

Clinicodemographic Profile and Management Outcomes of Patients with Gallstone Disease: A Cross-Sectional Observational Study.

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Abstract

Background:

Gallstone disease is a frequent hepatobiliary disorder with wide variation in demographic distribution, clinical presentation, and treatment pathways. Local clinical data are useful for understanding presentation patterns and perioperative outcomes in secondary and tertiary care settings.

Objectives:

To evaluate the clinicodemographic profile, ultrasonographic features, management pattern, and treatment outcomes among patients with gallstone disease.

Methods:

This hospital-based cross-sectional observational study included 50 consecutive adult patients with ultrasonography-confirmed gallstone disease. Demographic details, symptoms, ultrasonographic findings, diagnosis, treatment modality, postoperative complications, and follow-up symptom status were analysed descriptively.

Results:

The mean age was 43.8 $\pm$ 12.6 years, and most patients were aged 31-50 years. Females constituted 68% of cases. Right upper abdominal pain was the commonest symptom, followed by nausea or vomiting and dyspepsia. Ultrasonography showed multiple gallstones in 64%, solitary stones in 36%, gallbladder wall thickening in 30%, pericholecystic fluid in 12%, and common bile duct dilatation in 8% of patients. Laparoscopic cholecystectomy was performed in 80%, open cholecystectomy in 12%, and ERCP followed by cholecystectomy in 8%. Uneventful recovery was noted in 84%, with complete symptom relief in 88%.

Conclusion:

Gallstone disease predominantly affected middle-aged females and commonly presented with right upper abdominal pain. Laparoscopic cholecystectomy was the principal management modality and showed favourable recovery with low complication rates.

Recommendations:

Early ultrasonographic evaluation, risk stratification for common bile duct stones, and timely laparoscopic intervention should be strengthened in routine surgical practice.

Keywords: Gallstone disease; Cholelithiasis; Cholecystectomy; Laparoscopy; Ultrasonography; Choledocholithiasis

Submitted: February 01, 2026 **Accepted:** February 28, 2026 **Published:** March 30, 2026

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Introduction

Gallstone disease is a major benign hepatobiliary condition and a frequent reason for surgical consultation. Its clinical spectrum ranges from silent gallstones detected incidentally

to biliary colic, acute calculous cholecystitis, choledocholithiasis, pancreatitis, and obstructive jaundice. Risk is shaped by a combination of age, female sex, obesity, parity, metabolic factors, dietary patterns, ethnicity, and

family predisposition [1-5]. When stones become symptomatic, repeated pain episodes, dyspeptic complaints, emergency visits, and the need for definitive surgery may affect patient morbidity and health-care use [6-9].

Gallstone formation reflects an imbalance between bile composition, gallbladder motility, and nucleation processes. Cholesterol-rich bile, impaired emptying of the gallbladder, mucin-mediated crystal aggregation, and changes in bile salt handling favour cholesterol stone formation, whereas pigment stones are often related to haemolytic states, infection, and biliary stasis [2,3,8]. In routine practice, abdominal ultrasonography is the initial imaging test because it is accessible, safe, inexpensive, and capable of showing stone number, gallbladder wall changes, pericholecystic fluid, and common bile duct dilatation. These imaging details support differentiation between uncomplicated cholelithiasis and complicated inflammatory or obstructive disease [10-12].

Treatment decisions depend on symptom status, inflammatory severity, ductal involvement, operative risk, and local expertise. Laparoscopic cholecystectomy is generally preferred for symptomatic gallstone disease because it offers definitive treatment with shorter recovery in suitable patients [13]. Open cholecystectomy is still required in selected cases, including dense adhesions, severe inflammation, unclear Calot's triangle anatomy, and conversion for patient safety. When common bile duct stones are suspected or confirmed, endoscopic retrograde cholangiopancreatography is used selectively as a diagnostic and therapeutic adjunct [14].

Because gallstone burden, patient profile, stage at presentation, and access to laparoscopy differ across regions, local observational evidence remains useful for service planning. Hospital-based data can clarify the age and sex distribution, symptom pattern, ultrasonographic findings, treatment choices, conversion rate, complications, and early symptom resolution in a defined setting. The present study was therefore undertaken to assess the clinicodemographic profile, ultrasonographic characteristics, management modalities, postoperative events, and short-term outcomes among patients with gallstone disease treated at Government Medical College and Government General Hospital, Bhadradi Kothagudem, Telangana, India.

Methodology

Study design and setting

This was a hospital-based cross-sectional observational study conducted in the Department of General Surgery, Government Medical College and Government General Hospital, Bhadradi Kothagudem, Telangana, India.

Government Medical College and Government General Hospital is a district-level public teaching hospital providing outpatient, emergency, inpatient, operative, and referral surgical services to patients from Bhadradi Kothagudem and surrounding tribal, rural, and urban areas. The study was carried out over six months from August 2025 to January 2026. The design was descriptive and intended to document the clinicodemographic profile, diagnostic findings, treatment pathway, and short-term outcome of patients presenting with gallstone disease.

Study population and sample size

A total of 50 patients with gallstone disease were included. Consecutive eligible patients attending the surgical outpatient department, emergency department, or admitted surgical wards during the study period were enrolled. Adult patients with ultrasonography-confirmed gallstones, with or without features of cholecystitis or common bile duct involvement, were considered eligible. The sample size of 50 was based on consecutive recruitment of eligible cases available during the predefined six-month study period in this institutional setting. As the study was descriptive and did not test an interventional hypothesis, no formal power calculation was performed. This number was considered feasible for documenting local clinicodemographic features, ultrasonographic patterns, management modalities, and short-term outcomes within the available study duration.

Inclusion and exclusion criteria

Patients aged 18 years and above with symptomatic gallstone disease, acute or chronic calculous cholecystitis, or suspected choledocholithiasis were included. Patients with acalculous cholecystitis, suspected gallbladder malignancy, severe unrelated systemic illness precluding definitive management, pregnancy, incomplete clinical records, or refusal to participate were excluded from analysis.

Data collection procedure

A structured proforma was used to record age, gender, residence, body mass index, diabetes status, presenting symptoms, clinical signs, ultrasonographic findings, final diagnosis, management modality, conversion to open surgery, postoperative events, readmission, symptom relief, and mortality. Right upper quadrant pain, nausea or vomiting, dyspepsia, fatty food intolerance, fever, jaundice, right hypochondrial tenderness, and Murphy's sign were specifically documented. Ultrasound findings included the number of gallstones, gallbladder wall thickening, pericholecystic fluid, and common bile duct dilatation.

Bias

Potential selection bias was reduced by enrolling consecutive eligible patients during the study period. Information bias was minimized by using a structured proforma and recording predefined clinical, ultrasonographic, management, and outcome variables for all participants. Ultrasonography-confirmed diagnosis was used to avoid clinical misclassification. Data were checked for completeness before analysis, and patients with incomplete clinical records were excluded according to the predefined criteria. As this was a single-centre descriptive study, referral pattern and institutional practice bias could not be completely eliminated.

Clinical management and outcome assessment

Management decisions were made by the treating surgical team based on clinical condition, imaging findings, and operative feasibility. Laparoscopic cholecystectomy was preferred for uncomplicated symptomatic disease and suitable acute cases, consistent with accepted management evidence and guideline principles [10,13]. Open surgery was performed when indicated by technical or clinical factors. Patients with suspected common bile duct stones underwent further evaluation and ERCP-based management wherever appropriate, in line with standard endoscopic recommendations [14]. Outcomes assessed included postoperative fever, surgical site infection, bile leak, readmission, complete symptom relief, persistent dyspeptic symptoms, and mortality.

Statistical analysis

Data were entered into a spreadsheet and analysed using descriptive statistics. Categorical variables were expressed

as frequency and percentage, while continuous variables were presented as mean and standard deviation. No inferential statistical comparison was planned, as the study was descriptive in design.

Ethical considerations

Institutional permission and ethical approval were obtained from Government Medical College, Bhadradi Kothagudem, Telangana, India, before initiation of the study. Informed consent was obtained from all study participants. Confidentiality of patient-related information was maintained throughout the study, and data were used only for academic and research purposes.

Results

Participant flow

During the six-month study period, 50 potentially eligible patients with suspected or ultrasonography-confirmed gallstone disease were assessed for eligibility. All 50 fulfilled the predefined inclusion criteria, provided informed consent, were enrolled, and were included in the final analysis. There were no post-enrolment exclusions, missing outcome records, losses to follow-up for the planned short-term assessment, or non-participation among eligible patients.

A total of 50 patients with gallstone disease were analysed. The mean age of the study population was 43.8 ± 12.6 years. Most patients were aged 31–50 years, including 14 (28.0%) patients aged 31–40 years and 16 (32.0%) aged 41–50 years. Females constituted 34 (68.0%) cases. Urban residence was reported in 28 (56.0%) patients. Overweight and obesity together were recorded in 34 (68.0%) participants, while diabetes mellitus was present in 10 (20.0%) patients (Table 1).

Table 1. Clinicodemographic profile of patients with gallstone disease

Variable	Category	n	%
Age group	≤30 years	8	16.0
	31–40 years	14	28.0
	41–50 years	16	32.0
	51–60 years	8	16.0
	>60 years	4	8.0
Gender	Male	16	32.0
	Female	34	68.0

Variable	Category	n	%
Residence	Rural	22	44.0
	Urban	28	56.0
Body mass index	Normal	16	32.0
	Overweight	22	44.0
	Obese	12	24.0
Diabetes mellitus	Present	10	20.0
	Absent	40	80.0

Note. Values are presented as frequency (n) and percentage unless otherwise indicated. Total N = 50.

Right upper abdominal pain was the leading presenting complaint, reported by 43 (86.0%) patients. Nausea or vomiting occurred in 27 (54.0%) patients, followed by dyspepsia or indigestion in 23 (46.0%) and fatty food intolerance in 18 (36.0%). Fever and jaundice were less frequent. On clinical examination, right hypochondrial tenderness was present in 21 (42.0%) patients, while Murphy's sign was positive in 14 (28.0%) cases (Table 2).

Table 2. *Clinical presentation of patients with gallstone disease*

Clinical feature	n	%
Right upper abdominal pain	43	86.0
Nausea/vomiting	27	54.0
Dyspepsia/indigestion	23	46.0
Fatty food intolerance	18	36.0
Fever	9	18.0
Jaundice	5	10.0
Right hypochondrial tenderness	21	42.0
Murphy's sign positive	14	28.0

Note. Clinical features were not mutually exclusive; therefore, percentages do not sum to 100%. Total N = 50.

Ultrasonography demonstrated multiple gallstones in 32 (64.0%) patients and a solitary gallstone in 18 (36.0%). Gallbladder wall thickening was observed in 15 (30.0%) patients, pericholecystic fluid in 6 (12.0%), and common bile duct dilatation in 4 (8.0%). Based on the combined clinical and imaging assessment, symptomatic cholelithiasis was the most frequent final diagnosis, followed by chronic cholecystitis, acute cholecystitis, and choledocholithiasis (Table 3).

Table 3. *Ultrasonographic and diagnostic profile*

Parameter	Category	n	%
Number of gallstones	Solitary stone	18	36.0
	Multiple stones	32	64.0
Gallbladder wall thickening	Present	15	30.0
	Absent	35	70.0
Pericholecystic fluid	Present	6	12.0
	Absent	44	88.0
Common bile duct dilatation	Present	4	8.0
	Absent	46	92.0
Final diagnosis	Symptomatic cholelithiasis	22	44.0
	Chronic cholecystitis	16	32.0
	Acute cholecystitis	8	16.0
	Choledocholithiasis	4	8.0

Note. Values are presented as frequency (n) and percentage. Total N = 50.

Regarding management, laparoscopic cholecystectomy was the most frequently performed definitive procedure and was undertaken in 40 (80.0%) patients. Open cholecystectomy was performed in 6 (12.0%) patients, while 4 (8.0%) patients with suspected or confirmed common bile duct

stones underwent ERCP followed by cholecystectomy. Conservative treatment followed by elective surgery was used in 12 (24.0%) patients. Conversion from laparoscopic to open cholecystectomy was required in 3 (6.0%) patients because of operative difficulty. Most patients experienced

an uneventful postoperative recovery. Surgical site infection occurred in 4 (8.0%) patients, postoperative fever in 3 (6.0%), and bile leak in 1 (2.0%). At follow-up, complete

symptom relief was reported by 44 (88.0%) patients, while 6 (12.0%) had persistent dyspeptic symptoms. No mortality was recorded (Table 4).

Table 4. *Management pattern and treatment outcomes*

Parameter	Category	n	%
Management modality	Conservative treatment followed by elective surgery	12	24.0
	Laparoscopic cholecystectomy	40	80.0
	Open cholecystectomy	6	12.0
	ERCP followed by cholecystectomy	4	8.0
Conversion	Laparoscopic to open surgery	3	6.0
Postoperative outcome	Uneventful recovery	42	84.0
	Surgical site infection	4	8.0
	Postoperative fever	3	6.0
	Bile leak	1	2.0
	Readmission	2	4.0
Follow-up outcome	Complete symptom relief	44	88.0
	Persistent dyspeptic symptoms	6	12.0
Mortality	Present	0	0.0

Note. Management modalities were not mutually exclusive because some patients received staged treatment (e.g., conservative therapy before elective surgery or ERCP before cholecystectomy). ERCP = endoscopic retrograde cholangiopancreatography. Total N = 50.

Overall, gallstone disease in this cohort predominantly affected middle-aged women and was frequently associated with overweight or obesity. Right upper abdominal pain was the principal symptom, and multiple gallstones were more common than solitary stones. Laparoscopic cholecystectomy was the dominant management approach and was associated with favourable short-term clinical recovery.

Discussion

The present observational study describes the clinicodemographic profile, clinical presentation, imaging pattern, management approach, and treatment outcomes of 50 patients with gallstone disease. The mean age was 43.8 +/- 12.6 years, and most patients were between 31 and 50 years. This age distribution is consistent with the recognised tendency of gallstone disease to increase with advancing adult age, although regional variation in age at presentation is well documented [1,4,6]. The clear female predominance

observed in this cohort also agrees with epidemiological literature, where female sex, parity-related hormonal exposure, and metabolic factors contribute to higher gallstone risk [1,4,7].

Right upper abdominal pain was the most frequent symptom, followed by nausea or vomiting, dyspepsia, and fatty food intolerance. These findings support the clinical pattern of symptomatic cholelithiasis, in which recurrent right hypochondrial or epigastric pain remains the central complaint. Fever and jaundice were less frequent, reflecting a smaller proportion of acute inflammatory or obstructive presentations. The 8% frequency of choledocholithiasis and 8% common bile duct dilatation is clinically relevant because common bile duct stones are important drivers of jaundice, cholangitis, and pancreatitis, and require appropriate endoscopic or surgical planning [14].

Ultrasonography detected multiple gallstones in nearly two-thirds of patients. Gallbladder wall thickening and pericholecystic fluid were found in smaller proportions, supporting a mixed cohort of uncomplicated symptomatic

cholelithiasis and inflammatory gallbladder disease. International guidance emphasises the combined use of local inflammatory signs, systemic features, and imaging findings for diagnosing and grading acute cholecystitis [10-12]. In this study, symptomatic cholelithiasis and chronic cholecystitis together formed the largest diagnostic group, which explains the high proportion of elective or planned surgical management.

Laparoscopic cholecystectomy was performed in 80% of patients and was the preferred definitive treatment. This aligns with evidence that laparoscopic cholecystectomy reduces hospital stay and supports quicker recovery compared with open surgery [13]. Conversion to open surgery occurred in 6% of patients, a rate that appears acceptable in a routine surgical setting. Surgical site infection, postoperative fever, bile leak, and readmission were infrequent, and no mortality occurred. Complete symptom relief in 88% of patients indicates favourable short-term outcome, although residual dyspeptic symptoms persisted in a small proportion, suggesting that not all upper gastrointestinal symptoms are solely attributable to gallstones.

Generalizability

The findings are applicable to comparable district-level and teaching hospital settings where ultrasonography is the primary diagnostic tool and laparoscopic cholecystectomy is routinely available. Because the sample was drawn from a single institution over six months, extrapolation to community prevalence, high-risk referral centres, or regions with different dietary, genetic, and health-care access patterns should be made cautiously.

Conclusion

Gallstone disease in this observational cohort was most commonly observed among middle-aged females, with a high proportion of overweight and obese patients. Right upper abdominal pain was the dominant clinical presentation, followed by nausea or vomiting and dyspeptic symptoms. Ultrasonography most often revealed multiple gallstones, while common bile duct dilatation and choledocholithiasis were less frequent. Laparoscopic cholecystectomy was the principal definitive treatment and showed favourable postoperative recovery. The low rates of surgical site infection, bile leak, readmission, and absence of mortality indicate safe short-term management outcomes in this setting. Early diagnosis, careful selection for ERCP, and timely operative intervention remain central to effective care.

Limitations

This study was limited by its single-centre design, small sample size, and short follow-up duration. Long-term recurrence of symptoms, quality of life, cost of care, and delayed biliary complications were not assessed. Laboratory parameters and operative difficulty grading were not included in detailed analytical comparison.

Recommendations

Hospitals managing gallstone disease should maintain a structured protocol for early ultrasonography, documentation of risk factors, assessment of common bile duct stones, and timely referral for ERCP when indicated. Laparoscopic cholecystectomy should remain the preferred definitive treatment for suitable symptomatic patients. Patients with obesity, diabetes, recurrent biliary pain, jaundice, or imaging evidence of ductal dilatation need closer evaluation. Standardised perioperative antibiotic use, safe Calot's triangle dissection, and clear conversion criteria can further reduce complications. Larger prospective studies with longer follow-up are recommended to assess symptom resolution, quality of life, and predictors of conversion.

Acknowledgement

The authors acknowledge the faculty, residents, nursing staff, and medical records personnel of Government Medical College, Bhadradi Kothagudem, Telangana, India, for their support during patient care, data collection, and documentation. The authors also thank the patients who participated in the study.

Abbreviations

BMI: Body mass index

CBD: Common bile duct

CBDS: Common bile duct stones

ERCP: Endoscopic retrograde cholangiopancreatography

GSD: Gallstone disease

USG: Ultrasonography

WSES: World Society of Emergency Surgery

Source of funding

The study had no funding.

Conflict of interest

The authors declare no conflict of interest.

Author contributions

BPR-Concept and design of the study, results interpretation, review of literature, and preparing the first

draft of the manuscript. Statistical analysis and interpretation, revision of manuscript.

BR -results interpretation, review of literature, and preparing the first draft of the manuscript, revision of manuscript.

Data availability

Data available on request

Author Biography

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Student's Journal of Health Research Africa

e-ISSN: 2709-9997, p-ISSN: 3006-1059

Vol.7 No. 3 (2026): March 2026 Issue

<https://doi.org/10.51168/mhdwba36>

Original Article

PUBLISHER DETAILS

Student's Journal of Health Research (SJHR)

(ISSN 2709-9997) Online

(ISSN 3006-1059) Print

Category: Non-Governmental & Non-profit Organization

Email: studentsjournal2020@gmail.com

WhatsApp: +256 775 434 261

Location: Scholar's Summit Nakigalala, P. O. Box 701432,

Entebbe Uganda, East Africa

