

Epidemiology of gallstone disease in Gondar University Hospital, as seen in the department of radiology

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Abstract

Back ground: Gallstone disease is a world wide problem and remains to be one of the most common health problems leading to surgical intervention. The magnitude of Gallstone disease in Ethiopia is not well known.

Objective: To assess the magnitude of gallbladder stones in Gondar university hospital among patients visiting at the department of radiology for ultrasound examination.

Methods: A retrospective observational study design was used over the period of September 2004 to January 2006 at the department of radiology, Gondar university hospital. Patients above the age of 14 years and whose Gallbladder was examined by ultrasound were considered as the study subjects.

Results: Among a total of 1603 study subjects, the proportion of patients with cholelithiasis was 5.2%. Of the patients with gallstone disease 55 were females and 28 were males with a ratio of 2:1. The prevalence of cholelithiasis in the age group 35-64 was 7.3%, 10.1% for females and 4.8 % for males. The ratio of symptomatic to asymptomatic cholelithiasis was 1:1 (34/34). The prevalence of cholelithiasis among patients clinically suspected to have cholelithiasis was 27.2%. Of the 68 patients with cholelithiasis, 22.1% had evidences of complication; 5 (7.4%) choledocholithiasis, 3 (4.4%) acute cholecystitis, 4 (5.9%) chronic cholecystitis, 2 with gallbladder (GB) hydrops and one patient with porcelain GB.

Conclusion: The prevalence of cholelithiasis (5.2%) in Gondar university hospital suggesting that cholelithiasis is not an uncommon disease in the area. A further community based and multi centered study is recommended to determine the prevalence of gallstone disease in Ethiopia. [*Ethiop.J.Health Dev.* 2008;22 (2):206-211]

Introduction

Gallstone disease (GSD) is a world wide disease and it remains to be one of the most common health problems leading to surgical intervention. Every year about 500,000 cholecystectomies are performed in the United States of America (USA) (1). The prevalence of GSD is about 10% in its adult population.

In western Europe the prevalence ranges from 5.9% to 21.9% with the highest prevalence seen in Norway, Sweden, Germany and the lowest in Simion , Italy (2). It has been demonstrated that prevalence of GSD increases with age. In the USA 20% of those 40 years and older and 30% of those above 70 years old have biliary stone with female to male ratio of 4:1. This discrepancy is narrowing in the older population (3).

In South America the highest prevalence is found in Chilli with incidence of 1.2/100 women/year (6). The lowest prevalence is found in Asian and African countries (7-15). The reported prevalence in Asia ranges from 4.35-10.7% (7-11). In Africa, the prevalence of GSD was reported from few countries. For instance, in a group of antenatal women, the prevalence was 2.1% in Nigeria, 4% in Tunisia, 5.2% in Sudan and 10% in black women (above 50 years) of Soweto (12-15).

There is an increasing incidence of GSD with age, preponderance in females, multiparty, use of oral contraceptive pills and in patients with chronic liver disease, hemolytic disorders and diabetes. Cholelithiasis is rare in pre pubertal children unless associated with a

hemolytic disease, congenital anomaly of biliary tree or rare conditions (8, 9,16).

The natural history of GSD, according to some studies, indicates 70% remain symptom free (17, 18).

GSD can lead to variety of complications including cholecystitis, choledocholithiasis, gallstone ileus, acute gallstone pancreatitis, biliary obstruction, gallbladder empyema or perforation. A study done in Taiwan showed a complication rate of 2% while other studies showed 58-72% patients with symptomatic GSD had an ongoing colic or complication (19).

Well-documented epidemiological data about the prevalence of cholelithiasis in general and the relative prevalence of asymptomatic and symptomatic cholelithiasis in particular in Ethiopians has been non-existent. Thus, the main objective of this study is to determine the prevalence of cholelithiasis in Gondar University Hospital (GUH) among patients presenting to the department of radiology for ultrasound examination, and describe the proportion of symptomatic and asymptomatic GSD and look for associated complications.

Methods

The study is a retrospective study with evaluation of record of patients that came for ultrasound examination at the department of radiology in the period of September 2004 to January 2006.

The study area is GUH which is a teaching referral hospital located 720 km North West of Addis Ababa. It is the only referral hospital for North West Ethiopia serving a population of about 5 million.

The study subjects were all patients aged 15 years and above who came for ultrasound examination and whose gallbladder was evaluated. Patients with and without symptoms of gallbladder stone were included. During the study period all patients referred for ultrasound had also examination of gallbladder. There were 1746 patients who underwent ultrasound examination of the gall bladder collected from the records of the department.

Aloka SSD 500 ultrasound machine with 3.5MHZ frequency curvilinear transducer was used as a definitive diagnostic modality as studies confirmed the specificity and sensitivity of ultrasound being >95% (20). All examinations were done by an experienced radiologist of the university hospital.

The data were collected using a structured and pre-tested questionnaire. The variables that were studied include socio-demographic characteristics, clinical presentation, ultrasound finding of GB and Common Bile Duct (CBD),

and complication of cholelithiasis. Signs and symptoms of GSD were considered positive if there is a record of right upper quadrant and epigastric pain with or without radiation to shoulder and back, dyspepsia, fat intolerance, and positive Murphy's sign.

Data were collected from the database in the computer and the registry book in the department of radiology. Ethical clearance was obtained from the university research and publication office and got permission from the department. Analysis was done using EPI-INFO version 3.2.2 statistical packages.

Results

The total number of patients seen in all age groups in the study period was 1746. Excluding those aged 14 years and below, size of the study population was 1603. Of these, 817 were females (51%) and 786 males (49%), with a male to female ratio of 1:1 (Table1). The mean age for females was 37.0 years with SD of 14.3 and for males 42.0 years with SD of 18.2 (Table 1). Of the total study subjects, 920 (58.8%) of patients came from Gondar town and other urban areas while the remaining 644 (41.2%) of patients came from rural areas (Table 1).

Table 1. Socio-demographic characteristics of patients and **Ultrasound finding of GB, September 2004-January 2006, GUH**

Age group	Normal Gallbladder	Gallbladder stone	Chole cystectomy	Acalculous cholecystitis	Gallbladder polyp	others	total
15-24	309 (97.2%)	7(2.2%)	0	2 (0.6%)	0	0	318 (100%)
25-34	376 (97.2%)	10 (2.6%)	0	1(0.3%)	0	0	387 (100%)
45-54	221(92.1%)	11(4.6%)	4 (1.7%)	0	1(0.4%)	3 (1.3%)	240 (100%)
55-64	150 (91.5%)	10 (6.1%)	4 (2.4%)	0	0	0	164 (100%)
65-74	100 (90.9%)	9 (8.2%)	1(0.9%)	0	0	0	110 (100%)
75-84	48 (96%)	2 (4%)	0	0	0	0	50 (100%)
85-96	7(100%)	0	0	0	0	0	7 (100%)
Total	1510 (94.3%)	68 (4.2%)	15 (0.9%)	4 (0.2%)	2 (0.12%)	3 (0.18%)	1602 (100%)
Sex							
Female	756 (92.6%)	44 (5.4%)	11(1.3%)	3 (0.4%)	1(0.1%)	1(0.1%)	816 (100%)
Male	753 (96.1%)	24 (3.1%)	4 (0.5%)	1(0.1%)	1(0.1%)	1(0.1%)	784 (100%)
Total	1509(94.3%)	68(4.3%)	15(0.9%)	4 (0.3%)	2(0.1%)	2(0.1%)	1600 (100%)
Address							
Rural	614 (41.7%)	26 (38.2%)	1(6.7%)	1	1	1	644 (41.2%)
Urban	859 (58.3%)	42 (61.8%)	14 (93.3%)	3	1	2	921 (58.8%)
Total	1473 (100%)	68 (100%)	15	4	2	3	1565 (100%)

The reasons for referral for ultrasound examination were, for gallbladder (GB) and biliary disease 121(7.6%), liver disease 162 (10%), general abdominal ultrasound other than hepatobiliary disorder 398 (24.8%), renal disease

436 (27.2%), prostate 117(7.3%), pelvis 95 (5.9%), obstetric US (ultrasound) 27(1.7%), echocardiography 220 (13.7), and others 26 (1.7%) see Table 2.

Table 2: Ultrasound findings of GB stratified by reason for referral, from September 2004 to January 2006, GUH

Ultrasound finding of Gallbladder (GB)	Reason for referral for an ultrasound examination									Total
	GB & biliary tree	Liver disease	Gen. Abd.*	renal	Prostate	Pelvis	Obstetric	Echo Cardiography	Others	
Normal	84(68.6%)	150(92.6%)	381(95.7%)	414(95.2%)	116(99.1%)	93(96.3%)	26(96.3%)	220(100%)	26(100%)	1510
Cholelithiasis	28(23.1%)	8(4.9%)	12(3%)	17(3.9%)	0	2(2.1%)	1(3.7%)	0	0	68
Cholecystectomy	5(4.1%)	2(1.2%)	5(1.3%)	2(0.5%)	1(0.9%)	0	0	0	0	15
Acalculus	3(2.5%)	1(0.6%)	0	0	0	0	0	0	0	4
cholecystitis										
Gallbladder polyp	0	0	0	2	0	0	0	0	0	2
Gall Bladder Cancer	0	0	0	0	0	0	0	0	0	0
Others	2(1.7%)	1(0.6%)	0	0	0	0	0	0	0	3
Total	121	162	398	435	117	95	27	220	26	1602

* Gen.Abd. - General abdominal examination expect hepatobiliary

Cholelithiasis was the most prevalent in patients sent for GB and biliary (27.2%), liver (6.1%) and renal (4.4%) examinations. The prevalence of GSD in patients who came for obstetric and gynecologic examination was 2.5% (Table 2).

Of the total study population, 189 (11.8%) patients had one or more signs and symptoms of GSD while the rest 1407(88.2%) did not have. The prevalence of GB stone in symptomatic and asymptomatic patients was 18.7% and 2.4% respectively (OR=9.23, $p=0.00$). Of the 68 patients who were diagnosed to have GSD by ultrasound, 34 (50%) were asymptomatic (Table 3).

Table 3: Prevalence of cholelithiasis in patients with signs and symptoms of GB disease, September 2004-January 2006, GUH

Ultrasound finding of Gallbladder	Prevalence of sign-symptom of gallbladder Disease
Normal	143 / 1505 (9.5%)
Gallbladder stone	34/68(50 %)
Cholecystectomy	7/15 (46.7%)
Acalculous cholecystitis	3/4 (75%)
Gallbladder Polyp	0
Others	2 (1.1%)
Total	189/1596 (11.8%)

The overall prevalence of cholelithiasis including Cholecystectomy in patients above the age of 14 was 5.2% (6.8% in females and 3.6% in males). About 64.2 % of patients with GSD were female and the rest 35.8% were male with a female to male ratio of 2:1. (OR=1.96, $p<0.01$). The prevalence of cholelithiasis in urban patients was 6.1% and 4.2% in rural areas (OR=1.48, $P=0.0503$).

The prevalence of GSD in the age groups of 15-24, 25-34, 35-44, 45-54, 55-64 and 65-74 was 2.2%, 2.6%, 7.6%, 6.3%, 8.5% and 9.1%, respectively. There is a tendency for an increase in prevalence of GSD with the increasing age of patients (Table 1).

There were 15 patients for whom Cholecystectomy was done for cholelithiasis, 11 were females and the remaining 4 were males. The peak age group for Cholecystectomy was 35-44 years (40%). There was no patient with Cholecystectomy below the age of 34. About 99% of Cholecystectomy patients were between the ages of 35-64 years.

Intra and extra hepatic bile ducts were normal in 99.6% (1595), of patients. Common Bile Duct (CBD) stone was found in 5 patients (0.3%). In one patient CBD was obstructed by pancreatic head tumor and in one patient the cause of CBD obstruction was not identified. All patients with CBD stones have associated stone in the

GB and one of the five patients showed chronic cholecystitis (Table 4).

Table 4: Frequency of complication of cholelithiasis, September 2004-January 2006, GUH

Complication	Frequency	%
Cholelithiasis with no complication	53	77.9
Choledocholithiasis	5	7.4
Chronic cholecystitis	4	5.9
Acute cholecystitis	3	4.4
GB hydrops	2	2.9
Porcelain GB	1	1.5
Total	68	100%

Discussion

Gallstone disease is a world wide problem and it remains to be one of the commonest causes of surgical intervention. The prevalence varies from country to country and from place to place. The highest prevalence was observed in Western Europe and North America ranging from 10–21.9% (1, 2) and the lowest is seen in Asia and Africa (7-15).

Understanding the burden of the disease, in addition to contributing to the clinical and public health knowledge, helps appropriate planning of services in hospitals.

The overall prevalence of cholelithiasis in GUH patients above the age of 14 years was 5.2% with female to male ratio of 2:1, 6.8% for females and 3.6% for males, (OR=1.96, $p<0.01$). In this analysis, increasing prevalence of GSD with increasing age of the study population was observed. The lowest prevalence of 2.2% was demonstrated in the age group 15-24 and the highest in the age group 65-74 with a prevalence of 9.1%. The trend of age and sex distribution in this study is consistent with most other studies (8, 9, 16).

In the present study, the prevalence of cholelithiasis in the age group 35-64 was 7.3% (10.1% for females and 4.8% in males) which is similar to the finding among black women in the study in Soweto, South Africa (15). Our study also showed a comparable prevalence rate to that of the study in Sudan of 5.2% (13). An overall prevalence rate of 2.1 % in a group of antenatal women in Ibadan, Nigeria (12) also corresponds to this study if one considers the prevalence in patients who came for obstetric and gynecologic examination, which was 2.5%. The studies in Bangladesh and Taiwan also have found similar prevalence rate of about 5% (7-11). Hence, when the figure is compared with 10-20% in Europe and North America, the prevalence rate is lower in Africa.

In general, the prevalence of cholelithiasis in this study showed similar pattern with the limited number of

African and Asian studies, but lower than rates reported in Europeans and Americans. Such difference in prevalence could be attributed to lifestyle, dietary pattern and genetic factors, though this study is not designed to identify risk factors for GSD.

The prevalence of GB stone in symptomatic and asymptomatic patients was 18.7% and 2.4% respectively (OR=9.23, p=0.00). Of 68 patients with GSD, the ratio of symptomatic to asymptomatic cholelithiasis in the present study was 1:1(34/34), which was not steady with most studies demonstrating more than 70% of the cholelithiasis being asymptomatic. A higher proportion of symptomatic GSD in this study could be explained by the fact that it was based in a hospital setting.

The prevalence of GSD among patients clinically suspected to have cholelithiasis was 27.2%. This was similar to the findings from Slovak, in which 67% were asymptomatic and the prevalence of cholelithiasis in atypical and typical complaints was 17.6% and 75% respectively (21).

Of the 68 patients with cholelithiasis without Cholecystectomy, 22.1% had evidences of complication of cholelithiasis, 5(7.4%) had CBD stone, 3(4.4%) presents with acute cholecystitis, 4(5.9%) chronic cholecystitis, 2 GB hydrops, one patient with porcelain GB. The complication rate is higher than that of the study in Taiwan (8), with a rate of 2%, which again could be due to the hospital based nature of our study, and the proportion of symptomatic cholelithiasis being higher than most studies elsewhere (1,17).

Conclusion

The prevalence of cholelithiasis was found to be 5.2% in patients presenting for ultrasound examination in GUH suggesting that cholelithiasis is not an uncommon disease in our country. Hence due attention and appropriate examination is recommended for patients presenting with RUQ pain, dyspepsia and other signs and symptoms of GSD. The prevalence has similar pattern to some African and Asian studies but still much lower than those in Europe and America. The proportion of asymptomatic cholelithiasis was almost 50% of the cholelithiasis detected.

As the study is based in a hospital setting, the true prevalence in the general population could be lower than 5.2%. Hence, a community based interdisciplinary and multi centered study is recommended.

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