
ORIGINAL ARTICLE

**Sociodemographic study of cholecystectomized patients of
Bathinda District, Punjab**

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ABSTRACT

Gall stone disease is very common gastrointestinal disorder worldwide. There are various modifiable and non-modifiable risk factors associated with cholelithiasis. Numerous clinical and epidemiological studies have come up with the fact that females are more susceptible to lithogenesis than males. The present study included 210 subjects who underwent laproscopic cholecystectomy in Adesh Institute of Medical Science & Research, Bathinda Punjab. A detailed history regarding age and parity was taken from each subject through a structured questionnaire. The study was conducted on 210 subjects including 26 males (12.38%) and 184 females (87.6%) with female to male ratio of 7.07:1. Among 184 females, 147 were multiparous, 32 are uniparous and 5 are nulliparous. Maximum cholelithiasis cases had been reported in multiparous women in the age groups 35-44 and 45-54. In this study, maximum subjects that have undergone laproscopic cholecystectomy are middle aged multiparous females indicating significant correlation of age, gender and parity with cholelithiasis.

Keywords: Cholelithiasis, Lithogenesis, Laproscopic Cholecystectomy, Parity

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INTRODUCTION

Cholelithiasis is frequently occurring gastrointestinal ailment that has imposed significant load on the global healthcare system. Geography and ethnicity affects its prevalence. European countries had reported its prevalence from 5% to 15% while Asian countries has observed it occurrence rate from 3% to 10% [1]. The Northern region of India is more prone to this disorder as compared Southern region [2]. Whilst, India's eastern part faces more challenge in this case than the west [3]. However, the formation of gallstones is multifactorial phenomenon. There are many intrinsic and extrinsic variable such as age, gender, genetics, medication, lifestyle (diet and physical inactivity) [4].

In the community-based studies by Goktas *et al.*, (2016), it has been reported that the lithogenesis phenomenon is two-fold more frequent in females as compared to males, suggesting a gender to a prime and invariable determinant for gallstone formation [5]. Moreover, multiple literature has come up with the findings that fertile age in the women is more prone to this disease [6] [7] [8] and surge has been related to multiplicity in pregnancy, accounting approximately 5 – 12% hike in the cases [9].

The severity of this disease advances with age [8]. Over the decades, it had been stated that middle aged people experience gallstones 4–10 times more frequently than do younger people [10][11] indicating that age is the invariable and initiation factor for cholelithiasis and choledocholithiasis. It is unusual in the first two decades and escalation has been significantly reported in third, fourth and fifth decade of age. The frequent occurrence of gallstones in the Indian population is likely to be in the reproductive phase of the females. The study of Katyal *et al.*, (2017) strongly confirms the fact that middle aged fat (obese) multiparous females are more prone to cholelithiasis [12].

According to Bass *et al.*, (2013), the subject with a profile of Female, Fat, Forty, Fertile and Fair are more likely to develop cholelithiasis [13]. Therefore, it is not wrong to suggest that 5F-rule has been strongly associated with the development of gallstones in Indian people.

The population surveys have found that cholelithiasis has risen to the position of being the second most typical reason for non-obstetric intervention during pregnancy [7] [14]. The ample of literature cite that female sex hormones like estrogen and/or progestins as a cause of cholelithiasis [10]. Chemically, main ovarian hormone namely Estrogen (17β -estradiol (E2)) is a steroid regulating a wide range of biological processes, including reproduction, cardiovascular function, hepatobiliary secretion, metabolic processes, nerve function, and inflammation. Since estrogen is a steroid, its liposoluble nature enables the passive diffusion of estrogen into liver cells passively and stimulating the liver to secrete the cholesterol into bile leading to the supersaturation condition in the bile and thus becoming the unmodifiable confounder of cholelithiasis [8]. Moreover, the deduction in limiting enzyme for bile acid synthesis 7α hydroxylase also increases the saturation of cholesterol in bile and thus instigating the prevalence of this disease by 1% and 0.5% annually in women and men respectively [15][16][17][18].

Thus, this sociodemographic study may aid in identifying modifiable and non-modifiable risk factors often associated with cholelithiasis and thus helps in developing the preventive measures against it.

MATERIAL AND METHODS

The cross-sectional study was conducted on 210 cholecystectomized subjects in the Department of Surgery, Adesh Institute of Medical Sciences & Research, Bathinda, Punjab. Approval from the Institutional Ethical Committee along with written and informed consent from the cases was taken. The subjects under any prolonged ailment or antibiotic treatment were excluded from the study. A questionnaire and interview-based approach was used to obtain the information from subjects. Predesigned questionnaire was used for recording relevant information including medical history of the subject like age, gender, marital status, parity, education, occupation, socio-economic status and dietary habits i.e. vegetarian/non-vegetarian, daily activities including smoking/alcohol intake), intake of calcium (either in the form of milk/milk products or in the form of tablets). Medical history included biochemical investigations (SGOT/SGPT), advent of epigastric pain (duration and location), gallstone discomfort (symptomatic and asymptomatic), gastric disturbance (bloating, indigestion and heartburn), any symptom of nausea and vomiting, history of any disease/surgery and prolonged intake of any drug especially antibiotics. After explaining the nature of the present study, written voluntary consents was taken from each patient in English and local language to use information for research.

RESULTS

The study was conducted on 210 subjects including 26 of which were males (12.38%) and 184 were females (87.6%) with female to male ratio of 7.07:1. The mean age of the subjects was 46.7 ± 10.3 years.

The age and gender wise distribution of cholelithiasis subjects that were used for the study is given in table 3 and represented graphically in Figure 1. Age groups 25-34 years and 35-44 years contained 43 and 51 females respectively and no male subjects having undergone cholecystectomy was observed in these two age groups. Age group 45-54 years had 42 females and 9 males. Age group 55-64 years had 31 females and 10 males. Age group 65-74 years had minimum number of subjects from both genders (17 females and 7 males) in comparison to other age groups. Absence of cholelithiasis in males in age groups 25-34 and 35-44 and high frequency of females in all the age groups suggest that females are more prone to this disorder than males. The observations given in table 1 suggest that as the age increases incidence of gallstone also increases in females. However, more cases of cholelithiasis had been observed in middle age groups (35-44 years and 45-54 years) which gradually decrease in the higher age groups.

The observations on parity among female subjects having cholelithiasis is given in table 2 and graphically represented in figure 2. Gallstones were found in 2.71% of nulliparous women (only 5 subjects), 32% females had single parity and 79.89% were having multiparity. This study indicate two to three times high rate of cholelithiasis in women with multiple pregnancies in comparison to nulliparous women as this effect was much more marked in age groups of 35-44 years and 45-54 years with 51 and 42 females respectively (Table 1). High rate of cholelithiasis has been observed in multiparous females in all age groups in contrast to uniparous females whose incidence decreases with increasing age that is 17 in age group of 25-34 years, 11 in age group of 35-44 years and 9 in age group of 45-54 years.

Table 1. Age and gender wise distribution of cholelithiasis cases

Sr. No.	Age group (Years)	Frequency and percentage of cases		
		Male	Female	Total
1.	25 -34	0	43 (23.36%)	43 (20.47%)
2.	35 - 44	0	51 (27.71%)	51 (24.28%)
3.	45 - 54	9 (34.61%)	42 (22.82%)	49 (23.33%)
4.	55 - 64	10 (38.46%)	31 (16.84%)	40 (19.04%)
5.	65 - 74	7 (26.92%)	17 (9.23%)	27 (12.85%)
	Total	26 (12.38%)	184 (87.6%)	210

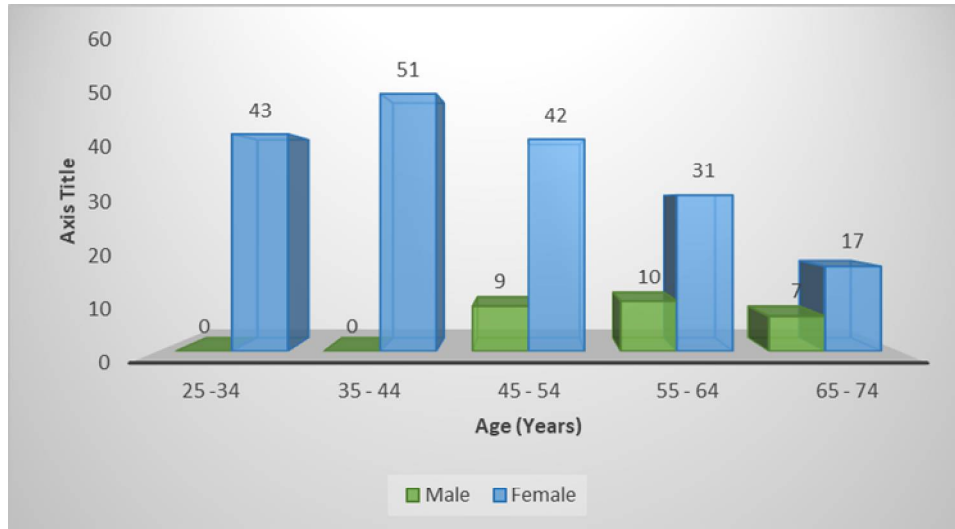


Figure 1. Age and gender wise graphical representation of cholelithiasis cases

Table 2. Incidence of gallstones with varying parity

Sr. No.	Age group (Years)	Nulliparous	Uniparous	Multiparous
1.	25-34	3	17	23
2.	35-44	2	11	38
3.	45-54	0	09	33
4.	55-64	0	0	31
5.	65-74	0	0	17
	Total	5 (2.71%)	32 (17.39%)	147 (79.89%)

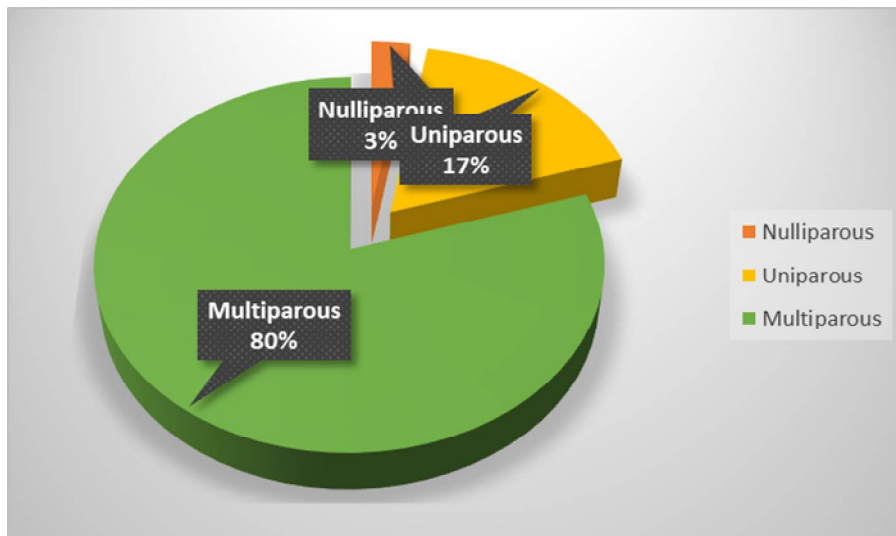


Figure 2. Representation of incidence of gallstones with varying parity

DISCUSSION

The present cross-sectional study included 210 subjects with 184 females (87.6%) and 26 males (12.38%). The study has recorded the maximum occurrence of cholelithiasis in the age group 35-44 years. Idris *et al.*, (2013) has reported abundance of gallstones in the age group 41-50 years which is almost in agreement with the present study [19]. The study by Pradhan *et al.*, (2009) has reported maximum cholelithiasis cases in the age group of 30-39 years which is again similar to the observations reported in this study [20].

The gender distribution is not uniform among the subjects taken, as the female to male ratio observed was 7.07:1 indicating that females are certainly more prone to cholelithiasis than males. The observational study of Idris *et al.*, (2013), Bansal *et al.*, (2014), Demehri *et al.*, (2016), Shafique *et al.*, and Sarda *et al.*, (2018), Ali *et al.*, (2021), Kazi *et al.*, and Song *et al.*, (2022), Mazyad *et al.*, (2023) also reported results similar to the current study [19][21][22][23][24][25][26][27][28]. A surge in cases has been observed in middle aged women especially during fertile period with incidence falling down in postmenopausal period. According to Hess *et al.*, (2021), multiparity and reproductive period are the significant risk factors for the formation of gallstones [29].

In the present study the frequency of parity seems to have promoted the gallstone formation as 99% of the females were bearing two or more children. Further, the occurrence of cholelithiasis in females was three folds higher in middle aged groups (51 female subjects in 35-44 years) that had eventually decreased in old age (17 female subjects in 65-74 years). Maximum frequency of this disorder has been seen in the age group of 35-44 years (27.71%) as compared to its preceding and succeeding age groups of 25-34 years (23.36%) and 45-54 years (22.82%) respectively, in the females.

Similar results have been reported earlier by Constantinescu *et al.*, (2012) and Kazi *et al.*, (2022) that the incidence of gallstones is experienced maximum during the childbearing phase and it declines in old age [30][26]. The reason ascribed is the postmenopausal phase that experience the low levels of female steroidal hormones [31]. The reason for the decline in frequency in the formation of gallstones in old age is reduction in the production of rate-limiting enzyme cholesterol 7 α -hydroxylase (CYP7A1) due to the reduced production of bile acid [32].

The association of increase in age with the increased incidence of gallstones has been explained on the basis of hormonal effect by Yang *et al.*, (2020) [33]. Estrogen, the primary female sex hormone controls the hepatic mechanism of cholesterol synthesis and secretion [34]. Estrogen governs the gallbladder motility by causing the sphincter of oddi to constrict thereby reducing or inhibiting free bile flow [35]. Estrogen, secreted during the reproductive age in an obese female increases cholesterol secretion into bile and supersaturating it that doubles probability of the formation of biliary sludge which solidify in the gallbladder to form gallstones gradually [36]. The available literature suggests that elevation in the female steroids namely estrogen (unconjugated estrone (E1), estradiol (E2) and estriol (E3)) and progesterone levels in the blood during the gestation period is the reason for cholelithiasis [6]. The estrogen acts as a signal moiety for the receptors present in the liver (ERD) governing the cholesterol metabolism and ultimately regulating the bile acid pool. However, contradictory to these studies, the experimental study by Zhang *et al.*, (2022) suggested that there is no evidence to prove that estrogen, a steroidal hormone is prime cause for cholesterol gallstones in females [36].

Pregnancy induces many physiological changes, some of which may be important in developing cholelithiasis. Observations in table 2 indicate positive association of cholelithiasis with parity. Increase in number of pregnancies is associated with increased risk of gall stone formation. Therefore, parity also appears to be a factor in the development of gallstones. Women with more pregnancies and longer lengths of fertility periods appear to have a higher likelihood of developing gallstones than those who remain nulliparous [26]. A present study also reflects that women in the age group 25-34 years with > 2 pregnancies have shown 11 times more gallstones as compared to nulliparous women as the age group of 25-34 years possessed 23 multiparous and 3 nulliparous women. These results are consistent with the results of [38][22]. The frequency of pregnancy has been considered to be a major determinant in the gall bladder pathologies as well as in biosynthesis of cholesterol by hepatocytes [35][39]. Therefore, it can be deduced from the observation reported in this study that multiparous females are more vulnerable to this disorder in comparison to uniparous or nulliparous females.

CONFLICT OF INTEREST

The authors declare no conflict of interests

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