Elective laparoscopic cholecystectomy in Bangladesh: Demographics, Comorbidities, and Preoperative Risk Features in 100 Consecutive Patients

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ABSTRACT

Background: Laparoscopic cholecystectomy (LC) is the global standard for managing symptomatic gallstone disease, yet detailed data on the preoperative characteristics of patients undergoing this procedure in Bangladesh remains limited. A clear understanding of local demographic patterns, comorbidity burdens, and preoperative risk features is essential for optimizing surgical care. **Aim:** The aim of this study was to characterize the demographic profile, comorbidity patterns, and preoperative risk features in patients undergoing elective LC at a tertiary care center in Bangladesh. **Methods & Materials:** This prospective cross-sectional observational study included 100 consecutive patients scheduled for elective LC at Shaheed Suhrawardy Medical College and Hospital, Dhaka, Bangladesh from January to December 2023. Data on demographics, comorbidities, surgical indications, and preoperative risk features from clinical assessment and imaging were systematically collected and analyzed. **Results:** The largest proportion of patients were aged 31-40 years (36.0%), with 64.0% being under 41 years of age. A female predominance was observed (59.0%). Symptomatic cholelithiasis was the primary indication for surgery (90.0%). Hypertension was the most common comorbidity (56.0%), followed by diabetes mellitus (20.0%). Preoperative risk features for difficult surgery were present in only 16.0% of patients, with gallbladder wall thickening on ultrasound being the most frequent (5.0%). **Conclusion:** Patients undergoing elective LC in Bangladesh are predominantly young to middle-aged females with a high prevalence of hypertension and diabetes, but relatively few preoperative risk factors for difficult surgery. This profile underscores the importance of preoperative comorbidity optimization and provides a valuable baseline for future studies in the region.

Keywords: *Laparoscopic cholecystectomy, Bangladesh, Demographics, Comorbidities, Preoperative risk factors*

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INTRODUCTION

Laparoscopic cholecystectomy (LC) has become the global standard for the management of symptomatic gallstone disease and remains one of the most commonly performed abdominal surgical procedures worldwide. Its adoption has been driven by clear advantages over open cholecystectomy, including reduced postoperative pain, shorter hospitalization, faster recovery, and lower morbidity, making it the preferred modality across diverse health systems. As the global burden of gallstone disease continues to rise, LC now represents a major component of routine surgical care. Recent epidemiologic analyses indicate that gallstone prevalence varies widely by region but is increasing overall; for instance, a contemporary meta-analysis confirmed rising global incidence patterns influenced by diet, obesity, and aging demographics [1]. Population-based data from high-income settings mirror these patterns, as seen in the United States, where gallstone-related morbidity remains substantial and cholecystectomy rates continue to climb [2]. Comparable trends have been documented in emerging economies, with South African data showing a notable increase in LC utilization for gallstone-related disease, underscoring the universal relevance of this operation across different socioeconomic environments [3]. Gallstone disease demonstrates well-established demographic patterns that influence both disease prevalence and operative demand. A consistent female predominance is reported globally, with biological, hormonal, and metabolic factors contributing to higher rates of gallstone formation among women. Large-scale prospective data from the MAUCO population cohort confirmed that females exhibit significantly higher gallstone disease prevalence and a correspondingly increased likelihood of requiring cholecystectomy [4]. These findings align with population studies from Scandinavia, where female sex and socioeconomic characteristics were predictive of increased operative intervention for gallstone disease [5]. Age is another critical determinant; risk rises progressively with advancing age, as documented in a population-based cohort study from Norway that identified older age as a strong predictor for subsequent cholecystectomy [6]. These demographic patterns shape operative case mix in most countries and highlight the importance of understanding local population characteristics when reporting LC outcomes. In South Asia, gallstone disease is an important contributor to surgical workload, but the epidemiology varies considerably within the region. Bangladeshi series consistently describe a predominance of female patients undergoing LC, along with a tendency toward younger operative age compared with Western populations. Local studies from tertiary centers have shown that symptomatic cholelithiasis remains the leading indication for LC, with acute cholecystitis contributing a smaller proportion of elective cases [7]. These findings reflect not only disease epidemiology but also referral patterns, healthcare access, and resource constraints. The increasing adoption of minimally invasive surgery in Bangladesh is evidenced by reports of large procedural series, including analyses of anesthesia practices and perioperative outcomes in thousands of LC cases [8]. However, most Bangladeshi publications focus on operative technique, perioperative outcomes, or complication profiles rather than systematic documentation of demographic, comorbidity, and risk-factor distributions in elective LC patients. Comorbidities and

preoperative risk factors play an important clinical role in anticipating technical difficulty, predicting conversion to open surgery, and counseling patients. Several international studies have emphasized that metabolic and cardiovascular comorbidities, including hypertension, diabetes, and obesity, contribute significantly to gallstone disease risk and may influence perioperative outcomes [9,10]. Moreover, a substantial body of evidence identifies specific preoperative imaging and clinical markers associated with difficult LC and greater likelihood of conversion, such as gallbladder wall thickening, contracted gallbladder, elevated inflammatory markers, and dilated common bile duct. These risk associations have been synthesized in multiple high-quality systematic reviews, including a recent meta-analysis confirming that age, male sex, previous abdominal surgery, and markers of inflammation significantly increase conversion risk [11]. Additional reviews incorporating both preoperative and intraoperative variables highlight severe adhesions, unclear anatomy, and hemorrhage as principal intraoperative reasons for conversion [12]. Yet, despite these insights, there remains heterogeneity in the predictive performance of individual risk factors across different populations, particularly in low- and middle-income countries. Within Bangladesh, preoperative risk characterization is insufficiently documented, and existing data often combine elective and emergency cases, limiting interpretability. While some studies report complication patterns and conversion rates, few provide detailed analyses of comorbidities, ultrasonographic markers, or biochemical abnormalities in exclusively elective LC cohorts. This gap hampers evidence-based operative planning, risk stratification, and informed decision-making. A more complete understanding of the demographic composition, comorbidity profiles, and preoperative risk features among Bangladeshi LC patients is essential for optimizing patient selection, anticipating operative difficulty, and guiding resource allocation within surgical departments. Therefore, the present study aims to provide a detailed characterization of these parameters in 100 consecutive elective LC patients managed at a tertiary center in Bangladesh, thereby contributing contextually relevant evidence to the regional literature and addressing a notable gap in current knowledge.

METHODS & MATERIALS

This prospective cross-sectional observational study was conducted in the Department of Surgery, Shaheed Suhrawardy Medical College and Hospital, Sher-E-Bangla Nagar, Dhaka, Bangladesh. The study period extended from January 2023 to December 2023. A total of 100 consecutive patients scheduled for elective laparoscopic cholecystectomy were enrolled after meeting the inclusion criteria and providing informed written consent. Patients with acute cholecystitis for longer than seven days or with gallbladder cancer were excluded. Sampling followed a purposive convenience approach, and all eligible patients presenting during the study period were included. Data collection followed a structured workflow. Demographic variables, comorbidity profiles, previous abdominal surgery, and preoperative clinical, laboratory, and ultrasonographic risk features were recorded using a standardized proforma. Imaging findings included gallbladder wall thickness, gallbladder contracture, common bile duct diameter, and the presence of any inflammatory markers or biochemical abnormalities. All information was obtained preoperatively through clinical assessment, ultrasound reports, routine laboratory investigations, and medical history reviews. Intraoperative observations were recorded for quality assurance, though only preoperative factors and baseline characteristics were analyzed for the present manuscript. Data quality was ensured through cross-checking, verification, and systematic entry procedures. Statistical analysis was performed using SPSS version 21.0. Descriptive statistics were applied to summarize the study population. Continuous variables were reported as mean and standard deviation, while categorical variables were presented as frequencies and percentages. Ethical approval for this study was obtained from the institutional ethical review board of Shaheed Suhrawardy Medical College and Hospital. Confidentiality was maintained throughout, and all participants were informed of the study's objectives, procedures, and associated risks and benefits prior to enrollment.

RESULTS

Among the 100 patients who underwent elective laparoscopic cholecystectomy, the largest proportion were between 31 and 40 years of age (36%), followed by those aged 20–30 years (28%). Only 16% of the study population were above 50 years. Females accounted for 59% of cases, reflecting the typical female predominance of gallstone disease, while males represented 41%. Symptomatic cholelithiasis was the primary indication for surgery, comprising 90% of the cohort, and the remaining 10% underwent surgery for acute cholecystitis of less than seven days' duration (*Table I*).

Table I
Demographic characteristics and indications for surgery (n = 100).

Category	n (%)
Age group (years)	
20–30	28 (28.0)
31–40	36 (36.0)
41–50	20 (20.0)
51–60	11 (11.0)
≥61	5 (5.0)
Sex	
Male	41 (41.0)
Female	59 (59.0)
Indication for surgery	
Symptomatic cholelithiasis	90 (90.0)
Acute cholecystitis (<7 days)	10 (10.0)

Hypertension was the most frequent comorbidity in the study population, identified in 56% of patients. Diabetes mellitus was present in 20%, and chronic obstructive pulmonary disease in 15%. Ischemic heart disease was less common, reported in 5% of cases. Only 3% of patients had a history of previous abdominal surgery, and obesity was rare, documented in 1% of the cohort. Overall, the distribution shows a moderate burden of metabolic and cardiopulmonary comorbidities among elective laparoscopic cholecystectomy patients (*Table II*).

Table II
Comorbidities and previous abdominal surgery (n = 100).

Comorbidity or condition	n (%)
Hypertension	56 (56.0)
Diabetes mellitus	20 (20.0)
Chronic obstructive pulmonary disease (COPD)	15 (15.0)
Ischemic heart disease	5 (5.0)
Previous abdominal surgery	3 (3.0)
Obesity	1 (1.0)

Preoperative risk features were observed in 16% of patients. The most frequent finding was a thickened gallbladder wall on ultrasound (5%). Contracted gallbladder, dilated common bile duct on MRCP, abnormal liver function tests, and recent acute cholecystitis with elevated inflammatory markers were each detected in 2% of patients. Hypertension, when considered specifically as a perioperative risk factor, was also present in 2%, while 3% had a history of previous abdominal surgery noted as a risk factor. These findings indicate that the majority of patients had no major preoperative predictors of difficult laparoscopic cholecystectomy (*Table III*).

Table III
Preoperative risk features detected (n = 100).

Risk feature	n (%)
Ultrasound showing thickened gallbladder wall	5 (5.0)
Contracted gallbladder on imaging	2 (2.0)
MRCP showing dilated common bile duct (CBD)	2 (2.0)
Abnormal liver function test (bilirubin or ALP)	2 (2.0)
Recent acute cholecystitis with raised CBC or CRP	2 (2.0)
Hypertension considered a perioperative risk factor	2 (2.0)
History of previous abdominal surgery	3 (3.0)
Patients with ≥1 listed risk feature	16 (16.0)

DISCUSSION

This prospective study delineates the demographic and clinical profile of 100 consecutive patients undergoing elective laparoscopic cholecystectomy (LC) at a Bangladeshi tertiary center, revealing a cohort that is largely young-to-middle-aged with a significant female predominance. The largest proportion of our patients were between 31 and 40 years of age (36.0%), a finding that closely mirrors the experience from another Bangladeshi tertiary hospital where the 31-40 age group constituted 26.23% of cases [13]. Furthermore, females accounted for 59.0% of our cohort, a consistent observation in gallstone disease epidemiology. This female predominance is not merely a local phenomenon but is underpinned by robust global evidence, with a large prospective cohort study identifying female sex as a strong predictor, more than doubling the prevalence of gallstone disease compared to males [4]. Beyond demographics, our study highlights a substantial burden of cardiometabolic comorbidities, with hypertension being remarkably prevalent at 56.0%, followed by diabetes mellitus at 20.0%. This pattern is comparable to findings from a large Brazilian cohort, where hypertension and diabetes were also the most frequent comorbidities, reported in 44.1% and 15.9% of patients, respectively Critically, that same study identified these conditions as independent predictors of postoperative complications, underscoring the clinical importance of our findings and the necessity for meticulous preoperative optimization [10]. The primary surgical indication in our series was symptomatic cholelithiasis (90.0%), which is characteristic of an elective surgical pathway. Despite the comorbidity burden, preoperative imaging and biochemical risk features predictive of a difficult cholecystectomy were infrequent, present in only 16.0% of our patients. The most common finding was a thickened gallbladder wall on ultrasound (5.0%). While this prevalence was low, the clinical significance of this marker cannot be overstated. Multiple meta-analyses have confirmed that gallbladder wall thickening significantly elevates the risk of conversion to open surgery, with one analysis reporting an odds ratio of 3.44, a finding corroborated by another systematic review [11,12]. This suggests that while our patient cohort was largely low-risk based on preoperative imaging, vigilant identification of these specific markers remains paramount for operative planning. In summary, our data characterizes the elective LC population in Bangladesh as predominantly young to middle-aged females with a high prevalence of hypertension and diabetes, yet a low incidence of preoperative radiological risk factors for difficult surgery. This profile, which aligns with regional reports and is supported by global epidemiological data, provides crucial context for surgical departments in Bangladesh, informing patient counseling, resource allocation, and the development of standardized preoperative assessment protocols tailored to the local population's needs.

LIMITATIONS

This study was conducted at a single tertiary care center with a relatively small sample size, which may limit the generalizability of our findings to other healthcare settings across Bangladesh. Furthermore, the focus on preoperative characteristics without comprehensive analysis of intraoperative outcomes or long-term follow-up restricts the scope of our conclusions.

CONCLUSION

The elective laparoscopic cholecystectomy population in Bangladesh is characterized by a predominance of young to middle-aged female patients with a significant burden of cardiometabolic comorbidities, particularly hypertension and diabetes mellitus. Despite this comorbidity profile, preoperative imaging and biochemical risk factors for difficult surgery were relatively uncommon, suggesting that most patients present with favorable profiles for successful laparoscopic intervention. These findings highlight the need for structured preoperative screening and optimization of comorbid conditions, providing valuable context for surgical planning and resource allocation in similar Bangladeshi healthcare settings.

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CONFLICT OF INTEREST

None declared

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee

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