The Research of Medical Science Review
ISSN: 3007-1208 & 3007-1216 Volume 3, Issue 7, 2025

GENDER BASED DISTRIBUTION AND CLINICAL PRESENTATION OF ACUTE CHOLECYSTITIS PATIENTS AT A TERTIARY CARE HOSPITAL

Dr. Muhammad Mubeen[*1], Prof. Dr. M Jamal Uddin[2], Dr. Imran Ahmed Khan[3], Dr. Hajra Hilal Ahmed[4], Dr. Umair[5], Dr. Asma Mozaffar[6]

[*1,6]*Postgraduate Trainee SU II, MBBS, Abbasi Shaheed Hospital (ASH)*
[2]*Supervisor SU II, MBBS, FCPS, Abbasi Shaheed Hospital (ASH)*
[3]*Senior Registrar SU II, MBBS, MS, Abbasi Shaheed Hospital (ASH)*
[4]*Assistant Professor, MBBS, FCPS, UMDC and Creek General Hospital*
[5]*Resident Surgeon SU II, MBBS, FCPS, Abbasi Shaheed Hospital (ASH)*

[*1]dr.muhammadmubeen18@gmail.com, [2]muhammad.jamaluddin@mhef.edu.pk, [3]drimranahmedkhan29@gmail.com, [4]hajrahilal@gmail.com, [5]mu.dahar@hotmail.com, [6]asma_muzaffer@hotmail.com

DOI: https://doi.org/10.5281/zenodo.15811960

Keywords
Acute Cholecystitis, Murphy' Sign, Gender Differences, Abdominal Pain

Article History
Received on 28 May 2025
Accepted on 28 June 2025
Published on 05 July 2025

Corresponding Author: *
Dr. Muhammad Mubeen

Abstract

OBJECTIVE: *This study aims to identify the frequency of acute cholecystitis across genders and analyze the respective clinical presentation in adults within a tertiary care hospital setting.*

METHODOLOGY: *A descriptive cross-sectional study was performed from 2024 to 2025 at Abbasi Shaheed Hospital Karachi to assess gender-based difference in the clinical presentation of acute cholecystitis. A consecutive non-probability sampling method was used to include adult patients aged 18 years and above with symptoms of acute cholecystitis who presented within 48 hours of the onset of symptoms. Statistical analysis of data related to demographics, clinical features, laboratory parameters and ultrasound findings was done using SPSS version 26. Statistical significance was set at $p \leq 0.05$.*

RESULT: *Among 79 patients, 48 (60.8%) were female and 31 (39.2%) male, with a mean age of 52.65 ± 13.98 years. Acute cholecystitis was diagnosed in 22 patients (27.8%). Right upper quadrant pain (83.5%), nausea/vomiting (74.7%), and Murphy's sign (67.1%) were most common. No statistically significant gender-based differences were found in symptoms, comorbidities, or ultrasound findings among patients with acute cholecystitis ($p > 0.05$).*

CONCLUSION: *The research indicates that while the prevalence of gallbladder disease was notably higher among females, males exhibited a greater proportion of diagnoses pertaining to acute cholecystitis. Clinical manifestations including right upper quadrant discomfort, nausea and vomiting, as well as the presence of Murphy's sign were prevalent in both sexes. Nevertheless, no statistically significant gender-related disparities were detected in the clinical presentation, underscoring the necessity for the establishment of standardized diagnostic protocols irrespective of gender in cases of suspected acute cholecystitis.*

INTRODUCTION

Cholecystitis, an inflammation of the gallbladder primarily resulting from gallstones, has historically been recognized as more prevalent among the older population, specifically females [1]. 59.4% of acute

cholecystitis patients are women, the proportion of people with gallstones who develop cholecystitis is higher in men [2]. Men also tend to have more severe symptoms. Older age was previously linked to increased risk of developing cholecystitis [3,4].

However, recent clinical observations have indicated a rise in the occurrence of this condition among younger adults, encompassing both males and females aged between 20–40 years [5].The observed trend switch indicates a possible change in the epidemiological distribution of cholecystitis and such information is essential for further modification of studies to fully reflect the true magnitude of cholecystitis in this specific young population and to determine any apparent sex differences in incidence. In a population study in Brazil, only 22.7% of patients with cholelithiasis/cholecystitis in 2008–2019 were male, but the in-hospital mortality rate increased significantly in men as compared with women [6]. Male gender was significantly associated with gangrenous cholecystitis in one US study in California [7].Another study found gender-based differences in demographics revealing that women made up 65% of cholecystitis admissions, exhibited improved outcomes post-cholecystectomy, including lower mortality rates (0.6% vs 1.1%), fewer complications (16.9 vs 24.1), and shorter hospital stays (4.2 vs 5.4 days) [8]. Hayat et al. [9], studied 200 patients with gallbladder disease out of these, fifty-seven (28.5%) presented with acute cholecystitis and given conservative trial before definitive surgery. 143 patients (71.5%) were symptom free at the time of presentation and they underwent laparoscopic cholecystectomy [9]. Furthermore, it was revealed that out of the 57 with acute cholecystectomy, 17 (29.8%) were male and 40 (70.2%) were females [9].

Overall, these studies suggest that there are gender-based differences in the clinical presentation and outcomes of acute cholecystitis. However, there is a scarcity of literature in the local context and more research is needed to fully understand these differences and their underlying causes.

Our research proposal aims to fill this existing knowledge gap by conducting a comprehensive investigation at a tertiary care hospital to discern the frequency of cholecystitis in the Pakistani population.

METHODOLOGY

This descriptive cross-sectional study was conducted during September 2024 to March 2025 in the Department of General Surgery at Abbasi Shaheed Hospital, Karachi, after the protocol had been approved by the institutional review board. Patients who had presented within 48 hours of right upper-quadrant or epigastric pain, fever, nausea, vomiting or anorexia were enrolled by consecutive non-probability sampling once they had provided written informed consent. Inclusion criteria comprised age ≥18 years and acute onset of the aforementioned symptoms, while exclusion criteria included chronic cholecystitis; alternative causes of upper-quadrant pain (e.g., peptic ulcer disease, pancreatitis, hepatic or renal pathology); prior cholecystectomy; known hepatobiliary malignancy; immunocompromised status or long-term steroid use; pregnancy; and inability or refusal to consent. Acute cholecystitis was defined according to the Tokyo Guidelines 2018 [10], requiring characteristic clinical signs (e.g., Murphy's sign), evidence of systemic inflammation (e.g., leukocytosis or elevated CRP) and supportive ultrasound findings (e.g., gallbladder distension, wall thickening, pericholecystic fluid or gallstones). Demographic information of the participants which includes (age, gender, BMI, comorbidities), clinical parameters, laboratory findings (WBC, CRP, bilirubin, alkaline phosphatase) and imaging data were recorded on a structured proforma and entered into a secure electronic database. Data were analyzed in SPSS v. 26; continuous variables were presented as Mean±SD, categorical variables were expressed as frequencies and proportions, group comparisons were performed by statistical test of significance at $p \leq 0.05$.

RESULT

A total of 79 individuals were included in the study, with an average age of 52.63 ± 9.59 years and a mean body mass index (BMI) of 25.97 ± 3.55 kg/m². Females constituted the majority of the sample (60.8%), whereas males represented 39.2%. Diabetes mellitus was identified as

43.0% of the individuals, and 55.7% were diagnosed with hypertension. Right upper quadrant (RUQ) abdominal pain was reported by 83.5% of the individuals. Furthermore, 59.5% exhibited an active fever, and 40.5% demonstrated moderate fever. Nausea and vomiting were documented in 74.7% of the instances, whereas anorexia was indicated by 43.0% of the subjects. Pericholecystic fluid was detected in 27.8% of the individuals. A positive Murphy's sign was noted in 67.1% of the subjects, suggesting gallbladder inflammation in the preponderance of cases, as elaborated in Table I.

Demographic and clinical characteristics comparison between patients with (n=22; 27.8%) and without (n=57; 72.2%) acute cholecystitis was not significantly different in all the variables. The average age in the acute cholecystitis group was 52.23±9.47 years vs 52.79±9.72 years in the non-cholecystitis group (p=0.817) and the mean BMI was 26.27 ± 3.73 kg/m2 vs 25.86 ± 3.50 kg/m2 (p=0.646). There were 31.8% men in the AC group and 42.1% men in the non-C group (p=0.401). Diabetes mellitus was present in 50.0% and 40.4% of the patients with and without acute cholecystitis (p=0.437), while hypertension was disclosed in 59.1% and 54.4%, respectively (p=0.706). RUQ abdominal pain was reported more commonly by those with acute cholecystitis (90.9% vs. 80.7%) but did not reach significance (p=0.230). Also, there was no significant difference between the groups in terms of fever (63.6% vs 57.9%, p=0.641), nausea/vomiting (72.7% vs 75.4%, p=0.804), anorexia (45.5% vs 42.1%, p=0.788), pericholecystic fluid (31.8% vs 26.3%, p=0.625) and positiveness of Murphy's sign (72.7% vs 64.9%, p=0.508) (Table II).

DISCUSSION

This study explored the gender-based distribution and clinical characteristics of patients with acute cholecystitis using the Tokyo Guidelines 2018 diagnostic framework [7]. Among 79 patients presenting with upper abdominal symptoms, 27.8% were diagnosed with acute cholecystitis. Although females comprised the majority of the overall population (60.8%), a higher proportion of male patients were diagnosed with the acute form, consistent with prior findings suggesting that men, while less frequently affected by gallstones, tend to present later and with more severe disease [3]. Common clinical symptoms in our cohort included right upper quadrant pain (83.5%), nausea and vomiting (74.7%), and positive Murphy's sign (67.1%). However, these features did not significantly differ between patients diagnosed with or without acute cholecystitis, reaffirming the limited diagnostic specificity of individual symptoms and the value of integrated diagnostic criteria as endorsed by the Tokyo Guidelines [7].

The absence of statistically significant differences in clinical features or comorbidities such as diabetes mellitus and hypertension between genders in our study differs from earlier findings by Hayat et al. [10], who identified significant gender-based differences in both clinical presentation and surgical outcomes. In their local Pakistani cohort, although females were more frequently diagnosed with gallstone disease, male patients had higher rates of complications, delayed presentation, and increased conversion to open cholecystectomy. Our study, by contrast, did not evaluate surgical outcomes or postoperative complications, which may account for the discrepancy. Moreover, while both studies observed female predominance, our identification of a greater share of males within the acute cholecystitis group may point toward persistent behavioral and systemic factors delaying male access to care. Comparison with Dua et al. [4] further contextualizes our findings. In their large-scale analysis of U.S. inpatient data, women underwent earlier surgical intervention and had better clinical and economic outcomes, whereas men were more likely to suffer complications, longer hospital stays, and higher mortality. Although our study did not assess surgical timing or outcomes, the disproportionate representation of males in the acute disease group parallels their observation that delayed presentation in men may lead to more severe illness. Our findings thus support previous assertions that gender influences not only the pathophysiology of gallbladder disease but also healthcare utilization and outcomes.

The evolving global epidemiology of cholelithiasis, particularly its increasing

prevalence in younger, overweight individuals, must also be considered. Stinton and Shaffer [11] noted this demographic shift, linking it to rising obesity rates and sedentary lifestyles. This trend may be reflected in our study's patient population, where the mean BMI was 25.97 kg/m² and nearly half had metabolic comorbidities. Moreover, Yang et al. [12] found that elderly patients with comorbidities are at higher risk for severe cholecystitis and adverse outcomes, a concern also highlighted by Kuy et al. [13], who emphasized the need for early surgical intervention in elderly patients to reduce postoperative morbidity.

In terms of gender-specific surgical outcomes, Nikfarjam et al. [14] demonstrated that men were more likely to require conversion to open surgery and had worse postoperative courses even after adjusting for comorbidities. These findings reinforce the importance of early diagnosis and timely intervention in male patients. Physiologic differences may also contribute to these disparities; Persson et al. [15] reported that variations in fat distribution and bile composition between men and women could influence gallstone formation and the severity of gallbladder inflammation, although these biochemical parameters were not examined in our cohort.

Strengths of this study include the prospective nature of data collection, early patient enrollment, and the use of standardized diagnostic criteria. These aspects enhance internal validity and minimize recall bias. However, several limitations must be acknowledged. The single-center design and relatively small sample size limit generalizability. Most importantly, the lack of operative, histopathologic, and follow-up data constrains our ability to assess disease outcomes and severity. Future studies should aim to incorporate multi-institutional cohorts with operative and postoperative metrics, time-to-treatment data, and laboratory-based severity stratification to better understand gender-based patterns in acute cholecystitis and improve clinical decision-making.

While this study confirms the female predominance in overall gallbladder disease, it also highlights that males are disproportionately represented among acute cholecystitis cases, likely due to delayed care and greater disease progression. Clinical presentation alone may be insufficient for accurate diagnosis, and a combination of standardized diagnostic tools and gender-aware management strategies remains essential for improving patient outcomes.

CONCLUSION

The research indicates that while the prevalence of gallbladder disease was notably higher among females, males exhibited a greater proportion of diagnoses pertaining to acute cholecystitis. Clinical manifestations including right upper quadrant discomfort, nausea and vomiting, as well as the presence of Murphy's sign were prevalent in both sexes. Nevertheless, no statistically significant gender-related disparities were detected in the clinical presentation, underscoring the necessity for the establishment of standardized diagnostic protocols irrespective of gender in cases of suspected acute cholecystitis.

Table I: Demographic and Clinical Characteristics of Study Participants (n=79)	
(Mean ± SD)	
Age in years = 52.63 ± 9.59	
Body Mass Index in kg/m^2 = 25.97 ± 3.55	
n (%)	
Gender	
Male	31 (39.2)
Female	48 (60.8)
Diabetes Mellitus	
Yes	34 (43.0)
No	45 (57.0)
Hypertension	
Yes	44 (55.7)

No	35 (44.3)
RUQ Abdominal Pain	
Yes	66 (83.5)
No	13 (16.5)
Fever	
Active	47 (59.5)
Moderate	32 (40.5)
Nausea/Vomiting	
Yes	59 (74.7)
No	20 (25.3)
Anorexia	
Yes	34 (43.0)
No	45 (57.0)
Pericholecystic Fluid	
Yes	22 (27.8)
No	57 (72.2)
Murphy's Sign	
Positive	53 (67.1)
Negative	26 (32.9)

Table II: Comparison of Demographic and Clinical Characteristics Among Patients with and without Acute Cholecystitis (n=79)

Patient Characteristics		Acute Cholecystitis		95% C. I	P-Value
		Yes (n=22)	No (n=57)		
Age in years		52.23 ± 9.47	52.79 ± 9.72	-5.388-----4.264	0.817
Body Mass Index in kg/m^2		26.27 ± 3.73	25.86 ± 3.50	-1.372-----2.198	0.646
Gender, *n (%)*	Male	7 (31.8)	24 (42.1)	0.227-----1.815	0.401
	Female	15 (68.2)	33 (57.9)		
Diabetes Mellitus, *n (%)*	Yes	11 (50.0)	23 (40.4)	0.550-----3.975	0.437
	No	11 (50.0)	34 (59.6)		
Hypertension, *n (%)*	Yes	13 (59.1)	31 (54.4)	0.447-----3.283	0.706
	No	9 (40.9)	26 (45.6)		
RUQ Abdominal Pain, *n (%)*	Yes	20 (90.9)	46 (80.7)	0.485-----11.791	0.230
	No	2 (9.1)	11 (19.3)		
Fever, *n (%)*	Yes	14 (63.6)	33 (57.9)	0.461-----3.513	0.641
	No	8 (36.4)	24 (42.1)		
Nausea/Vomiting, *n (%)*	Yes	16 (72.7)	43 (75.4)	0.285-----2.649	0.804
	No	6 (27.3)	14 (24.6)		
Anorexia, *n (%)*	Yes	10 (45.5)	24 (42.1)	0.426-----3.085	0.788
	No	12 (54.5)	33 (57.9)		
Pericholecystic Fluid, *n (%)*	Yes	7 (31.8)	15 (26.3)	0.447-----3.823	0.625
	No	15 (68.2)	42 (73.7)		
	Positive	16 (72.7)	37 (64.9)	0.487-----4.264	0.508

Murphy's Sign, *n (%)*	Negative	6 (27.3)	20 (35.1)		

REFERENCE

Falkowski E, Halpin V, Whinney RR. Acute cholecystitis. *BMJ Clin Evid*. 2008; 2008:0411.

Dorostan N, Boostani MR, Nazari I, Rajai E, Bahadoram M. The role of gender in cholecystitis complications. Int J Adv Biol Biomed Res. 2014;2(6):1997–2000.

Gallaher JR, Charles A. Acute cholecystitis: a review. JAMA. 2022 8;327(10):965–975.

Wadhwa V, Jobanputra Y, Garg SK, Patwardhan S, Mehta D, Sanaka MR. Nationwide trends of hospital admissions for acute cholecystitis in the United States. Gastroenterology. 2017;5(1):36–42.

Jaul E, Barron J. Age-related diseases and clinical and public health implications for the 85 years old and over population. Front Public Health. 2017 11; 5:335.

Nascimento JHFD, Tomaz SC, Souza-Filho BM, Vieira ATS, Andrade AB, Gusmão-Cunha A. A population study on gender and ethnicity differences in gallbladder disease in Brazil. Arq Bras Cir Dig. 2022;35:

Siada S, Jeffcoach D, Dirks RC. A predictive grading scale for acute cholecystitis. Trauma Surg Acute Care Open. 2019;4:

Dua A, Desai SS, Kuy S, Sharma R, Jechow SE, McMaster J, et al. Gender-based differences in management and outcomes of cholecystitis. Am J Surg. 2013 ;206(5):641–646.

Hayat N, Duja B. To determine the importance of age and sex in the clinical presentation and subsequent outcome in cholithiasis. J Univ Med Dent Coll . 2023;4(1):36–1.

Yokoe M, Hata J, Takada T, Strasberg SM, Asbun HJ, Wakabayashi G, et al. Tokyo Guidelines 2018: diagnostic criteria and severity grading of acute cholecystitis. J Hepatobiliary Pancreat Sci. 2018 ;25(1):41–54.

Stinton LM, Shaffer EA. Epidemiology of gallbladder disease: cholelithiasis and cancer. Gut Liver. 2012;6(2):172–187.

Yang SW, Kim HJ, Park YK. Risk factors for severe complications of acute cholecystitis in elderly patients. World J Gastroenterol. 2020;26(11):1128–1136.

Kuy S, Sosa JA, Roman SA. Age matters: clinical outcomes following cholecystectomy in elderly Americans. Am J Surg. 2011;201(6):789–796.

Nikfarjam M, Harnaen E, Tufail F. Sex differences and outcomes of management of acute cholecystitis. Surg Laparosc Endosc Percutan Tech. 2013;23(1):61–65.

Persson G, Sköld S, Thulin A. Physical constitution and biochemical characteristics of patients with gallstone disease. Eur J Surg. 1991;157(8):473–476.