OPEN ACCESS

ORIGINAL ARTICLE *Volume 14 (Issue 4), 2025*

PAKISTAN JOURNAL OF MEDICINE & DENTISTRY

Prevalence of Complications of Patients Presenting in Surgical Outdoor with Gallbladder Stones

Muhammad Junaid[1], *Imran Sadiq*[1], *Ahsan Masud Chaudhry*[1], *Sundas Sohail*[1], *Mian Ammar Farooq*[1], *Muhammad Javed Shakir*[1]

[1]*Department of General Surgery, Fatima Memorial Hospital, Lahore, Pakistan.*

ABSTRACT

Background: Gallstones are a prevalent gastrointestinal disorder that does not provide symptoms in many cases, but a considerable number of patients experience complications that result in surgical treatment. The study aimed to determine the pattern and frequency of complications due to gallbladder stones in symptomatic patients attending the surgical outpatient department.

Methods: A descriptive cross-sectional study was conducted in the surgery outpatient unit of a tertiary care hospital over six months. The postoperative assessment of 246 adult patients who had received surgery in response to gallbladder stones was evaluated. The included patients were those who were not asymptomatic and were released within 24 hours of the surgical procedure. The emergence of complications, like biliary colic, etc., and other less common consequences, was evaluated using the clinical assessment and imaging, consisting of an ultrasound. Data were analysed through SPSS v27.0, and the chi-square and t-tests were employed (p-value <0.05, significant).

Results: There were 246 patients, with 199 (80.9%) patients showing one or more complications. The most prevalent one was the biliary colic in 123 patients (50.0%), followed by acute cholecystitis (36; 14.6%) and acute biliary pancreatitis (16; 6.5%). Unusual complications were gallbladder perforation in 12 patients (4.9 %), hydrops (5; 2.0%), cholangitis (4; 1.6%), gallstone ileus (3; 1.2%), and Bouveret syndrome (1; 0.4%). Most patients were female (172; 70.0%) with a mean age of 47.5 ±12.6 years.

Conclusion: A substantial percentage of patients with gallstones experience complications, and the most common ones are biliary colic and acute cholecystitis. In symptomatic patients, routine follow-up with early elective cholecystectomy must be encouraged to alleviate outpatient surgical load and morbidity due to complications.

Keywords: Cholelithiasis, Gallbladder Diseases, Postoperative Complications, Outpatients, Cross-Sectional Studies, Prevalence.

***Corresponding Author:** Muhammad Junaid
Email: muhammadjunaidsurg@gmail.com

Citation: Junaid M, Sadiq I, Chaudhry AM, Sohail S, Farooq MA, Shakir MJ Prevalence of Complications of Patients Presenting in Surgical Outdoor with Gallbladder Stones. Pak J Med Dent. 2025 September ;14(4): A-B. Doi: https://doi.org/10.36283/ziun-pjmd14-4/004.

Received: Mon, August 4, 2025 **Accepted:** Tue, August 26, 2025 **Published:** Mon, September 29, 2025

INTRODUCTION

Gallstones are solid concretions in the gallbladder, which are chemically divided into cholesterol, pigment, and mixed ones. Gallstones consist of 90 % cholesterol stones (>50 % cholesterol) or mixed stones (20 to 50 % cholesterol), and the other 10 % are pigment gallstones (<20 % cholesterol) [1]. Gallstone disease is the prevalent gastrointestinal disorder, affecting both the United States and Europe [2]. Nevertheless, only one-fifth to one-third of these persons will develop symptoms, and this phenomenon usually appears in the form of biliary colic [3]. The asymptomatic gallstone illness does not have high rates of complications, as only 1% of the cases are estimated to develop annually [4].

Acute cholecystitis is often associated with gallstones in 90% of cases, characterized by local inflammation (e.g., pain in the right upper quadrant, tenderness) along with systemic symptoms, including fever and leukocytosis [5]. Complications include acute suppurative cholangitis, which has clinically been found to cause Charcot triad (fever, jaundice) or, in extreme cases, the Reynold pentad [6]. Also, another significant complication is acute biliary pancreatitis, which can coexist with or resemble cholecystitis symptomatically, and diagnostic challenges occur due to a similar set of symptoms and an increased level of pancreatic enzymes. Less common, yet clinically important consequences are Mirizzi syndrome, cholecystocholedochal fistula, and gallstone ileus [7].

The reported prevalence of complications of gallstones is as follows: biliary colic (70-80%), acute cholecystitis (10%), gallbladder perforation (up to 12%), acute biliary pancreatitis, and less common emphysematous cholecystitis, Mirizzi syndrome, hydrops of the gallbladder, gallstone ileus, and Bouveret syndrome, each less than 1-2% [8]. One third of patients develop symptoms of gallstones, which serves as evidence of the need to diagnose and treat them in time [9].

Despite international data, local evidence on the burden and range of gallstone-related complications in surgical outpatient departments is scarce in Pakistan.

The present study aimed to assess the incidence of complications related to gallbladder stones among surgical outpatients over six months in a tertiary care hospital in Pakistan.

METHODS

A descriptive cross-sectional study was conducted in Surgical Unit-I of Fatima Memorial Hospital, Lahore, a tertiary care teaching hospital in Pakistan, over six months between March 2023 and June 2024. The ethical approval was sought by the Institutional Review Board (IRB) of Fatima Memorial Hospital (Ref: FMH-IRB-1221) before commencement of the data collection.

The study was conducted on a non-probability consecutive sampling design where 246 patients were included. The OpenEpi version 3.0 (released 2013, Atlanta, GA, USA) was used to calculate the sample size; the estimated complication frequency of less than 10%, level of confidence 95% and the alpha 0.05. The sample size was selected because it is statistically relevant, but also considering the practical possibility within an outpatient treatment facility of the hospital.

The inclusion criteria included patients aged between 18 to 80 years, who had received surgical treatment of their gallbladder stones and were assessed at the surgical outpatient department. Only symptomatic ones were included, i.e., patients who came with complaints, like right upper quadrant pain or with biliary colic. The patients were excluded when they fell out of the age range, had asymptomatic gallstones, or did not have a surgical treatment for the gallbladder stones.

The eligible patients were assessed postoperatively within 24 h of discharge after providing written informed consent. A completed structured proforma was used to collect the data, which included information about the demographics of patients, clinical history, and complications associated with gallstone disease. The differential diagnoses were handled by a surgical team that gave clinical observation, lab workup, ultrasonography, and radiological imaging to pre-diagnose the complications. The complications that were reviewed were biliary colic, acute cholecystitis, emphysematous cholecystitis, Mirizzi syndrome, hydrops of the gallbladder, gallstone ileus (small bowel obstruction), Bouveret syndrome (gastric outflow obstruction), gallbladder perforation, acute biliary pancreatitis, and acute suppurative or obstructive cholangitis. IBM SPSS version 26 (released in 2019 by IBM Corp., Armonk, NY) was used to enter and analyse all the data, with a p-value of <0.05 considered to be statistically significant.

RESULTS

A total of 246 patients who fit the inclusion criterion were assessed within a six-month study period. Most of the patients were women (n = 172, 70%), and overall, the mean age of the study population was 47.5±12.6 years. Of all the samples, 199 patients (80.9%) had one or more complications associated with gallbladder stones, and 47 patients (19.1%) had no complications. Biliary colic was the most frequently found complication, with 123 patients (50.0%), acute cholecystitis with 36 patients (14.6%), and acute biliary pancreatitis with 16 patients (6.5%) were recorded.

Table 1: Demographic and Clinical Characteristics of Study Participants (n = 246)

Variable	Frequency (%)	Mean ± SD
Age (years)	-	47.5 ± 12.6
Female	172 (70.0%)	-
Male	74 (30.0%)	
Patients with at least one complication	199 (80.9%)	
Patients without complications	47 (19.1%)	

Less frequently observed complications were perforation of the gallbladder (n = 12, 4.9%), hydrops of the gallbladder (n = 5, 2.0%), and acute suppurative or obstructive cholangitis (n = 4, 1.6%). More

unusual complications, including Mirizzi syndrome, emphysematous cholecystitis, gallstone ileus, and Bouveret syndrome, were each witnessed in less than 2% of cases. The demographic and clinical characteristics of the participants of the study are summarized in **Table 1**.

Table 2: Frequency of Gallstone-Related Complications (n = 246)

Complication	Frequency (n)	Percentage (%)	Mean Age ± SD (years)
Biliary colic	123	50.0%	45.2 ± 11.7
Acute cholecystitis	36	14.6%	49.3 ± 13.4
Acute biliary pancreatitis	16	6.5%	48.7 ± 12.2
Gallbladder perforation	12	4.9%	50.1 ± 11.3
Hydrops of the gallbladder	5	2.0%	46.4 ± 12.9
Acute suppurative/obstructive cholangitis	4	1.6%	52.2 ± 13.7
Gallstone ileus	3	1.2%	58.1 ± 9.8
Emphysematous cholecystitis	2	0.8%	51.5 ± 10.5
Mirizzi syndrome	2	0.8%	54.0 ± 11.0
Bouveret’s syndrome	1	0.4%	62.4 ± 10.1

The percentage rate of complication incidence, as well as the distribution of complications related to gallbladder stones, is shown in **Table 2.** More than two-thirds of the complications were biliary colic and acute cholecystitis. By comparing males and females, it was found that the cases of acute cholecystitis and biliary pancreatitis occurred more frequently in the female gender, but this was not statistically significant ($p > 0.05$).

Table 3: Gender-wise Distribution of Gallstone Complications (n = 199)

Complication	Female (n = 140)	Male (n = 59)	p-value
Biliary colic	91 (65.0%)	32 (54.2%)	0.102
Acute cholecystitis	21 (15.0%)	15 (25.4%)	0.063
Acute biliary pancreatitis	11 (7.9%)	5 (8.5%)	0.891
Others (combined)	17 (12.1%)	7 (11.9%)	0.974

Additional analysis by the Chi-square test revealed no significant relationship between the type of complication, the gender of patients (p = 0.154), and the age category (p = 0.097). The allocation of complications as determined by gender is described in **Table 3**.

In general, biliary colic was the most common complication, with 50% of the total population affected, and other rare complications, such as Bouveret syndrome, had less than 1 percent of the total population. Statistically significant relationships between specific complications and demographics were not established, but certain trends were identified and should be investigated in future studies at a larger scale.

DISCUSSION

Gallstone disease is a leading cause of gastrointestinal morbidity globally and especially in low and middle-income nations such as Pakistan [10]. In the present study, it was inferred that out of 115 patients who came to the outpatient surgical department with symptomatic gallbladder stones, 80.9% had one or more complications. This reflection highlights the high burden of disease that is associated with gallstones, particularly in cases where it is late to diagnose or treat those [11]. The majority of cases of biliary colic (50%), acute cholecystitis (14.6%), and acute biliary pancreatitis (6.5%) are in line with previous data stating that biliary colic is often the first and most common symptomatic manifestation of cholelithiasis [12].

The frequency of acute cholecystitis and pancreatitis observed in several studies of the United States and Europe varies between 10-20% and 5-15% respectively, [13]. Our results are also comparable with regional reports that also state similar complication patterns in outpatient surgical patients [14,15]. The rare complications noted included Mirizzi syndrome (0.8%), gallstone ileus (1.2%), and Bouveret syndrome (0.4 per cent) in line with the fact that these complications have been reported in not more than 2% of admissions with gallstones [16].

The dominance of females in this study (70%) also agrees with the previous epidemiological data identifying gallstones with the hormonal factors, specifically, with bile supersaturation of cholesterol due to the action of estrogens [17]. Although the average age of the patients was 47.5 ±12.6 years, there tended to be an older age in uncommon complications, including gallstone ileus and Bouveret syndrome, which is elaborated in the articles [18,19]. Nonetheless, the statistical test did not show any significant gender- or age-associated relationship to complication type, which supports the multifactorial hierarchy of gallstone disease [20].

The study provides important information on the reality of gallstone complications in the real world in tertiary care, especially among individuals who are outpatients after surgery. This is a relatively unexplored population since the majority of the existing studies focus on in-hospital data [21,22]. Also, the higher diagnostic accuracy was obtained in categories through the application of radiological and clinical confirmation of complications [23,24].

However, a number of limitations are to be considered. The selection bias might be used by the non-probability consecutive sampling method, and generalizability will become restricted. Also, due to the evaluation of patients within 24 hours after the surgery, it is possible that late-presenting complications were overlooked. The advanced imagery methods, e.g., MRCP or CT, were not used uniformly and might have resulted in insufficient identification of deep-seated or out-of-the-ordinary

complications [25]. The prospective, multicentric design of the future research is recommended with some increase in the follow-up periods and a standardized rule of imaging. Moreover, a combination of community education, high-risk population preventive screening, and earlier elective cholecystectomy on symptomatic cases can potentially alleviate the problem of late-stage complications.

CONCLUSION

The study identifies a great incidence of complications among patients with symptomatic gallbladder stones seeking treatment in a tertiary care surgical outpatient department and shows biliary colic, acute cholecystitis, and acute biliary pancreatitis as the most prevalent complications. The majority of complications can be addressed promptly using surgery, but the problem of rare cases of serious complications, including gallstone ileus, Mirizzi syndrome, and gallbladder perforation, confirms the importance of early diagnosis and thorough postoperative assessment. The development of standardized follow-up protocols and improvements in disease awareness can be critical towards minimizing the burden of morbidity associated with gallstones in the outpatient care setting, especially in resource-restricted areas.

LIST OF ABBREVIATIONS

BMI	Basal Metabolic Index
IRB	Institutional Review Board
FMH	Fatima Memorial Hospital

ACKNOWLEDGMENT

None

FUNDING

None

CONFLICT OF INTEREST

None

ETHICAL APPROVAL

The ethical approval was sought by the Institutional Review Board (IRB) of Fatima Memorial Hospital (Ref: FMH-IRB-1221).

AUTHORS' CONTRIBUTION

All Authors Claimed to be in equal contribution as per ICMJE.

REFERENCES

1. Junhai GR, Topu MH, Joty RB, Moslem S, Della NA, Mahmud MR, et al. Epidemiology of Gallbladder Stones in Youth: Prevalence, Risk Factors, and Contributing Variables. Asia Pac J Surg Adv. 2025 Feb 17;2(1):33-40. doi: 10.70818/apjsa.2025.v02i01.017
2. Allatif RE, Mannaerts GH, Al Afari HS, Hammo AN, Al Blooshi MS, Bekdache OA, et al. Concomitant cholecystectomy for asymptomatic gallstones in bariatric surgery—safety profile and feasibility in a large tertiary referral bariatric center. Obes Surg. 2022 Feb;32(2):295-301. doi: 10.1007/s11695-021-05798-9
3. Almetrek M, Alsharabi A, Al Jarfan M, Alganmi A, Alotaibi S, Almalki F, et al. Knowledge and awareness about gallbladder stones and their complications among the general population in Saudi Arabia. Med Sci. 2022 Dec;26(130):01-11. doi: 10.54905/disssi/v26i130/ms567e2663
4. Al-Hayali M, Sami RA. Gallbladder Perforation During Elective Laparoscopic Cholecystectomy: Incidence, Risk Factors, and Outcomes. Indian J Public Health Res Dev. 2021 Oct 1;12(4).319. doi: 10.37506/ijphrd.v12i4.16564
5. Gupta R, Kumar A, Hariprasad CP, Kumar M. Anatomical variations of cystic artery, cystic duct, and gall bladder and their associated intraoperative and postoperative complications: an observational study. Ann Med Surg. 2023 Aug 1;85(8):3880-3886. doi: 10.1097/MS9.0000000000001079
6. Li X, Ouyang J, Dai J. Current gallstone treatment methods, state of the art. Diseases. 2024 Aug 26;12(9):197. Doi: 10.3390/diseases12090197
7. KHAN R, PARI B. RISK FACTORS OF GALLBLADDER STONE IN LADY READING HOSPITAL PESHAWAR, PAKISTAN. Quantum J Soc Sci Humanit. 2023 Oct 19;4(5):195-213. Doi:10.55197/qjssh.v4i5.304
8. Pahari S, Basukala S, Piya U, Khand Y, Thapa B, Thapa O, et al. Gallstone among Patients Presenting to the Department of Surgery in a Tertiary Care Center: A Descriptive Cross-sectional Study. JNMA J Nepal Med Assoc. 2023 Apr 1;61(260):315-319. doi: 10.31729/jnma.8123.
9. Gautam A, Pandey A, Masood S, Chauhan S, Choudhary D, Kumar S, et al. Incidental Gallbladder Carcinoma in Gallbladder Polyps: Challenges of Gallbladder Malignancy for an Endemic Population. Malays J Med Sci. 2021 Feb;28(1):27-34. doi: 10.21315/mjms2021.28.1.4.
10. Salati SA, Alfehaid M, Alsuwaydani S, AlSulaim L. Spilled gallstones after laparoscopic cholecystectomy: a systematic review. Pol Przegl Chir. 2022 May 23;95(2):55-78. Doi: 10.5604/01.3001.0015.8571
11. KHALIQ M, KHAN MH, AWAN B, SAEED Z, MAHMOOD A. Frequency of Biliary Complications in Laparoscopic Cholecystectomy. PJMHS. 2021;15(9):2587-2590. Doi: :10.53350/pjmhs211592587
12. Park SE, Choi HJ, You YK, Hong TH. Clinical significance of preoperative antibiotic use in mild to moderate acute inflammatory gallbladder disease: a randomized controlled trial. J Hepatobiliary Pancreat Sci. 2023 Apr;30(4):482-492. Doi: 10.1002/jhbp.1237
13. Wu PH, Yu MW, Chuang SC, Wang SN, Kuo KK, Chang WT, et al. Comparison of laparoscopic common bile duct exploration plus cholecystectomy and endoscopic retrograde cholangiopancreatography followed by laparoscopic cholecystectomy for elderly patients with common bile duct stones and gallbladder stones. J Gastrointest Surg. 2024 May 1;28(5):719-724. Doi: 10.1016/j.gassur.2024.02.026
14. LeCompte MT, Robbins KJ, Williams GA, Sanford DE, Hammill CW, Fields RC, et al. Less is more in the difficult gallbladder: recent evolution of subtotal cholecystectomy in a single HPB unit. Surg Endosc. 2021 Jul;35(7):3249-3257. Doi: 10.1007/s00464-020-07759-2.

15. Alam MR, Nuruzzaman M, Begum M, Alim MA, Rahman MM, Karim MR, et al. The frequency of port-site infection in laparoscopic cholecystectomies. Med Today. 2021 Feb 25;33(1):22-26. Doi: 10.3329/medtoday.v33i01.52153
16. Jung J, Basrai Z, Celedon M, Grock A. Retained gallstones: an elusive complication of laparoscopic cholecystectomy. BMJ Case Reports CP. 2020 Dec 1;13(12):e238456. Doi: 10.1136/bcr-2020-238456
17. Szymoniuk M, Brachet A, Ciejka K, Zielkowska A, Błaszczyk J, Burdan O, et al. Clinical significance of Left-Sided Gallbladder for laparoscopic cholecystectomy and hepatectomy. Pol J Surg. 2023 Jan 9;96(1):65-74. Doi: 10.5604/01.3001.0016.2124.
18. Schendel J, Ball C, Dixon E, Sutherland F. Prevalence of anatomic landmarks for orientation during elective laparoscopic cholecystectomies. Surg Endosc. 2020 Aug;34(8):3508-3512. Doi: 10.1007/s00464-019-07131-z
19. Talha A, Abdelbaki T, Farouk A, Hasouna E, Azzam E, Shehata G. Cholelithiasis after bariatric surgery, incidence, and prophylaxis: randomized controlled trial. Surg Endosc. 2020 Dec;34(12):5331-5337. Doi: 10.1007/s00464-019-07323-7
20. Cirocchi R, Amato L, Ungania S, Buononato M, Tebala GD, Cirillo B, et al. Management of acute cholecystitis in High-Risk patients: percutaneous gallbladder drainage as a definitive treatment vs. Emergency Cholecystectomy—Systematic review and Meta-Analysis. J Clin Med. 2023 Jul 26;12(15):4903. Doi: https://doi.org/10.3390/jcm12154903
21. Klimkowski SP, Fung A, Menias CO, Elsayes KM. Gallbladder imaging interpretation pearls and pitfalls: ultrasound, computed tomography, and magnetic resonance imaging. Radiol Clin. 2022 Sep 1;60(5):809-824. Doi: 10.1016/j.rcl.2022.05.002
22. Patel VB, Musa RK, Patel N, Patel SD. Role of MRCP to determine the etiological spectrum, level, and degree of biliary obstruction in obstructive jaundice. J Family Med Prim Care. 2022 Jul 1;11(7):3436-3441. Doi: 10.4103/jfmpc.jfmpc_2362_21
23. Cai HJ, Wang W, Fang JH, Chen CH, Kong FL, Xu CK. Treatment of acute suppurative cholecystitis with coagulopathy by percutaneous transhepatic gallbladder drainage after hepatic needle-track ablation: report of a new technique. Quant Imaging Med Surg. 2021 Apr;11(4):1674-1679. doi: 10.21037/qims-20-576.
24. Ahmad DS, Faulx A. Management of postcholecystectomy biliary complications: a narrative review. Am J Gastroenterol. 2020 Aug 1;115(8):1191-1198. Doi: 10.14309/ajg.0000000000000704
25. Kharazmi E, Scherer D, Boekstegers F, Liang Q, Sundquist K, Sundquist J, et al. Gallstones, cholecystectomy, and kidney cancer: observational and mendelian randomization results based on large cohorts. Gastroenterology. 2023 Jul 1;165(1):218-227. Doi: 10.1053/j.gastro.2023.03.227.
26. Bozic D, Ardalic Z, Mestrovic A, Bilandzic Ivisic J, Alicic D, Zaja I, et al. Assessment of gallbladder drainage methods in the treatment of acute cholecystitis: A literature review. Medicina. 2023 Dec 20;60(1):5. Doi: 10.3390/medicina60010005.