

Original Article

Ultrasonographic Evaluation of Cholelithiasis with Family History among Adults in Swabi

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ABSTRACT

Background: Gallstones, formed within the gallbladder, can lead to serious health complications in adults. Factors such as obesity and age are well-recognized contributors to gallstone formation. However, the influence of family history on the development of cholelithiasis remains unclear.

Objective: This study aims to investigate whether a family history of gallstones increases the likelihood of developing this condition in adults living in Swabi, using ultrasonographic techniques.

Methods: A cross-sectional study was conducted over four months, involving 125 adults diagnosed at Bacha Khan Medical Complex, Swabi, KP, Pakistan. Participants were selected based on a history of cholelithiasis and underwent ultrasonographic examinations using a Toshiba prime machine with convex (3.0—5.0 MHz) and linear (7.0—14.0 MHz) transducers. Family medical history was collected via structured questionnaires. Data were analyzed using SPSS version 25.0, focusing on the prevalence and potential familial ties of gallstone disease.

Results: Of the participants surveyed, 97.7% (n=125) were diagnosed with cholelithiasis, indicating a high prevalence of the condition. Among those with gallstones, 36.2% reported a positive family history, suggesting a significant association between familial history and the occurrence of cholelithiasis.

Conclusion: The study underscores a substantial prevalence of cholelithiasis among adults in Swabi, with a notable association to family history, highlighting the need for further investigation into genetic predispositions and preventive strategies for those at risk.

Keywords: Cholelithiasis, Ultrasonography, Family History, Gallstones, Risk Factors.

INTRODUCTION

Gallbladder, a small, pear-shaped organ located beneath the liver, plays a critical role in the digestion process by storing and concentrating bile—a fluid produced by the liver to aid in the digestion of fats. The typical volume of bile in a healthy human gallbladder ranges from 30 to 50 mL, and it mainly comprises bile salts (70%), phospholipids (22%), cholesterol (4%), proteins (3%), and a small percentage of carbohydrates and vitamins (1-3). Despite its essential functions, the gallbladder is susceptible to various disorders, the most common of which is cholelithiasis, or gallstones formation. This condition involves the precipitation and accumulation of bile components, particularly cholesterol, which although only constitutes about 5% of the bile, can form stones in higher concentrations (4-7).

Cholelithiasis is a significant global health issue due to its high prevalence and the severe complications it can cause, such as acute cholecystitis, cholangitis, and more rarely, cholangiocarcinoma (8-14). The clinical manifestations of gallstones can be quite painful, with common symptoms including severe pain at Murphy's point, dyspepsia, fever, jaundice, loss of appetite, and weight loss (15). While factors such as obesity and age are well-recognized contributors to the risk of gallstone formation, the impact of genetic predispositions, particularly family history, remains a topic of ongoing research (16).

This study, conducted at the Department of Radiology, Bacha Khan Medical Complex, Swabi, KP, Pakistan, utilizes a cross-sectional design to investigate the prevalence and familial patterns of cholelithiasis in the local adult population. Ethical clearance for this research was obtained from the Women University Swabi's Ethical Committee. The study exclusively included women from the Swabi district who had a history of gallstones, employing advanced ultrasonographic techniques using a Toshiba prime machine equipped

with both convex (3.0–5.0 MHz) and linear (7.0–14.0 MHz) transducers for diagnosis. Participants were screened based on clinical symptoms and ultrasonographic evidence of gallstones (13). The findings from this study are intended to enhance the understanding of the epidemiological and familial aspects of cholelithiasis, potentially guiding future preventative and therapeutic strategies.

MATERIAL AND METHODS

The study employed a cross-sectional design to examine the prevalence and familial linkage of cholelithiasis among women residing in the Swabi district of Khyber Pakhtunkhwa, Pakistan. Conducted at the Department of Radiology, Bacha Khan Medical Complex, the research was approved by the Ethical Committee of Women University Swabi, ensuring compliance with the ethical standards of the Helsinki Declaration for research involving human participants.

Participants were recruited from the local population based on a history of cholelithiasis. Eligibility was determined through initial screenings using clinical interviews and review of medical records, focusing on symptoms suggestive of gallstones and any relevant family medical history. The ultrasound examinations were pivotal in confirming the diagnosis of cholelithiasis, which were carried out using a Toshiba prime ultrasound machine equipped with two types of transducers: a convex transducer with a frequency range of 3.0–5.0 MHz and a linear transducer ranging from 7.0–14.0 MHz (17).

Data collection was conducted over a period of four months, where a structured questionnaire was utilized to gather detailed demographic information, clinical symptoms, and comprehensive family history regarding gallstone disease. This method ensured the systematic collection of relevant data while maintaining the confidentiality and anonymity of the participants.

The collected data were rigorously analyzed using the Statistical Software for Social Sciences (SPSS) version 25.0. The analysis involved descriptive statistics to determine the prevalence rates and cross-tabulation to explore the associations between cholelithiasis and familial history. The statistical tests applied provided a robust framework for interpreting the complex data, facilitating a clear understanding of the relationship between genetic predispositions and gallstone formation in this specific population.

RESULTS

The results of this study revealed a high prevalence of cholelithiasis among the participants, with significant implications regarding the impact of family history on the occurrence of this condition.

Table 1: Prevalence of Cholelithiasis Among Participants

| Condition | Frequency | Percentage | Valid Percent |
|-------------------|-----------|------------|---------------|
| Cholelithiasis | 125 | 97.7% | 97.7% |
| No Cholelithiasis | 3 | 2.3% | 2.3% |
| Total | 128 | 100.0% | 100.0% |

This table shows that out of 128 participants, 125 (97.7%) were diagnosed with cholelithiasis based on ultrasound findings, indicating a significant prevalence of gallstones within this cohort.

Table 2: Relationship Between Cholelithiasis and Family History (FHx)

| Cholelithiasis | Family History (No) | Family History (Yes) | Total |
|----------------|---------------------|----------------------|-------|
| No | 3 | 0 | 3 |
| Yes | 45 | 80 | 125 |
| Total | 48 | 80 | 128 |

The cross-tabulation of cholelithiasis with family history shows a notable distinction: out of 125 participants with cholelithiasis, 80 reported a positive family history of the condition. This suggests a strong familial component, as 64% of those with gallstones had a family history of the same.

These findings emphasize the potential genetic or hereditary factors influencing the development of cholelithiasis, aligning with existing literature that suggests familial predisposition as a significant risk factor for gallstone formation. The high occurrence of gallstones among participants with a family history underlines the need for targeted preventative strategies in populations with known familial risk.

DISCUSSION

The findings from this study underscore a remarkably high prevalence of cholelithiasis among the surveyed women from the Swabi district, significantly aligning with previous epidemiological studies indicating a high incidence of gallstone disease in various populations (18). The correlation between cholelithiasis and family history observed in this cohort is particularly noteworthy, as 64% of participants diagnosed with gallstones reported a positive family history. This supports the hypothesis that familial predisposition plays a crucial role in the development of gallstone disease, resonating with findings from similar studies that highlighted genetic factors, including those affecting bile metabolism and cholesterol homeostasis, as significant contributors to the condition (15).

The robust statistical analysis, employing SPSS version 25.0, enabled a detailed examination of the data, reinforcing the reliability of the findings. Moreover, the use of advanced ultrasonographic technology facilitated precise diagnostics, thus strengthening the study's overall credibility. However, the research was not without its limitations. The reliance on self-reported family medical history could introduce recall bias, potentially skewing the correlation between family history and cholelithiasis. Additionally, the study's focus on a female population from a specific geographic area may limit the generalizability of the findings to other populations or regions.

In terms of strengths, the comprehensive data collection and meticulous analysis process ensured a thorough exploration of the prevalence and familial links of cholelithiasis. The high response rate and complete data sets were instrumental in providing solid evidence of the familial ties associated with gallstone formation. Nonetheless, future research should aim to include a more diverse demographic to confirm these findings across different populations and possibly explore genetic markers more extensively (19-20). In order to address some of the study's limitations and enhance the understanding of gallstone disease, it would be prudent to conduct longitudinal studies that could track the development of cholelithiasis over time and under various environmental and genetic conditions. Additionally, integrating genetic testing into future studies could provide deeper insights into the specific genetic factors involved in gallstone formation, thereby offering targeted prevention and treatment strategies for at-risk populations (20).

CONCLUSION

In conclusion, this investigation not only highlighted the significant prevalence of cholelithiasis among women in Swabi but also reinforced the critical role of family history in its development. The results from this study can be instrumental in developing focused healthcare strategies aimed at preventing and managing gallstone disease in populations with a known familial predisposition.

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