RISK FACTORS OF GALLBLADDER STONE IN LADY READING HOSPITAL PESHAWAR, PAKISTAN

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Abstract. Gallbladder stones are a prevalent and expensive cause of gastroenterological problems in the surgical units and OPD patients at the Lead Reading Hospital in Peshawar. Identifying the risk factors of gallstones is essential to reduce the economic burden and life-threatening complications associated with this condition. The aim of this cross-sectional observational study was to determine the major causes and risk factors of gallbladder stones disease, the association with age, and the frequency of gallbladder stones among male and female participants admitted in the surgical unit and radiology department of the hospital. A sample size of 220 participants was collected from a total population of 1000 people in the specified period of time. Data was collected from patients' detailed history, signs, symptoms, and ultrasound reports over a six-month duration. After data collection and analysis, it was found that women had a twofold higher risk for cholelithiasis or gallstones compared to men. Age, body mass index, and high serum HDL cholesterol levels were independently associated with cholelithiasis in both men and women. In the male population, low alcohol and high coffee consumption were also associated with cholelithiasis. The major risk factors of gallbladder stones were obesity, increased BMI, age, diabetes mellitus, alcohol, smoking, HCV, cirrhosis of the liver, high cholesterol, infection, and cirrhosis in both genders, and menopause in females. The study identified that there were no unique causes or risk factors of gallbladder stones among the study of Asian versus western population.
Keywords: *gallbladder stones, cholelithiasis, risk factors, cirrhosis of the liver, menopause, obesity*

Introduction

The gallbladder is an elongated, oval-shaped organ located beneath the liver, and it is composed of blood vessels, connective tissue, and lymphatics (Horn, 1956). Gallstones are hard, small deposits that can develop within the gallbladder, a sac-like organ that is located beneath the liver on the upper right side of the abdomen. About 80% of gallstone cases are asymptomatic and have a low risk of developing symptoms. However, 10% to 20% of gallstones become symptomatic within 5 to 20 years of diagnosis, respectively (Diehl, 1991; Jørgensen, 1988; Friedman et al., 1966). Therefore, the risk of developing symptomatic gallstones is relatively low, averaging 2.0 to 2.6% per year (Hussain, 2011). Gallstones can cause various complications, such as inflammation of the gallbladder, pain, infection, or even more severe conditions like acute and chronic cholecystitis. In some cases, gallstones can pass into the common bile duct, leading to biliary obstruction that causes pain in the right upper quadrant with or without obstructive jaundice. Rarely, gallstones can perforate through the wall of an inflamed gallbladder into the intestine, producing a fistula. If a stone is large, it can cause internal obstruction and result in mucocele or empyema of the gallbladder (Everhart et al., 2002). Ultrasonography is a non-invasive and safe imaging technique

that can accurately detect the prevalence of gallstones in a defined asymptomatic population. The gallbladder can be used as a boundary for recognizing the junction between the right and left lobes of the liver, and its length is typically less than 10cm, with a width of 3cm and wall thickness less than 3mm. The gallbladder lumen appears anechoic on ultrasound, and it is recommended to fast for 6 hours before undergoing a gallbladder ultrasound examination (Cheon and Lehman, 2006). Gallstones are defined as stones formed inside the gallbladder, and the presence of gallstones within the gallbladder itself is also known as cholelithiasis. Clinical features of gallstones include echogenic, hyper-echoic, shiny stones that are mobile, produce black shadow, and exhibit positive Murphy's sign. The majority of gallstones are asymptomatic (Barbara et al., 1987; Kono et al., 1940).

Gallbladder stones are a significant problem in developed countries, with risk factors including age, increased BMI, diabetes, myelitis, alcohol consumption, smoking, HCV infection, cirrhosis of the liver and high cholesterol levels. According to international research reports, traditional risk factors for gallbladder stones include being female, over the age of forty, overweight, and fertile. The Babylonians first reported on gallstone disease around 2000 BC, and the Italian physician Gentile de Foligna described gallstones in men in the early 14th century (Diehl, 1991; Friedman et al., 1966). The first chemical identification of gallstone formation was performed by Fourcroy in 1789, and the first cholecystotomy (removal of stones without gallbladder removal) was performed by John Bobbs in 1867 in the US. However, Carl Langenbuch in Berlin was not satisfied with this method, as he observed that stones often recurred in the gallbladder, leading him to perform the first cholecystectomy (removal of the gallbladder with the stone) in 1882. The first laparoscopic cholecystectomy was performed in 1986. In the late 1890s, gallstones were first detected on plain x-ray examination, and oral cholecystography was performed in 1924. Ultrasound became the primary method for diagnosing gallstones in the 1970s. The three types of gallbladder stones are cholesterol stones (80%), black pigment stones, and brown pigment stones (20%). Black pigment stones are caused by hemolytic diseases such as sickle cell anemia and thalassemia, as well as cirrhosis of the liver. Brownstones are caused by stasis and infection of the biliary system. The major constituents of gallbladder stones are cholesterol, dried substances, fatty acids, triglycerides, proteins, calcium, and bicarbonate (Jørgensen, 1988). The purpose of this study is to investigate the risk factors associated with the development of gallstones in patients at the Lead Reading Hospital surgical units in Peshawar. The main objectives of the study are to identify the risk factors of gallstones, determine the association of these risk factors with specific age groups, and measure the prevalence of gallstones in male and female patients at the hospital. By achieving these objectives, the study aims to contribute to a better understanding of the factors that influence the development of gallstones, which could lead to improved diagnosis, treatment, and prevention of this condition.

Materials and Methods

This descriptive-analytical study was conducted with the approval of the head of the radiology department at Lead Reading MTI Hospital in Peshawar. The study aimed to discuss the research methodology used for the proposed study, including the placement of the universe of the study, the sample size of participants, and the methods of data collection and analysis. The data for this study were collected from the surgical units

and radiology department at Lead Reading MTI Hospital in Peshawar. The study was conducted after obtaining approval from the Ethics Committee of Lead Reading MTI Hospital Peshawar, and informed consent was obtained from all participants. The study was conducted for a period of 6 months from October 1, 2016, to April 1, 2017. The sample size for this study consisted of 220 participants (121 females and 99 males) who were collected from a total population of 1000 people at the surgical units and radiology department of LRH within a specified period of time. This study was conducted as a cross-sectional observational study and included participants between the ages of 20 to 60 years. Data was collected from the surgical ward and radiology department, and the sample size formula chi-square test was used to analyze the data. The study collected data from both the ultrasound report and the participant's comprehensive medical history, including signs and symptoms, during the specific time period. In-person interviews with all participants were conducted in various locations within LRH MTI, such as the surgical section, ultrasound room, and outpatient department. Despite the clinical exams taking place during the day, male and female adults were interviewed, and their radiological, ultrasound and other test results were reviewed. The participants' age and weights were also recorded during data gathering to assess their potential risk factors for gallbladder stones, regardless of gender. The selection method employed in this study was nonprobability convenient sampling.

Various tools, such as ultrasound examination, biopsy lab examination, physical examination, and questionnaires, were utilized. To observe the risk factors of gallbladder stone patients, the surgical and ultrasound departments at LRH Peshawar were examined during a specific period that met the inclusion criteria. The study included both male and female patients who underwent abdominal sonographic evaluation at the Radiology Department of Lead Reading MTI Hospital Peshawar. Patients who underwent cholecystectomy, liver transplant, choledochylocyst, liver mass resection, or had congenital absence and shrunken gallbladders with calculi were excluded from the study because their gallbladders cannot be visualized. After collecting the data, it was transferred to a computer and analyzed using SPSS software. The data was processed, tabulated, and presented through graphs and percentages.

Results and Discussion

In this research, 220 patients in total were enrolled; of these, 121 (55%) were female patients and 99 (45%) were male patients (*Table 1*). On ultrasonography, it was discovered that echogenic mass shadowing affected 24 individuals. Gallbladder stones are more common in women than in men, with the frequency in women being 8.6% compared to 2.3% for 99 males and 5 (21.74%) males with gallbladder stones, respectively. 9.5% of the time, gallbladder stone disease was prevalent altogether (10.9%). The P-value was significant at a 95% confidence level for gender, age, married status, diet, family history of gallbladder stone disease, and diabetes mellitus with gallbladder stone disease, according to *Table 2* for Analysis of Variables. However, the factors listed in *Table 2* for educational level, place of residence, diet, smoking, use of birth control, weight loss, and the monthly salary of the patients did not significantly correlate with gallbladder disease. The table also revealed a significant association between GSD and gender, with 121 (or 55%) of the study's participants being women and 99 (or 45%) men. In this research, 118 (53.4%) of the patients were illiterate, and *Figure 1* shows no significant relationship between education level and GSD. *Figure 2*

shows that 138 people (62.4%) were married and 83 people (37.6%) were unmarried. Marital status has been shown to be significantly associated with gallbladder stones. The residential position of the patients had no bearing on their GSD, as shown in *Figure 3*, where 135 (61.1% of the patients) belonged to urban areas and 86 (38.9%) to rural ones.

Table 1. *Summary of gallbladder stone cases.*

Variable	Frequency (N)	Percentage (%)
Gender of the patient		
Male	99	45
Female	121	55
Total	220	100

Table 2. *Descriptive analysis with p-value of risk factors of gallbladder stone.*

Variables	Frequency (N)	Percentage (%)	X^2	p-value
Gender				
Male	99	45		
Female	121	55	4.429	0.040
Educational level				
Illiterate	118	53.4		
Primary	23	10.4		
Secondary	18	8.1		
Intermediate	28	12.7		
Graduation	31	14		
More than 16 years	3	1.4	8.873	0.114
Marital status				
Single	83	37.6		
Married	138	62.4	11.922	0.000
Residence of the patient				
Urban	135	61.1		
Rural	86	38.9	1.103	0.301
Type of diet				
Vegetarian	29	13.1		
Non-vegetarian	14	6.3		
Both	178	80.5	30.173	0.000
Age of the patients				
1	80	36.2		
2	79	35.7		
3	46	20.8		
4	16	7.2	27.082	0.000
Monthly income				
1.00	195	88.2		
2.00	26	11.8	1.352	0.333
Family history of gallbladder stone				
No	177	80.1		
Yes	44	19.9	8.370	0.008
Diabetic mellitus status				
No	198	89.6		
Yes	23	10.4	12.189	0.002
Smoking status				
No	186	84.2		

Yes	35	15.8	0.024	1.000
Pregnancy status				
No	215	97.3		
Yes	6	2.7	0.114	0.547
Birth control pills status				
No	199	90		
Yes	22	10	2.516	0.160
Weight loss status				
No	164	74.2		
Yes	57	25.8	2.032	0.164

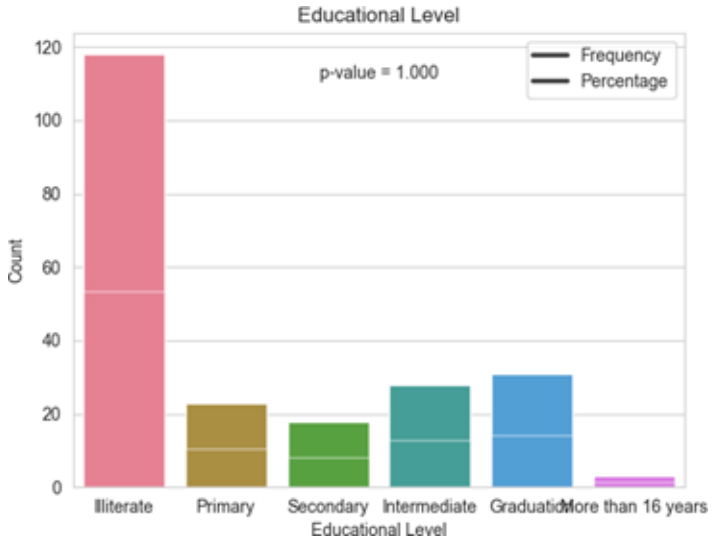

Figure 1. *Education level and GSD.*

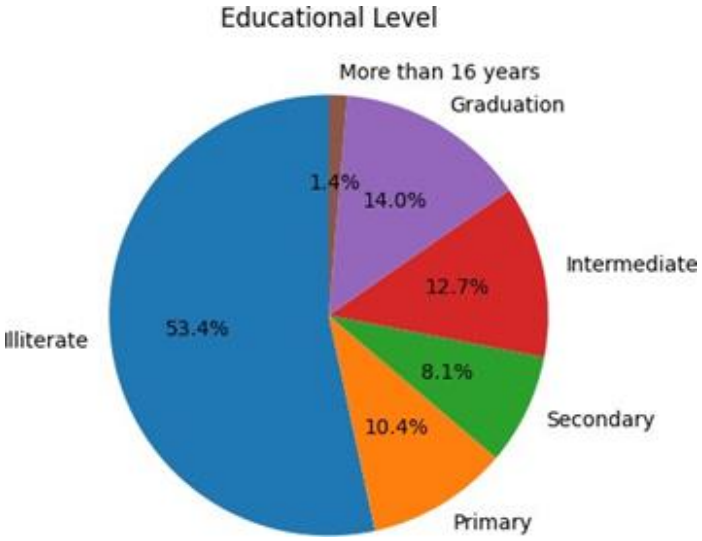

Figure 2. *Education level (in percentage, %).*

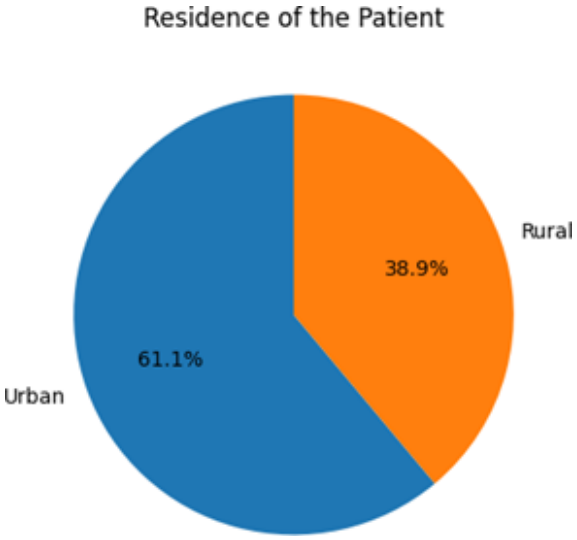

Figure 3. *Residence of patient.*

Significant evidence linking the patient's nutrition to GSD 29 (13.1% of the study group) were vegetarians, 14 (6.3%) were not, and 178 (80%) were following both types of diets on a daily basis, as shown in *Figure 4*. Significant evidence has linked gallbladder stone etiology to GSD. 177 (80.1%) patients had no family history of GSD, whereas 44 (19.9%) patients did, as shown in *Figure 5*. Significant associations with diabetes were found in our research. According to *Figure 6*, 23 people (10.4%) had diabetes while 198 people (89.6%) did not. A non-significant association between smoking and GSD was found in *Figure 7*, with 35 smokers representing 15.8% of the study group and 186 (84%) non-smokers. Only 6 (2.7%) of the 220 patients were pregnant, and the relationship is not statistically significant (*Figure 8*). Weight reduction, monthly income, and birth control pills did not significantly correlate with the GSD. Among the 220 patients, 22 (or 10.0%) used birth control pills, and 57 (or 25.8%) demonstrated weight reduction. Patients with GBS who were aged 10 to 20 years were 80 (36.2%), those aged 21 to 40 were 79 (35.7%), those aged 41 to 60 were 46 (20.8), and those aged 60 to 80 were 16 (7.2%). No substantial correlation between monthly incomes shows the results with GBS. The *Table 3* shows the ultrasonographic findings of gallbladder abnormalities during screening gallbladder 196 (89.09%) patients were shown no abnormality during scanning by ultrasound while 24 (10.9%) patients were positive for gallbladder stones, with single gallbladder stones being found in 7 (3.2%), multiple gallbladder stones being found in 12 (5.45%), sludge is found in 2 (0.9%), and gallbladder wall thickness being found in 3 (1.4%). This research is founded on a family history of gallstones. According to the research on heredity, the high occurrence among PIMA Indians is most likely. Oral contraception and parity have been risk variables documented and verified by a number of studies and research reviews (Diehl, 1991); it may be caused by female hormonal changes. However, the current research found no link between oral contraception and cancer. The current research discovered a link between diabetes and gallstone stones. Among Diabetics, possible reasons for gallstone formation include easy cholesterol supersaturation in bile; a diminished fraction of evacuation of the gallbladder and expanded gallbladder capacity in the fasting period (Diehl, 1991). Gallbladder stone formation has been linked to prevalent specific diseases including overweight, type 2 diabetes, and hypertension and cholesterol, which lends credence to the notion that gallstone disease

is a component of metabolic syndrome. The pathophysiological connection between diabetes and gallstone development is elevated blood cholesterol concentration in gallbladder bile. Obesity causes a rise in body cholesterol synthesis as well as the secretion of gallbladder cholesterol (Barbara et al., 1987).

***Table 3**. Ultrasonographic findings in gallbladder stone cases.*

Variable	Groups	Finding	Frequency	Percentage
Type of abnormality (GB occur)	None	-	196	89.09
	-	Single gallbladder stone	7	3.2
	-	Multiple gallbladder stone	12	5.45
	-	Sludge	2	0.9
Gallbladder wall thickness	-	-	3	1.4

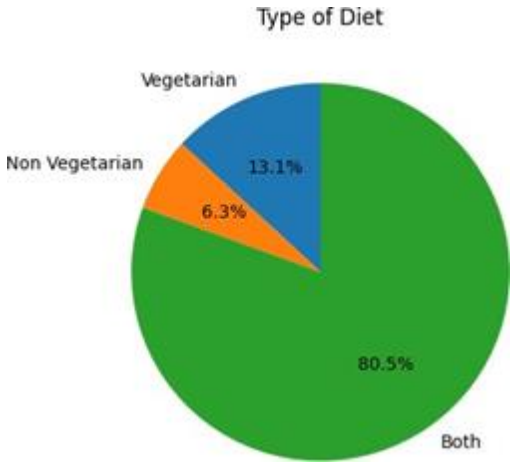

***Figure 4.** Diet variation.*

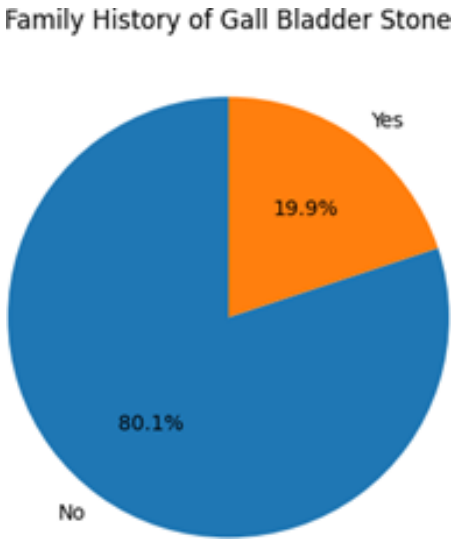

***Figure 5.** Family history of gallbladder stone.*

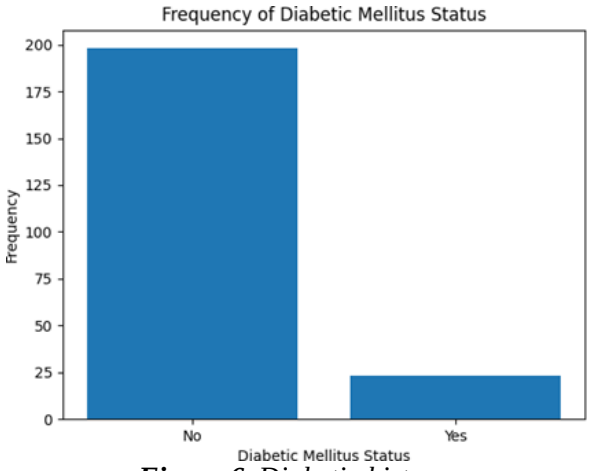

Figure 6. *Diabetic history.*

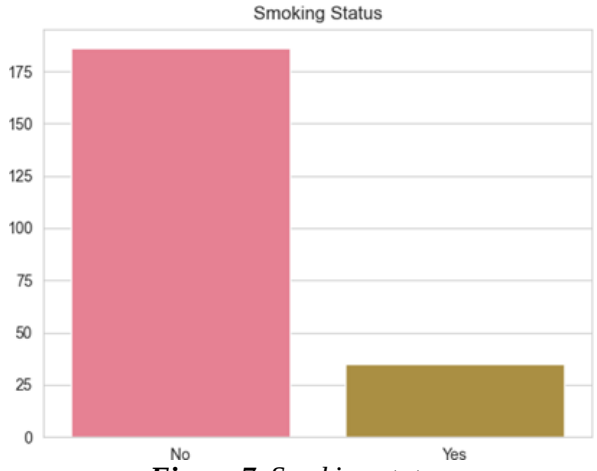

Figure 7. *Smoking status.*

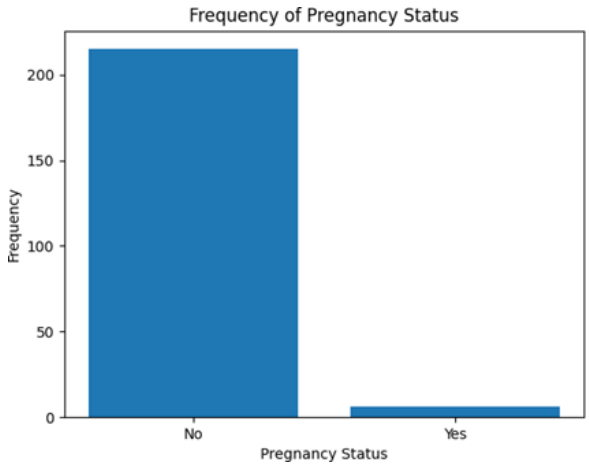

Figure 8. *Pregnancy status.*

We studied people who had or did not have ultrasonographic indications of gallstones. The total number of individuals in each cohort was roughly equal, and well almost all were participating in the research sequentially. The study's goal is to assess the risk factor for gallstone disease. The current research found that 10.9% of people have gallstone disease. The incidence rates are slightly higher than in the prior study,

which found an incidence rate of 9.03% (Kurtin et al., 2000). Despite the increase in incidence rates, very few preventive measures have been implemented to reduce the disease's prevalence (Nasir et al., 2021). The rates are comparable to those in America (10%) and Peru (10.7%), but vary from those in Bangladesh (5.4%), Germany (7.8%), Tunisia (4.1%), and New Zealand (20.8%), according to research (Jafri et al., 2022). A number of ultrasound-based studies performed in various parts of the world. GSD prevalence ranged from 5.9% to 21.9% around the globe (Rosenberg amd Leinskold, 2004; Friedman et al., 1966). These variations could be attributed to regional differences in food and lifestyle. According to the current research, the risk factors for gallbladder stone disease were gender, age, marital status, diet, family history of gallbladder stone, and diabetes mellitus. However, no substantial relationship was found between gallbladder disease and patients' educational level, residence, type of diet, smoking, birth control pills, weight loss, or monthly income. Gender was found to have a significant association in our research. The incidence of GD was found to be higher in females than in men. This result is consistent with prior to Pakistani research and other international studies (Channa, 2008). The distinction is caused by a rise in the female sex hormone estrogen, which causes increased cholesterol secretion in bile but rather induces bile saturation, resulting in the development of cholesterol gallstones (Samra et al., 1988). Our research found a link between married status and depression. Only a few investigations have found a link between GD and marital status. Females are nearly twice as likely as men to develop gallstones, especially during productive years and when using oral contraception and estrogen treatment (Sujatha et al., 2020). They revealed that marrying at a young age promotes female fertility and boosts parity rates. As a result, the female sex hormone may play an important part in the formation of gallstones during the fertile period. However, few studies have refuted such a connection in their own work (Natique et al., 2021). Our research discovered a significant connection between a family history of gallstones and yet many studies (Pak and Lindseth, 2016; Holzbach and Busch, 1991), however not all study results (identified any disease connection). The patient's diet was found to have a substantial correlation with GSD. 29 (13.1%) of the study population were vegetarian, 14 (6.3%) were non-vegetarian, and 178 (80%) consumed both types of diet on a regular basis. A lineage of gallbladder stones was found to have a substantial association with GSD. 177 (80.1%) patients had no family background of GSD, whereas 44 (19.9%) patients had a family history of GSD. Our research found a link between diabetes and obesity (Njeze, 2013).

The current research discovered a link between diabetes militias as well as gallstone formation in various studies without sex differences. A majority of various national studies in Karachi in 2016 found a link between diabetes and gallstone disease, as did this study. They figure out which diabetes mellitus (Channa, 2008; Everhart et al., 1999) might be regarded as a risk factor in gallstone development and our research find out that diabetes is 89.6% the reason for gall bladder forming. Moreover, we discovered a link between both cholesterol as well as gallstone illness in a single analysis yet not in a multivariate. In this research, elevated concentrations of TG were significantly linked to the development of gallstones. This finding is consistent with prior research (Taher, 2013; Channa, 2008; Samra et al., 1988). It was discovered that every digestive indicator and sign usually existed prior to colectomy (removal of the gallbladder). Along with flatulence and uncomfortable stomach gas, these sensations rarely occurred on a daily basis for the majority of the patients, who experienced them at intervals of

less than once per week. At three months following the operation, all symptoms showed a substantial decrease in incidence when compared to baseline, with the exception of diarrhea and stomach pain with unusual or multiple locations. Nothing else changed after that (Di Ciaula et al., 2019; Channa, 2008) 14 patients did not describe any signs or symptoms of abdominal discomfort in the three months prior to their cholecystectomy. The development of symptoms of gallbladder cancer was linked to smoking, according to a large British cohort analysis, but our research found no link to smoking. Most research indicates that pregnancy carries danger (Chapman et al., 2000). However, two significant investigations found that smoking reduced mediator formation and mucus formation in the biliary mucosa, protecting smokers from gallstone disease (Attili et al., 2005). The study finds no connection between smoking and GBS. In contrast to the findings that gallstone formation was unrelated to smoking, the prevalence of gallstone disease was comparable in women who did not smoke and in women who smoked frequently (>35 cigarettes per day) (Attili et al., 2005). One each in Germany and France was unable to support the inference that childbearing is a given (GREPCPO, 1984; Sampliner et al., 1970). Our research, however, found no correlation to conception. According to a Taiwanese study, regardless of location or quality of living, extended exposure to certain other risk factors directly correlates with the emergence of gallstones as people age (Friedman et al., 1966). The current research demonstrates a correlation between GBS and age. While different research found a greater prevalence in the age range of 41 to 50 years. This outcome was comparable to Indian research (Mjåland et al., 1998). Our research discovered no correlation between educational attainment, monthly income, or place of residence and gallstones. Occasional uses of economic status include employment, education, and place of residence. University education has been demonstrated by Italian MICOL research to be a major risk for GS (Fernandes et al., 2000).

Low socioeconomic standing or a person who shares with GS, according to a British study (Méndez-Sánchez et al., 2005), although some research suggests a disputed relationship between socioeconomic position and gallstones (Shaffer 2005), socioeconomic status has been determined to have an opposite relationship to gallbladder disease in a previous cross-sectional survey of non-Hispanic Whites and Mexican Americans. Gallstones are associated, according to our research. While some studies have linked obesity to high-calorie consumption, the significance of dietary composition is uncertain and challenging to evaluate (Shaffer 2005). By using a multimodal logistic regression approach, our research found a significant correlation between the incidence of gallstone disease but rather unmodifiable risk factors like age and gender as well as modifying variables like marriage status and a non- physical work lifestyle. The results and a current Iranian study from 2016 are linked. The findings showed that participants who were in their fourth or later decade of life experienced greater levels of presence. The results are consistent with earlier research carried out in Pakistan by Aslam et al. (2013) and in Western nations (Bilal et al., 2016). Because of environmental risk factors, the link between age and finding is more common in individuals. The incidence of GD was also found to be higher in females than in males, especially during the premenopausal phase. This result is in keeping with previous research from Pakistan (Aslam et al., 2013) and other countries (Bilal et al., 2016). The difference is related to higher estrogen levels, which are connected to the main sex hormone in females. The production of cholesterol gallstones was caused by a rise in the excretion of cholesterol in bile due to higher estrogen levels (Verma et al., 2013).

Additionally, our research found that GD was more common in single, widowed, and separated women than in married women. Only a few studies have identified a connection between GD and marital status (Bilal et al., 2016). They understood this from the fact that adolescent marriage extends the female reproductive age and raises parity rates. Lastly, female sex hormones may be a major factor in gallstone pathogenicity throughout fertile years. In our research, the statistical significance of marital status was related to hormonal changes, and the increased parity rate had a significant impact on gallstone formation. Marital status has a strong correlation to liver stones, with 138 (62.4%) of those who were married and 83 (37.6%) of the people who were unmarried. The patients' living situation has no bearing on their GSD. Among the patients, 135 (61.1%) were from metropolitan areas, while 86 (38.9%) were from rural areas.

So even though therapeutic individuals were significantly younger than untreated individuals, Agha Khan Hospital scientists in Karachi in 2013 discovered no significant variations in initial risk variables or digestive signs among those receiving treatment and untreated attendees. It is crucial to send patients for cholecystectomy when they have gallstone diseases and unsettling stomach cramps in order to prevent "post-cholecystectomy syndrome." We also discovered in our prevalence research that individuals who had under- gone cholecystectomy surgery performed worse in regard to life satisfaction and abdominal discomfort. It is unknown whether the procedure caused this pattern to appear or whether it was already there before. We did a prospective investigation on 200 patients in a row who were having cholecystectomy surgery for specific reasons in order to clarify these features. Only 8.7% of the cohort with normal pain had pain that remained the same or got worse, while the participants with unusual pain locations reported this occurrence 22.9% more frequently (Ansari-Moghaddam et al., 2016; Zahor et al., 1974). It's possible that retained stones or stone regrowth in the remaining liver are to blame for symptoms continuing after cholecystectomy (Abu Eshy et al., 2007; Méndez-Sánchez et al., 2005). Absolutely correct topmost quadrant abdomen discomfort and dyspepsia are the typical symptoms, alongside or without jaundice. Peptic ulcers, abdominal discomfort, gastrointestinal illnesses, liver diseases, bowel dysfunction, and heart disease are among the non-biliary reasons for post-cholecystectomy illness (Abu Eshy et al., 2007). However, in certain individuals, biliary factors such as residual cystic duct/gallbladder, severe biliary stenosis, choledocholithiasis, or bile duct stenosis may be the underlying cause, despite the presence of symptoms of gallstone disease like biliary colic and obstructive jaundice. To rule out any retained stones, a comprehensive evaluation is recommended. Post-cholecystectomy syndrome can arise in up to 40% cases, and symptoms may appear anywhere between two days and 25 years after the procedure. There may also be gender-specific risk factors for post-cholecystectomy complaints, as demonstrated by Bodvall and Overgaard, who found that 43% of female patients and 28% of male patients had recurrent complaints. In our study, 99 males and 121 females, accounting for 55% and 45% of the participants, respectively, were observed. According to several accounts, the post-cholecystectomy syndrome may be caused, at least in part, by a cystic duct remnant that is longer than 1 cm after cholecystectomy. Various writers dispute this (Kurtin et al., 2000; Kono et al., 1940). Remains of the cystic tract are where residual gallstones are more frequently found. The failure to identify the cystic duct, CBD intersection, is frequently the potential etiology for this kind of instance. In the presence of severe inflammatory cytokines or fibrosis, it's more probable.

In some individuals, it may be wise to remove the cystic duct all the way to the common duct that marks their junction. Individuals who have a history of biliary colics, gastroenteritis, chronic bilirubin, and those who underwent restorative ERCP previous to removing and partitioning a cystic duct have a higher risk of accumulating stones in the bile ducts. The presence of stone blocks in the bile ducts may be seen visu- ally or felt with the responsibility to look. Another sign of a displaced stone inside the cystic duct may be adhesions all around the duct. Dissection should proceed in these situations near the stone, more towards the intersection of the bile ducts and CBD as one gain more expertise, among the primary causes of comment syndromes, Moody (Shaffer, 2005) listed gallbladder remnant. He cited Bodvall's prior experience with 26 cases of gallstone remnant as a source of a post-cholecystectomy syndrome found in a sum of 103 instances operated on, equaling to 25% prevalence (Kurtin et al., 2000). Following laparoscopic or laparotomic cholecystectomy, there are three potential causes of stone return in a gallbladder vestige: improperly carried out partial deliberate cholecystectomy (fundectomy), unintentionally incomplete excision of the gallbladder. Applying clips on the cystic conduit close to the stone is frequently a viable option. No need to try to "milk" the stone proximal because doing so could cause it to fragment and possibly enter the normal duct alone), or eventually the discovery of a second or even third gallbladder that was accidentally overlooked during the operation (or probably voluntarily missed because seemingly healthy). Both deliberate and unintentional partial gallbladder excision throughout cholecystectomy is possible. Kuster and Domagk suggest that instead of converting to an open cholecystectomy for cases of acute cholecystitis, an interim laparoscopic cholecystostomy followed by a delayed laparoscopic cholecystectomy should be performed. Some authors recommend tube cholecystostomy as a good option for certain patients with acute cholecystitis or poor general condition. In cases where anatomical distortion at Calot's triangle makes dissection insecure, a safe and effective alternative is subtotal cholecystectomy. Patients with acute cholecystitis have a higher conversion rate to open surgery than those without, but laparoscopic partial cholecystectomy has been suggested as an alternative to reduce this conversion rate. It has been found in our research that some individuals are encountering problems. Improved radiological imaging techniques have helped in diagnosing the causes of persistent symptoms in post-cholecystectomy patients.

Ultrasound, CT scan, ERCP, and MRCP are used to detect gallbladder remnants with or without stones in patients reporting symptoms consistent with post-cholecystectomy syndrome. However, it is challenging to diagnose residual gallbladder with gallstones. In cases where clinical suspicion is high with a negative abdominal ultrasound, EUS is recommended for diagnosis due to its high sensitivity (96.2%) and specificity (88.9%), and cost-effectiveness in avoiding ERCPs. ERCP is an invasive investigation and is associated with specific complications (Kim et al., 2011). MRCP is a non-invasive alternative to EUS with similar sensitivity and specificity. Treatment options depend on the suspected cause, and surgical excision should be done for residual stones to prevent potentially life-threatening complications such as carcinoma and recurrent cholangitis, recurring cholelithiasis of extensive remnant enlargement, mucocele, and Mirizzi syndrome (Channa, 2008). A researcher reported the whole first laparoscopic total cholecystectomy in 1995. In the past, the open approach was thought to be the best method for removing these remaining stones. Later, the laparoscopic method gained popularity but was only used in sophisticated centers. The cystic duct remnant and Calot's triangle are typically buried in inflammatory tissue following partial

cholecystectomy, therefore it was believed that performing a laparoscopic revision was too risky for these patients. Limited to the abundance of competence, minimally invasive treatment has revolutionized the management procedure for these patients, as it has in other surgical fields. Numerous specialists have effectively removed cystic duct residue using laparoscopic surgery, resulting in complete healing of the patient who experienced little or no postoperative complications. Recently, it has been proposed that laparoscopic removal of the gallbladder or the remnants of the gallbladder in such individuals is both safe and practical. When performed by skilled laparoscopic surgeons, the laparoscopic treatment to constantly remind the bile duct shows to be a noninvasive, safe, practicable, and effective treatment (Grodstein et al., 1994). GD is thought to be the preventable cause of mortality (Reshetnyak, 2012). Globally, GD-related complications are regarded as one of the most expensive pathological diseases. The current study found that 10.2% of Karachi's statistical sample had GD, which indicates a large financial burden on the nation's healthcare resources. The incidence rates seem to be marginally greater than in earlier research of In 2014, a 9.03% incidence rate was reported (Aslam et al., 2013). Despite the increase in incidence rates, very few preventative measures have been implemented to lessen the disease's prevalence (Kim et al., 2011). According to research by Abu Eshy et al. (2007), the percentages are comparable to those in America (10%) and Peru (10.7%), but indifferent to those in Bangladesh (5.4%), Germany (7.8%), Tunisia (4.1%), and New Zealand (20.8%) (Hayat et al., 2005). removing numerous stones from cystic duct residuals in their own patients was simple, but Kodali and Petersen had significant difficulties in doing so for patients who had post-cholecystectomy Mirizzi syndrome. Also mentioned are non-surgical options like ESWL (Grodstein et al., 1994). With growing expertise and the creation of auxiliary techniques like electrohydraulic lithotripsy (ESWL), electrohydraulic lithotripsy (EHL), as well as laser lithotripsy, it is now feasible to cure Mirizzi syndrome victims using percutaneous endoscopic techniques. When it is preferred to prevent surgical treatment, ESWL in conjunction with the proper therapeutic endoscopic interventions is particularly safe and efficient in the management of cystic duct remnant stones and Mirizzi syndrome.

According to Channa (2008), gallstones are indeed the solidifications that can be found in the gallbladder and are thought to be the most common disorder to bring to the nearest hospital appear in any area of a biliary system, and the condition known as cholelithiasis results from their buildup inside the gallbladder. The side effects of gallstone disease (GSD), like cholecystitis, gastritis, as well as cholangitis, are becoming serious public health problems and place a heavy financial load on all countries (Shaffer, 2005). According to a 2015 research, 700,000 cholecystectomies are carried out in the US every year at a cost of 6.5 billion (Shaffer, 2005). Similarly to this, according to existing studies, 50,000 cholecystectomies are done annually in the UK, and twice as many persons are brought to hospitals for common bile duct episodes (Atesok et al., 2012). GSD was once thought to be a rare disease that only affected the western population, but as dietary habits have changed, it has grown into a more and more frequent cause of mortality in emerging nations (Sachdeva et al., 2011). The frequency has been documented to range from 10% to 20% in developed nations like the UK, and the USA, as well as Italy (Bilal et al., 2016). Studies using the ultrasonography method, however, have revealed a prevalence of 22% to 54% in these nations (Packer et al., 2015). Additionally, a researcher observed that the prevalence of GSD varied from 5.2 to 10% in African communities, 3.1 to 6.1% in Asian countries,

and 6.3% in Iranian populaces. It is crucial to forecast a positive result from a surgical cholecystectomy. First, it's crucial but challenging to pinpoint those symptomless people who are more likely to experience gallstone disease problems. Second, it's critical to recognize those who exhibit symptoms. Case studies of cystic duct calculi following cholecystec- tomy reveal conflicting outcomes for treatments utilizing ERCP solely (Channa, 2008) In the past two decades, cases have been documented inside which cystic duct residual stones had all been treated endoscopically, through a backward reoccurring method or percutaneously following surgical cholecystostomy (Barbara et al., 1987). Observed by a researcher who is more likely to experience a surgical result that is unsatisfactory, such as ongoing pain or what is known as a "post-cholecystectomy condition."

Gallstone disease consequences can be expensive and even fatal. The aged have the highest mortality rates. Some problems (like acute pancreatitis) don't even have a known cause. One might contend that all people with documented gallstones should be operated on in order to prevent some of this mortality. However, given the high prevalence, the fact that the majority of stones are undetectable, and the fact that health care expenses would skyrocket, this is unrealistic. As a result, it would be ideal to be able to foresee who with benign stones will experience complications (Sachdeva et al., 2011; Abu Eshy et al., 2007). Population statistics from Pakistan have been discovered to just be scarce, but earlier research in Pakistan's southern Sindh region has recorded a surgical frequency of 9.03% (Channa, 2008) in Pakistan, the prevalence rate was 4% for men and 14.2% for women (Bilal et al., 2016). GSD risk factors have been shown to be multifactorial (Panpimanmas and Manmee, 2009), and they include age, gender, dietary factors such as elevated calorie consumption, low dietary fiber, high intake of processed carbs, hypertriglyceridemia, physical inactivity, pregnancy, parity, overweight, and obesity (Bilal et al., 2016). Additionally, both genders are more susceptible to disease as they age (Ansari-Moghaddam et al., 2016), with a high incidence of occurrence between the ages of 50 and 60 (Portincasa et al., 2012). In which the male-to-female ratio varies, it is stated that females seem to be two times more susceptible to this illness than males (Ansari-Moghaddam et al., 2016). The mnemonic "female, obese, fertile, and forty" can be used to remember the risk factors associated with gallstones. Likewise, women who are using contraceptive pills had full-term births, had three or more children, or used oral contraceptives were at higher risk (Puig-Campmany et al., 2020). Regarding the relationship between triglyceride, cholesterol, obesity, glucose, and diet-related gallstones, there have been some conflicting studies. According to some research, the main factors contributing to the development of gallstone diseases include elevated TG levels, obesity, the duration of obesity, a lack of physical activity, elevated glucose serum levels/diabetes, and elevated cholesterol serum levels (Corli et al., 2016). Prior research was done on people who were committed to hospitals, with very little community-based research done. The purpose of the current research was to ascertain the incidence as well as risk factors for the condition being studied because doing so can aid in developing prevention and treatment measures. Consuming veggies and fruits lowers the chance of developing gallstone disease, according to another study. LRH MTI Peshawar KPK South Pakistan general community sample factors associated with GSD. Additionally, our research showed that GD was more common in single, widowed, and separated women than in married women. Only a few studies have found a link between GD and marital state (Ansari-Moghaddam et al., 2016). They provided an explanation on the basis of the evidence that early marriage lengthens the female

reproductive cycle and boosts viability rates. Therefore, the female sex hormones may be extremely important in the development of gallstones during the fertile time. However, only a few studies in their study (Ansari-Moghaddam et al., 2016) denied the existence of such a relationship. In this instance, greater number and hormone imbalances may also be associated with the statistical significance of marital status as demonstrated by multimodal logistic regressions rates. Additionally, it was found that regular physical exercise is crucial for preventing GD. The finding is in line with the results of various studies, including those by Ansari-Moghaddam et al. (2016), which also found that increased physical activity significantly lowers the chance of developing GD. Our findings, even so, are at odds with those of (Puig-Campmany et al., 2020) who found no evidence of a significant link between GD and physical exercise. In a different research, participation in sports is inversely related to the onset of GD.

Reduced physical activity significantly raises biliary cholesterol, percent biliary cholesterol, and serum triglycerides, which supports the result (TG). To keep daily physical activity and manage obesity, the general public must be educated with Serum TG concentrations (Alishi et al., 2017; Abu Eshy et al., 2007). According to a number of investigators, low HDL tiers are thought to play a significant role in the pathology of GD through the indirect effects of body mass index (BMI) and muscle mass on metabolic diseases as well as the distinct effects of regular exercise on body mass (Ansari-Moghaddam et al., 2016). Individuals in our research who had aberrant Levels of high-density had a higher prevalence of GD. The current research also showed that patients with fatty livers had a higher prevalence of GD on ultra-sonographic graphic findings. The findings are consistent with earlier research from Pakistan (Koller et al., 2012) and other countries (Sohail et al., 2017). The results confirm that fatty liver causes an accumulation of lipids and TG in hepatocytes, which sets off an inflammatory response. Leakage of the liver enzyme into the bloodstream results as a consequence. The gallbladder does not empty properly when there is fatty liver present. Gallstones are consequently precipitated by bile accumulation. Likewise, ultra-sonographic results showed that the majority of GD patients had numerous stones, which again is in accordance with results from earlier studies (Reshetnyak, 2012). In the current research, the occurrence of GD was highly associated with an elevated alkaline phosphatase level. The outcome is consistent with those of an earlier investigation (Bilal et al., 2016). The majority of GD patients were female, and the result could be explained by the evidence that an increase in alkaline phosphatase emerged because of elevated bone resorption or concurrent osteoid formation (Ansari-Moghaddam et al., 2016) in patients who are female (Alishi et al., 2017). Additionally, there was a strong correlation between the rise in serum SGPT levels and the frequency of GD. This outcome is congruent with earlier research from Pakistan (Aslam et al., 2013) and abroad (Alishi et al., 2017). This indicates that hepatocytes become inflammatory and injured all through GD pathology, which causes a significant increase in serum liver enzymes. Our studies were the first to use a drawing of a torso to allow patients to identify pain localization at leisure even without the effects of a doctor's visit. This helped to categorize the pain into normal and unusual pain locations, which was very helpful. Additionally, we measured people's quality of life. similar criticisms, such as psychological other investigations have been using factors 125 In our research, the incidence of abdominal discomfort episodes, the intensity of the pain, and the quality of life all changed after cholecystectomy, but these changes were interrelated and stable after three months. A significant finding was that after cholecystectomy, patients with a history of frequent pain episodes were less likely

to experience pain. These outcomes are consistent with two additional newly published studies. Patients with unusual pain at the outset and associated poorer outcomes following surgery should be anticipated to have a lower post-operative quality of life than patients with typical pain. This wasn't the situation. However, this association has been demonstrated in a number of other investigations. Patients with mental illnesses and vulnerability typically have a worse recovery from surgery and just a lower standard of life (Aslam et al., 2013).

Conclusion

According to the results of the study, the risk factors for gallbladder stone disease include gender, age, marital status, diet, family history of gallbladder stones, and diabetes mellitus. Ultrasound, patient history, and physical examination were found to be the best modalities for the detection of gallbladder stones. The risk of gallstone disease was found to be more common in the female population, particularly among multiparous women, non-vegetarians, obese women, and those who had a history of taking oral contraceptives and smoking habits. In the past 25 years, gallstones have become more prevalent in both sexes over the age of 40. Changes in cholecystectomy rates were found to be only partly explained by changes in gallstone prevalence and were more determined by surgical practice. By identifying the risk factors associated with gallbladder stones, this study aim to contribute to the development of effective strategies for the diagnosis, treatment, and prevention of this condition, particularly among high-risk groups.

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Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

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