Socio Demographic Profile of Common Bile Duct Stone in Odisha

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KEYWORDS

Common bile duct, Ultrasonography, CBD stones, Socio Economic profile, smoking, alcoholism.

ABSTRACT

Aim: To assess the socio-demographic profile of CBD stones in patients in the eastern part of Odisha.
Methods: This observational study was, conducted in a hospital setting, at SCB Medical College and Hospital Medical College following Institutional Ethics Board's (IEB) approval. The study enrolled 60 cases over the period spanning from 2022 to 2024. The study included all individuals aged between 20 and 80 years who visited the Surgery Outpatient Department (OPD) with symptomatic common bile duct stones and were validated by sonographic examination.
Results: The study included 60 individuals with a common bile duct stone. The disease was prevalent among females (n=39), individuals aged 31–40 (n=19), and those who consumed a varied diet (n=49). Of the 60 patients, 25 were overweight, while 26 were obese. In this study 52 symptomatic cases were identified. The most prevalent symptom was dyspepsia (n=20) followed by heartburn (n=34).
Conclusion: According to our findings, cholelithiasis is more common in people in their 30s and 40s.A higher number of females were affected. Both smoking and drunkenness did not affect the incidence of gallstones. However, it was more common in people with a higher body mass index and less active lifestyles.

Introduction

Gallstone prevalence varies geographically, with over 85% in developed countries being cholesterol stones. In the USA, about 20 million people have CBD stones, with higher prevalence in Mexican Americans and American Indians [1,2]. In Europe, 9-21% prevalence is reported, with a trend for increasing prevalence in Europe and North America [3]. The prevalence and management of common bile duct (CBD) stones may be influenced by socioeconomic, dietary, and healthcare access factors, making the socio-demographic profile of these stones a topic of significant research, particularly in regions such as Odisha, India [4]. Due to their association with substantial morbidity, CBD stones, a component of biliary tract disease, impose a considerable healthcare burden. Timely diagnosis and appropriate intervention are necessary to prevent complications, including pancreatitis and cholangitis [5].

A diverse socioeconomic and cultural demographic creates a unique setting for examining the link between CBD stones and various socio-demographic factors. The population features diverse economic conditions, varying healthcare access, a mix of urban and rural communities, and different dietary preferences [6]. These factors could significantly influence the epidemiology of CBD stones, impacting both incidence and clinical outcomes [7]. Varying lifestyle patterns, including activity, prevalence of obesity, and intake of diets rich in fats or cholesterol, also play a significant role in CBD stones. In rural areas, limited access to healthcare services may contribute to delays in the identification and treatment of medical conditions, potentially leading to more

severe complications. On the other hand, with increased consciousness and availability of state-of-the-art diagnostic equipment, CBD stones may present at an earlier stage in the urban population. However, a sedentary lifestyle and diet high in processed food might predispose them to more. The influence of cultural practices, including the utilization of traditional healing methods and certain dietary constraints, can markedly shape the expression of diseases and the effectiveness of their management. It is crucial to comprehend the interactivity of these socio-demographic factors to tailor prevention efforts and deliver the most effective treatment to various patient groups.

The research in this field is to establish the correlation between the incidence and presentation of CBD stones and factors such as age, gender, socioeconomic status, dietary practices, and access to healthcare services [8]. Understanding these associations can provide valuable insights into public health strategies and clinical management practices. Identifying high-risk populations can lead to targeted screening programs and preventive measures [1-8]. Additionally, investigating the influence of dietary patterns common in a locality or area, such as vegetarianism or high-fat diets, on the development of CBD stones can provide valuable insights for nutritional recommendations [9]. Additionally, it is imperative to investigate the function of healthcare access in the timely diagnosis and treatment of CBD stones. Limited access to advanced diagnostic and therapeutic facilities in rural areas can cause treatment delays, increasing the risk of complications. Urban areas may pose unique challenges, particularly lifestyle factors that increase the prevalence of certain diseases. This research aims to create a detailed socio-demographic profile of CBD stones in Odisha to improve public health policies and clinical practices suited to the region's needs. This study aimed to evaluate the socio-demographic profile of CBD stones in patients from eastern Odisha.

Methods:

Study Design and Setting

This observational study was conducted at SCB Medical College & Hospital with IEB approval. The study, conducted from 2022 to 2024, enrolled 60 patients.

Study Population

The study included patients aged between 20 and 80 years who presented to the Surgery Outpatient Department (OPD) with symptomatic common bile duct stones, as confirmed by sonographic examination. Patients diagnosed with acute cholecystitis initially received conservative management before undergoing interval cholecystectomy.

Inclusion and Exclusion Criteria

The present study involved participants aged 20 to 80 who visited the Surgery Outpatient Department with symptomatic common bile duct stones, as verified by ultrasonography. Furthermore, patients who received conservative treatment for acute cholecystitis, which later resulted in an interval cholecystectomy, were also included in this analysis. Conversely, the study excluded individuals who were not eligible for surgical interventions, those unable to undergo ultrasonography, and patients with bleeding disorders.

Data Collection

A comprehensive medical history was collected from each participant in the study, considering demographic variables such as age, gender, religious affiliation, and socioeconomic background. About the symptoms reported, we documented their characteristics, duration, and any pertinent medical history involving similar issues. The evaluation of dietary and lifestyle factors focused

primarily on eating patterns. Smoking was quantified using a smoking index, calculated by multiplying the daily cigarette consumption by the number of years, and subsequently classified into three severity levels. Alcohol consumption was divided into four specific categories, and comorbidities, such as diabetes, were separated.

Categorization of Smoking and Alcohol Consumption

The smoking index was a product of the number of cigarettes consumed per day by the number of years of smoking. Patients were then in three groups based on their smoking levels. Alcohol consumption was in four clear categories according to the guidelines.

Clinical Examination and Investigations

All patients underwent a thorough clinical examination and subsequent investigative tests. These were CBC, ECG, LFTs, blood glucose level, serum urea and creatinine, and urine analysis. The process included blood group typing. Imaging studies, specifically chest X-ray and abdominal ultrasound, were performed to gain insights into the anatomical layout of the bile duct and surrounding structures. Further clinical evaluations were performed based on the discovery of any comorbid conditions. A single group of surgeons carried out all laparoscopic cholecystectomies to preserve consistency in treatment and outcomes.

Ethical Consideration

This study was conducted by the Declaration of Helsinki and approved by the Institutional Ethics Board (IEB) of SCB Medical College & Hospital. Informed consent was obtained from participants after a detailed explanation of the study before their inclusion. To ensure patient privacy, we maintained confidentiality and anonymized the data. All participants were made aware of the risks and benefits of the study, and they were free to withdraw at any time without affecting their treatment.

Statistical Analysis

The collected data was verified to ensure it was complete and accurate and then entered into Microsoft Excel for further analysis. Data was analyzed using SPSS software version 2.6. Descriptive statistics summarized the data using mean, standard deviation, and percentages. Inferential statistical tests of the data and the significance levels reported.

Results:

The study included 60 patients, comprising 21 males and 39 females. The largest group of patients fell within the 31-40 year age group (19 patients), followed by 16 patients aged 41-50. The youngest age groups were those under 20 (1 patient) and over 60 (5 patients). The mean age of the participants was 46.7 ± 4.1 years. [Table 1]

Table 1: Age and gender profile of the study population (n=60)

Variable	**Number**
Gender	
Male	21
Female	39
Age Group	
< 20 years	1
20-30 years	6
31-40 years	19

41-50 years	16
51-60 years	13
> 60 years	5
Mean Age	46.7 ± 4.1

The largest group of patients (52 out of 60) were strongly symptomatic, while eight presented with mild symptoms. The most common presenting symptom was heartburn or water brash, reported by 34 patients, followed by dyspepsia (20 patients) and nausea (16 patients). Less frequent symptoms included jaundice (1 patient) and fever (2 patients). Upon clinical examination, Murphy's sign was positive in 3 patients, and a palpable lump detected in 1 patient (Table 2).

Table 2: Clinical profile of the study population (n=60)

Variable	**Number**
Presentation of Symptoms	
Strongly symptomatic	52
Mildly symptomatic	8
Presenting Symptoms	
Heartburn/Water brash	34
Nausea	16
Dyspepsia	20
Jaundice	1
Fever	2
Signs	
Murphy's sign	3
Palpable lump	1

Out of the 60 cases, 59 underwent laparoscopic cholecystectomy, while one converted to open cholecystectomy due to challenging access. Three patients were diagnosed with acute cholecystitis, and after treating the acute episode, the patient underwent interval cholecystectomy.

The sociodemographic profile of the study population, comprising 60 patients, revealed that the largest followed a mixed diet (49 patients), while 11 patients adhered to a vegetarian diet. Regarding body mass index (BMI), most participants were categorized as obese (26 patients), followed by overweight individuals (25 patients). A smaller number of patients were classified as healthy weight (8 patients) and underweight (1 patient) (Table 3).

Table 3: Sociodemographic profile of the study population (n=60)

Variable	Number
Diet	
Vegetarian	11
Mixed	49
BMI	
Underweight	1
Normal	8
Overweight	25
Obese	26

The smoking index and alcohol consumption profile of the study population, consisting of 60 patients, indicated that the majority fell within the 400 to 799 range of the smoking index (35 patients). While 15 patients had a smoking index greater than 800 pack-years, and 10 patients had an index of less than 400. In terms of alcohol consumption, most participants were classified as occasional drinkers (16 patients) and excessive drinkers (16 patients). Additionally, ten patients were abstainers, and 8 were moderate drinkers (Table 4).

Table 4: Smoking index and alcohol consumption profile of the study population (n=60)

Variable	Number
Smoking Index (SI)	
< 400	10
400 - 799	35
> 800	15
Alcohol Intake	
Abstainer	10
Moderate drinker	8
Occasional drinker	16
Excessive drinker	16

The analysis of complications following surgery in the study population of 60 patients revealed several postoperative issues. Specifically, one patient experienced a wound infection, another had a minor leakage of bile, one patient suffered from excessive bleeding, and one presented with prolonged ileus. These findings highlight the potential complications related to surgical procedures in this patient cohort (Table 5).

Table 5: Complications after the surgery (n=60)

Complications	Number
Wound infection	1
Minor leakage of bile	1
Hemorrhage	1
Prolonged ileus	1

Discussion:

The disease is well known to occur more frequently in females. Our study also reveals a male-to-female incidence ratio of 1:1.85. The observed outcome can result from a rise in estrogen concentrations and a corresponding reduction in exercise engagement. Consequently, there is an elevation in the amount of cholesterol expelled into the bile by supersaturating it with cholesterol and forming stones. Additionally, a reduction in the contractile force of the gallbladder muscles can cause delayed cholestasis and precipitate cholesterol crystals. Also, oral contraceptive pills and hormone replacement therapy add to the risk factors [12-14]. Other studies find a similar incidence. Revealed a 3:1 male-female ratio [15]. This change may occur after menopause; the incidence decreases in females [10].

Stone formation is more common in middle-aged groups. In our study, the peak incidence was in the age group of 30–40 years. Most studies show a peak incidence around the 4th decade [15]. 24 The age group of 30–40 years exhibited the highest incidence, according to a study by [16]. As age increases, long-term exposure to risk factors increases, leading to a higher incidence of stone disease in the latter age group [8]. The recurrence rate of choledocholithiasis in patients over 65 is as high as 30%. Another study [15] found that age was the only independent risk factor, with 86.4% occurring over 65.

Our study revealed a higher risk of CBD stones in the study population consuming a non-vegetarian diet. Numerous studies [11-16] also support this finding. This finding may result from the consumption of high-protein and high-fat foods. Conversely, a study conducted by [17] reveals a higher incidence of CBD stones among vegetarians compared to those who consume a mixed diet [18, 19]. The vegetarian group may consume more starch, and factors such as a sedentary lifestyle and BMI may also be confounding factors.

In our study, the majority of the patients presenting to emergency/OPD were symptomatic, with heartburn or water brash being the most common symptom. This trend may be because most people are unaware of regular health checkups and follow-ups and present only when the symptoms are problematic. CBD stones have symptomatic presentations in many other studies [20, 21]. This finding is in contrast to the study done in India, where [19] reported that 94% of the study population was asymptomatic at the time of diagnosis. This discrepancy may depend on people's awareness and the availability of health facilities. Abdominal pain was the most common symptom, a finding that was also consistent with other studies [22].

Our study does not show a direct relationship between CBD stones and cigarette smoking, whereas moderate alcohol consumers have a lower occurrence. Theoretically, smoking lowers plasma high-density lipoprotein cholesterol, which increases the risk of gallbladder disease. However, many

studies have shown that smoking is associated with an increased risk of gallbladder carcinoma, but there is no direct relationship with gallstone formation. Many studies have shown that moderate alcohol consumption is beneficial for maintaining blood cholesterol levels and reducing gallstone formation. However, studies have found that heavy drinkers have deranged blood cholesterol levels [14]. Furthermore, a study reveals that cigarette smoking does not correlate with gallstone risk, while alcohol consumption appears to offer protection against gallstone formation [13]. However, further studies are required to define the cut-off limit for moderate alcohol intake.

In our study, gallstone disease is associated more with a sedentary lifestyle and an increased BMI. This finding aligns with the results of several other studies. However, in a study, physical activity reduced the occurrence of gallstone disease only among males but not in females [14, 15]. Hormones may be the contributing factor to this.

Conclusion:

In conclusion, research shows that gallstones are more likely to happen in people aged 30 to 40 and are more frequent in women. Hormonal factors, like estrogen, likely raise cholesterol levels in bile. Ironically, smoking and alcohol intake do not have much influence on the formation of gallstones, though it is a prevalent belief that alcohol and smoking contribute to gallstone formation. On the contrary, people with greater body weights and fewer physical activities have significantly higher risks of gallstones due to increased cholesterol and slower bile movement that life has promoted. In addition to this, metabolic conditions like insulin resistance and diabetes occurred more frequently in those with gallstones, associating obesity and metabolic disorders with risks for gallstones. This points to lifestyle changes involving weight regulation and increased exercise to prevent gallstone disease.

Conflict of interest:

There is no conflict of interest among the present study authors.

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