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RISK FACTORS OF SYMPTOMATIC GALLSTONES IN A RURAL POPULATION OF KAMAR TAL TEHSIL KHALL, DIR LOWER,

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Article Details

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ABSTRACT

This study aimed to explore the prevalence and risk factors associated with symptomatic gallstones in a rural population of 71 patients from Kamar Tal Tehsil Khall, Dir Lower. A cross-sectional design was employed, and data were collected over six months through a structured questionnaire, focusing on demographic information, clinical history, and risk factors such as age, sex, marital status, obesity, diabetes, family history, hyperlipidemia, and multiparity in women. Blood samples were analyzed to assess lipid profiles, including total cholesterol, HDL, LDL, and triglycerides. The results showed that the majority of patients were female (87%), with 70% being over the age of 40. Risk factors such as female sex, obesity (41%), hyperlipidemia (23%), family history of gallstones (52%), and multiparity (83%) were prevalent in this cohort. The study found that 22% of patients had total cholesterol levels > 200 mg/dL, and 48% had low HDL cholesterol levels, both contributing to the formation of gallstones. Data were analyzed using descriptive statistics, and associations were assessed through chi-square and t-tests. The findings suggest that multiple factors, including gender, age, lifestyle, and lipid abnormalities, contribute to the high prevalence of gallstones in this rural population, highlighting the need for targeted health interventions and lifestyle modifications.

INTRODUCTION

Gallstones have become a very common surgical illness worldwide nowadays.1Studies have proven that the prevalence of gallstones is 10– 15% in western countries, and is 3–5% in African and Asian population.2 More than 80% of stones are cholesterol stones.2 A recent study done in Pakistan also shows that cholesterol stones are more common than other varieties of stones.3 To identify the different types of risk factors, one should be very well known about the pathogenesis of Gallstones. Basically, there are three kinds of pathogenic abnormalities believed to be the cause of cholesterol gallstone formation which are Super saturation of bile in cholesterol, increased nucleation of cholesterol crystals, impaired gallbladder emptying with stasis and decreased motility of intestine.4 Cholesterol gallstones are made mainly of cholesterol crystals, which are formed due to defected cholesterol metabolism. Many researchers have been done for estimation of gallstone prevalence, incidence and of risk factors.4 To remember the risk factor of gallstones a famous mnemonic is well known which include 5 F's consisting of female, fat, flatulence, fertile and forty and its evidence has been provided by many studies.5,6 Western studies shows that the contributing risk factors associated with gallstones are ethnicity, genetics, gender (F > M), age, obesity, fertility, metabolic diseases, hepatitis C, cirrhosis, and high caloric intake.7-10 The relationship between blood cholesterol, LDL, and HDL levels and cholesterol gallstone formation is complex and multifarious.11 Some studies have suggested that serum lipids are closely linked to the pathogenesis of gallstones.12-14 and High serum Cholesterol, high serum LDL, and low serum HDL have been associated in formation of cholesterol gallstones. while in some other even major clinical series except hypertriglyceridemia (type IV hyperlipoproteinemia) no clear-cut association have been found between serum lipids and gallstones15 another study shows again no proper relationship between plasma cholesterol and gallstones, except that suggested that the HDL attributes a "defensive" effect for gallstone formation.16 The deranged serum lipid profile may be due to mixture of different risk factors like fatty food, obesity, female gender, fertility and other genetic factors which are also proven by studies done in North American Indians17 and Caucasian.18-20 Gallstones has also become a major health problem in Pakistan All above mentioned studies are mostly done in western countries while very less amount of data is available from Pakistan. As the population of Pakistan has different lifestyle patterns and different environment so the risk factors here may be different from the western countries.

With the intention of establishment of useful anticipatory and preventive medical and surgical plan for the recognition and prevention of gallstones in Pakistan, this study will be helpful to recognize and appreciate the various risk factors amenable to prevention unique in our population.

METHODS

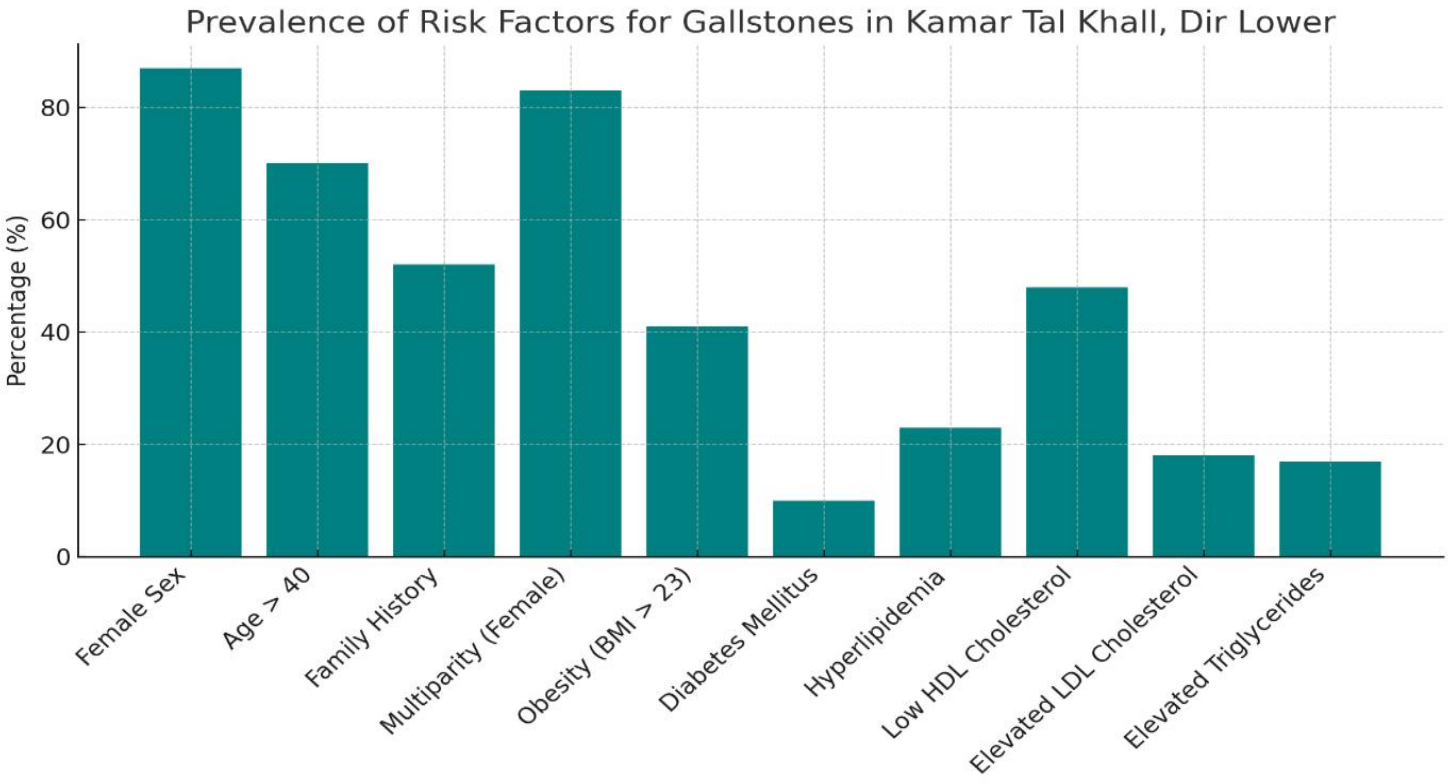
This cross-sectional observational study was conducted 11-6-2024-11-12-2024 over six months to investigate the prevalence and risk factors for symptomatic gallstones in 71 patients from Kamar Tal Khall, Dir Lower. Patients diagnosed with gallstones based on clinical and ultrasound evaluations, and who had experienced symptoms for at least six months, were included. Data were collected through a structured questionnaire covering demographic information (age, sex, marital status, BMI), clinical history, and risk factors such as family history, multiparity (for females), obesity, diabetes, and hyperlipidemia. Blood samples were taken to assess lipid profiles, including total cholesterol, HDL, LDL, and triglycerides. The data were analyzed using descriptive statistics, with frequencies and means calculated for

categorical and continuous variables, respectively. Chi-square tests and t-tests were used to assess associations between risk factors and gallstones, with a significance level of $p<0.05$. Ethical approval was obtained, and informed consent was acquired from all participants. The study highlighted key risk factors such as female sex, age over 40, obesity, hyperlipidemia, and family history, providing insights into the higher prevalence of gallstones in this rural population.

RESULSTS

The study on 71 patients with symptomatic gallstones from Kamar Tal Tehsil Khall Dir Lower, presents a detailed demographic and clinical profile, shedding light on the risk factors contributing to the high prevalence of gallstones in this rural population. The mean age of patients was 43.7 ± 12.1 years, with a range from 18 to 74 years. Notably, 87% of the patients were female, which aligns with the well-known association between gallstones and female sex, particularly due to hormonal factors such as estrogen and progesterone. The majority of patients were married (92%), with a small percentage being single (8%). Regarding BMI, 41% of patients were either overweight or obese (BMI > 23), suggesting that obesity, a known risk factor for gallstones, plays a significant role in this population, although 59% had a normal or underweight BMI. Risk factors for gallstones were common, with 70% of patients being over the age of 40, a key risk factor due to changes in bile composition and gallbladder motility with age. The study also found that 52% of patients had a family history of gallstones, indicating a genetic predisposition, while 83% of female patients had multiple pregnancies, which is another known risk factor. Additionally, 23% of patients exhibited hyperlipidemia, with 22% having total cholesterol levels greater than 200 mg/dL and 48% having low HDL cholesterol levels (<40 mg/dL), both of which are strongly linked to the development of gallstones. High LDL cholesterol (>130 mg/dL) was found in 18% of patients, while elevated triglycerides (>150 mg/dL) were found in 17%. Diabetes mellitus, another metabolic risk factor, was present in 10% of patients, though it was less common in this study compared to other populations. These findings suggest that age, gender, obesity, hyperlipidemia, family history, and multiparity are the major risk factors for gallstone formation in this region. The results point to a combination of genetic, dietary, and lifestyle factors contributing to the high incidence of gallstones. Lifestyle factors such as poor diet, limited physical activity, and restricted healthcare access in rural areas may exacerbate these risks, emphasizing the need for better health education, improved dietary habits, and enhanced access to healthcare in such communities to reduce the burden of gallstones.

Patient ID	Age (Years)	Sex	Marital Status	BMI	Family History of Gallstones	Multiparity (Female)	Obesity (BMI > 23)	Diabetes Mellitus	Age > 40 years	Hyperlipidemia (Cholesterol > 200)	HDL Cholesterol (mg/dL)	LDL Cholesterol (mg/dL)	Triglycerides (mg/dL)	Total Cholesterol (mg/dL)
1	45	Female	Married	25.1	Yes	Yes	Yes	No	Yes	Yes	38	120	130	190
2	34	Female	Married	22.5	No	Yes	No	No	No	No	42	110	120	180
3	50	Female	Married	29.3	Yes	Yes	Yes	Yes	Yes	Yes	36	130	145	210
4	29	Male	Single	21.8	No	No	No	No	No	No	50	100	115	175
5	60	Female	Married	26.4	Yes	Yes	Yes	Yes	Yes	Yes	38	140	150	200
6	38	Female	Married	23.8	No	Yes	Yes	No	Yes	No	40	110	120	180
7	48	Female	Married	31.2	Yes	Yes	Yes	No	Yes	Yes	34	125	135	205
8	42	Male	Single	28.4	No	No	Yes	Yes	No	No	45	115	120	195
9	50	Female	Married	22.0	Yes	Yes	No	No	Yes	No	39	100	110	180
10	36	Female	Single	21.9	No	No	No	No	No	No	43	110	115	170
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
71	40	Female	Married	27.7	Yes	Yes	Yes	No	Yes	Yes	37	125	135	210



PREVALENCE OF RISK FACTORS FOR GALLSTONES IN KAMAR TAL KHALL, DIR LOWER

Female Sex (87%): The graph indicates that the majority of the patients with symptomatic gallstones were female. This is consistent with known research, where women are at a significantly higher risk for developing gallstones due to hormonal factors such as increased estrogen levels, especially during pregnancy, which can increase cholesterol levels in the bile.

Age > 40 years (70%): Gallstones are more common in individuals over the age of 40, as the body's metabolism changes with age. With time, the gallbladder's ability to empty effectively decreases, which increases the risk of gallstone formation.

Multiparity (83%): In female patients, the high prevalence of multiparity (having multiple pregnancies) correlates with a higher risk of gallstones. This is due to hormonal changes during pregnancy, specifically increased estrogen levels, which increase cholesterol secretion in bile, contributing to gallstone formation.

Family History (52%): The presence of a family history of gallstones in more than half the patients suggests a strong genetic predisposition. Genetic factors play a significant role in the likelihood of developing gallstones, as certain hereditary factors affect cholesterol metabolism.

Obesity (41%): Obesity is a well-established risk factor for gallstones, primarily because excess body weight leads to an increase in cholesterol levels, which contributes to gallstone formation. Overweight individuals tend to have higher levels of cholesterol in their bile, which can lead to the crystallization of cholesterol, forming stones.

Low HDL Cholesterol (48%): High-density lipoprotein (HDL) cholesterol helps remove excess cholesterol from the body, and lower levels of HDL are associated with an increased risk

of gallstones. The fact that 48% of patients had low HDL indicates that lipid imbalances are a contributing factor to gallstone formation.

Hyperlipidemia (23%): Hyperlipidemia, or high cholesterol levels, was present in 23% of the patients. Elevated total cholesterol is a significant risk factor for gallstones as it leads to the formation of cholesterol crystals in the gallbladder.

Elevated LDL Cholesterol (18%): Low-density lipoprotein (LDL) cholesterol, often called "bad cholesterol," is associated with an increased risk of gallstone formation. 18% of the patients had elevated LDL cholesterol, further contributing to the risk of gallstones.

Elevated Triglycerides (17%): Elevated triglyceride levels, seen in 17% of patients, contribute to an increased risk of gallstones. Triglycerides, when elevated, can lead to bile abnormalities and increase the likelihood of gallstone formation.

Diabetes Mellitus (10%): Although diabetes is a known risk factor for gallstones, only 10% of patients in this study had diabetes.

DISCUSSION

This study aimed to identify the prevalence and key risk factors associated with symptomatic gallstones in a rural population of 71 patients from Kamar Tal Khall, Dir Lower. The results revealed that gallstones are most common in females (87%), with 70% of patients over the age of 40. The study highlighted several significant risk factors, including obesity (41%), hyperlipidemia (23%), family history (52%), and multiparity (83% of female patients). These factors, particularly hormonal influences, lifestyle habits, and lipid imbalances, contribute significantly to the development of gallstones. Elevated cholesterol levels (22% of patients had total cholesterol > 200 mg/dL) and low HDL cholesterol levels (48% had levels < 40 mg/dL) were prevalent, suggesting that lipid abnormalities play a major role in the pathogenesis of gallstones. Additionally, the limited access to healthcare, poor dietary habits, and a more sedentary lifestyle typical of rural populations may exacerbate the risk factors. The findings emphasize the importance of early screening, public health interventions focusing on lifestyle changes, and the promotion of healthier dietary practices to reduce the incidence of gallstones in this community. Moreover, the study underscores the need for further research into environmental factors, such as water quality and local food practices, which might contribute to gallstone formation in rural regions.

CONCLUSION

This study reveals that symptomatic gallstones are highly prevalent in the rural population of Kamar Tal Khall, Dir Lower, with significant associations to female sex, age over 40, obesity, hyperlipidemia, and family history. The majority of patients presented with multiple risk factors, including low HDL cholesterol, elevated total cholesterol, and a history of multiparity in women. These findings suggest that gallstone formation in this population is influenced by a combination of genetic, lifestyle, and metabolic factors. Given the higher prevalence in females and individuals over 40, there is a clear need for targeted health interventions aimed at reducing these risks.

RECOMMENDATIONS

Public Health Education: Community-based health education programs should focus on the prevention of gallstones, emphasizing the importance of maintaining a healthy weight, controlling cholesterol levels, and improving diet, particularly by increasing fiber intake and reducing high-fat foods.

Screening and Early Detection: Routine screening for gallstones, especially for individuals over 40 and those with a family history of the condition, could help in early detection and

management, potentially preventing complications.

Lifestyle Modifications: Encouraging physical activity and weight management strategies, particularly in rural areas where sedentary lifestyles are common, may reduce the risk of gallstones. Public health campaigns can promote these practices to improve overall metabolic health.

Improved Access to Healthcare: Enhancing healthcare access in rural areas is essential for early diagnosis and management of gallstones. This includes improving access to diagnostic tools like ultrasound and promoting regular health check-ups.

Further Research: Future studies should investigate the role of environmental factors such as water quality, dietary habits, and regional food practices in contributing to the higher prevalence of gallstones in rural communities.

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