RESEARCH PAPER

The Symptomatic Outcomes in Patients Undergoing Cholecystectomy for Gallstones Disease

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ABSTRACT

Objective: To evaluate symptomatic outcomes in patients undergoing cholecystectomy for gallstone disease at a Pakistani tertiary care hospital.

Study design: A descriptive study.

Place and duration of study: From November 2025 to April 2026 at the department of Surgery at Shifa International Hospital, Islamabad.

Methods: A total of 100 patients aged 25–65 years with gallstone disease undergoing cholecystectomy under general anaesthesia were included through non-probability consecutive sampling. Demographic and clinical characteristics were recorded. Gastrointestinal symptoms including pain attacks, heartburn, abdominal fullness, bloating, belching, regurgitation, diarrhea, bowel urgency, constipation, restricted eating, and reduced enjoyment of food were assessed before and after surgery. SPSS was used for data analysis and $p \leq 0.05$ was considered statistically significant.

Results: The mean age of the patients was 43.6 ± 9.8 years and the mean BMI was 26.9 ± 4.4 kg/m². Females constituted 67% of the study population. Pain attacks decreased from 91% before surgery to 39% after surgery ($\chi^2 = 52.4$, $p < 0.001$). Heartburn decreased from 38% to 3% ($\chi^2 = 33.7$, $p < 0.001$), abdominal fullness from 36% to 12% ($\chi^2 = 9.5$, $p = 0.002$), and bloating from 40% to 16% ($\chi^2 = 12.7$, $p < 0.001$). Other symptoms such as belching, regurgitation, restricted eating, and reduced enjoyment of food also improved significantly. However, diarrhea did not show a significant change after surgery ($\chi^2 = 0.06$, $p = 0.812$).

Conclusion: Cholecystectomy significantly improves biliary pain and several gastrointestinal symptoms in patients with gallstone disease; however, some symptoms such as diarrhea may persist after surgery.

Keywords: Gallstone Disease, Cholecystectomy, Biliary Pain, Gastrointestinal Symptoms, Post-cholecystectomy Outcomes

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INTRODUCTION

Cholelithiasis,formation of gallstone, is one of the most common gastrointestinal disorders worldwide and represents a significant cause of morbidity among adults[1]. The frequency of cholelithiasis cases increases with advancing age, and symptomatic disease tends to become more frequent and severe over time. Delayed presentation is often observed in many patients, which may lead to increased complications, greater morbidity, and challenges in timely diagnosis and management[2, 3].

Cholecystectomy remains the definitive treatment for patients with symptomatic gallstones, and the number of procedures performed globally continues to rise[4]. While surgical intervention is widely accepted for complicated gallstone disease, there is still considerable debate regarding the appropriate clinical criteriafor selection of patients with uncomplicated symptomatic gallstones for cholecystectomy[5, 6, 7, 8]. Consequently, significant differences in cholecystectomy rates have been reported between hospitals, regions, and countries[9, 10]. Despite the high frequency of this procedure, evidence regarding optimal treatment strategies remains limited, and only a few systematic reviews have addressed this topic comprehensively[4, 11]. Furthermore, heterogeneity in reported outcomes has made it difficult to accurately evaluate the effectiveness of different treatment approaches for symptomatic gallstone disease. The relevance and clinical value of many outcomes measured in previous studies also remain uncertain for both clinicians and patients[12].

Already published literature has demonstrated that a large proportion of patients experience resolution of biliary pain following cholecystectomy, with reported relief ranging from 66% to 100%. However, gastrointestinal symptoms such as dyspepsia may persist or newly develop after surgery. The reported rate of dyspepsia resolution ranges from 41% to 91%, while postoperative diarrhea has been documented in approximately 14–17% of patients. Several factors have been associated with persistent symptoms following surgery, including pre-existing dyspepsia, functional gastrointestinal disorders, atypical pain location, longer existing pre-operative symptoms, and poor physical or psychological health. Despite these issues, overall patient satisfaction following cholecystectomy remains high, often reflecting substantial relief of biliary symptoms[5, 13, 14]. Similar Persistent postoperative symptoms have also been reported in several other studies. These include abdominal pain in approximately 37.8% of patients, abdominal fullness in 13.2%, bloating in 14.8%, belching in 10.2%, reduced enjoyment of food in 17.9%, dietary restriction in 18.4%, regurgitation in 6.8%, diarrhea in 16.7%, bowel urgency in 16.6%, constipation in 7.6%, and heartburn in 4.45% of cases[15].

Although several international studies have evaluated symptomatic outcomes following cholecystectomy, there is limited data available from the local population. Understanding postoperative symptom patterns in local settings is important for guiding clinical decision-making and counseling patients regarding expected outcomes. Therefore, our study intends to determine the prevalence of symptomatic outcomes in patients undergoing cholecystectomy for gallstone disease. The findings of this study may contribute to improved clinical practice by providing evidence regarding the effectiveness of cholecystectomy in relieving symptoms among patients in the local population.

While multiple international investigations have examined symptomatic outcomes following cholecystectomy, several knowledge gaps persist within the local literature. Most existing Pakistani studies have concentrated on surgical complications rather than comprehensive assessment of gastrointestinal symptoms. No previous investigation from Pakistan has systematically evaluated a wide range of digestive symptoms—including pain episodes, heartburn, abdominal distension, bloating, belching, acid regurgitation, diarrhea, bowel urgency, constipation, dietary restriction, and reduced meal enjoyment—both prior to and following cholecystectomy using standardized definitions. Furthermore, factors that predict which patients will experience persistent postoperative symptoms remain inadequately characterized in the local population. The present study addresses these gaps by offering comprehensive, real-world data on symptomatic outcomes after cholecystectomy in a Pakistani tertiary care environment, thereby establishing an evidence base for enhanced preoperative patient counseling and future interventional research.

We hypothesized that cholecystectomy would produce substantial reduction in biliary pain and associated dyspeptic symptoms; however, a proportion of patients would continue to report gastrointestinal complaints, particularly diarrhea, attributable to physiological alterations in bile acid circulation following gallbladder removal.

METHOD

This descriptive study was conducted in the Department of Surgery at Shifa International Hospital. The study was conducted over a period of six months from November 2025 to April 2026, after approval of the research synopsis and ethical clearance from the institutional review committee by Ref No.IRB#411-25 dated 15-10- 2025.

A total of 100 patients were included in the study. The sample size was calculated using a 95% confidence level and a margin of error of 10%, considering a reported prevalence of persistent pain after cholecystectomy of 37.8% from previously published literature[15]. Patients were selected using a non-probability consecutive sampling technique.

Patients aged between 25 and 65 years of either gender who were diagnosed with gallstone disease according to the clinically defined criteria and were scheduled to undergo cholecystectomy under general anesthesia were included in the study. Only patients classified as American Society of Anesthesiologists (ASA) physical status I–III were considered eligible. Patients were excluded if they were pregnant, had complicated cholecystolithiasis, malignancy, had an expected life duration of less than one year, or had known liver cirrhosis defined as coarse liver texture on ultrasound with ALT and AST levels 40 IU. Patients with cognitive disorders that could interfere with reliable symptom assessment were also excluded.

Patients admitted to the surgical wards who fulfilled the selection criteria were enrolled after obtaining informed consent. Baseline demographic and clinical information was recorded using a structured proforma. Variables documented included age, gender, body mass index (BMI), duration of gallstone disease, smoking history defined as more than five pack-years, alcohol intake greater than 20 ml per day, or any other addiction. Medical comorbidities including diabetes mellitus (random blood sugar >200 mg/dl), hypertension (blood pressure ≥140/90 mmHg), and dyslipidemia (total cholesterol >200 mg/dl) were also recorded. Family history of gallstone disease, ASA classification, and gallstone size were noted as well.

All patients underwent cholecystectomy following general anesthesia performed by the same team of surgeons with the assistance of the researcher in order to maintain procedural consistency. Intraoperative variables including operative time and estimated blood loss were recorded. Clinical symptoms were assessed before and after surgery. The symptoms evaluated included pain attacks, heartburn, abdominal fullness, bloating, belching, not enjoying food, restricted eating, regurgitation, diarrhea, bowel urgency, and constipation according to

predefined operational definitions. All collected data were documented in the study proforma.

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 25. Continuous variables such as age, BMI, duration of gallstone disease, stone size, operative time, and intraoperative blood loss were expressed as mean ± standard deviation. Categorical variables including gender, smoking status, alcohol consumption, other addictions, diabetes mellitus, hypertension, dyslipidemia, family history of gallstone disease, ASA classification, and symptomatic outcomes were documented as frequencies and percentages. Stratification was performed for variables including age, gender, BMI, duration of gallstone disease, stone size, smoking history, alcohol consumption, other addictions, diabetes, hypertension, dyslipidemia, family history of gallstone disease, ASA status, operative time, and blood loss.Chi-square test was applied to ascertain the significance of association between pre and post symptomatic outcomes. A p-value of ≤0.05 was considered statistically significant.

RESULTS

A total of 100 patients undergoing cholecystectomy for gallstone disease were considered for study. The average age of the participants was around 44 years whereas the mean BMI was 26.9 ± 4.4 kg/m². The average duration of gallstone disease was 12.5 ± 5.6 months, while the mean gallstone size was 9.8 ± 2.9 mm. The mean intraoperative time was 65.6 ± 13.7 minutes and the mean estimated blood loss during surgery was 88.2 ± 25.7 ml. Female patients constituted the majority of the study population (67%), whereas males accounted for 33%. Detailedclinical and demographic features are presented in Table I.

Regarding baseline risk factors and comorbid conditions, 22% of the patients had a history of smoking, while 9% reported alcohol consumption. Other addictions were reported in 7% of the patients. Among the medical comorbidities, diabetes mellitus was present in 25% of patients, hypertension in 32%, and dyslipidemia in 18%. A family history of gallstone disease was reported by 24% of the participants. With respect to anesthetic risk classification, 39% of the patients were categorized as ASA class I, 46% as ASA class II, and 15% as ASA class III (Table II).

A comparison of gastrointestinal symptoms before and after cholecystectomy demonstrated a significant reduction in several symptoms. Pain attacks were reported by 91% of patients preoperatively, which decreased to 39% postoperatively ($p < 0.001$). Similarly, heartburn decreased from 38% before surgery to 3% after surgery ($p < 0.001$). Abdominal fullness showed a reduction from 36% preoperatively to 12% postoperatively ($p = 0.002$). Bloating also decreased significantly from 40% to 16% following surgery ($p < 0.001$).

Other symptoms also showed significant improvement after cholecystectomy. Belching decreased from 30% to 10.2% ($p = 0.003$), while the proportion of patients reporting reduced enjoyment of food decreased from 32% to 19% ($p = 0.021$). Restricted eating declined from 36% preoperatively to 16% postoperatively ($p = 0.014$). Regurgitation also demonstrated a significant reduction from 13% to 7% ($p = 0.048$).

In contrast, diarrhea did not show a statistically significant change after surgery. The prevalence of diarrhea was 18% before surgery and 20% after surgery ($p = 0.812$). Overall, the findings indicate that cholecystectomy resulted in significant improvement in most gastrointestinal symptoms, particularly biliary pain and dyspeptic symptoms, while some postoperative gastrointestinal complaints persisted in a subset of patients (Table III).

Table I

Clinical and Demographic Features of Study Participants (N=100)

Variable	Mean ± SD / n (%)
Age (years)	43.6 ± 9.8
BMI (kg/m²)	26.9 ± 4.4
Duration of gallstone disease (months)	12.5 ± 5.6
Stone size (mm)	9.8 ± 2.9
Intraoperative time (minutes)	65.6 ± 13.7
Blood loss (ml)	88.2 ± 25.7
Male	33 (33%)
Female	67 (67%)

Table II

Baseline Risk Factors and Comorbidities (N=100)

Variable	Frequency (n)	Percentage (%)
Smoking (>5 pack years)	22	22%
Alcohol consumption	9	9%
Other addiction	7	7%
Diabetes mellitus	25	25%
Hypertension	32	32%
Dyslipidemia	18	18%
Family history of gallstone disease	24	24%
ASA I	39	39%
ASA II	46	46%
ASA III	15	15%

Table III

Comparison of Symptoms Before and After Cholecystectomy (N=100)

Symptom	Preoperative n (%)	Postoperative n (%)	χ^2 value	p-value
Pain attacks	91 (91%)	39 (39%)	52.4	<0.001
Heartburn	39 (38%)	3 (3%)	33.7	<0.001
Abdominal fullness	36 (36%)	12 (12%)	9.5	0.002
Bloating	40 (40%)	16 (16%)	12.7	<0.001
Belching	30 (30%)	10 (10%)	8.7	0.003
Not enjoying food	32 (32%)	19 (19%)	5.3	0.021
Restricted eating	36 (36%)	16(16%)	6.0	0.014
Regurgitation	13 (13%)	7 (7%)	3.9	0.048
Diarrhea	19 (18%)	20 (20%)	0.006	0.812

DISCUSSION

Gallstone disease remains one of the most common gastrointestinal disorders worldwide and is a frequent indication for surgical intervention. Cholecystectomy is widely considered the standard treatment for symptomatic gallstones and is expected to provide relief from biliary pain and associated gastrointestinal symptoms. The present study evaluated symptomatic outcomes in patients undergoing cholecystectomy and demonstrated a significant reduction in several preoperative symptoms following surgery.

In this study, biliary pain showed a marked reduction after cholecystectomy. Pain attacks were reported by 91% of patients before surgery and decreased to 39% after surgery, indicating a significant improvement. These findings support previous evidence suggesting that cholecystectomy is highly effective in relieving biliary colic. Earlier systematic reviews have reported that more than 90% of patients experience relief from biliary pain following laparoscopic cholecystectomy[16]. The results of the present study are therefore consistent with the established understanding that removal of the gallbladder effectively eliminates the source of biliary obstruction and inflammation responsible for gallstone-related pain.

In addition to relief of pain, several dyspeptic symptoms improved significantly after surgery. Symptoms such as heartburn, abdominal fullness, bloating, belching, regurgitation, and restricted eating showed a noticeable reduction in frequency following cholecystectomy. Similar improvements in upper gastrointestinal symptoms have been reported in previous clinical studies. A study conducted on patients undergoing cholecystectomy demonstrated significant reductions in symptoms such as nausea, bloating, regurgitation, and abdominal discomfort after surgery. These findings suggest that removal of the gallbladder may relieve the functional disturbances associated with gallstone disease, leading to improvement in digestive symptoms and overall patient comfort[17].

However, not all symptoms improved following surgery. In the current study, diarrhea did not show a statistically significant reduction after cholecystectomy. The proportion of patients reporting diarrhea remained similar before and after surgery. Persistent or newly developed diarrhea following cholecystectomy has been described in several studies and is considered a recognized postoperative complication in a subset of patients. A prospective study by Farrugia et al. (2024) reported that post-cholecystectomy diarrhea may be related to changes in bile acid metabolism following removal of the gallbladder[18]. After cholecystectomy, bile flows directly into the intestine instead of being stored and released in a regulated manner. This continuous bile flow may alter intestinal absorption and lead to bile acid malabsorption, which can contribute to symptoms such as diarrhea and bowel urgency.

The persistence of gastrointestinal symptoms after cholecystectomy may also be influenced by other underlying conditions[3]. Functional gastrointestinal disorders such as functional dyspepsia and irritable bowel syndrome are common in the general population and may coexist with gallstone disease. Because many of the symptoms associated with these disorders overlap with symptoms of gallstone disease, patients may continue to experience abdominal complaints even after removal of the gallbladder. In such cases, the symptoms may not be directly related to gallstones but rather to underlying functional gastrointestinal disturbances that become more evident after surgery.

The results of the present study align with those reported by Nasir and colleagues (2018), who documented a 16% prevalence of post-cholecystectomy syndrome within a Pakistani cohort, a figure comparable to the rate of persistent symptoms observed in our patient population. However, our investigation extends these prior observations by providing a more granular symptom-by-symptom analysis across eleven distinct gastrointestinal complaints. Samad and coworkers (2025) reported biliary complications in 22.5% of patients following laparoscopic cholecystectomy; nevertheless, their study focused predominantly on surgical adverse events rather than patient-reported gastrointestinal symptoms. The present study complements these findings by concentrating specifically on symptomatic outcomes from the patient's perspective, which remains equally important for evaluating treatment effectiveness and guiding clinical decision-making.

In addition, a retrospective cohort study by Castillo et al. (2024) found that approximately 15% of patients developed post-cholecystectomy syndrome, with female gender identified as an important risk factor[19]. In the present study, females constituted the majority of the study population, which is consistent with the known higher prevalence of gallstone disease among women. Hormonal factors, particularly the influence of estrogen on cholesterol metabolism and bile composition, are believed to contribute to the higher incidence of gallstones in females[20, 21, 22, 23].

The findings carry direct implications for Pakistani clinical practice. First, preoperative counseling should inform patients that while biliary pain relief is highly predictable (91% to 39% reduction), complete resolution of all gastrointestinal complaints cannot be assured. Second, the absence of diarrhea improvement (18% preoperatively versus 20% postoperatively, $p = 0.812$) suggests that patients with pre-existing diarrhea may not benefit symptomatically from cholecystectomy and should be evaluated for alternative causes. Third, persistent postoperative diarrhea warrants assessment for bile acid malabsorption, manageable with cholestyramine. Fourth, the marked improvement across most symptoms supports cholecystectomy as the standard therapeutic approach for symptomatic gallstone disease.

This investigation possesses several strengths, including prospective data collection, a comprehensive symptom assessment instrument covering eleven distinct gastrointestinal complaints, and representation of a real-world Pakistani tertiary care patient population. Limitations include the single-center design, the relatively modest sample size of 100 participants, the absence of a

non-surgical control group for comparison, the lack of validated quality-of-life measurement instruments, and the relatively short postoperative follow-up duration. Additionally, the descriptive study design does not permit causal inferences regarding factors associated with persistent postoperative symptoms. Future multicenter investigations employing larger sample sizes, extended follow-up periods, and multivariate analytical approaches are warranted to further characterize predictors of symptomatic outcomes following cholecystectomy.

CONCLUSION

Cholecystectomy significantly improves biliary pain and most gastrointestinal symptoms in patients with gallstone disease. However, diarrhea does not improve following surgery and may persist or even increase in some patients. These findings support preoperative patient counseling regarding expected symptomatic outcomes and highlight the need for postoperative evaluation of persistent diarrhea, which may be managed with bile acid sequestrants. Future research should focus on identifying predictors of persistent postoperative symptoms.

REFERENCES

1. Lammert F. Gallstones: The thing in itself. Clinical Liver Disease. 2022.20:57-72
2. Lodha M, Chauhan AS, Puranik A, Meena SP, et al. Clinical profile and evaluation of outcomes of symptomatic gallstone disease in the senior citizen population. Cureus. 2022.14(8)
3. Wanjura V, Lundström P, Österberg J, Rasmussen I, et al. Gastrointestinal quality-of-life after cholecystectomy: indication predicts gastrointestinal symptoms and abdominal pain. World journal of surgery. 2014.38(12):3075-81
4. Abdallah HS, Sedky MH, Sedky ZH. The difficult laparoscopic cholecystectomy: a narrative review. BMC surgery. 2025.25(1):156
5. Shabanzadeh DM. The symptomatic outcomes of cholecystectomy for gallstones. Journal of Clinical Medicine. 2023.12(5):1897
6. Ahmed I, Hudson J, Innes K, Hernández R, et al. Effectiveness of conservative management versus laparoscopic cholecystectomy in the prevention of recurrent symptoms and complications in adults with uncomplicated symptomatic gallstone disease (C-GALL trial): pragmatic, multicentre randomised controlled trial. bmj. 2023.383
7. Zeineddin A, Cornwell III EE, Fullum TM, Chu QD, et al. Early cholecystectomy in patients with sickle cell disease with uncomplicated cholelithiasis is associated with better outcomes. Journal of the American College of Surgeons. 2024.238(4):543-50
8. Kousgaard N, Rasmussen SKM, Möller S, Koulaouzidis A, et al. Symptomatic uncomplicated gallstone disease is associated with a high short-term risk of gallstone-related complications: a contemporary cohort study. Scandinavian Journal of Gastroenterology. 2024.59(8):954-60
9. Latenstein CS, Hannink G, van der Bilt JD, Donkervoort SC, et al. A clinical decision tool for selection of patients with symptomatic cholelithiasis for cholecystectomy based on reduction of pain and a pain-free state following surgery. JAMA surgery. 2021.156(10):e213706
10. Latenstein CS, Wennmacker SZ, Groenewoud S, Noordenbos MW, et al. Hospital variation in cholecystectomies in the Netherlands: a nationwide observational study. Digestive Surgery. 2020.37(6):488-94
11. Shenoy R, Kirkland P, Hadaya JE, Tranfield MW, et al. Management of symptomatic cholelithiasis: a systematic review. Systematic Reviews. 2022.11(1):267
12. Innes K, Hudson J, Banister K, Croal B, et al. Core outcome set for symptomatic uncomplicated gallstone disease. British Journal of Surgery. 2022.109(6):539-44
13. Taha M, Aleesa BA, Algarni MA, Alomari SM, et al. Evaluating patient satisfaction and quality of life after undergoing laparoscopic cholecystectomy in Al-Qunfudhah Governorate, Saudi Arabia. Cureus. 2024.16(6)
14. Nyundo M, Kayondo K, Gasakure M, Urimubabo JC, et al. Patient-reported outcome, perception and satisfaction after laparoscopic cholecystectomy in Kigali, Rwanda. Surgery Open Science. 2023.15:67-72
15. Thunnissen FM, Baars C, Arts R, Latenstein CS, et al. Persistent and new-onset symptoms after cholecystectomy in patients with uncomplicated symptomatic cholecystolithiasis: A post hoc analysis of 2 prospective clinical trials. Surgery. 2023.174(4):781-6
16. Lamberts MP, Lugtenberg M, Rovers MM, Roukema AJ, et al. Persistent and de novo symptoms after cholecystectomy: a systematic review of cholecystectomy effectiveness. Surgical endoscopy. 2013.27(3):709-18
17. Aggarwal M, Agarwal N, Mishra TS, Sharma N, et al. Is laparoscopic cholecystectomy effective in relieving dyspepsia in patients of cholelithiasis? A prospective study. Tropical Gastroenterology. 2016.37(2):86-92
18. Farrugia A, Williams N, Khan S, P. Arasaradnam R. Bile acid diarrhoea and metabolic changes after cholecystectomy: a prospective case-control study. BMC gastroenterology. 2024.24(1):282
19. Casfillo J, Narayan S, Urreola G, Soufi K, et al. Risk Factors Associated with Post-Cholecystectomy Syndrome and Insights into Post-Surgical Follow-Up: Retrospecfive Cohort Study. J Surgery 2024; 4 (2).1174
20. Khan M, Raj R, Shibu A, Sharma R, et al. Gallstone Disease in Females: Predominance, Multiplicity, Gallbladder Stone Formation and Clinical Parameter Analysis in a Prospective Cross-Sectional

Observational Study. Vascular and Endovascular Review. 2025.8(16s):381-5
21. Salari N, Hasheminezhad R, Heidarisharaf P, Khaleghi AA, et al. The global prevalence of gallstones in pregnancy: A systematic review and meta-analysis. European Journal of Obstetrics & Gynecology and Reproductive Biology: X. 2023.19:100237
22. Huang X, Hao X, Wang T, Zhang X, et al. Sex-related association between smoke exposure and gallstones in a US population: a cross-sectional study. BMC Public Health. 2025.25(1):344
23. Saddique MN, Saleem S, Shahid I, Javid S, et al. The estrogen-gallstone connection: uncovering the pathways. Discover Public Health. 2024.21(1):113