Assessment of Gallstone Disease in Libya Correlated to Age and Gender; Ultrasound Use for Diagnosis Proved by Surgical Operations

Ramadan M. Abuhajar [(1)]*

[(1)]Faculty of Medicine, Almergib University, Alkhoms-Libya
* Corresponding Author

ABSTRACT

Purpose: Gallstone disease (GSD) is a common disease and a worldwide problem leading to surgical intervention. The purpose of the study was to find out the assessment of gallstone disease correlated to age and gender in the a population sample from Zliten area Libya.

Patients and method: Our study was conducted for 2477 Libyan patients that were referred to polyclinics and teaching hospital in Zliten over the period of 12 months. The examined patients were including both gender and various age groups, between 10 and 90 years. Ultrasound method was used for abdominal examination and found 242 affected patients with GSD proved by surgical operation.

Results: The rate of the affected patients with GSD among the total examined patients was 9.77 % affected with GSD and showed variable frequency corresponding to age and sex. The affected female patients with GSD more than the affected male patients with ratio of 4:1

Conclusion: GSD affected females more than males with mean age for both sex of 45.33±15.77 year as well as the frequency was similar to many countries in the world.

Key words: Gallstone disease, Ultrasound, Libyan patients, Assessment, Age, Gender.

INTRODUCTION

Gallstone is a benign old disease. In Egyptian mummy gallstones were found since 1000 BC. Gallstones were described by Greek doctor for first time by a 6th century. Today gallstones disease is a common disease in large areas of the world affected mainly adult patients. GSD made one of the major surgical interventions in the hospital admissions. The highest rate of the disease was on North America followed by Europe specially Norway and Germany, whereas the lowest rate was in southeast Asia and Africa (1,2). Stones in gall bladder may cause retention of bile in gall bladder and may lead to cholecystitis (2). Nowadays we are using modern technology for diagnosis and magnitude establishment of gallstone disease as following; X-ray can diagnose the radio-opaque stones only with components of calcium and successful in about 15% of cases only. CT scan is same of the x-ray, it can detect the radio-opaque stones with difficult detection of the cholesterol stones (figure 1). MRI, MRCP and ERCP; MRI can establish few cases of stones. The technique of magnetic resonance cholangiopancreatography (MRCP) is more useful in diagnosis of stones in gall bladder and bile duct, as well as endoscopic retrograde cholangiopancreatography (ERCP) which used as diagnostic and therapeutic tool only for common bile duct stone. Cholecystography used also in the diagnosis of gall stones. Ultrasound is the modality of choice for diagnosis of the gallstones, with advantages; inexpensive, non-invasive and with no ionizing radiation effect, accurate diagnosis and high sensitivity and specificity (3-5) (figures 2a,b,c).

SRDFs involve any delivery system that produces slow release of drug over a long period of time [3, 4]. Indeed, these dosage forms are commonly administered only once or twice daily, compared to the counterpart immediate release dosage forms (IRDFs) that have to be taken three or four times daily to achieve the same effect [2]. The majority of oral pharmaceutical products are designed as IRDFs for rapid onset of action. IRDFs have various limitations including; poor patient's compliance due to frequent doses are required for drugs with short half-lives. Additionally, fluctuations of steady state plasma drug concentrations can lead to a patient being over medicated or under medicated [5, 6].

Every year in United Status of America (USA) approximately 500.000 to 600.000 cholecystectomies are performed. The prevalence of gallstone disease (GSD) in USA is about 10% of the adult population. The prevalence GSD in Europe varies from country to another country and range of prevalence from 5.9% to 21.9%. GSD increased with increasing age. The difference of incidence in sex decreased with increased age (3,6-9) . In USA the prevalence is about 20% of 40 years and older
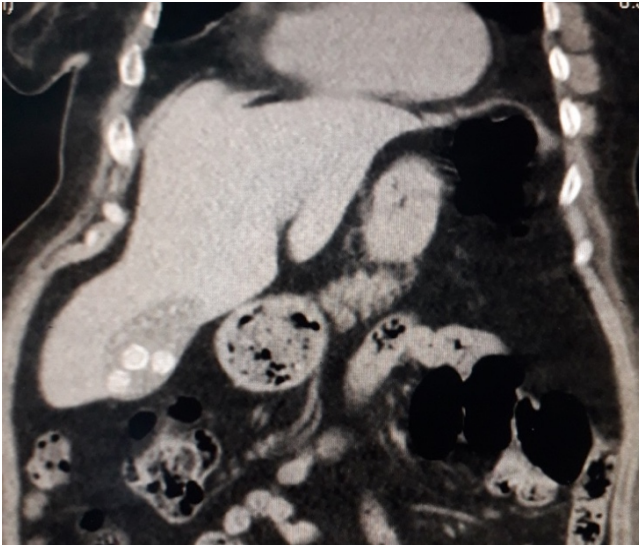
Figure 1: CT scan abdomen showed multiple stones in the gall bladder (Zliten teaching hospital).
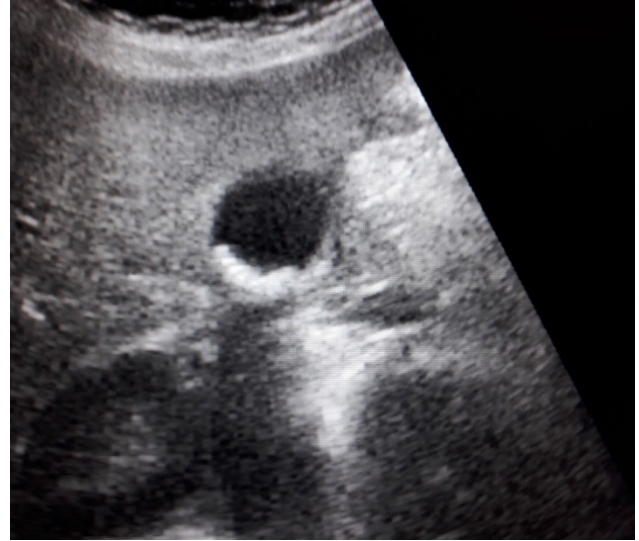

Figure 2b multiple gall bladder stones (Zliten teaching hospital)
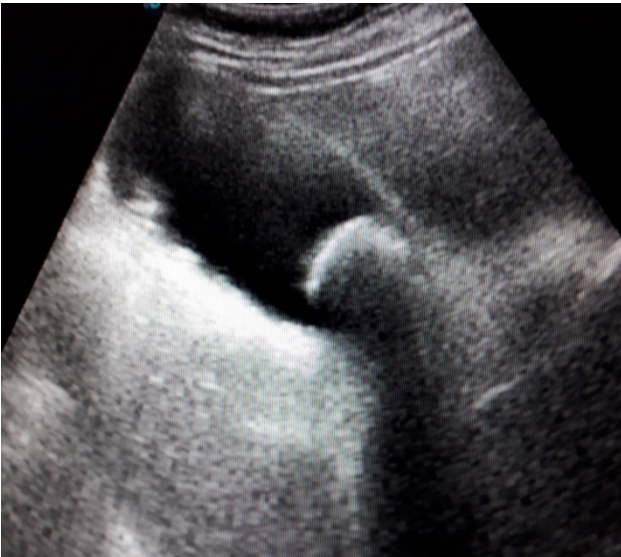

Figure 2a solitary gall bladder stone (Zliten teaching hospital)

Figure 2c multiple gall bladder stones (Zliten teaching hospital)

and 30% for above 70 years old have stones. The lowest prevalence in Asia and Africa; in Asia it ranges from 4.35% to 10.7%. In Africa the prevalence was reported in few African countries ranging from 2.1% to 5.2% and in black women above 50 years was about 10%(7).

The frequency of gallstone disease in females is more than in males due to hormonal factors on female patients. Female to male ratio is about 4:1 and in other studies the ratio is about 3:1. The other associated risk factors to the gallstones disease including increasing in age, overweight, hemolysis, food pattern, family history of the disease and metabolic diseases [2,5,7-14] . In Libya like in other countries, patients with gallstones disease made a big surgical problem and account the major admissions and surgical interventions in the hospitals[15]

Zliten district (in Libya) population is more than 300.000 individuals. To the best of our knowledge no reported data from Zliten district about the magnitude and prevalence of gallstones disease in the population. Many cases of gallstones disease were observed every time among population in all health centers in Zliten during abdominal ultrasound examination.

This effort of gallstones disease assessment among the patients in Zliten was by ultrasound use. The disease was surgically confirmed among the admitted patients in Zliten teaching hospital that was the main and the biggest health center in Zliten district.

PURPOSE OF THE STUDY:

Gallstone disease is a common disease in the world affected mainly adult patients. The purpose of this study was to find out the frequency of gallstone disease correlated to age and gender in Libyan population. Ultrasonography method which used in abdominal

examination for diagnosis of the gallstone disease among the Libyan patients of both gender and various age groups. The patients were referred to polyclinics and the teaching hospital in Zliten district and diagnosis was proved by surgical operations.

PATIENTS AND METHOD:

Our study of gallstone disease was performed during a period between August 01, 2018 to March 31, 2019. The studied number of 2477 Libyan patients (1295 females and 1182 males) among ages between 10 to 90 years, was referred to the teaching hospital and polyclinics in Zliten district-Libya. The ethics committee in Zliten teaching hospital approved the study. Ultrasound imaging modality was used and underwent for every patient. Ultrasound machines; GE 9 corporation and Philips corporation (ClearVue 350) with convex transducers of frequency 3.5-5.0 MHz were used for abdominal examination. The scanning of the abdomen was done in supine and left lateral positions. In the study was found 242 affected patients with gallstone disease which were admitted and operated in the hospital.

RESULTS:

The total examined patients using ultrasound modality was 2477 subject (1295 females and 1182 males). GSD was observed in 242 (9.77%) subjects. The female patients with GSD were 177 out of 1295 (13.67%) and male patients were 65 out of 1182 (5.48%). The ratio of GSD in female patients to male patients was 4:1. The difference between both genders of patients with GSD was highly significant. $Z = 2.99$, P-value = 0.0014.

Table 1: patients with GSD distribution and percentage among females and males.

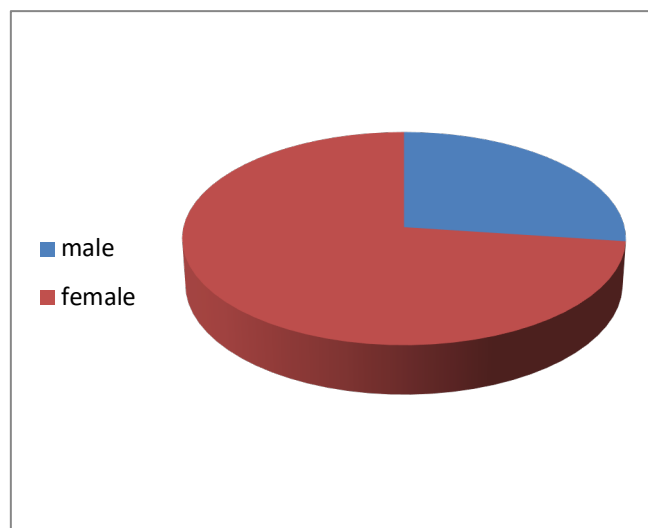|	Patients with GSD	Number of examined patients	Percentage of patients with GSD
Females	177	1295	13.67%
Males	65	1182	5.48%
Total	242	2477	9.77%

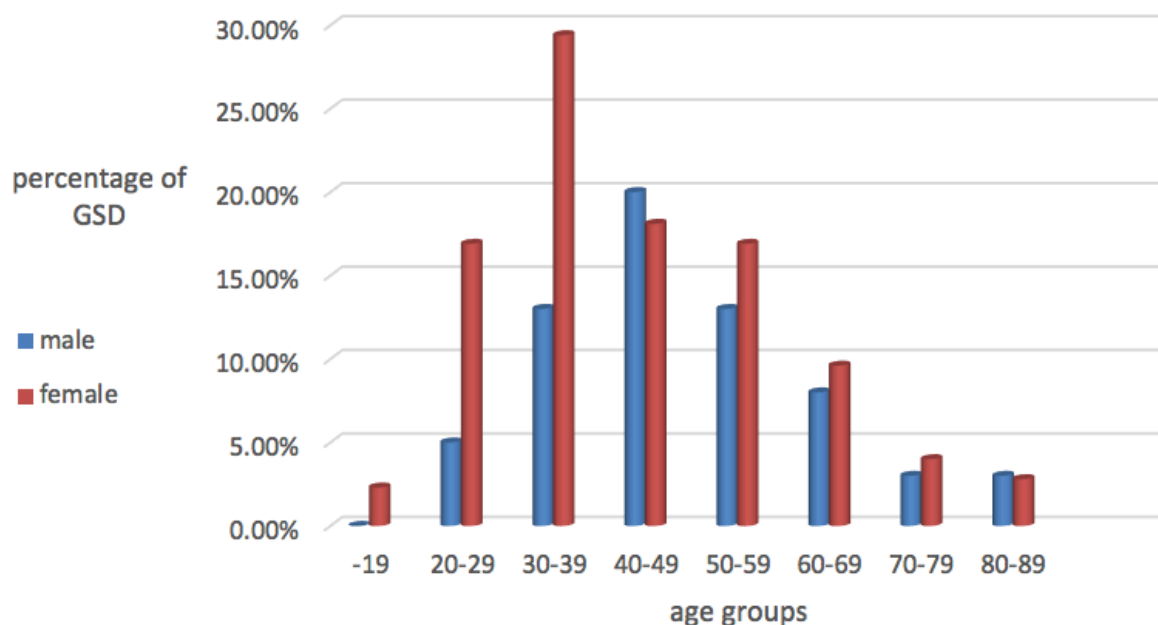Figure 3: distribution of gallstones among females and males.

Figure 4: percentage of the affected female and male patients with GSD in each age group.

Table3: categories of the affected patients with GSD.

Age categories	(f) No. of categories	(X) categories centers	X . f	X2 . f
10 -	4	15	60	900
20 –	35	25	875	21875
30 –	65	35	2275	79625
40 –	52	45	2340	105300
50 –	43	55	2365	130075
60 –	25	65	1625	105625
70 –	10	75	750	56250
80–89	8	85	680	57800
Total	242	-	10970	557450

Mean $(\dot{X}) = (\sum X. f) / \sum f = (10970/ 242) = 45.33$

Standard deviation (SD) = root of $\left(\frac{\sum x^2 . f}{\sum f} - \dot{X}^2 \right)$ =
route of $\{(557450/242) - (45.33)^2\} = 15.77$

Mean age of the affected patients with gallstones = $45.33 \pm$ (SD) 15.77 year

Distribution of the affected patients with GSD in each age group among the whole diseased patients with gallstone. Its percentage and proportion among female and male patients as well as the mean age with standard deviation were shown in the demonstrated tables and figures.

DISCUSSION:

The study was conducted on patients who attended to polyclinics and the hospital in Zliten-district in Libya for abdominal examination. Gallstone disease frequency correlated with age and gender. Ultrasound machines were used for examination of the patients (examination of both genders and various age groups) to establish the diagnosis. Ultrasound is the modality of choice for diagnosis of the stones in gall bladder. In our study the diagnosis of gallstone disease was confirmed by surgical operations. In this study the female patients of 177 (73.14%) out of 242 patients with GSD whereas male patients of 65 (26.86%) out of 242 patients with GSD. The findings showed females were far more prone to GSD than males with a ratio of females to males as 4:1 (table 1, figure 3). This difference between female and male affected patients with gall stones had a significantly higher in females than in males, Z = 2.99, P-value = 0.0014. This study was similar to many previous studies in many countries [2]. GSD was higher among females than males in our study, most likely due to many risk factors including; pregnancy which is the important risk factor for development of gall bladder stones in females. Pregnancy leads to increasing in saturation of bile with cholesterol, which promote gall bladder formation. Overweight facilitates cholesterol synthesis and secretion is a high risk factor in women[10]. Consumption of large amounts of saturated fat facilitates the risk of gallstones formation[12]. Oral contraceptive is believed to be a risk factor for gall bladder stone formation[10]. The other risk factors like diabetes mellitus, family history and increased VLDL in females facilitate development of biliary stasis

[10]. In our performed study 242 patients were affected with GSD out of 2477 studied patients, i.e. 9.77%. So, the rate of gallstone disease among the studied patients in population was 9.77%. The study including patient between ages of 10 and 90 years. The study result showed most of the affected patients with GSD noticed among both genders was 20 to 69 years old. The mean age of the affected patients with GSD was $45.33 \pm$ (SD) 15.77 year (table 3). In our study the peak of affected patients with GSD distribution was among age group 30-39 years followed by the age groups of 40-49, 20-29, 50-59 and less distribution in the affected patients among the age group 60-69 years. Only 4 patients with GSD was among age group 10-19 years. The affected patients with gallstones of age 70 years or above were limited number. No detectable GSD among patients under the age of 10 years old (table 2). In female gender the highest percentage of affected patients with GSD was among the age group 40-49 followed with age groups 30-39, 50-59 and less percentage was among the age group 60-69 years. In male gender the highest percentage of affected patient with GSD was among age group 40-49 followed by the age groups 30-39, 50-59 and less percentage was among 60-69 years. The percentages of GSD among patients of age 70 years or more were very small. In males no detectable affected patients with GSD among ages less than 20 years. Generally, GSD was rarely affects children in Libya (figure 4). Our study was similar to the literatures and resembled the previous studies in many world countries including European and other countries [1,14,15,16].

CONCLUSION:

The conducted study included 2477 patients, using ultrasound modality for diagnosis of GSD and confirmed by surgical operations. We found out 242 patients with GSD in rate of 9.77%. The disease affected females more than males with ratio of 4:1. The mean age of the affected patients with gall stones was $45.33 \pm$ (SD) 15.77 year. Our study results were similar to many previous studies which were conducted in many countries in the world.

ACHNOWLEDGEMENTS:

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