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General Surgery

# DEMOGRAPHIC PROFILE AND RISK FACTORS FOR CHOLELITHIASIS IN POST-OPERATIVE PATIENTS AT A DISTRICT HOSPITAL

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**ABSTRACT** **Background:** Cholelithiasis is one of the most common gastrointestinal disorders worldwide and is influenced by demographic, socioeconomic, and lifestyle-related factors. Till date there is no published regional demographic and risk factor data from North Maharashtra on cholelithiasis; therefore, this study was undertaken. **Methods:** A retrospective observational study was conducted on 62 patients who underwent cholecystectomy over a three-year period at a tertiary care government hospital. Demographic characteristics, socioeconomic status, clinical presentation, associated risk factors, and treatment details were collected from medical records and analysed using descriptive statistics. **Results:** The mean age of the patients was 46.5 years, with the highest frequency in the 40–49-year age group. Females predominated (59.7%), and most patients belonged to the middle socioeconomic class. Right upper quadrant abdominal pain was the commonest presenting symptom. Advanced age, female gender, obesity, sedentary lifestyle, and positive family history were the major associated risk factors. Laparoscopic cholecystectomy was performed in 83.9% of patients. **Conclusion**: Cholelithiasis predominantly affected middle-aged females and was associated with both demographic and lifestyle-related risk factors. Early identification of individuals at risk and appropriate lifestyle interventions may facilitate timely diagnosis and reduce disease burden. Laparoscopic cholecystectomy remains the standard treatment for symptomatic cholelithiasis.

**KEYWORDS :** Cholelithiasis, Epidemiology, Gallstones, Laparoscopic surgery, Risk Factors, Cholecystectomy

## INTRODUCTION:

Cholelithiasis, commonly referred to as gallstone disease, is characterized by the formation of stones within the gallbladder or the biliary tract. Diagnosis of Cholelithiasis is usually based on clinical symptoms supported by imaging studies. Ultrasonography is considered the initial imaging modality of choice due to its high diagnostic accuracy, non-invasive nature, wide availability, and cost-effectiveness [1]. It represents one of the most frequently encountered gastrointestinal disorders worldwide and contributes substantially to patient morbidity and healthcare burden. The prevalence of Cholelithiasis varies across different populations and geographic regions, affecting approximately 5–20% of individuals in the general population [2] and It was a common disease and affected the health of one in twenty people worldwide [3]. with varying incidence rates, with a predictable global pooled occurrence of 6.1%. Regional evaluations showed substantial difference across continents, ranging from 5.1% to 11.2%.[4]. Studies from India have reported variable gallstone prevalence, ranging between 4% and 6% [5 6 7 8]. Past data also indicate patterns of regional differences, demonstrating that gallstone prevalence was nearly seven times more common in northern India compared with the south.[9]. Similarly, India also displays noticeable regional and sex-based variation for GSD. Females exhibited a 2–3 times higher prevalence than males in both the studies. [5 6]. The disease occurs more commonly in females, particularly during the reproductive period, and is associated with several risk factors including obesity, increasing age, multiparity, rapid weight loss, diabetes mellitus, dyslipidaemia, hormone remedy, oral contraceptives and genetic predisposition [3]. Traditionally, the risk profile of Cholelithiasis has been summarized by the well-known "four F's" female, fat, fertile, and forty.

Although many individuals with gallstones remain asymptomatic, approximately 10–20% eventually develop symptoms during their lifetime. Symptomatic disease typically presents as biliary colic, characterized by episodic pain in the right upper quadrant or epigastric region. If left untreated, gallstones may lead to complications such as acute or chronic cholecystitis, choledocholithiasis, cholangitis, gallstone pancreatitis, gallbladder empyema, and in rare cases gallbladder carcinoma[10].

The management of gallstone disease depends primarily on the presence or absence of symptoms and associated complications. Asymptomatic gallstones are usually managed conservatively by antibiotics, analgesics, supportive and symptomatic. Gall stone dissolving therapy is generally not effective and guided in the condition when patient is unfit for surgery, whereas symptomatic disease generally requires surgical intervention. Open Cholecystectomy is the traditional surgical procedure used to remove the gallbladder through a single large incision in the upper right abdomen first performed in 1882 by Carl Langenbuch, marking a major milestone in the surgical management of gallstone disease. For many decades thereafter, open cholecystectomy remained the standard method of gallbladder removal. At present, cholecystectomy: the surgical removal of the gallbladder—is regarded as the definitive treatment for symptomatic gallstone disease. It remains one of the most frequently performed abdominal operations worldwide[11] Till date there is no published regional epidemiological data from North Maharashtra on cholelithiasis; therefore, this study was undertaken to describe the demographic profile and associated risk factors among operated patients with cholelithiasis.

## METHODS

After approval from the Institutional Ethics Committee present investigation was conducted as a retrospective study on patients with symptomatic gallstone disease at Department of Surgery, Shri Bhausaheb Hire Govt. Medical College Dhule**.**

**Sample and data collection:** All the relevant details of 62 operated patients of cholelithiasis from were obtained from departmental medical record. Patients aged 20–80 years who fulfilled the inclusion criteria and had a diagnosis of cholelithiasis based on detailed clinical history, physical examination, and ultrasonographic findings were included in the study. All eligible patients were admitted to the Department of Surgery and underwent cholecystectomy during the study period. Patient confidentiality was preserved by anonymizing all patient identifiers. Patients with acute cholecystitis, with choledocholithiasis or obstructive jaundice, with previous upper abdominal surgery, suspected or confirmed gallbladder malignancy and Patients who refused to give consent were excluded from the study. Using detailed proforma, data were tabled for age, sex, socioeconomic status, symptoms and risk factors. All the relevant collected data was compiled on master chart. the data were analysed using descriptive statistics only. The findings are presented as frequency and percentage (%) in tables.

## RESULTS.

The present study was conducted to evaluate the demographic profile and analyse the risk factors associated with cholelithiasis among

operated patients. During the three-year study period, a total of 62 patients who underwent cholecystectomy and fulfilled the study criteria were included in the analysis.

The highest number of operated cases was recorded in 2024 (40.3%), followed by 2023 (32.3%) and 2025 (27.4%). This distribution indicates that the majority of cases were managed during the middle year of the study period. Table 1.

**Table 1. Year-wise Distribution of Operated Cases.**

| Year | Number of Patients(n) | Percentage (%) |
|---|---|---|
| 2023 | 20 | 32.3 |
| 2024 | 25 | 40.3 |
| 2025 | 17 | 27.4 |
| Total | 62 | 100 |

**Table-2: Sex wise distribution**

| sex | Number of Patients(n) | Percentage (%) |
|---|---|---|
| Male | 25 | 40.3 |
| Female | 37 | 59.7 |
| total | 62 | 100 |

***Female: Male ratio = 1.48: 1***

Female patients constituted the majority of the study population, accounting for 59.7% of all operated cases, while males comprised 40.3%. The female-to-male ratio was 1.48:1, indicating a female predominance among patients undergoing surgery for cholelithiasis. Table 2.

Female patients predominated in the younger age groups (20–39 years), whereas male patients were more frequently represented in the middle-age groups (40–69 years). Patients aged ≥70 years showed a slight female predominance. Table 3

**Table 3. Age-wise Distribution According to Sex**

| Age Group (Years) | Male | Female |
|---|---|---|
| 20–29 | 3 | 8 |
| 30–39 | 2 | 9 |
| 40–49 | 8 | 7 |
| 50–59 | 5 | 4 |
| 60–69 | 5 | 4 |
| ≥70 | 2 | 5 |
| Total | 25 | 37 |

**Table 4. Age Group Distribution**

| Age Group (Years) | Number of Patients (n) | Percentage (%) |
|---|---|---|
| 20–29 | 11 | 17.7 |
| 30–39 | 11 | 17.7 |
| 40–49 | 15 | 24.2 |
| 50–59 | 9 | 14.5 |
| 60–69 | 9 | 14.5 |
| ≥70 | 7 | 11.3 |

The highest proportion of patients belonged to the 40–49-year age group (24.2%), followed by the 20–29 and 30–39-year groups (17.7% each). Fewer patients were observed in the older age group (≥70 years), indicating that cholelithiasis was most commonly encountered during the fourth and fifth decades of life. Table 4.

The mean age of the study population was 46.5 years, with a median age of 45 years and an age range of 20–75 years, indicating that the majority of patients were middle-aged adults. Table 5.

**Table 5. Mean Age**

| Variables | Value |
|---|---|
| Mean age | 46.5 years |
| Median age | 45 years |
| Minimum age | 20 years |
| Maximum age | 75 years |

Most patients belonged to the middle socioeconomic class (46.8%), followed by the lower socioeconomic class (37.1%), while the upper socioeconomic class constituted the smallest proportion (16.1%). This finding indicates that cholelithiasis was more commonly encountered among individuals from the middle and lower socioeconomic groups in the present study. Table 6.

**Table-6: Socioeconomic status wise distribution.**

| Status | Number of Patients (n) | Percentage (%) |
|---|---|---|
| Lower | 23 | 37.1% |
| Middle | 29 | 46.8% |
| Upper | 10 | 16.1% |
| Total | 62 | 100 |

**Percentages shown are the actual values based on whole-patient counts (23/62, 29/62, and 10/62).*

The majority of patients (80.6%) were symptomatic at presentation, whereas 19.4% were asymptomatic. Among symptomatic patients, right upper quadrant abdominal pain (54.8%) was the most frequent complaint, followed by bloating and flatulent dyspepsia (51.6%), nausea and vomiting (48.4%), and epigastric pain (24.2%), highlighting the predominance of typical biliary symptoms. Table 7.

**Table-7: History of complaints/symptoms.**

| complaints/symptoms. | Number of Patients (n) | Percentage (%) |
|---|---|---|
| Asymptomatic | 12 | 19.4 % |
| Symptomatic | 50 | 80.6% |
| - Pain in right upper quadrant of abdomen | 34 | 54.8% |
| - Pain in epigastrium of abdomen | 15 | 24.2% |
| - Bloating and Flatulent Dyspepsia | 32 | 51.6% |
| - Nausea and vomiting | 30 | 48.4% |

**Table.8: Common risk factors for cholelithiasis.**

| Risk Factors | Number of patients (n) | Percentage (%) |
|---|---|---|
| Advanced Age | 45 | 72.1% |
| Female gender | 37 | 59.7% |
| Family history or genetics | 32 | 52.3% |
| Obesity | 35 | 56.6% |
| Rapid weight loss | 14 | 23.1% |
| Sedentary lifestyle | 38 | 61.1% |
| Pregnancy | 1 | 1.3% |
| Total parenteral nutrition | 1 | 1.3% |
| Fasting. | 3 | 4.5% |

Advanced age was the most common risk factor, present in 72.1% of patients, followed by female gender (59.7%), sedentary lifestyle (61.1%), obesity (56.6%), and family history (52.3%). Other risk factors, including rapid weight loss, prolonged fasting, pregnancy, and total parenteral nutrition, were observed less frequently. These findings suggest that both demographic and lifestyle-related factors play a significant role in the development of cholelithiasis. Table 8.

Laparoscopic cholecystectomy was the preferred surgical approach, performed in 83.9% of patients, while 16.1% underwent open cholecystectomy. This reflects the current standard surgical practice favouring laparoscopic management because of its well-recognized advantages, including reduced postoperative pain, shorter hospital stays, and faster recovery. Table .9

**Table-9: Management of cholelithiasis**

| Procedure | Number of patients(n) | Percentage (%) |
|---|---|---|
| Open cholecystectomy | 10 | 16.1 |
| Laparoscopic cholecystectomy | 52 | 83.9 |
| Total | 62 | 100 |

**DISCUSSION:**

The present retrospective study included 62 operated patients with cholelithiasis managed at a tertiary care government hospital. Most surgical cases were recorded during 2024, reflecting the increasing utilization of surgical services for gallstone disease during the study period.

The study population was predominantly composed of middle-aged adults, with a mean age of 46.5 years (median 45 years; range 20–75 years). The highest proportion of patients belonged to the 40–49-year age group (24.2%), followed by the 20–29-year and 30–39-year groups (17.7% each), indicating that cholelithiasis was most frequently encountered during the fourth and fifth decades of life. These findings are comparable to those reported by Rachamalla et al. [12], who observed a mean age of 34.12 ± 6.2 years with peak incidence during the fifth decade, and Tafazal H et al., [13] who also reported maximum occurrence in the fifth decade. Increasing age has long been recognized as an important determinant of gallstone

formation because of prolonged exposure to metabolic and environmental risk factors, as described by Chen et al. [14].

A female predominance was observed in the present study, with females accounting for 59.7% of cases and a female-to-male ratio of 1.48:1. This finding is consistent with previous reports by Naik [15], who also demonstrated female predominance among patients with cholelithiasis. Females predominated in the younger age groups (20–39 years), whereas males were relatively more common in the 40–69-year age groups. The higher prevalence among women has traditionally been attributed to hormonal influences, particularly the effects of oestrogen and progesterone on cholesterol metabolism and gallbladder motility. Channa et al., [16] reported an association between gallstone disease in women and elevated serum alkaline phosphatase levels. However, geographical variations exist; for example, Higashizono et al. [17] reported male sex as a significant risk factor for gallstone disease in the Japanese population, highlighting the influence of ethnic, genetic, and lifestyle differences.

Socioeconomic status also appeared to influence disease occurrence. Nearly half of the patients belonged to the middle socioeconomic class (46.8%), followed by the lower socioeconomic class (37.1%), whereas only 16.1% belonged to the upper socioeconomic class. Similar observations have been reported in developing countries where changing dietary habits, increasing obesity, and sedentary lifestyles among middle-income populations contribute to the rising burden of gallstone disease. Wang and Jiang [4], in their global epidemiological review, reported an overall pooled prevalence of 6.1%, with higher prevalence in upper-middle-income countries than in high-income nations, emphasizing the role of socioeconomic and lifestyle transitions.

Most patients [approximately 80%] were symptomatic at presentation, while about one-fifth were diagnosed incidentally. Among symptomatic patients, right upper quadrant abdominal pain was the most common presenting complaint, followed by bloating with flatulent dyspepsia, nausea and vomiting, and epigastric pain. These findings are comparable to those of Joshi et al. [18], who reported abdominal pain as the predominant symptom, followed by nausea, dyspepsia, vomiting, fever, and jaundice. Although many gallstones remain clinically silent, the present study included only operated patients, which explains the predominance of symptomatic disease. Therefore, comparisons with population-based studies, such as Khuroo et al. [6], which included a large proportion of asymptomatic individuals, should be interpreted cautiously because of differences in study design and patient selection.

Analysis of associated risk factors demonstrated that advanced age (72.1%) was the most frequently observed factor, followed by female gender (59.7%), sedentary lifestyle [61.1%], obesity (56.6%), and family history (52.3%). These findings support the multifactorial nature of gallstone disease. Liu et al. [19] demonstrated that increased waist circumference and waist-to-hip ratio were significantly associated with gallstone disease in both sexes, while Radmard et al. [20] identified obesity, assessed by body mass index, as an important determinant of gallstone formation. Similarly, Shaffer et al. [1] and Walcher et al., [21] reported that regular physical activity lowers the risk of gallstone disease, supporting the role of sedentary behaviour observed in the present study. According to Hemminki et al., [22] the patterns of family history suggest that the large majority of the population, with one affected family member, are at a 1.6-fold to 1.7-fold risk of being hospitalised for gallstone disease. Less common risk factors included rapid weight loss, prolonged fasting, pregnancy, and total parenteral nutrition. Owing to their low frequency in the present study, these factors could not be evaluated further. Dietary practices have also been implicated in gallstone formation, and studies [23] [24] [25] from India and Nepal have reported a higher prevalence among individuals consuming non-vegetarian diets.

Laparoscopic cholecystectomy was the preferred surgical procedure in the present study, accounting for 83.9% of all operations, whereas only 16.1% underwent open cholecystectomy. This finding reflects current surgical practice, where laparoscopic cholecystectomy is regarded as the gold standard because of its advantages of reduced postoperative pain, shorter hospital stays, earlier recovery, and improved cosmetic outcome, as reported by Schirmer et al. [26] and Joshi et al. [14]. Open cholecystectomy was reserved for patients with difficult biliary anatomy or severe acute inflammatory changes that limited safe laparoscopic dissection. Conversion to an open procedure should not be regarded as a surgical failure but rather as a prudent intraoperative decision undertaken to minimize the risk of bile duct and major vascular injury and to ensure patient safety. The findings of the present study are largely consistent with previous national and international reports, confirming that advancing age, female sex, obesity, sedentary lifestyle, and family history remain the principal factors associated with cholelithiasis. Despite regional differences in patient features, the overall epidemiological outline observed in the present study closely resembles that studied in other developing countries, suggesting that these risk factors remain relevant across diverse populations**.** As some lifestyle-related risk factors depended on documents in the medical records and therefore may have been underestimated. Nevertheless, the study provides useful regional epidemiological data regarding cholelithiasis in operated patients.

## CONCLUSION:

The present study suggests that cholelithiasis is a multifactorial disease predominantly affecting middle-aged women, with a higher prevalence among females and individuals from the middle and lower socioeconomic groups. Advanced age, female gender, sedentary lifestyle, obesity, and family history emerged as the major associated risk factors. Most patients presented with typical biliary symptoms and were successfully managed by laparoscopic cholecystectomy. These findings highlight the importance of early identification and modification of preventable risk factors to facilitate timely diagnosis and appropriate surgical management.

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