbladder stone is common disease and very costly than other digestive diseases (2). More than 700,000 cholecystectomies done every year in USA and costs about 6.5 billion USA dollars.

Gallbladder stones affecting about 10-15% of white-skin adults in well-developed countries. This high frequency-result is more decreased among blacks in united states, Africa citizens, Sub-Saharan and among East Asian. Cholesterol gallstones are predominating in developed countries and about 15% are black pigment stones. Gallbladder stones among East Asians are developed as brown-pigmented stones in biliary system, and usually accompanied with infections, parasites, or intra-hepatic ducts stones (3). Female to male ratio represents 6.4 to 1 and is reported in cholesterol and mixed stones. Female preponderance is not present with pigment stones (4). The most common types of the gallbladder stones are

the cholesterol, black pigment, mixed and to less extent is the brown pigment stones (5).

Types and composition: Pure cholesterol stone (10%): are usually single (cholesterol solitaire), yellow, more than 2.5 cm in diameter and contain nearly 100% of their weight cholesterol (6). Mixed stones (80%): These are typically consisting of 20–80% or 30–70% cholesterol. Other types of gallbladder stones include calcium bilirubinate, calcium phosphate, calcium palmitate (5). The pigmented stones include black pigment stones and brown pigment gallbladder stones (7).

Risk factors for cholesterol gallstones: Female gender, elderly people, obesity, pregnancy, uses of contraceptive pills, hormone therapy, rapid loss of weight, Crohn's disease, high blood triglycerides, patient has Metabolic syndrome (8).

Signs and symptoms: Usually people with gallbladder stones are free from any symptoms. The biliary colic is the most common symptom of gallbladder stones. The common complications are cholecystitis, cholangitis, pancreatitis, jaundice, gangrene, sepsis, fistula, paralytic ileus and cancer. Gallbladder sludge is usually associated with symptoms and complications of gallbladder stones, however, sludge alone is usually does not cause problems (8).

Diagnosis: Abdominal ultrasonography is a best test for diagnosis the gallbladder stones. Other diagnostic procedures that can be used are upper gastrointestinal ultrasonographic endoscopy, Magnetic Resonance Chol-angiographic Pancreatography (MRCP), chole-scintigraphy-Scan, Endoscopic Retrograde Chol-angiographic Pancreatography (ERCP), blood test for liver and pancreas, drainage from duodenum and examination, oral chole-cysto-gram (OCG), and intravenous-cholangio-gram (IVC).

Management of the Gallbladder stones are done primarily by keeping the patient under observation without treatment. Cholecystectomy, total removal of the gallbladder with the stones it contains, is a common surgical procedure of its management. Sometimes, sphincterotomy is used to extract the stones from the gallbladder. Some oral medication can be used to dissolve stones. Shock-wave lithotripsy (ESWL) is also used. Symptoms of gallbladder stones usually disappear after cholecystectomy but if symptoms persist after cholecystectomy, it is most likely some stones might be left in the biliary ducts or it could be the presence of another problem within the biliary ducts. Dysfunction of the sphincter of Oddi couldn't be excluded. Many studies are focusing on the possibility of genetic factor the formation of gallbladder stones (8).

Study has been done in Asir region, which is a high-altitude region at Saudi Arabia and focused on the risk

factors and prevalence of the gallbladder stones. Their study concluded that the gallbladder stones in Asir area was about 11.7% (9). Other epidemiological study done at the hospital of Gondar University Hospital, in Ethiopia (between September 2004 and January 2006). They concluded that the prevalence of gallbladder stones was 5.2 (10). Considerable amount of literature has been published on 2003 about biliary lithiasis in India. Ultrasound studie showed that the overall prevalence of biliary system stones was 11.56% with the female to male ratio was 4:1 in patients with fifty years and below. This ratio was 6.5:1, in cases of age 60 years and below (11). The academic literature on prevalence rates of gallbladder stone disease in Italy (1994), has revealed that the emergence of several contrasting themes. Overall prevalence of gallbladder stone disease (cholecystectomy + cholelithiasis) was 5.9%. Female to Male ratio was 8.4% to 3.7%. (12).

There are almost scanty number of studies in Yemen about GBS among patients who had abdominal U/S. In addition, almost nothing has been done about this subject here in USTH in Sana'a. It was observed that a lot of cases of Gallbladder stone disease were seen among patients at the Surgery Department. A research group was formed at USTH to study this subject to find the relationship between sex, age, size, number, patient type of Gallbladder stone disease.

The aim of this study is to find the prevalence of gallbladder stones among patients who had abdominal ultrasound in UST hospital from January to June – 2013 in Sana'a, Yemen.

MATERIALS AND METHODS

Study design, subjects and methods of collecting data

This is a record-based study conducted at the hospital of the University of Science and Technology (USTH), a tertiary care hospital in Sana'a city. All records of patients referred for carrying out abdominal ultrasound in Radiology Department during the period between January – June 2013. The soft copy of abdominal ultrasound report of each patient was reviewed and data such as age, gender, presence or absence of GBS, size of GBS and number of GBS found were extracted using a pre-designed standard tool.

Data analysis

Data were analyzed using IBM SPSS Statistics for Windows, version 20.0 (IBM Corp., Armonk, NY, USA). The data presented in frequency tables and figures. The association between categorical variables and GBS was tested using chi-square test. Differences at P values measured by T-Test.

Ethical clearance

The protocol of this was approved by the Medical Ethical Committee (MEC), at the University of Science and

Technology, Yemen (UST). The Researcher have been told by the MEC committee that no need for informed consent because data were recruited from the Radiology Department records. However, the data were collected anonymously and kept confidentially.

Limitation of the study:

The data was not collecting randomly. The data collected was restricted to the information found in the abdominal ultrasound reports, due to difficulty to find large number of patients within short period.

RESULTS

The present study included records of 4935 referred patients, 2541 (51.5%) males and 2394 (48.5%) were females. The mean of age of all patient was 37 ± 17.2 (Table 1). The frequency of patients with GBS was 5.53%. Multiple stones were observed in 3.57% of patients and 4.34% patients had large stones with size ≥ 5 mm (Figure 1). Females had significantly higher frequency of GBS, 8.0% (191/2394) than males 3.2% (82/2541) the P value was < 0.001 . There is no significant difference between males and females in harboring small stones with size less than 5mm, (the P value was 0.251). However, significantly higher frequency of large GBS (≥ 5 mm) was found among females compared to males ($P < 0.001$). The frequencies of GBS, small size of GBS and large size of GBS have significantly increased with increasing age, $P < 0.001$ (Table 3).

Table 1 : Characteristics of patients underwent abdominal ultrasound in USTH, Sana'a, Yemen, 2013 (n= 4935)

Variable	n (%)
Age of patients	Mean (SD) = 37 (± 17.2)
Age groups (Years)	
< 20	693 (14.1)
20 – 39	2344 (47.5)
40 – 59	1279 (25.9)
≥ 60	619 (12.5)
Gender	
Male	2541 (51.5)
Female	2394 (48.5)
Patient type	
In- patients	339 (6.9)
Out- patients	4596 (93.1)

DISCUSSION

In this study, the prevalence of GBS among the patients at USTH was (5.5%), 51.5% were males and 48.5% were females.

In comparing the prevalence of the GBS in USTH, Yemen

Table II : Distribution of GBS according to gender and age among patients underwent abdominal ultrasound in USTH, Yemen, 2013.

Variable	N	Presence of GBS		Size of GBS		P value	
		n(%)	P value	< 5 mm	5 mm		
Gender							
Male	2541	82 (3.2)	<0.001	26(1.0)	0.251	56(2.2)	< 0.001
Female	2394	191(8.0)		33(1.4)		158(6.6)	
Age (Years)							
< 20	693	9 (1.3)	<0.001	0(0.0)	< 0.001	9(1.3)	<0.001
20 – 39	2344	78 (3.3)		3(0.1)		65(2.8)	
40 – 59	1279	106 (8.3)		21(1.6)		85(6.7)	
≥ 60	619	80 (12.9)		25(4.0)		55(8.9)	

N; number of patients examined, n; number of patients with GBS, GBS; gallbladder stone

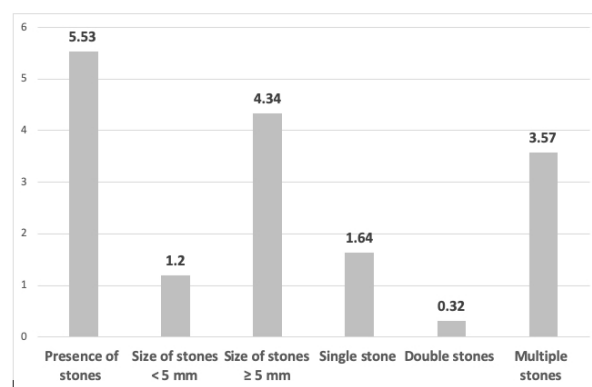


Fig. 1, Frequencies of GBS among patients underwent abdominal ultrasound in USTH, Yemen, 2013 (N = 4935).

to a similar study done in Asir of Saudi Arabia, is much less (5.5% in Yemen and 11.7% Asir of Saudi Arabia with male to female ratio was male (49.1%) and female (50.9%) (9). The mean of age of all patient in this study was 37 and standard deviation was 17.2 but in Asir's study the mean of age was (44.3) and standard deviation was (10.2) (9).

The prevalence of GBS was (5.5%) in comparing with previous study done in Ethiopia which was (5.2%) (10). So, there is resembling between both studies due to similar methodology. But in study which done in Asir in Saudi Arabia the prevalence was (11.7%) (9) and in India was (11.6%) (11). So, by comparing between both studies and our study there is difference between them due to different in methodology, that our study was hospital based while the other studies were community based.

The prevalence of GBS according to gender in our study among female was (8%), and among male was (3.2%), and in comparing with previous studies, the study done

in Asir in Saudi Arabia the prevalence of GBS among female was (9.6%) and among male was (2.06%) (9) and in the study done in Ethiopia the prevalence of GBS among female was (5.4%) and among male was (3.1%) (10), and in the study done in India the prevalence of GBS among female was (9.3%) and among male was (2.3%) (11). This reveals that females are more affected with GBS than males in all studies because gender could be an important risk factor in formation the GBS.

The majority of GBS patients according to age interval in our study was from 60 years and more (12.9%) and lowest age interval affected was less than 20 years (1.3%) while in study which done in Ethiopia the majority of GBS patients was from 65-74 years (8.2%) and lowest age interval affected was from 15-24 years (2.2%) (10). This mean that old age is more affected with GBS because increase in age could be a risk factor for GBS.

The number of GBS in our study appear more as multiple (64.4%) similar to the Indian study in which the multiple GBS represents 75% (11). There is similarity of the results between both studies in which mixed stones is the common type of GBS. But in Asir's study showed that single stones is more common (63.3%) (9). The prevalence of gallbladder stones was 11.7% (9), much higher than the prevalence in this study which is 5.53%. The difference between Asir's study and this study regarding to the number and prevalence it may be due to difference in food habits between two countries as in Saudi Arabia red meat forming the main dish in the three meals while in in Yemen the main dish is mostly vegetables and white meat.

The common size of GBS in this study was medium 5-10 mm (43.6%), while in Indian study was small 2-4 mm (37%)(11). In our study the medium size of stones is more frequencies in all age intervals except in 60 years and above patients revealed the large stones. Both genders are more affected by medium size stone.

CONCLUSION

The prevalence of GBS was (5.5%). Female sex is significantly more affected than male .Elderly is significantly more affecting than young .The most common size of GBS in our study was medium. The most common number of GBS in our study was multiple. The most common patient type of GBS was out-patient type and the value demonstrated no significant in this relation.

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REFERENCES

1. Merck CO., Sharp M. Dohme. The Merck manual of diagnosis and therapy. Merck 2006.
2. New York Presbyterian Hospital. Gallbladder disease: Available from: <https://www.nyp.org/digestive/services/liver-diseases/gallbladder-disease>. [Accessed 29th May 2013].
3. Shaffer EA. Epidemiology of gallbladder stone disease. *Best Practice & Research. Clinical Gastroenterology*. 2006;20(6):981-996.
4. Mohan H, Punia R, Dhawan S, Ahal S, Sekhon M. Morphological spectrum of gallstone disease in 1100 cholecystectomies in North India. *Indian Journal of Surgery*. 2005;67(3).
5. Singh V, Yadav A, Chauhan K, Sharma SP, Verma N. Morphological study of gallstone- A Review. *J Anat*. 2014;22(2):25-28.
6. Njeze GE. Gallstones. *Nigerian Journal of Surgery*. 2013;19(2):49-55.
7. Cariati A. Gallstone classification in western countries. *Indian Journal of Surgery*. 2015;77(2):376-380.
8. Marks JW, Anand BS. Gallstones. Pain, Symptoms, Causes, Diet, and Treatment. *MedicineNet News letters* 2008.
9. Abu-Eshy SA, Mahfouz AA, Badr A, El Gamal MN, Al Shehri MY, Salati MI, Rabie ME. Prevalence and risk factors of gallstone disease in a high altitude Saudi population. *East Mediterr Health J*. 2007 July-August; 13(4):794-802.
10. Getachew A. Epidemiology of gallstone disease in Gondar University Hospital, as seen in the department of radiology. *Ethiopian Journal of Health Development*. 2008 January; 22(2).
11. Maj JD, Maj IC, Col RM. Biliary lithiasis: Prevalence and ultrasound profile in a service hospital. *Medical Journal Armed Forces India*. 2003;59(1):15-17.
12. Loria PD, Dilengite MA, Bozzoli M, Carubbi F, Messora R, Sassatelli R, Bertolotti M, Tampieri A, Tartoni PL, Cassinadri M, et al. Prevalence rates of gallstone disease in Italy. The Chianciano population study. *Eur J Epidemiol*. 1994 Apr; 10(2):143-150.