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Original Article

Clinical Profile of Patients with Gallstone Disease at a Tertiary Care Hospital

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Abstract

Background: Background: Gallstone disease is a prevalent hepatobiliary condition linked to metabolic and lifestyle-related risk factors, exhibiting varied clinical manifestations and complications that lead to a substantial healthcare burden. The objective of this study was to assess the demographic traits, clinical symptoms, imaging results, laboratory irregularities, and related factors in patients suffering from gallstone disease.

Methods: An observational study based in a tertiary care hospital Dhaka, between May and December 2025, involving 110 adult patients diagnosed with gallstone disease via ultrasound. Demographic features, clinical manifestations, comorbid conditions, laboratory results, imaging observations, treatment methods, and short-term results were gathered through a structured proforma and analyzed with SPSS version 26.0. Ethical consent and informed approval were secured before participation.

Results: In a study of 110 patients, gallstone disease was primarily observed among middle-aged women (67.3%), with obesity and metabolic conditions frequently present. Common clinical findings included RUQ pain (90.0%), tenderness (78.2%), and elevated ALT (40.9%). Ultrasonography revealed multiple gallstones in 63.6% of cases, with laparoscopic cholecystectomy being the main treatment modality (82.7%) and demonstrating favorable short-term outcomes. Stones larger than 20 mm showed a significant correlation with acute cholecystitis (p=0.009), indicating a higher risk of inflammatory complications

Conclusion: Gallstone disease typically impacted middle-aged women with metabolic risk factors. RUQ pain was the main symptom, ultrasonography assisted in diagnosis, and laparoscopic cholecystectomy resulted in positive outcomes. Bigger stones were linked to an increased risk of acute cholecystitis.

Keywords: Gall Stone Disease, right upper quadrant tenderness, Laparoscopic cholecystectomy, Acute cholecystitis

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Introduction

Gallstone disease (GSD) is a prevalent hepatobiliary condition resulting from the development of stones in the gallbladder or biliary tract due to changes in bile composition and dysfunction of the gallbladder. It varies from asymptomatic stones to issues like biliary colic, cholecystitis, choledocholithiasis, and pancreatitis, resulting in a considerable healthcare burden globally [1,2]. This

disease impacts about 6.1% of the worldwide population, being more common in females, older individuals, and those with metabolic risk factors. Its load is rising in developing nations because of urban growth, shifts in diet, obesity, and metabolic diseases [3].

The development of gallstones is a complex process that includes genetic, metabolic, and environmental influences. Key mechanisms include cholesterol supersaturation, crystal formation, and impaired gallbladder function. Key risk factors include obesity, diabetes, dyslipidemia, metabolic syndrome, female gender, age, pregnancy, and swift weight loss [4,5]. It exhibits a diverse clinical presentation, which can vary from asymptomatic incidental discoveries to symptomatic biliary colic characterized by right upper quadrant discomfort, nausea, vomiting, and dyspeptic symptoms. Chronic obstruction of the cystic duct can result in acute calculous cholecystitis, which is marked by extended pain, fever, vomiting, and a positive Murphy's sign. Proper diagnosis necessitates combining clinical characteristics, inflammatory indicators, and imaging results [6,7]. Laboratory tests and ultrasound are crucial for diagnosing gallstone disorders and detecting biliary complications. Symptomatic gallstones are primarily treated through laparoscopic cholecystectomy, whereas ERCP followed by surgery is the favored method for stones in the common bile duct [8,9].

A comprehensive review and meta-analysis indicated that gallstone disease impacts a significant portion of the worldwide population, with greater prevalence noted in women, older age groups, and individuals with metabolic risk factors, while geographic differences were shaped by genetic, dietary, and lifestyle influences. A different meta-analysis assessing imaging techniques for acute cholecystitis revealed that ultrasonography serves as an effective initial diagnostic tool, offering strong diagnostic accuracy and endorsing its regular application in clinical settings [3,8]. Research in Bangladesh and Asian populations has highlighted a rising prevalence of gallstone disease in younger individuals, with obesity, dietary practices, female gender, and metabolic factors recognized as significant risk contributors. Data from multiple centers in Bangladesh highlighted the importance of lifestyle and metabolic factors in the development of gallstones [10,11].

There is a shortage of data in Bangladesh concerning the clinical features and trends of gallstone disease. This research seeks to assess the demographic traits, clinical aspects, and related findings in patients with gallstone disease to enhance comprehension and treatment of the condition.

Methodology

A hospital-based observational study was carried out in a tertiary care hospital, Dhaka, Bangladesh, between May and December 2025. During the study period, adult patients diagnosed with gallstone disease were prospectively enrolled to describe their clinical characteristics, laboratory abnormalities, imaging findings, and treatment outcomes.

Patients aged 18 years or above with ultrasonographic evidence of gallstones were considered eligible for participation. Individuals with isolated common bile duct stones, biliary tract malignancy, congenital biliary anomalies, previous cholecystectomy, or incomplete diagnostic information were excluded. Using a consecutive sampling technique, 110 patients fulfilling the selection criteria were recruited.

Clinical information was obtained through patient interviews, physical examination, and review of hospital records using a structured case record form. Data collected included demographic characteristics, presenting complaints, associated comorbidities, and relevant physical findings. Laboratory evaluation comprised complete blood count and liver function tests, while ultrasonography was performed in all patients to document the number and size of gallstones, gallbladder wall thickness, common bile duct diameter, pericholecystic fluid, and other associated biliary abnormalities. The choice of treatment, including conservative management, laparoscopic cholecystectomy, or open cholecystectomy, was determined by the treating surgical team according to the patient's clinical condition and institutional practice guidelines. Patients were monitored throughout their hospital stay, and any postoperative complications and discharge outcomes were recorded.

Data analysis was performed using IBM SPSS Statistics version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables were summarized as mean ± standard deviation (SD) or median with interquartile range (IQR) where appropriate, whereas categorical variables were expressed as frequencies and percentages. Associations between categorical variables were evaluated using the Chi-square test or Fisher's exact test, and a p-value <0.05 was considered statistically significant.

Prior to data collection, ethical approval was obtained from the Institutional Review Board/Ethical Review Committee of Bangladesh Medical University (BMU). Written informed consent was obtained from all participants, and strict confidentiality of patient information was maintained throughout the study.

Results

Table 1 shows a total of 110 patients with ultrasonographically confirmed gallstone disease were enrolled during the six-month study period. The mean age of the study participants was 47.8 ± 13.6 years (range: 19–78 years). The highest proportion of patients (34.5%) belonged to

the 41–50 years age group, followed by 31–40 years (24.5%) and 51–60 years (20.0%). Females constituted 67.3% of the study population, with a female-to-male ratio of approximately 2.1:1. More than half of the participants (60.0%) were from urban areas. Obesity was present in 29.1% of patients, while hypertension (30.9%) and diabetes mellitus (24.5%) were the most common comorbid conditions.

Table 1. Sociodemographic Characteristics and Comorbidities of the Patients (N = 110)

Variable	Frequency (n)	Percentage (%)
Age group (years)		
18 – 30	14	12.7
31 – 40	27	24.5
41 – 50	38	34.5
51 – 60	22	20.0
>60	9	8.2
Mean ± SD	47.8 ± 13.6	-
Range	19 – 78	-
Sex		
Male	36	32.7
Female	74	67.3
Residence		
Urban	66	60.0
Rural	44	40.0
BMI		
Normal	41	37.3
Overweight	37	33.6
Obese	32	29.1
Comorbidities *		
Hypertension	34	30.9
Diabetes mellitus	27	24.5
Dyslipidemia	19	17.3
Previous biliary colic	29	26.4

*Multiple responses were allowed; therefore, percentages do not total 100%.

Figure I show the presenting clinical symptoms. Right upper quadrant abdominal pain was the most common presenting complaint, occurring in 99 (90.0%) patients, followed by nausea or vomiting (55.5%), dyspepsia (50.9%), fever (26.4%), jaundice (19.1%), and abdominal bloating (16.4%).

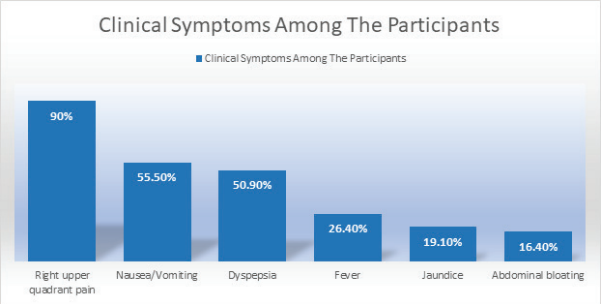


Figure I: Distribution of Presenting Clinical Symptoms Among Patients with Gallstone Disease (N = 110)

Figure legend: Distribution of presenting clinical symptoms among patients with gallstone disease (N = 110). Right upper quadrant abdominal pain was the most common presenting symptom. Multiple responses were allowed; therefore, percentages do not total 100%.

Table 2 shows the physical examination findings and laboratory profile of the patients. Right upper quadrant tenderness was observed in 78.2% of patients, while Murphy's sign was positive in 40.9%. Icterus was present in 18.2% of patients. Among laboratory abnormalities, elevated alanine aminotransferase (ALT) was found in 40.9%, elevated alkaline phosphatase (ALP) in 35.5%, elevated total bilirubin in 21.8%, and leukocytosis in 30.9% of the patients.

Table 2. Physical Examination Findings and Laboratory Profile (N = 110)

Variable	Frequency (n)	Percentage (%)
Physical examination *		
Right upper quadrant tenderness	86	78.2
Positive Murphy's sign	45	40.9
Icterus	20	18.2
Palpable gallbladder	7	6.4
Laboratory abnormalities *		
Leukocytosis	34	30.9
Elevated ALT	45	40.9
Elevated AST	38	34.5
Elevated ALP	39	35.5
Elevated total bilirubin	24	21.8

*Multiple responses were allowed; therefore, percentages do not total 100%.

Table 3 shows the ultrasonographic characteristics of gallstone disease. Multiple gallstones were identified in 70 (63.6%) patients, whereas 40 (36.4%) had a single gallstone. The majority of gallstones measured 10–20 mm (44.5%), followed by <10 mm (30.0%) and >20 mm (25.5%). Gallbladder wall thickening (>3 mm), suggestive of inflammation, was observed in 35 (31.8%) patients. Pericholecystic fluid was detected in 10 (9.1%), while common bile duct dilatation was noted in 14 (12.7%) patients.

Table 3. Ultrasonographic Findings of the Patients (N = 110)

Variable	Frequency (n)	Percentage (%)
Number of gallstones		
Single	40	36.4
Multiple	70	63.6
Largest stone size		
<10 mm	33	30.0
10 – 20 mm	49	44.5
>20 mm	28	25.5
Gallbladder wall thickening (>3mm)	35	31.8
Pericholecystic fluid	10	9.1
Common bile duct dilatation	14	12.7

Table 4 shows the treatment modalities and short-term hospital outcomes. Laparoscopic cholecystectomy was performed in 91 (82.7%) patients, while 13 (11.8%) underwent open cholecystectomy. Conservative management was adopted in 6 (5.5%) patients because of high surgical risk or patient preference. Among surgically treated patients, postoperative wound infection occurred in 5 (4.8%), bile leakage in 2 (1.9%), and postoperative bleeding in 1 (1.0%) patient. The median duration of hospital stay was 3 days (IQR: 2–5 days). All patients recovered and were discharged without in-hospital mortality.

Table 4. Treatment Modalities and Hospital Outcomes (N = 110)

Variable	Frequency (n)	Percentage (%)
Treatment modality		
Laparoscopic cholecystectomy	91	82.7
Open cholecystectomy	13	11.8
Conservative management	6	5.5
Post -treatment complications *		
Wound infection	5	4.8
Bile leakage	2	1.9
Postoperative bleeding	1	1.0
Hospital outcome		
Recovered and discharged	110	100.0
Median hospital stays (IQR)	3 (2 – 5) days	–

*Percentages were calculated among surgically managed patients (n = 104).

Table 5 shows the association between gallstone size and the occurrence of acute cholecystitis. Acute cholecystitis was significantly more frequent among patients with gallstones measuring >20 mm than among those with stones measuring ≤20 mm (46.4% vs. 20.7%, p = 0.009), indicating that larger gallstones were associated with a higher likelihood of inflammatory complications.

Table 5. Association Between Gallstone Size and Acute Cholecystitis (N = 110)

Stone size	Acute cholecystitis n (%)	No acute cholecystitis n (%)	Total	p-value
≤20 mm (n = 82)	17 (20.7)	65 (79.3)	82	
>20 mm (n = 28)	13 (46.4)	15 (53.6)	28	**0.009**
Total	**30**	**80**	**110**	

Chi-square test.

Discussion:

In this research, gallstone disease was prevalent in middle-aged individuals and among females, with urban living and obesity often noted as common traits. Hypertension, diabetes mellitus, and dyslipidemia were prevalent comorbidities, suggesting a link between gallstone disease and metabolic risk factors. Comparable demographic trends were observed in a multicenter study from Bangladesh, emphasizing the prevalence of middle-aged women and related metabolic issues among patients with gallstones [12].

In this study, RUQ abdominal pain was the most frequently reported symptom, followed by nausea/vomiting and dyspepsia. Recent studies have noted similar results, indicating that abdominal pain was the main symptom of symptomatic gallstone disease, whereas jaundice and fever were primarily linked to more complicated cases like biliary obstruction and cholecystitis [13,14].

In this research, RUQ tenderness was the most prevalent clinical observation (78.2%), with a positive Murphy's sign in 40.9% of subjects. Increased ALT, ALP, bilirubin, and leukocytosis were common lab abnormalities, indicating inflammatory alterations and potential biliary blockage. Recent studies have reported comparable results, emphasizing the significance of clinical assessment and liver biochemical indicators in assessing complications related to gallstones [13,15].

In this research, ultrasonography showed that 63.6% of patients had multiple gallstones, with the majority of stones sized between 10–20 mm. Some patients exhibited gallbladder wall thickening and dilation of the common bile duct, indicating inflammatory and obstructive alterations. Recent studies emphasize ultrasonography as the primary imaging technique for assessing gallstone quantity, dimensions, and related complications [16].

In this research, laparoscopic cholecystectomy was the main treatment approach, accompanied by a low incidence of postoperative complications and a median hospitalization duration of 3 days. These results endorse laparoscopic cholecystectomy as the optimal approach for symptomatic gallstone disease because of its safety, reduced recovery duration, and positive results. Comparable evidence has shown that laparoscopic cholecystectomy offers effective treatment with minimal morbidity, while postoperative issues like wound infection and bile leakage turn out to be rare when executed correctly [17,18].

This study found that gallstones larger than 20 mm had a significant link to acute cholecystitis, indicating that bigger stones heighten the risk of cystic duct blockage and inflammatory issues. Comparable results emphasize stone properties as significant indicators of the severity of acute cholecystitis [19].

This study emphasizes that gallstone disease primarily impacts middle-aged women and is linked to metabolic risk factors, specific clinical symptoms, ultrasonographic results, and positive outcomes after laparoscopic treatment.

Conclusion:

Gallstone disease mainly impacted middle-aged women and was often linked to obesity and metabolic complications. RUQ discomfort was the most frequent presentation, and ultrasonography successfully detected the characteristics of stones and complications. Laparoscopic cholecystectomy demonstrated positive short-term results with few complications. Bigger gallstones were linked to a higher risk of acute cholecystitis, emphasizing the need for prompt diagnosis and swift treatment.

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