



**DEPARTMENT OF PUBLIC HEALTH
ST PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE**

**PATTERNS AND OUTCOMES OF PATIENTS WITH
SYMPTOMATIC CHOLELITHIASIS ADMITTED TO SPHMMC**

**A THESIS TO BE SUBMITTED TO THE DEPARTMENT OF PUBLIC
HEALTH, SPHMMC**

**IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE
DEGREE OF DOCTOR OF MEDICINE**

BY

BETHEL KIFLE (INTERN)

OCTOBER, 2017

SPHMMC



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ACRONYMS AND ABBREVIATIONS

BMI.....Body Mass Index

CI.....Confidence interval

FMOH.....Federal Ministry of Health

GD.....Gallstone Disease

HMIS.....Health Management Information System

LC.....laparoscopic cholecystectomy

NHANES III..... Third National Health and Nutrition Examination Survey

OR.....Odds Ratio

RVI.....Retroviral infection

SPHMMC.....Saint Paul's Hospital Millennium Medical College

USA.....United State of America

Summary

Introduction: gall stone disease is a worldwide problem and remains to be one of the most common health problems leading to surgical intervention. The previous researches done on this subject mainly focused on the prevalence and epidemiology of the disease, and there was a gap on our knowledge of the pattern and outcomes the patients with this disease. The relevance of the study is that it would show the magnitude of the disease and common postoperative complications in our setup.

Objective: to describe the pattern and outcomes of patients with symptomatic gallstone admitted to St. Paul's hospital millennium medical college.

Methods: The study area is surgical department of the St. Paul's hospital. The study was conducted in the time period between January 2017 and March 2017. The study population was patients admitted with the assessment of symptomatic cholelithiasis for which cholecystectomy was done. Institutional based descriptive cross-sectional study design based on record review was used; the sample size was 187, which was selected by systematic sampling method from admitted patients. The data was collected by using checklist from patient's charts and analyzed using SPSS version 20 software. The analysis method used is a descriptive cross sectional study method.

Results: of patients admitted to surgery ward, the proportion of patients with symptomatic cholelithiasis was 5.4%. Of these patients, 86% were females while males were 14% with the ratio of 6:1. In 57% of the patients, stones were the intraoperative finding and 11% of the patients developed postop complications, 8% of it was found to be wound infection while 1% was bile duct injury.

Conclusion: The magnitude of cholelithiasis was found to be 5.4% in patients admitted to surgery department. The proportion of gallstone disease is comparable to other developing countries and the results of this study can be used as a basis to do population based researches and health care workers need to work on surgical site infection prevention methods, policy makers need to increase public awareness of the disease and improve the quality of health care patients get. The next research question should be what is the magnitude of gallstone disease in the general population? What risk factors are common in this population?

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1. Introduction

1.1. Background

Gallstones occur commonly in the western world. Most are asymptomatic, but still, gallstone disease contributes substantially to health care costs, and its complications are sometimes life threatening. In the US, more than 700,000 cholecystectomies are performed each year. Gallstones constitute a significant health problem in developed societies affecting 10%-15% of the adult population, meaning 20-25 million Americans have gallstones. The resultant direct and indirect cost of gallbladder disease represent a consumption of \$6.2 billion annually in the U.S., constituting a major health burden that has increased more than 20% over the last 3 decades but the mortality rate for gallstone disease is relatively low at 0.6% (1, 2).

The prevalence differs not only between countries but also between ethnic groups. Age and gender also influence the prevalence of gallstone disease. Diseases of the gallbladder commonly manifest as gallstones. To identify risk factors in a given population, epidemiological studies must define the frequency of disease. Studies employing healthcare databases carry biases by requiring biliary symptoms or complications. Other potential measure of disease burden, the frequency of cholecystectomy, is a limited marker for the prevalence of gallstones, as the perceived threshold for surgery and patient access to care differ greatly. More reliable epidemiological studies now use transabdominal ultrasound to screen both symptomatic and asymptomatic populations. This study aims to include clinical symptoms and ultrasound evidences for the diagnosis (2).

Gallstones are common, but the majority will never experience biliary pain or complications such as acute cholecystitis, cholangitis, or pancreatitis. Hence, most gallstones are clinically “silent” an incidental finding often uncovered during abdominal ultrasound being performed for another reason. People with such asymptomatic gallstone, however, eventually may develop symptoms (biliary pain) that require treatment, but this risk is quite low averaging 2%-3% per year. Even lower proportions, 1%-2% per year, develop major gallstone complications (4).

Since most gallstones are asymptomatic, it is essential to define exactly which caused by gallstones, gallstone associated pain seems to follow a certain pattern in most patients. Some groups have attempted to establish criteria for biliary pain relative to defined characteristics (e.g.

episodic, steady, severe pain located in the upper abdomen and lasting more than 30 minutes) and some accompanying features (e.g. nocturnal onset, nausea and vomiting, pain radiating through the back), clarifying the symptoms better predict relief following cholecystectomy (3).

Important risk factors have been identified as being associated with gallstones. Multiple case-control studies, comparing those with gallstones versus those without, have shown that gallstone formation is multifactorial. Some features, such as ethnicity, genetics, advancing age and female gender cannot be modified, whereas others (e.g. diet, physical activity, rapid weight loss and obesity, total parenteral nutrition) are modifiable. The implications of changing environmental risk factors predict an increase in the numbers of individuals with gallstone (4).

Gall stone disease leads to a variety of complications including cholecystitis, choledocholithiasis, gallstone ileus, acute gall stone pancreatitis, biliary obstruction, gall stone empyema or perforation.

This study aims to determine the pattern and outcomes of patients undergoing cholecystectomy to St. Paul's hospital in surgery department.

1.2. Statement of the problem

Gallstones are formed in the biliary tract, mainly in the gallbladder. About 10-15% of gallstone patients have simultaneous gallbladder and common bile duct stones, whereas intrahepatic stones occur less frequently (6, 8).

There is a marked geographic variation in gallstone prevalence. In developed countries, more than 85% of gallstones are cholesterol stones. About 20 million people in the USA have gallstones. The third national health and nutrition examination survey (NHANES III) indicated a higher prevalence in Mexican-Americans than in non-Hispanic whites and a lower prevalence in non-Hispanic blacks. An extraordinarily high prevalence was found in American Indians (the Pima tribe). In Europe, ultrasound studies revealed a prevalence of 9-21% and an incidence of 0.63/100 persons/year. A trend for increasing gallstone prevalence has been identified in Europe and North America by necrotic and ultrasound studies (4).

This trend has also been demonstrated in Japan. Here, a higher gallstone prevalence (10%) than that previously described as well as an increased proportion of cholesterol stones has been

documented by the Japan gallstone study group. In south eastern Asia, the prevalence of gallstones (mostly brown pigment) is low. Gallstone prevalence rates are even lower in Africa (2, 4).

Mortality rates for GD (gallstone) decreased between 1979 and 2004 in the United States by 56% for gallstones as the underlying cause and by 71% for GD as the underlying or other cause. This was the greatest rate of decline for any common digestive disease in this time period. The trend is not the same with respect to morbidity rates. Although symptomatic and complicated stones represent only 20% of all gallstones, they lead to clinically relevant morbidity and complications as well as high costs of medical care. Complication rates are higher in older people and in some ethnic groups, and are also influenced by socioeconomic factors (5).

In the United States, GD is the second most common inpatient diagnosis, with 262,411 hospitalizations and in 2004; there were 1.8 million ambulatory care visits with GD diagnosis. Every year about 700,000 cholecystectomies are performed in US; in Germany 190,000 patients with GD undergo surgery. The health care costs of GD increased by 20% over the last three decades in US (8).

The GD prevalence is rising in the industrialized countries in Europe and America due to the changes in life style. A similar trend appears to be present in some developing countries. Apart from the aging of the population, key risk factors accounting for the increasing GD prevalence are environmental, like obesity, diabetes mellitus, metabolic syndrome, “western-type” diet, decreased physical activity.

In developing countries, there also exists a trend toward an increasing prevalence of the metabolic risk factors for GD. As long as the obesity and diabetes epidemics continue to spread around the world, an increase in gallstone prevalence rates is to be expected.

There are studies that showed the risk of developing can be reduced by maintaining an ideal body weight and by consuming a diet similar to diets recommended for preventing other diseases such as heart disease, diabetes, and hypertension. Certain nutritional supplements like supplementing with vitamin C and iron may also help prevent gallstones, but the evidence supporting that possibility is not strong. Overall, lifestyle changes, in particular reducing total caloric intake, prevent the disease but controlled studies are missing.

Further research on gallstones is needed because there is a knowledge gap on the risk factors and their implied outcome; also it's not known what specific preventive measures can be taken to prevent the rising incidence of the disease.

The result expected from this research is, it would identify the trend weather it is increasing and what factors are contributing for the rising incidence and to measure how effective is the surgery done for these patients and identify the common complications of the surgery. The findings will be used for creating public awareness on preventive measures and to improve the quality of care provided for these patients.

1.3. Significance of the study

The essence of this study is to determine the pattern and outcome of patients with symptomatic gallstone admitted to surgery department of SPHMMC, as there is a limited data on this subject, and to offer some suggestions on how to improve the prognosis of the patients and to reduce morbidity and mortality related to the surgery.

Gallstone disease is one of the most common public health problems. Approximately 10-20% of the national adult population in US currently carries gallstones, and gallstone prevalence is rising worldwide. In addition, nearly 750,000 cholecystectomies are performed annually in the United States, direct and indirect costs of gallbladder surgery are estimated to be \$ 6.5 billion. Cholelithiasis is also strongly associated with gallbladder, pancreatic and colorectal cancer occurrence. Moreover, it is estimated that almost 3,000 deaths (0.12% of all deaths) per year are attributed to complications of cholelithiasis (4, 5, and 7).

Although extensive research has tried to identify risk factors for gallstone disease, several studies indicate that definitive findings still remain elusive.

The study is needed to determine the pattern of the disease and what outcomes to expect from the cholecystectomies performed. This is beneficial in that it would indicate where knowledge gaps occur and try to fill them by identifying weather the pattern is increasing as the populations' lifestyle is changing and to give a due emphasis on the associated factors which will determine the outcomes of the patients.

This study can fill the knowledge gap as the regional prevalence of gallstone is not known. The outcome of the patients undergoing cholecystectomy also would determine the success rate of the surgeries performed and identify the mortality and morbidity rate following the surgeries.

This information can improve the public health by creating awareness of the risk factors for developing the gallstone disease as the common causes are related to lifestyle and also it is believed to have a role in decreasing the hospital cost, mortality and morbidity burden. This study expects to find the prevalence of gallstones and outcomes of the surgery and identify some correlations between the socio demographic factors, the method of surgery and outcomes.

The importance of the findings of this result will be beneficial for different parties. It can contribute by being an additional paper on gallstone disease as there is not much papers to review on this subject and for the practicing physicians it would help in identifying and screening the patients for some commonly related diseases like diabetes and also it anticipate the common complications related to the surgery.

The study also can give insight to the policy makers to work on ways to increase public awareness of the disease and to take preventive measures and improve the quality of health care patients get.

2. Literature review

2.1. Magnitude of gallstone disease

Gall stone disease is a worldwide disease and it remains to be one of the most common health problems leading to surgical intervention. But the incidence rate show substantial geographical variation, with the lowest rates reported in African population.

A study done in North America, found that worldwide gallstone disease is increasing. The highest prevalence of gallstone disease is noted in Native American Indians (Pima) in Arizona. An alarming frequency of 73% of Pima women having gallstones around the age of 30 was noted and 10%-15% of white adults of developed countries. In the last 50 years the prevalence of gallstone disease in Japan has doubled. Ethnic differences abound with a reduced frequency in black Americans and those from East Asia, while being rare in sub-Saharan Africa.

Every year about 700,000 cholecystectomies are performed in the United States of America (USA) (1). The prevalence of gall stone disease is 10% in adult population. Majority of patients (80%) with gall stone are asymptomatic. In the Western Europe the prevalence ranges from 5.1% to 21.9% with the highest prevalence seen in Norway, Sweden and Germany and the lowest in Italy (2).

In South America, the highest prevalence is found in Chili with incidence of 1.2/100 women per year (3). The lowest prevalence is found in Asian and African countries. The reported prevalence in Asia ranges from 4.35%-10.7% (4). In Africa, the prevalence of gallstone disease was reported from few countries. For instance, in group of antenatal women, the prevalence was 2.1% in Nigeria, 4% in Tunisia, 5.2% in Sudan, 10% in black south Africans(5).

Certain risk factors for gallstone are immutable: female gender, increasing age, ethnicity (genetic traits). Others are modifiable: obesity, metabolic syndrome, rapid weight loss, gallbladder stasis (from spinal cord injury or drugs like somatostatin), certain diseases like (cirrhosis and crohn's disease), and lifestyle. The only established dietary risk is a high caloric intake. Protective factors include diet containing fiber, vegetable, calcium, vitamin C plus physical activity.

It has been demonstrated that the prevalence of gall stone disease increases with age. In the USA 20% of those 40 years and older and 70% of those older than 70 years have biliary stone with the female to male ratio of 4:1.

2.2. Outcomes of patients with symptomatic cholelithiasis

A study of hospital admissions done in England between 1990-2000, found that age standardized hospital admission rates for gallstones has increased by 30% for males and by 64% for females. The admission rate has increased, while the frequency of operation has declined. In-hospital case fatality rate and in hospital mortality rate from gallstone also has declined. But the study couldn't determine the bases of these changes based on the collected data (3, 5).

Most patients will remain asymptomatic from their gallstones throughout life. For unknown reasons some patients' progress to a symptomatic stage, with biliary colic caused by a stone obstructing the cystic duct. Symptomatic gallstone disease may progress to complications related to the gallstones. These include acute cholecystitis, choledocholithiasis with or without cholangitis, gallstone pancreatitis, cholecystocholedochal fistula, cholecystoduodenal fistula, cholecystoenteric fistula leading to gallstone ileus, and gallbladder carcinoma. Rarely, complication of gallstones is the presenting picture.

Gallstones in patients without biliary symptoms are commonly diagnosed incidentally on ultrasonography, CT scans, abdominal radiography, or at laparotomy. Several studies have examined the likelihood of developing biliary colic or developing significant complications of gallstone disease. Approximately 3% of asymptomatic individuals become symptomatic per year (i.e., develop biliary colic). Once symptomatic, patients tend to have recurring bouts of biliary colic. Complicated gallstone disease develops in 3 to 5% of symptomatic patients per year. Over a 20-year period, about two thirds of asymptomatic patients with gallstones remain symptom free.

Since few patients develop complications without previous biliary symptoms, prophylactic cholecystectomy in asymptomatic persons with gallstones is rarely indicated. For elderly patients with diabetes, for individuals who will be isolated from medical care for extended periods of

time, and in populations with increased risk of gallbladder cancer, a prophylactic cholecystectomy may be advisable (3).

There are not many studies of gallbladder disease in Africa. A 5-year retrospective study done in 747 patients surgically treated for gallbladder disease in period of 1995-1999 in black lion hospital showed that the disease appears to be not uncommon in Ethiopia. The sex ratio (M: F) was 1:5, the mean age was 42years. About 80% patients were in the age group of 30-60years. The median duration of symptoms at admission was 2 years. Clinically 29.4% of patients were categorized obese. Gallstone detection rate by ultrasound was about 96%. Cholecystectomy was performed in 99% cases, most often through oblique sub costal route. The overall in-hospital mortality rate was 0.4%. Nearly 87% of cases had postoperative course without incident. The etiologic factors and the type of the gallstones were not different from that of the developed world. Cholecystectomy was found to be a safe and most effective procedure that provides ultimate cure for symptomatic gallstone disease (10).

3. Objectives of the study

3.1. General objective

To describe the patterns and outcomes of patients with symptomatic gallstone disease admitted to SPHMMC surgery department.

3.2. Specific objective

- To describe the patterns of admission of patient with symptomatic gallstone disease
- To assess the outcomes of patients after cholecystectomy

4. Method and materials

4.1. Study setting

St. Paul's Hospital was built in 1969 (was named St Paul General Specialized Hospital until 2008) by Emperor Haile Selassie in collaboration with the German Evangelical Church, as a source of medical care for underserved populations. It currently has 392 beds, with an annual average of 200,000 patients and a catchment population of more than 5 million. Approximately 75% of the patients receive medical care free of charge.

The College sees an average of 1,200 emergency and outpatient clients daily. The study setting will be SPHMMC's surgery department which has around 120 beds in three wards. Annually 3000-6000 patients are admitted to surgical ward.

4.2. Study period

The study period was from February 15 to March 2, 2017, while the study time is in September, 2017.

4.3. Study design

Institutional based retrospective descriptive cross sectional study design based on record review was conducted.

4.4. Source and Study population

Source population- All records of patients admitted to surgery department with the assessment of symptomatic cholelithiasis during the specific time period.

Study population- Patients who were admitted with the assessment of symptomatic cholelithiasis for whom cholecystectomy was done and those who fulfill inclusion and exclusion criteria were included in the study.

Inclusion Criteria

Any patient admitted with the assessment of symptomatic gallstone and undergone cholecystectomy and are registered on the log book during the study period was included in the study.

Exclusion Criteria

Those patients who have incomplete records and those patients admitted to the private wing were excluded from this study.

4.5. Sample size and sampling procedure

Sample size was determined by the following formula

Sample size = $Z^2 a / 2P (1-P) / d^2$, where $Z^2 a / 2$ is a precision to an acceptable approximation of the population and that is taken to be 95% ($Z^2 a / 2 = 1.96$).

P is the proportion of patients admitted with the assessment of symptomatic gallstone. A study done in Ethiopia (Gondar university) found that the prevalence of gallstone disease to be 12% (1)

D is the absolute precision and is taken as 0.05%

Hence the sample size required for this study for one year is

$= (1.96)^2 (0.12) (0.88) / (0.05)^2 = 162 + 15\% (1)$ to account for the lost or misplaced documents = 187 records

Total required sample size for one year retrospective study is 187.

Sampling technique

Systematic sampling procedure was used. All the patients records admitted on the specified time period was collected from the log book and first numbers were assigned to every patient admitted in the specified time interval and the total number of patients admitted was divided by the sample size. The n^{th} sampling digit was chosen.

The total number of patients admitted during this study period is 374. So, after selecting the first patient record randomly 374 is divided 187, every other patient record was included in the study. The first patient record is selected by lottery method.

4.6. Measurement

4.6.1. List of variables

Socio demographic characteristics

- age,
- sex,
- religion,
- marital status,
- educational status,
- residence

Associated variables

- drug intake,
- co morbid illnesses
- parity

Outcomes of the patients

- improved,
- developed complication,
- died

4.6.2. Instruments

The tool for data collection is by reviewing the patient's clinical records using checklist.

4.7. Data collection technique

In St. Paul's hospital, all patients admitted to the hospital are registered to Health Management Information System (HMIS) a log book prepared for this purpose. This log book contains the registration number, age, sex of patient, diagnosis on admission, number of stay in the hospital, the proposed surgical procedure, and condition of the patient on discharge. Data was collected from this log book and the patient cards.

The study units were selected by systematic sampling method out of the admitted patients. The data was collected by reviewing the study unit's charts.

The data was collected by creating a check list which included the demographic elements, common associated factors of the disease (diabetes, obesity), the hospital stay of the patients and outcome of the patients' whether they had a smooth postoperative course or developed complication and the common complications identified. Pilot study was conducted in 15 patient records and it was found that the data required for studying associated factors was incomplete or unavailable so it is taken out of the study.

After accessing the patients' cards the data was collected from the cards entirely by the investigator using the check list.

4.8. Data quality control

The data quality was assured by increasing regular reviews of the data. Crosschecking the entered data, checking the data for completeness, summary and entry was done.

4.9. Method for data processing and analysis

Before the data entry, the completeness of the data was checked and data was coded and entered into computer using SPSS version 20 software which was used for statistical analysis. Descriptive statistics was used to summarize the variables in the data set. Frequency distribution, percentages were calculated for selected variables.

4.10. Ethical considerations

Prior to the study official letter was obtained from Research Ethics Committee of SPHMMC, public health department.

Anonymity of records was maintained by using client's registration number and not mentioning the name of the patients.

4.11. Operational definition

Symptomatic cholelithiasis – A patient is having clinical manifestations (biliary colic) and evidence of gallstones on diagnostic imaging (ultrasound evidence) (4).

5. Plan for dissemination of findings

The findings of this study were submitted to the SPHMMC public health department.

6. Result

6.1. Socio-demographics characteristics

The total number of patient records included in this study was 187.

The patients were in the age range of 24-86 years with a mean age of 39.39 & SD of 14.767 years. Of this, 139(86%) were females and 23 (14%) were males, with a female to male ratio of 6:1.

Majority of the patients were married 121 (75%) and 66 (41%) of the patients had primary education, and those without education accounted for 50 (31%). Of the total study subjects, 113 (70%) of the patients come from urban area and the remaining 49 (30%) patients come from rural area.

Table 1- Socio demographic characters of patients admitted with gallstone to surgical department of SPMMC, 2015/2016(n=187)

<i>Characteristics</i>	<i>Response variables</i>	<i>Number (%)</i>
Age	25-34	27%
	35-44	30%
	45-54	21%
	55-64	11%
	65-74	10%
	85-96	1%
Sex	Female	139(89%)
	Male	23(14%)

Marital status	Married	121(75%)
	Single	29(18%)
	Living together	6(4%)
	Widowed	3(2%)
	Divorced	2(1%)
patient's education	Primary education	66(41%)
	No education	50(31%)
	Secondary education	31(19%)
	>secondary education	15(9%)
Residence	Urban	113(70%)
	Rural	49(30%)

Of the 139(86%) female patient's, 72(83.7%) were found to be parous, 14(16.3%) were nulliparous.

It was found that, 84 (52 %) of the patients don't have history of drug intake, while 32 (20%) had taken contraceptive drugs while 45 (28%) had taken other types of medications for different purpose.

In 113 (70%) of the patients no comorbid illnesses were detected, but 23 (16%) had hypertension, 11 (7%) had diabetes mellitus, 8 (5%) of them had retroviral infection.

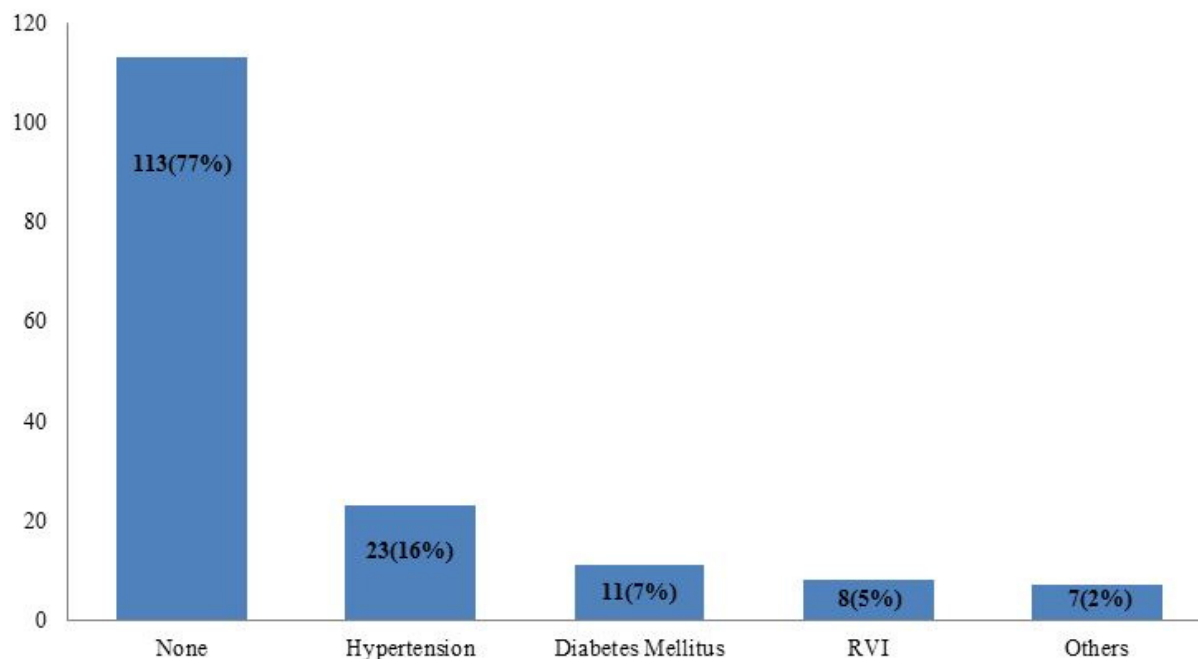


Figure 1- Proportions of comorbid illness of patients admitted with gallstone surgical department of SPMMC, 2015/2016 (n=187)

The median duration of symptom is 1 year; the range is from 1-5 years while the mean is 1.7 with a standard deviation of 1.072.

Gallstones were detected by ultrasound for the complaint of right upper quadrant pain was 152 (94%), and gallstone was detected incidentally in 10 (6%) of patients. 131 (81%) of the patients have undergone open surgery while, 31 (19%) have undergone laparoscopic surgeries. The type of incision was right subcostal in 131 (81%), right transverse in 31 (19%) of the patients.

6.2. Outcomes of patients undergoing cholecystectomy

The intraoperative findings were 92 (57%) of them had symptomatic stones, 26 (16%) had both stones and adhesions, 23 (14%) had stone and hydrops of gallbladder, 16 (10%) had hydrops of gall bladder, 5 (3%) had adhesions.

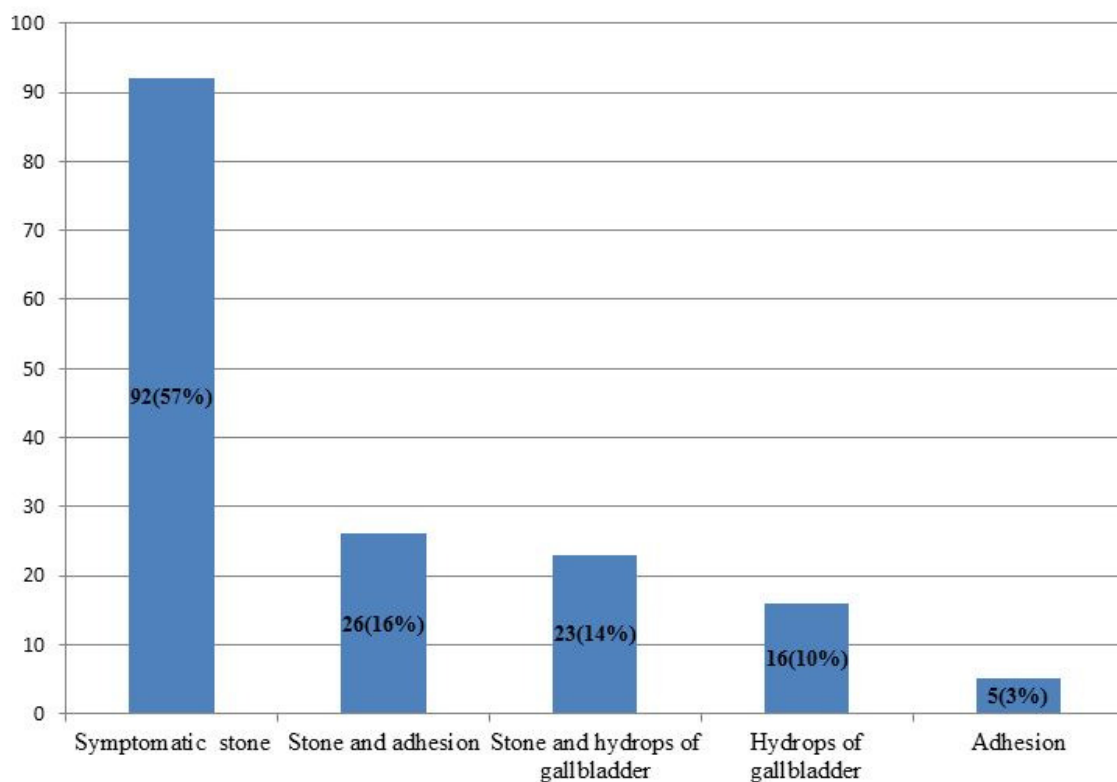


Figure 2- Intraoperative findings of patients admitted with gallstone surgical department of SPMMC, 2015/2016 (n=187)

Of the patients undergoing cholecystectomy, 144 (89%) didn't develop any complication, while 18 (11%) had developed complications, which were, 13 (8%) developed wound infection, 2 (1%) had incisional hernia, 2 (1%) had bile duct injury.

Table 2, identified complications of cholecystectomy in patients admitted with gallstone surgical department of SPMMC, 2015/2016 (n=187)

Complications	Frequency	Percentage
None	144	89%
Wound infection	13	8%
Incisional hernia	2	1%
Bile duct injury	2	1%

7. Discussion

Gallstone disease is a worldwide 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% and the lowest is seen in Asia and Africa (1).

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 magnitude of cholelithiasis in the studied patients was 5.4% with female to male ratio of 6:1, which is found to be comparable to the study done in black lion hospital which found the female to male ratio to be 5:1. In this analysis, the highest prevalence was in the age group 35-44 with a prevalence of 30%, and 73% of the patients were found to be above the age of 35, this is also comparable to the 80% of patients being above age 35 in the black lion study. The trend of rise with increasing with age and female preponderance in this study is consistent with most other studies (1, 3, and 5).

This study also showed a comparable proportion to that of the study in Sudan of 5.2% (13). 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 magnitude 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 magnitude could be attributed to lifestyle, dietary pattern and genetic factors, though this study was not able to identify risk factors for GSD because of limitations on data availability.

The median duration of symptoms in this study was 1 year while it was found to be two years in other local studies.

The proportion of GSD among patients clinically suspected to have cholelithiasis was 94%, while incidental finding accounted for 6%, in the black lion study gallstone detection rate by ultrasound was about 96% which is comparable to this study. Cholecystectomy was performed

in 99% cases, most often through oblique sub costal route (81%). The magnitude of GSD among patients clinically suspected to have cholelithiasis was 27.2% in the research done in Gondar University. 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 (1).

Of the 162 patients undergoing cholecystectomy, 89% of the cases has smooth postop course, which is found to be comparable to the black lion study which found nearly 87% of cases to have postoperative course without incident. The etiologic factors and the type of the gallstones were not different from that of the developed world. 18 (11%) had evidences of complication of cholelithiasis, 13 (8%) developed wound infection, 2 (1%) had incisional hernia, 2 (1%) had bile duct injury. The complication rate is higher than that of the study in Taiwan, with a rate of 2% , which again could be due to the hospital based nature of this study, and the proportion of symptomatic cholelithiasis being higher than most studies elsewhere (1,8).

This study showed that cholecystectomy to be a safe and most effective procedure that provides ultimate cure for symptomatic gallstone disease.

The strength of the study is, it generates some hypothesis like: does gallstone increase with increasing age? What is the correlation between female gender and gallstones? Further researches can be done by taking this research as a baseline study.

The limitation of the study is small sample size.

8. Conclusion

The magnitude of cholelithiasis was found to be 5.4% in patients admitted with symptomatic cholelithiasis which shows that it is not an uncommon disease in our country. Hence due attention and appropriate examination is recommended for patients presenting with right upper quadrant pain, dyspepsia and other signs and symptoms of GSD. The magnitude of gallstones was positively related to age and female gender. As the study is based in a hospital setting, the true prevalence in the general population could be lower than 5.4%.

The implication of this study's finding is the proportion of gallstone disease is comparable to other developing countries and the results of this study can be used as a basis to do population based researches and health care workers need to work on surgical site infection prevention methods, policy makers need to increase public awareness of the disease and improve the quality of health care patients get. The next research question should be what is the magnitude of gallstone disease in the general population? What risk factors are common in this population?

9. Recommendation

- ✓ For researchers to do a community based study on risk factors of gallstone disease; Community based studies better to identify common risk factors associated with gallstone disease.
- ✓ For the hospital to digitalize the patient data by computerizing patient records; during this study it was observed that the data collection would have been easier if patient records were computerized.
- ✓ For surgeons to work on prevention of surgical site infections; this study found 11% complication rate of this 8% accounted for wound infection this implies that surgeons should work more on surgical site infection prevention methods.

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Annex

Annex 1. Dummy tables

Serial no.	Variable	Response	NO %	P value	OR	95% CI for OR
1	Age					
2	Sex	Male Female				
3	Religion	Orthodox Muslim Protestant Others				
5	Marital status	Single Married Divorced Widowed				
6	Educational status	Illiterate Read and write Elementary school Secondary school Higher education				
7	Ethnicity	Amhara Oromo Tigre Gurage Other				
8	Residence	Urban Rural				
9	Obesity	BMI >18 BMI >24 BMI > 30				
10	Parity	Nulliparous Parous				
11	Drug intake	Contraceptives Antibiotics Others				
12	Family history	First degree relatives Second degree relatives Others				

13	Co morbidity	Diabetes mellitus Hypertension Liver disease Others				
14	Type of surgery	Laparoscopic cholecystectomy Open cholecystectomy				
15	Condition after surgery	Improved Complicated Died				
16	Complications	Cholecystitis Bile duct injury Wound infection Incisional hernia Others				

Annex 2 Assurance of the principal investigator

I the undersigned agree to accept all responsibilities for the scientific and ethical conduct of the research project. I will provide timely progress report to my advisors and seek the necessary advice and approval from them in the course of the research.

Name of the investigator: Bethel Kifle

Signature: _____

Date: _____

Approval of the clinical advisor

Name of the clinical advisor: Dr Engida Abebe

Signature: _____

Date: _____

Approval of the public health advisor

Name of the public health advisor: Dr Samrawit Solomon

Signature: _____

Date: _____