

**Prospective Observational Study Assessing Factors Associated with the Gall Stones at Tertiary Health Care Center****Kundan Kumar<sup>1</sup>, Rahul Singh<sup>2</sup>, Manish<sup>3</sup>**<sup>1</sup>Senior Resident, Department of General Surgery, Narayan Medical College and Hospital, Sasaram, Bihar, India<sup>2</sup>Senior Resident, Department of General Surgery, Narayan Medical College and Hospital, Sasaram, Bihar, India<sup>3</sup>Professor, Department of General Surgery, Narayan Medical College and Hospital, Sasaram, Bihar, India

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Conflict of interest: Nil

**Abstract****Aim:** The aim of the present study was to assess the factors associated with the Gall stones at tertiary health care center in Bihar region.**Methods:** The present study was a hospital based, prospective, observational study, conducted in Department of General Surgery. Study duration was of 12 months. During study period, 200 cases were studied with confirmed diagnosis of gallstones.**Results:** During study period, 200 cases were studied with confirmed diagnosis of gallstones. Majority of patients were from age group 51-60 years (32%) followed by age group 41-50 years (24%). Females (63%) outnumbered males (37%). Diabetes mellitus (36%), gastro-esophageal reflux disease (34%), hypertension (26%), ischemic heart disease (20%) and renal calculus (10%) were common comorbidities noted among patients with gall stone disease. Common clinical symptoms noted among patients with gall stone disease were right hypochondrial pain (75%), nausea (50%), epigastric pain (46%), vomiting (34%) and jaundice (10%). USG findings in majority of patients multiple stones (45%), other findings were two to three stones (20%), biliary sludge (19%), single stone (12%), choledocholithiasis (3%) and carcinoma gall bladder (1%). Sedentary lifestyle (68%), female gender (63%), obesity (BMI > 25 kg/m<sup>2</sup>) (58%), age > 50 years (40%), family history (38%) was common risk factors noted in patients with gall stone disease. Less common risk factors were parity ≥ 3 (30%), h/o rapid weight loss due to fasting, illness (28%), alcohol drinking (22%), smoking (20%) and drugs like ceftriaxone, octreotide and thiazide diuretics (5%).**Conclusion:** Gallstone disease is one of the most common disorders among patients presenting to emergency rooms with abdominal discomfort. Sedentary lifestyle, female gender, obesity (BMI > 25 kg/m<sup>2</sup>), age > 50 years, family history was common risk factors noted in patients with gall stone disease.**Keywords:** Gallbladder Stones, Sedentary Lifestyle, Female Gender, Obesity.

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**Introduction**

Gallstone is the most common biliary pathology with a global incidence of 3-21.9%. [1] In Asia, it is 4-15%. [2,3] Most of the patients with gallstone are asymptomatic and are diagnosed incidentally. Symptomatic patients classically present with biliary colic, usually accompanied by nausea, vomiting and diaphoresis. [4] Laparoscopic cholecystectomy is the gold standard treatment. However, about 5.2% of cases convert to open cholecystectomy for better outcomes due to various reasons. [5] Once considered a disease of the western world, the incidence of gallstone in Asia is considerable and rising. [5-7]

Biliary lithiasis has been a common disease all over the world. Gallstones are among the most common gastrointestinal conditions presenting with acute abdomen pain and requiring hospitalization in otherwise healthy people. More than half of the cases are asymptomatic, usually detected during an abdominal ultrasound. [8] Although most patients remain asymptomatic from their gallstones, some patients develop symptoms, the 'biliary colic' being caused by a stone obstructing the cystic duct. Most of the studies done to identify the risk factors for biliary stones have zoomed in on the hyper saturation of cholesterol in bile in the nucleation process. [9] However, gall bladder stone

composition is supposedly heterogeneous, and has been found to differ within and without populations. [10,11]

Diseases of the gallbladder are common and costly. Gallstone disease is a chronic recurrent hepatobiliary disease, the basis for which is the impaired metabolism of cholesterol, bilirubin and bile acids, which is characterized by the formation of gallstones in the hepatic bile duct, common bile duct, or gallbladder. [12] Gallstone disease remains one of the major causes of abdominal morbidity and mortality through the world. [13] Nowadays, gallbladder disease is a frequent problem in developed countries including India, representing a major health problem.<sup>3</sup> Gallstone disease and cardiovascular disease, common diseases worldwide, are strongly associated and have considerable economical impact. [14] Intermediate prevalence rates occur in Asian populations (5-20%) and Black Americans (13.9% of women and 13.9% of men). Prevalence of cholelithiasis in India is more in females than males. [15,16] The treatment options for gallstone disease varies from bile salts dissolution, laser fragmentation, extracorporeal shock wave lithotripsy, endoscopic extraction and classical surgery. Bile acid therapy is only effective in some cholesterol gallstones and ineffective in treating calcium bilirubinate or calcium carbonate/phosphate stones. It is therefore ideal that the composition of the stones be determined to select the treatment of choice.

The aim of the present study was to assess the factors associated with the Gall stones at tertiary health care center in Bihar region.

### Materials and Methods

The present study was a hospital based, prospective, observational study, conducted in Department of General Surgery, Narayan Medical College and Hospital, Sasaram, Bihar, India Study duration was of 12 months. During study period, 200 cases were studied with confirmed diagnosis of gallstones.

**Inclusion criteria:** All patients attending the outpatient department or emergency department, with confirmed diagnosis of gall stone disease, willing to participate in present

**Exclusion Criteria:** Patients underwent cholecystectomy. Patients who did not give consent for participation

Study was explained to patients and written informed consent. Data was collected from all the participants including demographic characteristics like age, gender, literacy, occupation, religion, complaints at present. Lifestyle variables and dietary pattern (vegetarian/non- vegetarian) were also recorded. Medical history of diabetes, coronary artery disease (CAD), cholecystitis was noted. In female patients menstrual and obstetric history was noted.

Body mass index (BMI) was calculated by dividing weight (kg) by square of height (m<sup>2</sup>). On clinical examination, significant findings were noted. The diagnosis of gall stone disease was confirmed by ultrasonography, number of gallstones (single/multiple) and other USG findings were noted. Patients underwent CBC, urine analysis, LFT, RFT, fasting BSL and fasting lipid profile. Data was collected in Microsoft excel sheet. Statistical analysis was done using descriptive statistics.

### Result

**Table 1: General Characteristics**

Age in years	N%
≤ 20	4 (2)
21-30	20 (10)
31-40	44 (22)
41-50	48 (24)
51-60	64 (32)
≥ 61	20 (10)
<b>Gender</b>	
Male	74 (37)
Female	126 (63)

During study period, 200 cases were studied with confirmed diagnosis of gallstones. Majority of patients were from age group 51-60 years (32%) followed by age group 41-50 years (24%). Females (63%) outnumbered males (37%).

**Table 2: Co-morbidities**

Co-morbidities	N%
Diabetes mellitus	72 (36)
Gastro-esophageal reflux disease	68 (34)
Hypertension	52 (26)
Ischemic heart disease	40 (20)
Renal calculus	20 (10)

Diabetes mellitus (36%), gastro-esophageal reflux disease (34%), hypertension (26%), ischemic heart disease (20%) and renal calculus (10%) were common comorbidities noted among patients with gall stone disease.

**Table 3: Clinical symptoms**

Clinical symptoms	N%
Right hypochondrial pain	150 (75)
Nausea	100 (50)
Epigastric pain	82 (46)
Vomiting	68 (34)
Jaundice	20 (10)

Common clinical symptoms noted among patients with gall stone disease were right hypochondrial pain (75%), nausea (50%), epigastric pain (46%), vomiting (34%) and jaundice (10%).

**Table 4: USG findings**

USG findings	N%
Multiple stones	90 (45)
Two to three stones	40 (20)
Biliary sludge	38 (19)
Single stone	24 (12)
Cholelithiasis	6 (3)
Carcinoma gall bladder	2 (1)

USG findings in majority of patients multiple stones (45%), other findings were two to three stones (20%), biliary sludge (19%), single stone (12%), cholelithiasis (3%) and carcinoma gall bladder (1%).

**Table 5: Risk Factors**

Risk factors	N%
Sedentary lifestyle	136 (68)
Female gender	126 (63)
Obesity (BMI > 25 kg/m <sup>2</sup> )	116 (58)
Age > 50 years	80 (40)
Family history	76 (38)
Parity ≥ 3	60 (30)
H/o Rapid weight loss due to Fasting, illness	56 (28)
Alcohol drinking	44 (22)
Smoking	40 (20)
Drugs like ceftriaxone, octreotide and thiazide diuretics	10 (5)

Sedentary lifestyle (68%), female gender (63%), obesity (BMI > 25 kg/m<sup>2</sup>) (58%), age > 50 years (40%), family history (38%) was common risk factors noted in patients with gall stone disease. Less common risk factors were parity ≥ 3 (30%), h/o rapid weight loss due to fasting, illness (28%), alcohol drinking (22%), smoking (20%) and drugs like ceftriaxone, octreotide and thiazide diuretics (5%).

### Discussion

Gallstone disease is a chronic recurrent hepatobiliary disease, the basis for which is the impaired metabolism of cholesterol, bilirubin and bile acids, which is characterized by the formation of gallstones in the hepatic bile duct, common bile duct, or gallbladder. [17] Risk factors for GB disease can be categorized into two, namely, immutable factors, such as ethnicity, advanced age, female sex, and pregnancy, and modifiable factors. Age, obesity, weight loss, multiparity, hyperlipidemia, diabetes mellitus, a high calorie diet, and the drugs used will reduce storage

function and normal motility, causing the formation of cholesterol stones. [18] High low-density lipoprotein (LDL), low high-density lipoprotein (HDL), and high triglyceride levels are positively correlated with gallstone formation. [19,20] Incidence of gall stone disease is on a rise globally due to the vast changes in the dietary habits, life style changes associated with high junk diet consumption and increased sedentary life style. [21]

During study period, 200 cases were studied with confirmed diagnosis of gallstones. Majority of patients were from age group 51-60 years (32%) followed by age group 41-50 years (24%). Females (63%) outnumbered males (37%). In study by Veerabhadrapa PS et al [22] majority (26.6%) of cases was in the age group of 51-60 years followed by 21.6% cases in the age group of 41-50 years. Sex wise 63.3% were females. Most (71.7%) patients presented with the complaints of pain in the region of hypochondrial region followed by nausea in 46.6%. Jaundice was the least common presenting feature shown by 6.6% patients. Risk

factors commonly associated with cholelithiasis are increasing age, female gender, family history or genetics, obesity, rapid weight loss, sedentary lifestyle, pregnancy, drugs like ceftriaxone, octreotide and thiazide diuretics, total parenteral nutrition or fasting, diseases like cirrhosis, chronic hemolysis and ileal Crohn's disease. [23] The stones form due to imbalance or change in the composition of bile. The first factor that predisposes to stone formation is how often and how well the gallbladder contracts; incomplete and infrequent emptying of the gallbladder may cause the bile to become over-concentrated and contribute to gallstone formation. The second important factor is the presence of proteins in the liver and bile that either promote or inhibit cholesterol crystallization into gallstones. Increased levels of the hormone estrogen as a result of pregnancy, hormone therapy, or the use of birth control pills, may increase cholesterol levels in bile and also decrease gallbladder movement, resulting in gallstone formation. Other factors are parity, smoking, alcohol, diabetes and overweight. [24]

Diabetes mellitus (36%), gastro-esophageal reflux disease (34%), hypertension (26%), ischemic heart disease (20%) and renal calculus (10%) were common comorbidities noted among patients with gall stone disease. Common clinical symptoms noted among patients with gall stone disease were right hypochondrial pain (75%), nausea (50%), epigastric pain (46%), vomiting (34%) and jaundice (10%). USG findings in majority of patients multiple stones (45%), other findings were two to three stones (20%), biliary sludge (19%), single stone (12%), choledocholithiasis (3%) and carcinoma gall bladder (1%). Sedentary lifestyle (68%), female gender (63%), obesity (BMI > 25 kg/m<sup>2</sup>) (58%), age > 50 years (40%), family history (38%) was common risk factors noted in patients with gall stone disease. Less common risk factors were parity  $\geq 3$  (30%), h/o rapid weight loss due to fasting, illness (28%), alcohol drinking (22%), smoking (20%) and drugs like ceftriaxone, octreotide and thiazide diuretics (5%). Numerous studies that have assessed the role of diet as a potential risk factor for gallstone formation, including energy intake, cholesterol, fatty acids, fiber, carbohydrates, vitamins and minerals, and alcohol intake. Recent discoveries of the role of orphan nuclear receptors in the regulation of fatty acid and hepatic cholesterol metabolism and excretion open new perspectives for a better understanding of the role of dietary constituents on cholesterol gallstone formation. [25] In a study by Mathur et al, the number of stones varied from a single calculus in 39.6% cases, double in 8.8% and multiple in the remaining majority: 51.6%: cases. [26] 62% of the patients had stones composed of cholesterol, bilirubin, calcium carbonate and calcium oxalate. Mixed stones formed the majority

which is similar to most of the other studies. In the study by Tyagi et al, gall stones were of mixed variety in as high as 78.2% of the cases. [27] In the study by Mathur et al, mixed gall stones were found in 60.4%. [26]

The treatment options for gallstone disease varies from bile salts dissolution, laser fragmentation, extracorporeal shock wave lithotripsy, endoscopic extraction and classical surgery. Bile acid therapy is only effective in some cholesterol gallstones and ineffective in treating calcium bilirubinate or calcium carbonate/phosphate stones. It is therefore ideal that the composition of the stones be determined to select the treatment of choice.

### Conclusion

Gallstone disease is one of the most common disorders among patients presenting to emergency rooms with abdominal discomfort. Sedentary lifestyle, female gender, obesity (BMI > 25 kg/m<sup>2</sup>), age > 50 years, family history was common risk factors noted in patients with gall stone disease.

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