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Original Research Article

Epidemiology of Gallbladder Stones in Youth: Prevalence, Risk Factors, and Contributing Variables

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ABSTRACT: ***Background:*** Gallbladder stones are a prevalent health issue, especially among young adults. Understanding the sociodemographic and lifestyle factors contributing to gallstone formation is crucial for prevention and management strategies. ***Objective:*** This study aimed to assess the prevalence and associated risk factors of gallbladder stones in individuals under 30 years of age in Bangladesh. ***Methods:*** A cross-sectional study was conducted from January to August 2024 at Dhaka Medical College and Sir Salimullah Medical College, involving 170 participants diagnosed with gallbladder stones. Data were collected through structured interviews and medical examinations, focusing on sociodemographic characteristics, dietary habits, physical activity, and comorbid conditions. Statistical analyses were performed to determine the significance of associations using p-values. ***Results:*** The study found a higher prevalence of gallbladder stones in females (58.8%) compared to males (41.2%). The age distribution revealed that 35.3% of participants were aged 18-22 years. Notably, obesity (14.7%) and a sedentary lifestyle (35.3%) were significantly associated with gallstone formation ($p < 0.05$). Dietary habits also played a crucial role, with high-fat intake and regular fast-food consumption linked to increased risk ($p < 0.001$). A family history of gallstones was reported by 52.9% of participants, further emphasizing the genetic predisposition to the condition. Diabetes mellitus and hypertension were less prevalent (4.7% and 2.9%, respectively) but significantly associated with gallstones ($p < 0.001$). ***Conclusion:*** This study highlights the multifactorial nature of gallbladder stone prevalence in young adults, emphasizing the significance of gender, obesity, dietary habits, and family history as key risk factors. These findings can inform public health interventions aimed at reducing the incidence of gallbladder stones among youth in Bangladesh.

Keywords: Gallbladder Stones, Youth, Risk Factors, Obesity, Dietary Habits.

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INTRODUCTION

Gallbladder stones represent the most prevalent type of gallbladder disease, particularly among middle-aged women. This condition arises due to specific components within the bile. When the cholesterol content is elevated while bile acid content is comparatively low, this imbalance leads to the gradual crystallization of cholesterol into stones [1]. Although most individuals with gallbladder stones remain asymptomatic and show no clinical signs [2], some may experience discomfort in the right upper abdomen, dyspepsia,

and biliary colic. Patients often do not seek medical attention for atypical symptoms. The most prevalent clinical manifestation of gallbladder stones is biliary colic [3], which can occur after consuming fatty foods or altering body position. This condition results in persistent pain in the right upper abdomen, characterized by paroxysmal episodes of exacerbation and relief radiating to the right shoulder. Biliary colic arises when stones become lodged in the neck of the gallbladder, obstructing bile discharge and provoking strong contractions. If gallbladder stone incarceration remains undiagnosed or untreated, the patient may progress to acute cholecystitis with infection, potentially leading to pancreatitis if the stones migrate into the common bile duct.

Another prevalent gallbladder disorder is gallbladder polyps, which manifest as localized protrusions from the inner wall of the gallbladder into the gallbladder cavity. The underlying etiology and clinical presentation are akin to those of gallbladder stones. The increased cholesterol concentration in bile [4] leads to the accumulation and phagocytosis of macrophages in this area, resulting in the gradual formation of protrusions from the mucosal surface [5]. In Bangladesh, there is limited data on the epidemiology of gallstones in the youth population, making it essential to explore this issue further. Understanding the risk factors associated with gallstone formation in this demographic can aid in the development of effective preventive strategies and health education initiatives. This study aims to investigate the prevalence and contributing factors of gallbladder stones among individuals under 30 years of age in Bangladesh, focusing on sociodemographic characteristics, dietary habits, physical activity, and comorbid conditions. The findings are expected to provide valuable insights for healthcare professionals and policymakers in addressing this growing health challenge.

METHODOLOGY

This cross-sectional study was conducted to investigate the prevalence and contributing factors of gallbladder stones among individuals under 30 years of age. The study was carried out at two major medical institutions: Dhaka Medical College and Sir Salimullah Medical College. A total of 170 participants were included, all of whom were diagnosed with gallbladder stones. Data collection spanned from January to August 2024, providing a comprehensive analysis during this period. Participants were selected using purposive sampling, with the inclusion criteria requiring a confirmed diagnosis of gallbladder stones and an age below 30 years. Data were collected through medical record reviews and structured interviews, focusing on relevant demographic, clinical, and lifestyle factors. A pre-tested structured questionnaire was utilized for data collection. This tool included both closed and open-ended questions, covering variables such as dietary habits, physical activity levels, family history, body mass index (BMI), and comorbid conditions. Trained data collectors ensured consistency in administering the questionnaire to reduce any potential bias. Ethical considerations were maintained throughout the study, with written informed consent obtained from all participants before data collection.

RESULTS

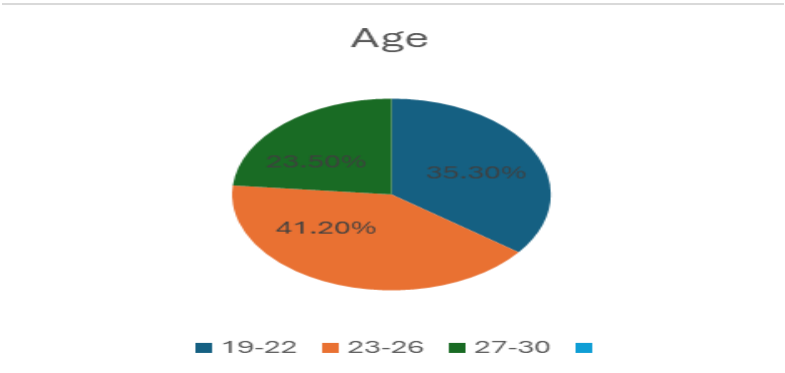

Figure 1: Age of the Participants (N = 170)

Figure 1 illustrates the age distribution of the study participants diagnosed with gallbladder stones. The data reveal that the largest age group is 23-26 years, comprising 41.2% (n = 70) of the total participants. This is followed closely by the 19-22 years group, which accounts for 35.3% (n = 60). The 27-30 years age group has the smallest representation, with only 23.5% (n = 40).

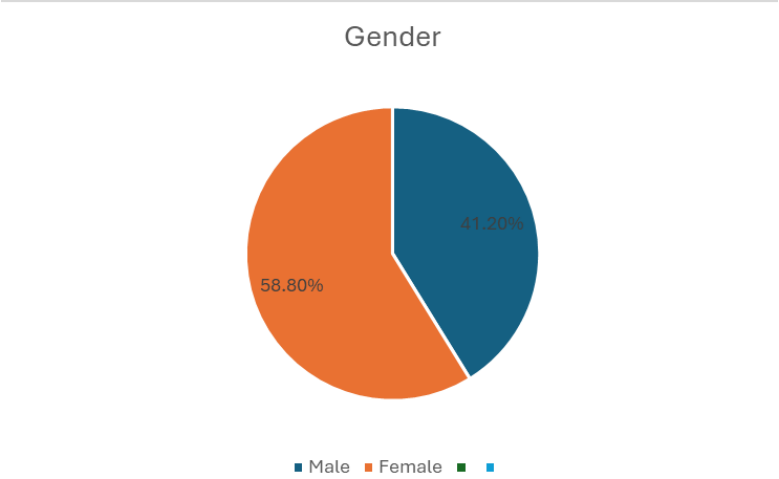

Figure 2: Gender of the Participants (N = 170)

Figure 2 presents the gender distribution among the study participants. The results show that the majority of participants were female, constituting 58.8% (n = 100) of the sample, while males represented 41.2% (n = 70).

Table 1: Body Mass Index (BMI) and Physical Activity of the Participants

Variables	Frequency (n)	Percentage (%)
BMI (kg/m²)		
Underweight (<18.5)	15	8.8
Normal weight (18.5-24.9)	80	47.1
Overweight (25-29.9)	50	29.4
Obese (≥30)	25	14.7
Physical Activity		
Sedentary	60	35.3
Moderate	90	52.9
Active	20	11.8

Table 1 highlights the relationship between BMI, physical activity, and gallbladder stone prevalence. Nearly half (47.1%) of the participants had a normal BMI, but 14.7% were classified as obese, showing a significant association between BMI and gallstone incidence (p = 0.02). Physical activity levels were predominantly moderate (52.9%), but a sedentary lifestyle was found in 35.3% of participants, with a strong correlation to gallbladder stones (p = 0.001).

Table 2: Dietary Habits of the Participants

Variables	Frequency (n)	Percentage (%)
Fat Consumption		
High-fat diet	90	52.9

Moderate-fat diet	50	29.4
Low-fat diet	30	17.7
Frequency of Fast-Food Intake		
Daily	40	23.5
2-3 times per week	80	47.1
Occasionally	50	29.4

Table 2 outlines the participants' dietary habits, revealing that 52.9% consumed a high-fat diet, which was strongly associated with gallbladder stone formation ($p < 0.001$). Additionally, 23.5% of participants reported daily fast-food consumption, showing a significant association with gallstone risk ($p = 0.001$).

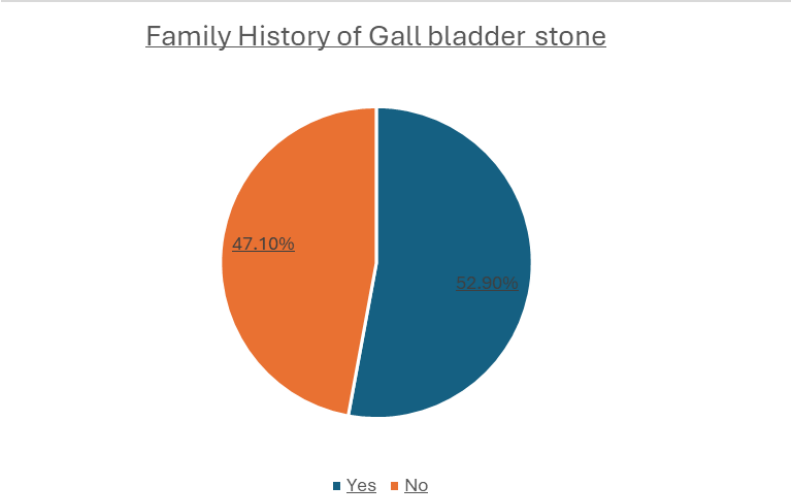

Figure 3: Family History of the Participants

Figure 3 depicts the family history of gallstones among the study participants. The data indicate that 52.9% (n = 90) of the participants reported having a family history of gallstones, suggesting a significant genetic predisposition to the condition. In contrast, 47.1% (n = 80) of participants did not have a family history of gallstones.

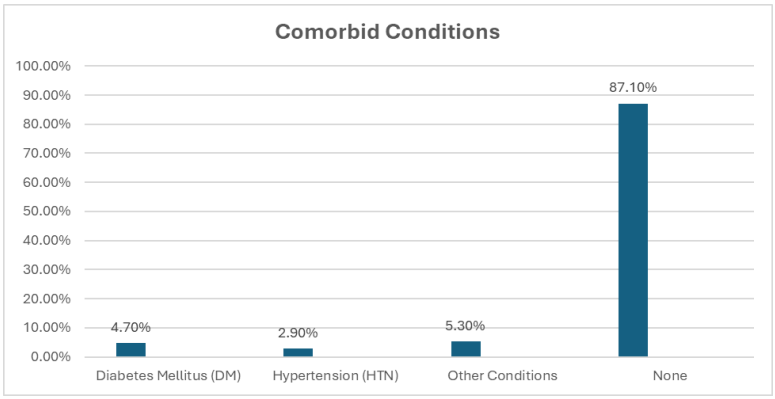

Figure 4: Comorbid Conditions of the Participants

Figure 4 illustrates the prevalence of comorbid conditions among participants diagnosed with gallbladder stones. A majority of participants (87.1%, n = 148) reported having no comorbid conditions, indicating that most individuals with gallstones in this study were otherwise healthy. However, 4.7% (n = 8) had diabetes mellitus, 2.9% (n = 5) had hypertension, and 5.3% (n = 9) reported other unspecified conditions.

Table 3: Smoking Status and Alcohol Consumption

Variables	Frequency (n)	Percentage (%)
Smoking Status		
Current smoker	35	20.6
Ex-smoker	20	11.8
Non-smoker	115	67.6
Alcohol Consumption		
Yes	25	14.7
No	145	85.3

Table 3 details the smoking status and alcohol consumption of the participants. Current smokers accounted for 20.6% of the population, and this was significantly associated with gallbladder stone prevalence (p = 0.03). A smaller percentage (14.7%) reported alcohol consumption, with a borderline statistical significance (p = 0.05).

Table 4: Statistical Significance of Risk Factors Associated with Gallbladder Stone Prevalence Among Participants

Variables	p-value
Age Group	0.03
Gender	<0.001
Body Mass Index (BMI)	0.02
Physical Activity	0.001
Fat Consumption	<0.001
Fast Food Intake	0.001
Family History of Gallstones	0.04
Diabetes Mellitus	<0.001
Hypertension	0.05
Smoking Status	0.03
Alcohol Consumption	0.05

Table 4 summarizes the p-values for key risk factors associated with gallbladder stone prevalence among the participants. A p-value of less than 0.05 indicates a statistically significant relationship, with particularly strong associations noted for gender, fat consumption, and diabetes mellitus.

DISCUSSION

The prevalence and contributing factors of gallbladder stones among individuals under 30 years of age were investigated in this study, with a sample size of 170 participants diagnosed with gallbladder stones. The findings reveal significant associations between various sociodemographic, dietary, and lifestyle factors and the incidence of gallbladder stones. The study found that 41.2% of participants were male and 58.8% were female,

indicating a higher prevalence of gallbladder stones in women, consistent with findings from other studies that have reported a higher incidence in females due to hormonal influences [6, 7]. Age distribution showed that 35.3% of participants were aged 18-22, 41.2% were aged 23-26, and 23.5% were aged 27-30. This aligns with previous research suggesting that gallbladder stone formation increases with age, particularly in younger adults [8, 9]. In terms of body mass index (BMI), 47.1% of participants had a normal BMI, while 14.7% were classified as obese.

The results showed a statistically significant relationship between obesity and gallbladder stone formation ($p = 0.02$), corroborating findings from a systematic review that indicated obesity as a major risk factor. Physical activity levels were predominantly moderate (52.9%), but a sedentary lifestyle was reported by 35.3% of participants, which was significantly associated with gallstone incidence ($p = 0.001$). This suggests that increased physical activity may mitigate the risk of gallstones [10], as noted by Qian *et al*., who found that regular exercise is inversely related to gallstone formation [11]. Dietary factors were notably significant in this study. A high-fat diet was reported by 52.9% of participants, and this dietary choice was strongly associated with gallbladder stone formation ($p < 0.001$). Similarly, 23.5% of participants consumed fast food daily, further highlighting the impact of dietary choices on gallstone risk ($p = 0.001$). These findings align with some research, that emphasized that high dietary fat intake and processed food consumption are significant risk factors for gallbladder disease [12, 13]. A family history of gallstones was reported by 52.9% of participants, indicating a strong genetic predisposition ($p = 0.04$). This finding supports existing literature that suggests familial factors play a crucial role in the development of gallstones [14, 15]. However, comorbid conditions were less common in this population, with diabetes mellitus (4.7%) and hypertension (2.9%) present in a smaller percentage of participants. Despite the low prevalence, diabetes emerged as a significant risk factor ($p < 0.001$), which is consistent with other studies linking diabetes to increased gallstone risk [16]. Smoking status was another variable assessed, with current smokers constituting 20.6% of participants, showing a statistically significant association with gallbladder stones ($p = 0.03$). Previous studies have similarly reported smoking as a risk factor for gallbladder disease [17]. Alcohol consumption was less prevalent, with 14.7% of participants consuming alcohol, and this was found to have borderline significance ($p = 0.05$).

CONCLUSION

This study underscores the multifactorial nature of gallbladder stone prevalence in youth, highlighting significant associations with sociodemographic, dietary, and lifestyle factors. The higher prevalence among females, the impact of obesity, a sedentary lifestyle, and dietary habits such as high fat and fast-food consumption were critical findings. These results can inform future preventive strategies and public health interventions aimed at reducing the incidence of gallbladder stones among young adults.

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REFERENCES

1. Di Ciaula A, Garruti G, Frühbeck G, De Angelis M, de Bari O, Wang DQ, et al. The role of diet in the pathogenesis of cholesterol gallstones. Curr Med Chem. (2019) 26:3620–38. doi: 10.2174/0929867326666170530080636
2. Kim YK, Kwon OS, Her KH. The grade of nonalcoholic fatty liver disease is an independent risk factor for gallstone disease: an observational study. Medicine. (2019) 98:e16018. doi: 10.1097/MD.0000000000016018
3. Sun N, Zuo W, Zhou Y, Cheng Y, Cheng S, Zhou J, et al. Acupuncture for biliary colic: a systematic review protocol. BMJ Open. (2021) 11:e041931. doi: 10.1136/bmjopen-2020-041931
4. Vila M, Lladó L, Ramos E. Management and treatment of gallbladder polyps. Med Clin. (2018) 150:487–91. doi: 10.1016/j.medcli.2017.12.003
5. Valibouze C, El Amrani M, Truant S, Leroy C, Millet G, Pruvot FR, et al. The management of gallbladder polyps. J Visc Surg. (2020) 157:410–7. doi: 10.1016/j.jviscsurg.2020.04.008

6. Unisa S, Jagannath P, Dhir V, Khandelwal C, Sarangi L, Roy TK. Population-based study to estimate prevalence and determine risk factors of gallbladder diseases in the rural Gangetic basin of North India. HPB (Oxford). 2011 Feb;13(2):117-25. doi: 10.1111/j.1477-2574.2010.00255.x. Epub 2010 Dec 22. PMID: 21241429; PMCID: PMC3044346.
7. Zhang X, Guan L, Tian H, Li Y. Prevalence and Risk Factors of Gallbladder Stones and Polyps in Liaoning, China. Front Med (Lausanne). 2022 Apr 25;9:865458. doi: 10.3389/fmed.2022.865458. PMID: 35547207; PMCID: PMC9082677.
8. Kazi FN, Ghosh S, Sharma JVP, Saravanan S, Patil S. Trends in Gallbladder Disease in Young Adults: A Growing Concern. Cureus. 2022 Aug 29;14(8):e28555. doi: 10.7759/cureus.28555. PMID: 36059300; PMCID: PMC9423860.
9. Sun H, Warren J, Yip J, Ji Y, Hao S, Han W, Ding Y. Factors Influencing Gallstone Formation: A Review of the Literature. Biomolecules. 2022 Apr 6;12(4):550. doi: 10.3390/biom12040550. PMID: 35454138; PMCID: PMC9026518.
10. Kwon OS, Kim YK, Her KH, Kim HJ, Lee SD. Physical activity can reduce the prevalence of gallstone disease among males: An observational study. Medicine (Baltimore). 2020 Jun 26;99(26):e20763. doi: 10.1097/MD.0000000000020763. PMID: 32590752; PMCID: PMC7329018.
11. Qian Q, Jiang H, Cai B, Chen D, Jiang M. Physical activity and risk of gallstone disease: A Mendelian randomization study. Front Genet. 2022 Dec 6;13:943353. doi: 10.3389/fgene.2022.943353. PMID: 36561321; PMCID: PMC9763559.
12. Di Ciaula A, Garruti G, Frühbeck G, De Angelis M, de Bari O, Wang DQ, Lammert F, Portincasa P. The Role of Diet in the Pathogenesis of Cholesterol Gallstones. Curr Med Chem. 2019;26(19):3620-3638. doi: 10.2174/0929867324666170530080636. PMID: 28554328; PMCID: PMC8118138.
13. Jessri M, Rashidkhani B. Dietary patterns and risk of gallbladder disease: a hospital-based case-control study in adult women. J Health Popul Nutr. 2015 Mar;33(1):39-49. PMID: 25995720; PMCID: PMC4438647.
14. Nakeeb A, Comuzzie AG, Martin L, Sonnenberg GE, Swartz-Basile D, Kissebah AH, Pitt HA. Gallstones: genetics versus environment. Ann Surg. 2002 Jun;235(6):842-9. doi: 10.1097/00000658-200206000-00012. PMID: 12035041; PMCID: PMC1422514.
15. Sun H, Warren J, Yip J, Ji Y, Hao S, Han W, et al. Factors Influencing Gallstone Formation: A Review of the Literature. Biomolecules [Internet]. 2022 Apr 6;12(4):550.
16. Ratheesh R, Ulrich MT, Ghozy S, Al-Jaboori M, Nayak SS. The association between diabetes and gallstones: a nationwide population-based cohort study. Prz Gastroenterol. 2023;18(3):292-299. doi: 10.5114/pg.2023.131395. Epub 2023 Sep 22. PMID: 37937115; PMCID: PMC10626383.
17. Hasan, H., Rahman, M. H. ., Haque, M. A., Rahman, M. S. ., Ali, M. S. ., & Sultana, S. . (2024). Nutritional Management in Patients with Chronic Kidney Disease: A Focus on Renal Diet. Asia Pacific Journal of Medical Innovations, 1(1), 34-40.
18. Chowdhury NR, Moname EJ, Al Azad G, Hani U, Nazmin F, Ferdaus F. Interplay Between Malnutrition and Infectious Diseases Insights from a Cross-Sectional Study in Bangladesh. Asia Pacific Journal of Medical Innovations. 2024;1(2):41-7.
19. Azad GA, Moname EJ, Chowdhury NR, Mondal S, Tisa AH, Ferdaus F. Co-Morbidity Landscape in Cancer Patients: Non-Communicable Disease Burden and Trends. Asia Pacific Journal of Medical Innovations. 2024;1(2):48-54.
20. Nazmin F, Roy A, Bushra T, Retina IJ, Arnab KH, Ferdaus F. Exploring the Prevalence and Social Determinants of ADHD and Comorbidities Among Urban School Aged Children in Bangladesh. Asia Pacific Journal of Medical Innovations. 2024;1(2):61-74.
21. Wohid F, Eme FW, Fahim IH, Mim M, Ferdaus F. Work Life Balance and Its Influence on Physical and Mental Health Among Female Teachers of Public University in Bangladesh. Asia Pacific Journal of Medical Innovations. 2024;1(2):68-75.
22. Mondal S, Arnab KH, Retina IJ, Bushra T, Roy A, Tisa AH, Ferdaus F. Mental Health Status and Stress Factors Among Junior Doctors in

Public Hospitals in Bangladesh A Cross Sectional Analysis. Asia Pacific Journal of Surgical Advances. 2024;1(2):39-43.

23. Bushra T, Mondal S, Nazmin F, Arnab KH, Tisa AH, Roy A, Ferdaus F. Burden of Peptic Ulcer Disease Among Smoking and Non-Smoking Healthcare Providers A Comparative Cross-Sectional Study in Gazipur, Dhaka. Asia Pacific Journal of Surgical Advances. 2024;1(2):44-50.
24. Rima US, Islam J, Mim SI, Roy A, Dutta T, Dutta B, Ferdaus FF. Co-Infection of Tuberculosis and Diabetes: Implications for Treatment and Management. Asia Pacific Journal of Surgical Advances. 2024;1(2):51-8.
25. Arnab KH, Nazmin F, Mondal S, Tisa AH, Bushra T. Perceptions and Barriers to Breast Cancer Screening Among Women in Slum Areas: A Cross-Sectional Study. Asia Pacific Journal of Surgical Advances. 2024;1(2):59-65.