ISSN 2313-4941

Volume 14 Number 2 July 2026



The Journal of Ad-din Women's Medical College

Recognized by BM & DC

The Journal of Ad-din Women's Medical College

Volume 14, Number 2, July 2026

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The Journal of Ad-din Women's Medical College

ISSN 2313-4941

Volume 14, Number 2, July 2026

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1. Gyton AC, Hall JE The thyroid metabolic hormones In Textbook of Medical Physiology. 10th edn. NewTork: WB Saunders Company. 2000: 858-86

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1. Khan MAH. Lipid profile and renal function status of hypothyroid patients [MD Thesis). Dhaka Bangabandhu Skeikh Mujib Medical University:2005

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Editorial

Digital Dementia in Children: An Emerging Challenge to Cognitive Health in This Digital Era

Mahmuda Hassan

"Dementia" is an umbrella term used to refer to a range of degenerative neurological illnesses that lead to a decrease in cognitive function serious enough to interfere with daily life.[1] Dementia describes symptoms caused by brain injury that impair cognitive skills beyond the boundaries of natural ageing. This disorder impairs emotional regulation, behavior, and motivation while maintaining consciousness.

In the year 2012, in this digital era, Manfred Spitzer, a German neuroscientist, invented the phrase 'Digital Dementia,' referring to the cognitive decline linked with excessive reliance on digital technologies such as cell phones and Google, which may exacerbate attention-deficit hyperactivity disorder (ADHD) or memory loss, especially in children and adolescents.[2]

Digital dementia, the term has gained popularity as research has revealed the neurological and behavioral alterations related to digital multitasking and decreased physical activity and social connection, notably among the adolescents.[3]

Digital dementia, also known as virtual dementia, is not a formally recognized medical condition, yet it is gaining a growing attention in neuroscience and public health discourse. The concept describes dementia-like symptoms - such as memory lapses, reduced attention span and impaired cognitive processing - arising from excessive reliance on digital devices and screen-based activities. Although still debated, this evolving framework highlights the potential long-term impact of digital lifestyles on brain health and has sparked increasing concern among researchers, clinicians and policymakers.[4]

Correspondence: Dr. Mahmuda Hassan, Principal and Professor, Department of Paediatrics, Ad-din Women's Medical College, Moghbazar, Dhaka. Email: mahmudahasn@yahoo.com, Mobile: +8801711814940

Received Date : 20 June, 2026

Accepted Date : 25 June, 2026

In recent years, the development of digital tools, including smartphones, social media platforms and artificial intelligence technology, has led to a substantial paradigm shift in how we interact with information. These gadgets have undoubtedly improved our lives by providing extraordinary comfort in terms of connectivity, speed and efficiency.[5] But constant scrolling, instant notifications, and exposure to fast-paced content overstimulate the brain's reward system, reducing tolerance for slower, deeper emotional exchanges and often making individuals more reactive or irritable in real-world interactions, especially in children and among the young generation.

Memory Impairment

Digital dementia refers to the tendency to forget information that is readily accessible through digital devices, a phenomenon that has become increasingly prevalent with the widespread use of smartphones, cloud storage and search engines. In cognitive neuroscience terms, it reflects a shift in how the brain encodes, stores and retrieves information. Normally, memory formation involves deep encoding through attention, elaboration and consolidation processes that engage the hippocampus and interconnected cortical regions. Also, another term, digital amnesia, is not pathological in itself; its cumulative impact, combined with other effects of digital overuse such as attentional fragmentation, may contribute to measurable cognitive inefficiencies over a period of time.[6,7] The growing human brain is constantly building neural connections while pruning away less-used ones, and digital media use may play a negative role in this normal process.

Language and attention problem

Neuroimaging links heavy screen time with decreased gray matter regions controlling emotional regulation, memory, and impulse control, as well as lower white matter integrity. Problems like shorter attention spans, fragmented focus, difficulty in forming long-term memories, language problems, as well as executive

dysfunction in terms of critical thinking, problem-solving, and impulse control, are also affected.[8]

Reduced skill and awareness

Children rely on physical facial cues to build empathy. Fast-paced, on-screen content can also trigger chronic "fight-or-flight" stress responses, resulting in increased anxiety and emotional dysregulation, which affect social and emotional functions. Lack of physical activity decreases spatial awareness and delays motor skills.[9]

Sleep disturbance

Blue light disrupts essential sleep cycles needed for brain restoration. A goodnight sleep is also key for brain development. Using blue light-emitting screen devices like smartphones before bedtime can disrupt sleep patterns by suppressing secretion of the hormone melatonin. Many teens who stay up late texting are not only getting less shut-eye, they are also lacking the deep REM sleep essential for processing and storing information from that day into memory.[10]

Long term learning

Increased screen time and digital device use can have widespread consequences, particularly on learning. Storing information on digital devices reduces the need for individuals to use their own memory abilities[11].

However, strategies for mitigation and prevention can effectively counter these effects.

1. Strive for balanced device use.

- Set specific times for using digital devices.
- Practice taking regular breaks from devices to reduce screen time.
- Use devices for productive purposes rather than constant entertainment or social media
- Keep smartphone or tablet in a separate room or out of reach from the children.

2. Engage in mentally stimulating activities.

- Engage in activities that challenge the brain, such as puzzles, reading, or learning new skills.
- Practice memory exercises, such as recalling information without digital aid.

3. Lead a healthy lifestyle.

- Ensure adequate sleep by limiting screen time before bed and using blue light filters on devices.
- Maintain a balanced diet and regular physical exercise, both of which support cognitive health.

Final messages are that digital dementia, or virtual dementia, represents a potentially reversible form of technology-associated cognitive impairment. Appropriate digital hygiene and proper use of this technology, proper cognitive training, and policies can protect cognitive health.

References

1. Reuben DB, Kremen S, Maust DT. Dementia prevention and treatment. JAMA Intern Med. 2024; 184: 563.
2. Ali Z, Janarthanan J, Mohan P. Understanding digital dementia and cognitive impact in the current era of the internet: a review. Cureus. 2024; 16(9).
3. Matei SA. The shallows: What the internet is doing to our brains, by Nicholas Carr. The Information Society. 2013; 29: 130–132.
4. Drabo EF, Barthold D, Joyce G, et al. Longitudinal analysis of dementia diagnosis and specialty care among racially diverse Medicare beneficiaries. Alzheimers Dement. 2019; 15: 1402–1411.
5. Shanmugasundaram M, Tamilarasu A. The impact of digital technology, social media, and artificial intelligence on cognitive functions: a review. Frontiers in Cognition. 2023; 2: e1203077.
6. Soliani AG, Baptista JS, Muratori BG, et al. Linking new information to a short-lasting memory trace induces consolidation in the hippocampus. iScience. 2024; 27: e111320.
7. Madore KP, Wagner AD. Multicosts of multitasking. Cerebrum. 2019; 4:04-19.
8. Zhang Z, Wiebe SA, Rahman AA, Carson V. Longitudinal associations of subjectively measured physical activity and screen time with cognitive development in young children. Ment Health Phys Act. 2022; 22: e100447.
9. Gu Y, Johnson RK. Vocabulary learning strategies and language learning outcomes. Language Learning. 1996; 46: 643–679.
10. Hale L, Guan S. Screen time and sleep among school-aged children and adolescents: A systematic literature review. Sleep Med Rev. 2015; 21: 50–58.
11. Hong SB, Zalesky A, Cocchi L, Fornito A, Choi EJ, Kim HH, et al. Decreased functional brain connectivity in adolescents with internet addiction. PLoS One. 2013; 8: e57831.

Original Article

Metabolic Syndrome and Co-occurrence of Its Components Among Female Medical Students in A Private Medical College in Bangladesh: A Cross-Sectional Study

Tohura Sharmin[1], Richmond Ronald Gomes[2], Evan Akhter Adrita[3], Nahid Yasmin[4]

Abstract

Background: Medical students often face intense academic pressure; moreover, they adopt sedentary lifestyles, which can significantly elevate their cardiometabolic risk. As future healthcare providers, their own health status is a critical indicator of public health trends.

Objective: This study aimed to determine the prevalence of metabolic syndrome and its components among female medical students in a private medical college in Bangladesh.

Methods: A cross-sectional study was conducted at Ad-din Women's Medical College, Dhaka. Data were collected from female students following NCEP ATP III criteria. Clinical and biochemical assessments included waist circumference, blood pressure, fasting blood glucose, fasting triglycerides, and HDL cholesterol.

Result: The overall prevalence of metabolic syndrome was 78 (42.2%). The most pervasive metabolic abnormality was low HDL cholesterol 101 (54.6%), followed by elevated blood pressure 70 (37.8%) and triglycerides 69 (37.3%). Notably, a high proportion of students who did not meet the full criteria for MetS (Metabolic Syndrome) were found to have one or two risk factors, placing them on the threshold of the syndrome.

Conclusion: The prevalence of metabolic syndrome in this cohort is alarmingly high compared to international data for medical students. These findings highlight an urgent need for institutional health interventions, regular screenings, and lifestyle modifications to safeguard the health of future physicians.

Keywords: Metabolic Syndrome; Medical Students; Cardiometabolic Risk; HDL Cholesterol; NCEP ATP III.

1. Assistant Professor, Department of Community Medicine and Public Health, Ad-din Women's Medical College, Dhaka, Bangladesh
2. Professor and Head, Department of Internal Medicine, Ad-din Women's Medical College, Dhaka, Bangladesh
3. Lecturer, Department of Community Medicine and Public Health, Ad-din Women's Medical College, Dhaka, Bangladesh
4. Professor and Head, Department of Community Medicine and Public Health, Ad-din Women's Medical College, Dhaka, Bangladesh

Correspondence: Dr. Tohura Sharmin, Assistant Professor, Department of Community Medicine and Public Health, Ad-din Women's Medical College, Dhaka, Bangladesh. Email: tohurasharminmercy@gmail.com, Mobile: 01731537870

Received Date : 2 June 2026
Accepted Date : 11 June 2026

Introduction

Non-communicable diseases are a rising concern across South Asia specially South East Asia, with evidence indicating that medical practitioners are increasingly vulnerable to premature cardiovascular complications due to the demanding nature of their academic and clinical environments.[1,2] Medical students, in particular, face a confluence of chronic stress, sedentary routines, and suboptimal dietary practices that exacerbate their susceptibility to metabolic syndrome.[3,5] This condition, characterized by central obesity, dyslipidemia, hypertension, and impaired glucose homeostasis, serves as a critical harbinger of long-term cardiovascular disease and type 2 diabetes.[3,6,7] While the pathophysiology of metabolic

syndrome is well- established in older populations, the subtle emergence of these risk factors among seemingly healthy young adults warrants careful clinical attention.[8,9] Moreover, professional and academic stressors correlate with deleterious lifestyle behaviors, including disrupted sleep and physical inactivity.[10,11] Despite the potential for long-term health consequences, systematic assessments of metabolic health in this demographic remain scarce.[12,13] Furthermore, in female populations, specific physiological responses to chronic stress and shifts in visceral fat accumulation during early adulthood may uniquely modulate susceptibility to metabolic syndrome.[14,15] This study, therefore, aims to quantify the prevalence of metabolic syndrome among female medical students in Bangladesh, examining the interplay between physiological indicators and modifiable lifestyle variables.

Materials and Methods

The objective of the study was to determine the prevalence of metabolic syndrome and its individual components among medical students in a private medical college in Bangladesh.

Study Design and Setting:

This cross-sectional study was conducted among female medical students of Ad-din Women's Medical College, Moghbazar, Dhaka, Bangladesh, from August 2025 to January 2026. The study aimed to determine the prevalence of metabolic syndrome and assess the distribution of its individual components among future healthcare professionals. Ad-din Women's Medical College is a tertiary-level academic institution that accommodates both Bangladeshi and international female medical students, providing a diverse population for assessing metabolic health status in young adults.

Study Population:

The study population consisted of undergraduate female medical students enrolled in the 3rd, 4th, and 5th academic years of the MBBS program at Ad-din Women's Medical College. These students represented a relatively homogeneous educational group but belonged to different nationalities & socio-demographic backgrounds.

Inclusion Criteria:

Participants were included in the study if they:

- Were female medical students enrolled in the 3rd, 4th, or 5th year of the MBBS program.
- Were present during the data collection period.
- Provided written informed consent to participate in the study.
- Agreed to undergo physical examination and biochemical investigations.

Exclusion Criteria:

Participants were excluded if they:

- Were pregnant at the time of data collection.
- Were unwilling to participate in the study.
- Could not be contacted after repeated attempts.

Sample Size Determination:

The sample size was calculated using the standard formula for estimation of a population proportion:

$n = Z^2pq/d^2$

Where:

- n = required sample size
- Z = standard normal deviate at 95% confidence level (1.96)
- p = anticipated prevalence of metabolic syndrome (14%)[8]
- q = 1 – p
- d = allowable error (5%)

n = (1,96)2 0.14 x (1-0.14)/ (0.05)2 = 185

Based on the prevalence reported in a previous study among medical students, the calculated minimum sample size was 185 participants. Although a larger sample was initially planned to compensate for possible non-response, complete data were ultimately available for 185 participants, and these participants constituted the final study sample.[8]

Sampling Technique:

The study institution and participants were selected purposively. Eligible participants fulfilling the inclusion criteria were recruited from the 3rd, 4th, and 5th academic years. Students were approached during academic sessions and invited to participate voluntarily. Those providing written informed consent underwent clinical assessment and laboratory investigations.

Data Collection Instrument:

Data were collected using a pretested semi-structured questionnaire and a structured clinical assessment form. The questionnaire was developed after an extensive review of relevant literature and modified according to the objectives of the study.

The questionnaire was pretested among a group of students with similar characteristics who were not included in the final study. Necessary modifications were made before commencement of the actual survey.

Data Collection Procedure:

Eligible students were informed about the purpose, objectives, benefits, and procedures of the study. Written informed consent was obtained from each participant before enrollment.

Data collection was performed through face-to-face interviews, physical examination, anthropometric measurements, and laboratory investigations. Privacy and confidentiality were maintained throughout the data collection process.

All measurements were conducted by trained investigators following standardized procedures to minimize measurement bias and ensure consistency.

Anthropometric Assessment:

Waist Circumference Measurement

Waist circumference was measured using a non-stretchable measuring tape while the participant was standing erect with feet placed close together and arms relaxed at the sides.

The measurement was taken midway between the lower margin of the last palpable rib and the iliac crest at the end of normal expiration. Measurements were recorded to the nearest 0.1 cm.

Blood Pressure Measurement:

Blood pressure was measured using a calibrated sphygmomanometer following standard recommendations.

Participants were allowed to rest in a seated position for at least five minutes before measurement. Blood pressure was measured from the right arm with the arm supported at heart level and both feet placed flat on the floor.

Two readings were obtained at one-minute intervals, and the average of the two measurements was recorded for analysis. Both systolic blood pressure (SBP) and diastolic blood pressure (DBP) were documented.

Biochemical Assessment:

Participants were instructed to undergo overnight fasting for at least 8 hours before blood sample collection.

Venous blood samples were collected aseptically from the antecubital vein by trained personnel in the morning. Samples were transported immediately to the designated laboratory for analysis.

The following biochemical parameters were measured:

- Fasting Blood Glucose (FBG)
- Fasting Serum Triglycerides (TG)
- Fasting High-Density Lipoprotein Cholesterol (HDL-C)

Laboratory investigations were performed according to standard laboratory procedures with appropriate quality-control measures.

Diagnosis of Metabolic Syndrome:

Metabolic syndrome was diagnosed according to the National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) criteria.[16]

A participant was considered to have metabolic syndrome if three or more of the following five components were present:

1. Waist Circumference (WC) ≥88 cm.
2. Serum Triglycerides (TAG) ≥150 mg/dL.
3. HDL Cholesterol (HDL-C) <50 mg/dL.
4. Systolic Blood Pressure (SBP) ≥130 mmHg and/or diastolic blood pressure (DBP) ≥85 mmHg.
5. Fasting Blood Glucose (FBG) ≥100 mg/dL17

Participants with fewer than three positive components were classified as not having metabolic syndrome.[18]

Quality Control:

Several measures were undertaken to ensure the quality and reliability of data:

- The questionnaire was pretested before the main survey.
- Investigators received training regarding interview techniques and measurement procedures.
- Standardized protocols were followed for anthropometric and blood pressure measurements.
- Measuring instruments were calibrated before use.
- Laboratory analyses were performed in a certified laboratory using standardized methods.
- Completed questionnaires were reviewed daily for completeness and consistency.
- Data entry was cross-checked to minimize transcription errors.

Data Management and Statistical Analysis:

Collected data were checked for completeness, coded, entered, cleaned, and analyzed using Statistical Package for Social Sciences (SPSS) version 26 (IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp.).

Descriptive statistical methods were employed to summarize the study findings. Continuous variables were expressed as mean ± standard deviation (SD), whereas categorical variables were presented as frequencies and percentages.

The prevalence of metabolic syndrome was calculated as the proportion of participants fulfilling the diagnostic criteria. The frequency distribution of individual metabolic syndrome components was also determined.

Ethical Considerations

Ethical approval for the study was obtained from the Institutional Review Board (IRB) of Ad-din Women's Medical College, ensuring compliance with the Declaration of Helsinki before initiation of data collection.

Participation was entirely voluntary. Written informed consent was obtained from all participants after explaining the objectives, procedures, potential benefits, and possible discomforts associated with blood sampling.

Participants were assured that all information would remain confidential and would be used solely for research purposes. Personal identifiers were removed during data analysis to maintain anonymity. Participants retained the right to withdraw from the study at any stage without any academic or personal consequences.

Result

Table 1 presents the socio-demographic characteristics of the study participants. The mean age of the respondents was 22.95 ± 1.06 years, with the majority 131 (70.8%), belonging to the 23–25 years age group. Most participants were unmarried 172 (93.0%), and Muslim 182 (98.4%). More than half of the respondents were Bangladeshi nationals 108 (58.4%), while 76 (41.1%) were Indian and 1 (0.5%) was Nepali. Co-morbid conditions were reported by 19 (10.3%) of participants, whereas the majority 166 (89.7%) had no known co-morbidities.

Table 1: Socio-Demographic Characteristics of the Study Participants (n = 185)

Variable	Frequency (%)
Age Group (years)	
20–22	54 (29.2)
23–25	131 (70.8)
Mean Age ± SD	22.95 ± 1.06
Marital Status	
Unmarried	172 (93)
Married	13 (7)
Religion	
Islam	182 (98.4)
Hinduism	3 (1.6)
Nationality	
Bangladeshi	108 (58.4)
Indian	76 (41.1)
Nepali	1 (0.5)
Co-morbidity Status	
Absent	166 (89.7)
Present	19 (10.3%)

Table 2 shows the prevalence of metabolic syndrome among the study participants. Metabolic syndrome was identified in 78 participants, resulting in a prevalence of 42.2%, while 107 (57.8%) participants did not meet the diagnostic criteria for metabolic syndrome.

Table 2: Prevalence of Metabolic Syndrome Among the Study Participants (n = 185)

Metabolic Syndrome Status	Number (%)
Present	78 (42.2)
Absent	107 (57.8)

Table 3 demonstrates the overall prevalence of individual components of metabolic syndrome among the study participants. Low HDL cholesterol was the most prevalent metabolic abnormality, affecting 101 (54.6%) of participants. High blood pressure and elevated triglyceride levels were observed in 70 (37.8%) and 69 (37.3%) of participants, respectively. Increased waist circumference was present in 57 (30.8%) of participants, whereas impaired fasting blood glucose was the least common component, affecting 38 (20.5%) of the study population. These findings indicate that dyslipidemia, particularly reduced HDL cholesterol, was the predominant metabolic abnormality among the female medical students.

Table 3: Overall Prevalence of Individual Components of Metabolic Syndrome Among the Study Participants (n = 185)

Metabolic Syndrome Component	Number (%)
Low HDL Cholesterol	101 (54.6)
High Blood Pressure	70 (37.8)
Elevated Triglycerides	69 (37.3)
Increased Waist Circumference	57 (30.8)
Impaired Fasting Blood Glucose	38 (20.5)

Table 4 illustrates the clustering of metabolic syndrome components according to the number of positive risk factors present among participants. 36 (19.5%) participants did not exhibit any metabolic syndrome component, while 41 (22.2%) and 30 (16.2%) participants had one and two positive risk factors, respectively. A total of 78 (42.2%) participants exhibited three or more positive risk factors and were therefore classified as having metabolic syndrome.

Table 4: Distribution of Individual Metabolic Syndrome Components According to Number of Positive Risk Factors (n = 185)

Number of Positive Risk Factors	Total n (%)	Impaired Fasting Blood Glucose n (%)	High Blood Pressure n (%)	Low HDL Cholesterol n (%)	Elevated Triglycerides n (%)	Increased Waist Circumference n (%)
0	36 (19.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
1	41 (22.2)	3 (7.3)	6 (14.6)	22 (53.7)	7 (17.1)	3 (7.3)
2	30 (16.2)	5 (16.7)	10 (33.3)	18 (60.0)	12 (40.0)	9 (30.0)
3	37 (20)	8 (21.6)	20 (54.1)	25 (67.6)	18 (48.6)	15 (40.5)
4	29 (15.6)	10 (34.5)	22 (75.9)	24 (82.8)	20 (69.0)	18 (62.1)
5	12 (6.5)	12 (100.0)	12 (100.0)	12 (100.0)	12 (100.0)	12 (100.0)

Low HDL cholesterol was the most common abnormality across all risk-factor categories, affecting 22 (53.7%) of participants with one risk factor, 18 (60.0%) with two risk factors, 25 (67.6%) with three risk factors, and 4 (82.8%) with four risk factors. The prevalence of elevated blood pressure, elevated triglycerides, impaired fasting blood glucose, and increased waist circumference progressively increased with increasing numbers of positive risk factors. All participants with five positive risk factors demonstrated abnormalities in fasting blood glucose, blood pressure, HDL cholesterol, triglycerides, and waist circumference.

Discussion

This study reveals a high prevalence of metabolic syndrome among female medical students, primarily driven by dyslipidemia.[19,20] The high incidence of low HDL cholesterol aligns with previous studies, indicating that lifestyle and ethnic factors contribute to early-onset metabolic disturbances.[21,22] The observed clustering of risk factors confirms that individuals with multiple markers are more susceptible to concurrent lipid and glucose irregularities.[23,24] Furthermore, female students often exhibit greater vulnerability to these metabolic issues than their male counterparts.[25] Early detection of such clusters is crucial to prevent progression to severe cardiovascular disease.[26,27]

The observed 42.2% prevalence of metabolic syndrome is notably high, exceeding the 37.0% reported for the general Bangladeshi population.[1] This suggests that the sedentary nature of medical training may exacerbate metabolic risks [10]. Our findings are significantly higher than those reported in international cohorts, such as in Saudi Arabia (21.5%), India (7.6%), and Iran (up to 13.0%).[8,11,25] Although low HDL-C is common among young adults, our data indicates greater severity than other female-specific studies, such as those in Kolkata where low HDL affected 28.7% of students.[9, 22] This disparity underscores the urgent need for targeted interventions, as these future physicians face a higher cardiometabolic burden than their global counterparts.[4,14]

The high proportion of students with two metabolic risk factors is clinically significant, as these individuals approach the threshold for a metabolic syndrome diagnosis. This "pre-metabolic" state is consistent with other Bangladeshi cohorts; for example, while overall metabolic syndrome prevalence in one university study was 27.7%, low HDL-C affected 78% of the student population.[1] International data aligns with these concerns, such as a study of Iranian medical students where nearly 15% possessed two risk factors despite a 3.2% overall syndrome prevalence. These subclinical clusters represent a critical window for intervention before chronic disease manifests.[8] Female students appear particularly susceptible, with studies in India identifying low HDL and elevated blood pressure as primary drivers.[28] Early identification is essential, as the sedentary and high-stress demands of medical education can trigger the progression of these two-factor profiles into established disease.[8,28]

The high prevalence of metabolic syndrome likely results from the interplay between rigorous medical training and inadequate institutional support for wellness. Bangladeshi medical students face intense academic pressure, irregular sleep, and prolonged sedentary periods due to demanding curricula.[4,13] These stressors often correlate with unhealthy dietary habits, including frequent consumption of calorie-dense foods.[4,12] Additionally, the urban environment in Dhaka limits opportunities for physical activity; research on female professionals in Bangladesh identifies a "triad of risks" where sedentary behavior and stress are significantly associated with impaired fasting glucose and central obesity.[10] This compounded by long online sessions and

restricted movement post-pandemic, creates a "perfect storm" for early-onset metabolic disturbances.[11]

Given the study's focus on female students, sex-specific physiological factors warrant consideration. Visceral fat accumulation in women during early adulthood increases susceptibility to insulin resistance and atherogenic lipid profiles.[15] Female medical students frequently exhibit higher rates of abnormal waist-to-hip ratios and fat mass than their male peers, even when body mass index is within normal limits.[14] This aligns with Saudi Arabian findings, where female medical students showed higher metabolic syndrome prevalence than males.[25] These gender differences suggest that "apparently healthy" young women may be accumulating silent metabolic damage, predisposing them to premature cardiovascular disease and type 2 diabetes.[6,9]

These findings highlight the necessity of incorporating sex-specific screening protocols into academic health initiatives, rather than relying solely on generalized BMI metrics.[29] Current screening often fails to detect sub-clinical lipid and glucose abnormalities, which are key determinants of metabolic syndrome in sedentary university populations.[30] Consequently, longitudinal monitoring of body composition and metabolic biomarkers is essential to track health risks throughout undergraduate training.[31] Implementing structured wellness programs that integrate physical activity and nutritional education may mitigate these risks by addressing environmental and behavioral determinants.[32] By moving beyond conventional BMI-based screening, institutions can design targeted interventions that address the specific stressors identified in this study. Such comprehensive wellness frameworks can mitigate immediate cardiometabolic risks and better equip future physicians to maintain their health during their transition into professional practice.

Limitations

- **Cross-sectional design:** This study provides a snapshot of metabolic health but precludes establishing causality between lifestyle factors and metabolic disturbances.
- **Sample generalizability:** Conducted at a single institution, findings may not be generalizable to male students or diverse geographical regions within Bangladesh.
- **Self-reporting bias**: While clinical and biochemical markers were measured objectively, data regarding lifestyle habits and dietary patterns relied on participant recall, introducing potential reporting bias.
- **Diagnostic criteria:** While NCEP ATP III criteria are standard, results may differ when using other guidelines, such as the International Diabetes Federation's (IDF), which apply lower waist circumference thresholds for South Asian populations.
- **Biological variables:** The analysis excluded potential confounders, such as the phase of the menstrual cycle during blood sampling or potential ethnic variations.

Conclusion

This study identifies a high prevalence of metabolic syndrome among female medical students in Dhaka. Low HDL-C emerged as the primary metabolic abnormality, followed by elevated blood pressure and hypertriglyceridemia. A notable proportion of students, while not meeting full diagnostic criteria, present with one or two metabolic risk factors. This pre-clinical status indicates that a substantial segment of the future medical workforce faces elevated risks of premature cardiovascular disease and type 2 diabetes. The discrepancy between their future roles as health educators and their current cardiometabolic profiles underscores an urgent need for institutional health reform.

References

1. Ali N, Samadder M, Shourove JH, Taher A, Islam F. Prevalence and factors associated with metabolic syndrome in university students and academic staff in Bangladesh. Scientific Reports. 2023; 13(1): e19912.
2. Winfred Gnanaraj JP, Hariharan R, Sandeep S, Gnanaraj JP, Raghunanthan S, Anusuya M, Shanthi TS, Samuel Dinesh A, Sudharshini S, Ramalakshmi J, Anne Princy S. Gender differences in lifestyle and psycho-social aspects of medical students. a cross sectional study. European Heart Journal. 2023; 44(Supplement_2): ehad655-2579.
3. Kaoud A, Yones H, Hegazy Y, Ehab M, Tarek Y, Khaled M, Moawad Y, Elsaied R, Hatem F, Abdelkader E, Khalifa M. Risk Factors for Metabolic Syndrome Among Female Medical Students at Delta University: A Cross-Sectional Study. Delta University Scientific Journal. 2025; 8(3): 79-88.
4. Teli A, Jabannavar V, Adorno I, Gayatri GS, Lampis F, Patil P. Estimation of prevalence of metabolic

syndrome among 1st year medical students of a medical college in North Karnataka, India. Indian Journal of Health Sciences and Biomedical Research kleu. 2019; 12(2): 174-178.

5. Joseph N, Chettuvatti K, Yadav H, Bharadwaj H, Kotian SM. Assessment of risk of metabolic syndrome and cardio vascular diseases among medical students in India. Journal of Cardiovascular Disease Research. 2017;8(3):89-95.
6. Bonora E, Kiechl S, Willeit J, Oberhollenzer F, Egger G, Bonadonna RC, Muggeo M. Carotid Atherosclerosis and Coronary Heart Disease in the Metabolic Syndrome. Diabetes Care. 2003; 26(4): 1251–1257.
7. Simone G de, Devereux RB, Chinali M, Best LG, Lee ET, Galloway JM, Resnick HE. Prognostic Impact of Metabolic Syndrome by Different Definitions in a Population With High Prevalence of Obesity and Diabetes. Diabetes Care. 2007; 30(7): 1851–1856.
8. Ali AR, Parastouei K, Mohammad ES. Metabolic syndrome among medical university students in Kashan, Iran. Scientific Research and Essays. 2012; 7(41):3549–3553.
9. Nolan PB. Metabolic Syndrome and Metabolic Syndrome Components in Young Adults (Doctoral dissertation, University of Auckland). 2017.
10. Ali SA, Prome PR, Trapa T, Ferdaus F. Sedentary lifestyle, stress, and metabolic syndrome: A triad of health risks for female teachers in urban Bangladesh. Naogaon Medical College Journal. 2025; 2(2):26-32.
11. Phaneendra DJ, Arige G, Sirivelu B, Lakshmi GS. Prevalence of metabolic syndrome amongst undergraduate medical students: A cross-sectional study. National Journal of Laboratory Medicine. 2024; 13(2):5-9
12. Gnanaraj JPW, Hariharan R, Raghunanthan S, Kumaravelu KN, Anusuya M, Shanthi TS, Dinesh A, Umadevi TB, Malarvizhi P, Sundari S, Rajendran V, Manikandan PB, Sreedharan S, Sudharshini S, Gnanaraj JP. Correlation of heart healthy lifestyle parameters to blood pressure and obesity: A cross-sectional study in medical students. European Heart Journal. 2023; 44(1): 580.
13. Sharma M, Kaur J, Ahi RS, Jindal P, Seema. Existence of metabolic syndrome among medical students. In: New Vistas in Metabolic Syndrome. 2024;2:57-63.
14. Senevirathne T, Samaranayake D, Ojithmali M, Wickramarachchi P, Weerasinghe A, Muthuthamby MM, Wickramasinghe P. Cardio-metabolic risk among undergraduate medical students of a selected Faculty of Medicine in Colombo. Research Square. 2020.
15. Lee M, Lee JH, Sohn SY, Ahn J, Hong O, Kim M, Baek K, Song K, Han K, Kwon H. Cumulative exposure to metabolic syndrome in a national population-based cohort of young adults and sex-specific risk for type 2 diabetes. Diabetology & Metabolic Syndrome. 2023; 15(1): 80.
16. Am A, Elabid B, Elhassan K, Waggiallah HA. Metabolic syndrome among undergraduate students attending medical clinics for obligatory medical screening. Tropical Journal of Pharmaceutical Research. 2015; 14(2): 317–323.
17. Kandula SGNSV, D SSTV, Kongara S, Arepalli SK. A study on the prevalence of obesity and metabolic syndrome among students of a medical college. International Journal of Research in Medical Sciences. 2017; 5(6): 2331–2336.
18. Bulka CM, Persky V, Daviglus ML, Durazo-Arvizú R, Argos M. Multiple metal exposures and metabolic syndrome: A cross-sectional analysis of the National Health and Nutrition Examination Survey 2011–2014. Environmental Research. 2018; 168: 397–405.
19. Dhaheri ASA, Mohamad MN, Jarrar AH, Ohuma EO, Ismail LC, Meqbaali FTA, Souka U, Shah SM. A cross-sectional study of the prevalence of metabolic syndrome among young female Emirati adults. PLoS ONE. 2016; 11(7): e0159378.
20. Mbugua S, Kimani S, Munyoki G. Metabolic syndrome and its components among university students in Kenya. BMC Public Health. 2017; 17(1): 909.
21. Dalleck LC, Kjelland EM. The prevalence of metabolic syndrome and metabolic syndrome risk factors in college-aged students. American Journal of Health Promotion. 2012; 27(1): 37–42.
22. Das T, Sen M, Saha I, Chaudhuri D. Prevalence and gender differentials of metabolic syndrome among college students of Kolkata, West Bengal, India. International Journal of Current Research and Review. 2017; 9(14): 52-57.
23. Haroun D, Mechli R, Sahuri R, Al-Khatib S, Obeid O, Mallah CE, Wood L, Al-Suwaidi KEK. Metabolic syndrome among adolescents in Dubai, United Arab Emirates, is attributable to the high prevalence of low

HDL levels: A cross-sectional study. BMC Public Health. 2018; 18(1): 1284.

24. Zamil AH, Amin S. The prevalence of metabolic syndrome among university students in Wasit, Iraq. Saudi Medical Journal. 2022; 43(11): 1240–1247.
25. Khyzer E, Aftab T. Prevalence of metabolic syndrome and its risk factors among medical undergraduates at Northern Border University, Arar, Saudi Arabia. Tropical Journal of Pharmaceutical Research. 2024; 23(4): 737–745.
26. Madeira FB, Silva AAM, Veloso HF, Goldani MZ, Kac G, Cardoso VC, Bettiol H, Barbieri MA. Normal weight obesity is associated with metabolic syndrome and insulin resistance in young adults from a middle-income country. PLoS ONE. 2013; 8(3): e60673.
27. Nweke CO, Ibe CN, Iloka OC, Sampson RN, Maduka CC. Prevalence and risk factors of metabolic syndrome among female university students: A cross-sectional study. World Journal of Advanced Research and Reviews. 2024; 21(3): 225–231.
28. Begum GS, Adari P, Goud M, Kore SE, Eshwar MD. A study of diagnostic parameters in assessment of metabolic syndrome (MetS) among medical students. Biomedicine. 2023; 42(6): 1361–1367.
29. Bagabir ZA, Al-Taffi AS, Alamoudi A, Omrh MA, Baslasil AA, Ba-Ogba NO, Alattas A, Al-Ahdal OH, Bamga HA, Bawazeer OK, Mersal EM, Al-Idroos FA, Al-Kaf SA, Bamhfood SM. Prevalence and predictors of metabolic syndrome among university students in Yemen: A cross-sectional study. International Journal of Advanced Multidisciplinary Research and Studies. 2025; 5(3): 327–334.
30. Banna MdHA, Hamiduzzaman M, Akter S, Seidu A, Ayesha B, Yeasmin N, Kundu S, Begum MstUH, Sultana S, Kissi-Abrokwah B, Alshahrani NZ, Khan MSI, Hassan MdN. University students' sociodemographics, physical inactivity, and inadequate and poor-quality sleep are associated with their overweight/obesity: Findings from a case–control study in Bangladesh. Health Science Reports. 2025; 8(2): e70454.
31. Çam HH, Karasu F. A study of the frequency of overweight, obesity and metabolic syndrome among university students. Türkiye Halk Sağlığı Dergisi. 2019; 17(3): 294–303.
32. Ghosh S, Paul M, Mondal KK, Bhattacharjee S, Bhattacharjee P. Sedentary lifestyle with increased risk of obesity in urban adult academic professionals: An epidemiological study in West Bengal, India. Scientific Reports. 2023; 13(1): 4962.

Original Article

Cesarean Hysterectomy: A Retrospective Study on Incidence and Outcomes at Tertiary Care Hospital in Bangladesh

Banika Biswas[1], Swajal Chandra Das[2], Arshad Jahan Nasrin[3], Rahima Khatun[4]

Abstract

Background: Cesarean hysterectomy (CH) is a rare but life-saving procedure for uncontrolled obstetric hemorrhage, most frequently associated with placenta accreta spectrum (PAS). Rising cesarean rates have increased PAS incidence worldwide, yet data from Bangladesh remain limited.

Objective: To determine the incidence and outcomes of CH in a tertiary care hospital in Bangladesh.

Methods: This retrospective observational study was conducted at Ad-din Women's Medical College Hospital from January 1 to December 31, 2024. All lower uterine segment cesarean sections (LUCS) were reviewed, and CH cases identified. Maternal demographics, obstetric history, antenatal comorbidities, intraoperative findings, complications, and neonatal outcomes were recorded. Descriptive statistics were applied.

Result: Of 12,740 LUCS, 79 required CH (0.62%). Mean maternal age was 29.41 years; 34 (43%) were aged 26–30 years. Preterm delivery occurred in 44 (55.7%). PAS disorders were the leading indications: placenta increta 34 (43%), percreta 21 (27%), and accreta 17 (21%). Uterine rupture accounted for 7 (9%). Gestational diabetes was the most frequent antenatal comorbidity (18.9%). Intraoperative blood transfusion was required in 79 (100%), and 31 (39.2%) required ICU admission. Postoperative complications included urinary tract infection 19 (24.1%), surgical site infection 9 (11.4%), bladder injury 5 (6.3%), and disseminated intravascular coagulation 3 (3.8%). One maternal death (11.3%) occurred due to massive hemorrhage. Neonatal outcomes revealed 30 (38%) low birth weight, 4 (5%) intrauterine death, and 7 (8.9%) NICU admission.

Conclusion: CH was uncommon (0.62%) but carried significant maternal and neonatal morbidity. PAS was the predominant indication, reflecting the effect of prior cesarean deliveries. High transfusion rates and ICU needs highlight the importance of antenatal risk stratification, surgical preparedness, and multidisciplinary team involvement. Strengthening early diagnosis of PAS and ensuring adequate blood bank and critical care resources may improve outcomes in high-risk obstetric populations.

Keywords: Retrospective; Cesarean Hysterectomy; Tertiary Care Hospital; Placenta Accreta Spectrum; Obstetric Hemorrhage.

1. Associate Professor, Department of Obstetrics and Gynaecology, Ad-din Women's Medical College Hospital, Dhaka
2. Associate Professor, Department of Radiology and Imaging, Sylhet MAG Osmani Medical College Hospital, Sylhet
3. Associate Professor, Department of Obstetrics and Gynaecology, Gonoshasthya Samaj Vittik Medical College Hospital
4. Associate Professor, Department of Obstetrics and Gynaecology, Ad-din Women's Medical College Hospital, Dhaka

Correspondence: Dr. Banika Biswas, Associate Professor, Ad-din Women's Medical College Hospital, Dhaka. Email: bisbanika@gmail.com, Mobile: +8801712-140896

Received Date : 12 April 2026
Accepted Date : 28 April 2026

Introduction

Cesarean hysterectomy (CH) is a life-saving procedure performed during or immediately after cesarean delivery to control life-threatening obstetric hemorrhage. In obstetric practice, it is indicated when severe bleeding, infection, or abnormal placentation cannot be managed by conservative measures.[1,2] Although historically rare, peripartum hysterectomy is now recognized as a maternal "near-miss" criterion by the World Health Organization (WHO).[1] Over recent decades, global cesarean delivery rates have risen sharply (from ~7% in 1990 to ~21% by 2023), contributing to increases in

complex placental disorders.[3] As a result, the incidence of hysterectomy for obstetric hemorrhage has also risen worldwide, with an overall incidence of ~0.9 per 1,000 deliveries, with marked geographic variation found in a 2016 systematic review. For instance, rates are <0.2 per 1,000 in Scandinavia but exceed 10 per 1,000 in South Asia.[1] Low- and middle-income countries generally see higher peripartum hysterectomy rates than high-income countries.[1,2]

Major indications for CH include intractable postpartum hemorrhage and abnormal placentation. Abnormal placentation (placenta previa/accreta spectrum, PAS) has emerged as the leading risk factor for peripartum hysterectomy.[1,2] Globally, PAS incidence has risen in parallel with the cesarean rate. For example, placenta accreta spectrum is now seen in up to 1–3 per 1,000 deliveries, having increased 3 to 4-fold in recent decades.[4,5] The risk of PAS rises steeply with each prior cesarean delivery (with reported prevalence from ~0.3% after one cesarean to >6% after five cesareans) and with placenta previa.[5] In addition to PAS, other major indications for CH include severe uterine atony refractory to medical management, uterine rupture, abruption, and invasive placental pathology.[1,4] Risk factors for CH therefore include higher maternal age, multiparity, multiple gestation, placenta previa, and prior uterine surgery.[4,6] Notably, as cesarean prevalence rises, uterine atony is becoming a less common indication, while morbidly adherent placentae account for more cases of CH in many settings.[7]

The consequences of cesarean hysterectomy for women are severe. It invariably results in loss of fertility and is associated with high maternal morbidity and even mortality. Massive blood transfusion is usually required: in one series, all CH patients received transfusions, and newer analyses show a significant burden of ICU care and organ support after CH.[8] Maternal mortality rates differ by setting, but are substantially higher in low-resource settings. For instance, in one large review, the risk of death following CH was ~12% in low-income settings versus <2% in high-income settings.[1] Reported maternal deaths after CH range up to ~8–10% in South Asia and Africa.[8,9] Obstetric hemorrhage remains a leading cause of maternal death worldwide, accounting for about one-third of deaths in South Asia, including Bangladesh. Placenta previa and PAS together cause over half of antepartum hemorrhage cases and are prominent precursors to CH.[10] In high-volume centers, CH is often performed under multidisciplinary protocols, but in many low-resource settings such protocols are lacking, contributing to worse outcomes.

Regionally, South Asian countries share these challenges. A Nepalese tertiary center reported CH in 0.074% of deliveries (~0.74 per 1,000), with PAS the indication in 62% of cases.[7] In Bangladesh, few studies have focused on cesarean hysterectomy specifically. One tertiary study in Dhaka found an emergency peripartum hysterectomy rate of 0.625% (6.25 per 1,000), and another similar study reported 0.408% (4.08 per 1,000).[11] These rates appear higher than some high-income settings but similar to other South Asian series. For comparison, the incidence at a Romanian center was 0.099% (0.99 per 1,000), while a new Ethiopian cohort saw 5.2 per 1,000.[2,9] The leading causes in South Asia are increasingly placenta previa and accreta, whereas older reports from the region often noted atony and uterine rupture as main reasons.[7]

In Bangladesh, cesarean delivery rates have increased dramatically, from ~3% in 2000 to ~24% by 2014. Despite this rise, maternal mortality has not declined proportionately.[6] Postpartum hemorrhage is still the top cause of maternal death, with ~31% of Bangladeshi maternal deaths attributable to hemorrhage. Within hemorrhage-related deaths, placental causes (previa/accreta) and uterine rupture are major contributors.[10] Few local data exist on CH outcomes. A recent review in a tertiary Dhaka hospital found that CH often follows massive hemorrhage, with high transfusion needs and morbidity.[12] Given limited blood bank resources and critical care capacity, CH poses a serious burden on Bangladeshi obstetric care.

Despite the clinical importance of CH, a few studies have quantified the incidence and maternal outcomes of CH specifically in Bangladesh. To address this, we conducted a retrospective analysis of all cesarean hysterectomies in our tertiary care hospital. The objective of this study was to determine the incidence of CH among deliveries, describe its indications, and evaluate maternal outcomes.

Materials and Methods

This retrospective observational study was conducted at Ad-din Women's Medical College Hospital, Bangladesh. The study included all patients who underwent lower uterine segment caesarean section (LUCS) from January 1, 2024, to December 31, 2024. Among the patients who underwent LUCS, cases that required caesarean hysterectomy were identified. Any hysterectomy other than cesarean were excluded from this study.

Data were collected for further study. Variables included maternal age, gestational age, antenatal comorbidities, perioperative events, postoperative complications, and maternal and neonatal outcomes. Neonatal outcomes included birth weight, sex, intrauterine death, and need for NICU admission. Maternal outcomes included perioperative events (blood transfusion, ICU support), postoperative complications, and mortality.

Data were obtained from hospital records and operation theater registers, entered into Microsoft Excel, and analyzed using SPSS version 27. Descriptive statistics were presented as frequencies, percentages, and means where appropriate. Ethical clearance for this study was obtained from the Institutional Review Board of the medical college.

Continuous variables (e.g., maternal age) were expressed as mean ± standard deviation, while categorical variables were expressed as frequencies and percentages. As this was a single-group descriptive case series without a comparator arm, only descriptive statistical analysis was performed; no inferential statistical tests were applied.

Result

Table 1 shows A total of 12,740 LUCS were performed in the Ad-din Women's Medical College Hospital, Bangladesh, in 2024, of which 79 (0.62%) underwent cesarean hysterectomy. Among the 79 patients who underwent caesarean hysterectomy, the mean maternal age was 29.41 years. Where most women women aged 26–30 years- 34 (43%). The majority of cases were preterm deliveries 44 (55.7%), and 35 (44.3%) were term. Antenatal comorbidities included gestational diabetes mellitus 15 (18.9%), gestational hypertension 3 (3.8%), and hypothyroidism 4 (5%). Regarding obstetric history, 2 (2.5%) had no previous caesarean section, 26 (32.9%) had one, 32 (40.5%) had two, and 19 (24.1%) had three or more previous caesarean sections.

Table 1: Maternal Demographics and Antenatal Profile

Category		Frequency (%)
Age (years)	≤ 20	1 (1.3)
	21–25	14 (17.7)
	26–30	34 (43)
	31–35	23 (29.1)
	36–40	7 (8.9)
	Mean Age	29.41 years
Pregnancy Duration	Preterm	44 (55.7)
	Term	35 (44.3)
	Post-term	0 (0)
Antenatal	GDM	15 (18.9)
Co-morbidities	GHTN	3 (3.8)
	Hypothyroidism	4 (5)
History of previous	None	2 (2.5)
C/S	One	26 (32.9)
	Two	32 (40.5)
	Three	19 (24.1)

Preoperatively, 43% of the patients had placenta increta, 27% had placenta percreta, and 21% had placenta accreta. Ruptured uterus was identified in cases 9% (Pie chart 1).

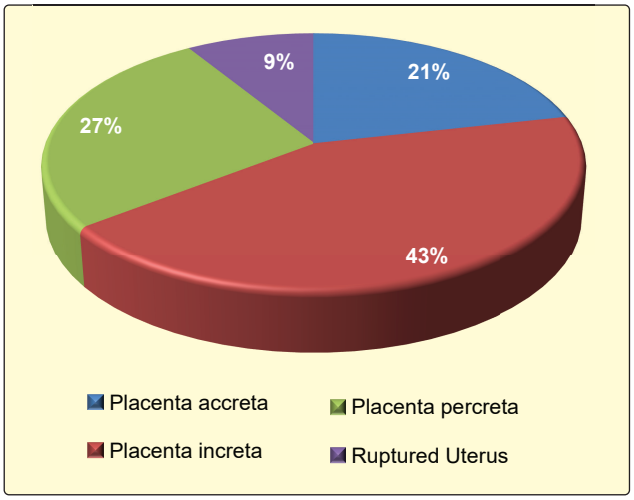


Chart 1: Peroperative Key findings

In Table 2, perioperative events showed that 79 (100%) women required blood transfusions, and 31 (39.2%) required ICU support. Postoperative complications included urinary tract infection 19 (24%), surgical site infection 9 (11.4%), bladder injury 5 (6.3%), disseminated intravascular coagulation 3 (3.8%), perioperative cardiac arrest 3 (3.8%), renal failure 2 (2.5%), multi-organ failure 2 (2.5%), and re-laparotomy 2 (2.5%). There was one maternal death 1 (1.3%).

Table 2: Perioperative and Postoperative Events and Complications

Category	Frequency (%)
Events	
Blood Transfusion	79 (100)
ICU support	31 (39.2)
Complications	
UTI	19 (24)
Surgical site infection	9 (11.4)
Bladder Injury	5 (6.3)
DIC	3 (3.8)
Perioperative Cardiac Arrest	3 (3.8)
Renal Failure	2 (2.5)
Multi Organ Failure	2 (2.5)
Re-laparotomy	2 (2.5)
Death	1 (1.3)

Regarding neonatal outcomes, Table 3 shows, 30 (38%) of newborns were of low birth weight, 47 (59.5%) had normal birth weight, and 2 (2.5%) were macrosomic. The male-to-female ratio was nearly equal: 37 (46.8%) vs. 42 (53.2%). 4 (5%) intrauterine deaths were recorded, and 7 neonates (8.9%) required NICU admission.

Table 3: Baby Outcome

Category		Frequency (%)
Birth Weight	Low Birth Weight (LBW)	30 (38)
	Normal	47 (59.5)
	Macrosomia	2 (2.5)
Sex	Male	37 (46.8)
	Female	42 (53.2)
Others	IUD	4 (5)
	NICU support	7 (8.9)

Discussion

In our study, caesarean hysterectomy (CH) was an uncommon event, occurring about 6.2 in 1000 of cesarean deliveries in the year 2024. Common antenatal comorbidities in this group were gestational diabetes and hypertensive disorders, along with hypothyroidism, reflecting a high burden of metabolic and endocrine conditions in pregnant women. Nearly all cases were precipitated by severe placenta accreta spectrum (PAS) or placenta previa (effectively 9 out of 10 of our CHs were due to placenta increta, percreta, or accreta). In this setting, intensive care (ICU) support was frequently required (almost 40% of cases), and major complications included urinary tract infections, wound infections, bladder injury, coagulopathy, and one maternal death.

The incidence of CH observed here (approximately 0.6% of cesarean deliveries) is close to other studies as well. For example, research found a CH rate of about 0.4% of all deliveries (62 of 36,371) at a tertiary center in Dhaka, and a meta-analysis also reported roughly 1.1 CHs per 1000 caesarean deliveries (0.11%).[13,14] In our center, CH was nevertheless rare – reflecting advances in hemorrhage management – but not negligible given the large surgical volume. Notably, several studies show an increasing incidence of PAS-related hysterectomy in recent decades, attributed largely to rising cesarean rates.[14,15]

Morbid adhesion of placenta was the leading indication for CH in our study. Among other studies, at a Bangladeshi center, it was found that 91% of hysterectomy cases had placenta previa and prior cesareans. Another research showed that placenta accreta (with previa) accounted for 35.5% of cases, while atonic PPH comprised only 12.9%.[13,16] Similarly, in Nepal, 62.5% of hysterectomies were for PAS and only 32.5% for atony.[17] This contrasts sharply with older studies done in high-income countries, where atony was the most common cause. A meta-analysis found that globally, placental causes now account for about 38% of peripartum hysterectomies (and up to 48% in high-income countries), whereas uterine atony has declined.[14] In low-income settings like ours, uterine rupture still contributes substantially, but placenta accreta is catching up.[14,17] In our data, placenta accreta spectrum conditions accounted for 91% of CH, with only a small remainder due to rupture. This high fraction underscores that abnormal placentation is now the dominant driver of CH here. The near-ubiquitous antecedent factor is prior uterine surgery: roughly 60–90% of PAS cases have prior cesarean or curettage in most series.[16,18]

The demographic pattern in our study indicates that most women were in the 26–30-year range. This differs somewhat from other reports where PAS patients tend to be older (often >30 years.[18] This may reflect that Bangladeshi women in their late 20s are often multigravid with prior cesareans, bringing the occurrence of PAS into a younger age group. Indeed, advanced maternal age is a known risk factor for PAS, but in our setting, high parity and prior obstetric interventions may outweigh age alone.[15,18] Nearly half of our women were grand-multiparous, and their average age was around 30, similar to an Indian study (mean 30.2 years).[19]

The high rate of preterm delivery (over half of cases) is also expected in PAS. Planned early delivery is a common practice to avoid maternal hemorrhage from PAS. In our study, 55.7% delivered preterm. A similar study in 2024 showed 55% preterm births in PAS patients and noted that preterm delivery is often planned to mitigate hemorrhagic risk.[20] Our obstetric team likely elected to deliver these women early because of abnormal placentation or rupture risk, which sacrificed some neonatal maturity for maternal safety. Another factor is that many PAS cases present with antepartum bleeding or rupture requiring urgent delivery.

It is worth noting that our patients often had common pregnancy morbidities. Gestational diabetes (GDM) was recorded in about one-fifth of cases. While GDM is a rising problem in South Asia, it is not classically linked to

placenta accreta. However, diabetes in pregnancy can be associated with larger babies and an overdistended uterus, potentially contributing to hemorrhage in other ways. Likewise, gestational hypertension and hypothyroidism were present in a minority (~5–10%) of our cases. We did not find clear evidence in the literature on whether hypothyroidism or GDM drives PAS or not, so their presence likely reflects the background prevalence of these disorders in our obstetric population. Nonetheless, their identification is important as these comorbidities can complicate perioperative management.

Nearly 4 in 10 women in our study required intensive care after hysterectomy. This underscores the severity of these cases. The literature supports that PAS cases frequently need critical care. For example, a similar study reported that up to 90% of PAS patients require blood transfusion, and many need ICU monitoring. In placenta accreta, average blood loss is often several liters, so hemodynamic support is essential.[15]

Our complication profile also parallels other reports. Common complications were urinary tract infections (~24%), wound infections (~11%), bladder injuries (6%), and DIC (4%), with one maternal death. Surgical site and urologic complications are known risks of CH. In an Indian study, bladder injury occurred in about 8% of cases and DIC in 2.4%.[14] A Nigerian study mentioned bladder injuries in 15% of PAS hysterectomies.[21] Our bladder injury rate (6%) was somewhat lower than these, possibly reflecting surgical expertise or case selection. Conversely, our infection rate was higher than some reports; one study reported ~12% UTI and ~24% wound infection. The wound infection rate in our study was lower, but UTI rate was higher than them.[11] These differences could be due to perioperative antibiotic protocols or detection practices. Notably, Maternal mortality in our study was 1.3% (one death), which is lower than some other reports. Another two studies showed 4.8% and 3.2% mortality.[13,14] Our lower death rate may be due to rapid intervention and ICU care.

Interpretation of these findings centers on the role of placenta accreta spectrum in modern obstetrics. Our data reinforce that PAS is a catastrophic but increasingly common cause of peripartum hysterectomy. The biological mechanism is tied to prior uterine injury: scarring from previous cesarean or curettage disrupts the normal decidua and allows placental villi to invade the myometrium.[15,16] In our study, patients often had multiple prior LUCS, providing the site for abnormal implantation. The rising cesarean rate in Bangladesh is likely driving an increased pool of PAS, consistent with global reports.[14,15] Moreover, incomplete prenatal assessment might under-detect PAS until surgery. Without a high index of suspicion, many of these cases likely presented emergently (often preterm) when bleeding was uncontrollable. This may explain why we observed a higher proportion of rupture (9%) and the high ICU need.

These results have significant public health and clinical implications. Pregnant women with one or more prior cesareans and placenta previa should be assessed for accreta with detailed ultrasound or MRI, so that delivery can be planned electively with multidisciplinary support. The high rate of ICU admission and transfusion in our series signals the need for robust blood-bank protocols and availability of critical care in centers managing CH. Health systems in Bangladesh should ensure referral pathways so that suspected PAS cases are delivered at tertiary hospitals. Furthermore, women with comorbidities like GDM and hypertension should have tailored prenatal care, although their direct link to CH risk is unclear.

Limitations

The study is retrospective, single-center, and may be subject to selection bias. Outcomes are reported only up to discharge, excluding long-term effects. The sample size is small, and the study spans just one year. Larger, multicenter studies are needed for more accurate results, and management strategies couldn't be compared since all cases involved hysterectomy.

Conclusion

Caesarean Hysterectomy is a rare but serious intervention that is almost always done due to abnormal placentation. Our findings underscore the need for vigilant antenatal risk assessment, preparedness for massive hemorrhage, and continued efforts to mitigate PAS. Attention to these factors can help improve maternal safety in future pregnancies.

References

1. Aimagambetova G, Sakko Y, Gusmanov A, Issanov A, Ukybassova T, Bapayeva G, Marat A, Nurpeissova A, Gaipov A. The Prevalence, Incidence, Indications and Outcomes of Peripartum Hysterectomy in Kazakhstan: Data from Unified Nationwide Electronic Healthcare System 2014-2018. Int J Womens Health. 2022; 14: 267-278.
2. Gică N, Ragea C, Botezatu R, Peltecu G, Gică C, Panaitescu AM. Incidence of Emergency Peripartum

Hysterectomy in a Tertiary Obstetrics Unit in Romania. Medicina (Kaunas). 2022; 12; 58(1): 111.

3. Angolile CM, Max BL, Mushemba J, Mashauri HL. Global increased cesarean section rates and public health implications: A call to action. Health Sci Rep. 2023; 6(5): e1274.
4. Pegu B, Thiagaraju C, Nayak D, Subbaiah M. Placenta accreta spectrum-a catastrophic situation in obstetrics. ObstetGynecol Sci. 2021; 64(3): 239-247.
5. Pan S, Han M, Zhai T, Han Y, Lu Y, Huang S, Zuo Q, Jiang Z, Ge Z. Maternal outcomes of conservative management and cesarean hysterectomy for placenta accreta spectrum disorders: a systematic review and meta-analysis. BMC pregnancy and childbirth. 2024; 24(1): 463.
6. Haider MR, Rahman MM, Moinuddin M, Rahman AE, Ahmed S, Khan MM. Ever-increasing Caesarean section and its economic burden in Bangladesh. PLoS One. 2018; 13(12): e0208623.
7. Lama S, Todi S, Shrestha R, Acharya S. Peripartum Hysterectomy among Patients Admitted to the Department of Obstetrics and Gynaecology in a Tertiary Care Centre: A Descriptive Cross-sectional Study. JNMA J Nepal Med Assoc. 2023; 61(261): 400-403.
8. Fatima M, Kasi PM, Baloch SN, Afghan AK. Experience of emergency peripartum hysterectomies at a tertiary care hospital in quetta, pakistan. ISRN Obstet Gynecol. 2011: e854202.
9. Desalegn H, Geta A, Nane D. Peripartum hysterectomy: prevalence, indications, maternal outcomes, and associated factors in a 7-year retrospective review at Wolaita Sodo University Comprehensive Specialized Hospital, Southern Ethiopia. BMC Pregnancy and Childbirth. 2025; 25(1): 489.
10. Jabeen S, Siddique AB, Hossain AT, Khan S, Haider MM, Tahsina T, Ahmed A, Ameen S, Chakraborty N, Nahar Q, Jamil K, El Arifeen S, Rahman AE. Haemorrhage-related maternal mortality in Bangladesh: Levels, trends, time of death, and care-seeking practices based on nationally representative population-based surveys. J Glob Health. 2023; 13: 07001.
11. Afroz R, Dewan F, Sarker MA, Ara R. Incidence and indications of peripartum hysterectomy among patients admitted in Dhaka Medical College Hospital. Int J Reprod Contracept Obstet Gynecol. 2024. 26; 13(10): 2623-2628.
12. Sultana T, Khatun R, Begum H. Incidence and Maternal Outcome of All Caesarean Hysterectomy in Tertiary Level Hospitals. Ann Int Med Dent Res. 2024; 10(4): 57–66.
13. Akhtar S, Begum KM, Anis RK, Sultana N, Hasan AS, Begum H, et al. Emergency Peripartum Hysterectomy and its Outcome in a Tertiary Care Hospital in Dhaka City, Bangladesh. Sir Salimullah Med. Coll. J. 2023; 31(2): 107-111.
14. Kallianidis AF, Rijntjes D, Brobbel C, Dekkers OM, Bloemenkamp KW, Van Den Akker T. Incidence, indications, risk factors, and outcomes of emergency peripartum hysterectomy worldwide: a systematic review and meta-analysis. Obstetrics & Gynecology. 2023; 141(1): 35-48.
15. Parvin J, Hossain MK. Maternal Outcome of Placenta Accreta Spectrum Disorder Patients admitted at Cumilla Medical College Hospital. Ann Int Med Dent Res. 2024; 10(1): 163–170.
16. Chowdhury F, Akhter M, Khatoon R, et al. Management Strategies and Maternal Outcome of Placenta Accreta. Bang J Obstet Gynaecol. 2013; 28(2): 71–75.
17. Bayable M, Gudu W, Wondafrash M, Sium AF. Incidence, indications, and maternal outcomes of emergency peripartum hysterectomy at a tertiary hospital in Ethiopia: A retrospective review. Int J Gynaecol Obstet. 2023; 161(1): 279-282.
18. Fitzpatrick KE, Sellers S, Spark P, Kurinczuk JJ, Brocklehurst P, Knight M (2012) Incidence and Risk Factors for Placenta Accreta/Increta/Percreta in the UK: A National Case-Control Study. PLoS ONE 7(12): e52893.
19. Tahmina S, Daniel M, Gunasegaran P. Emergency peripartum hysterectomy: A 14-year experience at a tertiary care centre in India. Journal of clinical and diagnostic research: JCDR. 2017; 11(9): QC08.
20. Chacko KS, Ashraf AA, Sayed SA, et al. Maternal and Clinical Outcomes of Placenta Accreta Spectrum: Insights from a Retrospective Study in Bahrain. Life (Basel). 2024; 15(6): 978.
21. Wekere FCC, Inimgba NM, Kua PL, Okagua KE, Asikimabo-Ofori S, Ocheche US, Clement-Wekere GAF. Placenta Accreta Spectrum: Prevalence, Trend and Association with Sociodemographic / Obstetric Factors in a Tertiary Health Facility in Niger Delta, Nigeria. Niger Med J. 2023; 63(6): 467-473.

Original Article

Correlation of Exercise on Body Mass Index (BMI) among Birmingham University College Students, United Kingdom (UK)

Nicolas Habib[1]

Abstract

Background: Obesity is increasing worldwide more than the undernutrition problem. Among students, maintaining health is essential, as this age group is vulnerable to lifestyle changes, sedentary habits, and poor diet choices. Physical activity plays an important role in regulating BMI and reducing the risk of obesity-related complications such as diabetes, cardiovascular disease, and mental health disorders.

Objective: This study aimed to investigate the correlation between physical activity and BMI among a specific college student in Birmingham, United Kingdom.

Methods: A descriptive type of cross-sectional study was conducted at the University College of Birmingham Sixth Form between July 2022 and June 2023. A total of 90 A-level students, randomly selected from 118 eligible participants, were enrolled. Data were collected using a semi-structured questionnaire and face-to-face interviews. Physical activity levels and sports participation were recorded alongside anthropometric measures for BMI calculation. Data were analyzed using SPSS version 22, applying descriptive and inferential statistics, including correlation coefficients.

Result: Sample was 90 students, the mean age of participants was 16.74 ± 0.59 years, with male being predominant 75 (83%). More than half of the students (54%) reported engaging in physical activities up to 18 days per month, while 16% had inconsistent workout routines. Football was the most popular sport 44 (50%), followed by cricket, with other activities including boxing and basketball. This was reflected in their BMI distribution, with 75 (83%) of students having a normal weight (18.5–24.9 kg/m^2), indicating an overall healthy nutritional status and here physical activities was positively associated with healthier BMI status in the study population.

Conclusion: The study found a positive correlation between higher levels of physical activity and normal BMI among students.

Keywords: Correlation of Exercise; BMI; College Students.

Introduction

Body Mass Index (BMI) is an anthropometric measure calculated as weight in kilograms divided by height in meters squared (kg/m^2), according to World Health Organization (WHO) standards.[1] It provides a simple index for classifying individuals as underweight, normal weight, overweight, or obese. Despite its wide application, obesity rates are increasing worldwide, highlighting a growing public health problem. Among college students, maintaining a healthy BMI is essential, as this stage of life often involves lifestyle transitions that influence diet, activity levels, and overall health.[2]

The extent of this issue is significant. Global evidence shows that obesity has nearly tripled since 1975, and young adults are particularly vulnerable due to sedentary behaviors and dietary shifts. In the United States, approximately (36%) of college students are overweight, while in China the prevalence is lower but rising steadily, reaching around (9%).[3] Within the United Kingdom, studies suggest that around (69%) of students

1. B.Sc Student, Department of Biomedical Science, Aston University, Birmingham, United Kingdom

Correspondence: Nicolas Habib, BSc. Student, Department of Biomedical Science, Aston University, Birmingham, United Kingdom Phone: +44 07404996687, Email: nicohabib26 @gmail.com

Received Date : 13 March 2026

Accepted Date : 20 March 2026

fall within the normal BMI range, leaving 31% either underweight or overweight/obese.[4] These conditions pose health risks; obesity increases the likelihood of type 2 diabetes, cardiovascular disease, and poor mental health, while underweight status is linked to malnutrition, weakened immunity, eating disorders, and impaired academic performance. Physical activity is a key modifiable factor that influences BMI, yet many students fail to engage in sufficient levels to maintain healthy weight and fitness.

Although research has explored BMI and obesity trends globally, more studies need to examine the correlation between physical activity and BMI among college students in the UK. This gap makes it important to investigate the relationship in the context of Birmingham, a diverse student population where lifestyle factors vary.

This study aims to determine the correlation between physical activity and BMI among college students in Birmingham and to analyze how activity patterns relate to BMI categories.

Materials and Methods

Study design:

This research was designed as an observational, descriptive type of cross-sectional study conducted among college students.

Study Area:

The study was carried out at the University College of Birmingham Sixth Form, located at Weoley Park Road, Selly Oak, Birmingham, UK.

Study population:

The target population included all 118 students enrolled in years 12 and 13 at the Sixth Form.

Time period:

The study was conducted over a 12-months period, from July 2022 to June 2023.

Sample size and sampling method:

Using the formula Z^2pq/d^2 (Z=1.96, p=50%, q=100–p, d=9, 95% CI), the required sample size was calculated to be 118 students. However, a total of 90 students were successfully enrolled through simple random sampling (SRS) from the eligible 115 students.

Operational definition:

Correlation- It measures the direction and strength of the linear relationship between two quantitative variables.

Body Mass Index (BMI) is an anthropometric measure calculated as weight in kilograms divided by height in meters squared (kg/m^2)

Exercise- It is a physical activity that is planned, structured, and repeated for the goal of maintaining physical health, like different indoor and outdoor games.

Inclusion and exclusion criteria:

All students in years 12 and 13 were considered eligible. Students unwilling to participate were excluded.

Data collection instrument and procedure:

Data were collected using a self-designed semi-structured questionnaire. Information was obtained through face-to-face interviews during free intervals, ensuring minimal disruption to students' academic schedules. The questionnaire included sections on demographic information, physical activity habits, and anthropometric data (height and weight for BMI calculation). Physical activity was defined as voluntary movement involving skeletal muscles, including exercise and differents sports.

Data analysis:

All information was carefully collected and entered into SPSS version 22 for analysis. Descriptive statistics such as frequency, percentage, mean, median, mode, and standard deviation were calculated. Inferential statistics, including correlation coefficients, were used to examine the relationship between physical activity and BMI. Results were presented in tables with percentages.

Result

Table 1 shows that the majority of college students are male, with 75 students (83%) being male. In comparison, only 15 students (17%) are female. Overall, the study included 90 college students, indicating a clear gender imbalance in favor of male students.

Table 1: Gender Variation of College Students

Sex	Number (%)
Male	75 (83)
Female	15 (17)

The table indicates that 25(28%) students engage in physical activities every day in a month. The majority, 51(56%) students , participate in physical activities for up to 18 days in a month. A smaller proportion of students, 14(16%), perform physical activities irregularly. Overall, the findings show that most students participate in physical activities regularly, although not on a daily basis.

Table 2: Physical Activities of College Students

Physical activities done	Number (%)
Each day in a month	25 (28)
Up to 18 days in a month	51 (56)
Irregularly done	14 (16)

Table 3 summarizes the favourite games among the college students. Football was the most preferred game, reported by 40 (44.4%) students. Cricket was the second most preferred game, with 17 (18.9%) students, followed by basketball, which was preferred by 11 (12.2%) students. Boxing was preferred by 6 (6.7%) students, while table tennis and lawn tennis were each preferred by 1 (1.1%) student. Additionally, 14 (15.6%) students reported that they participated in physical activities irregularly. Overall, football was the most popular game among the college students.

Table 3: Favourite Games of College Students

Favourite games	Number (%)
Football	40 (44.4)
Cricket	17 (18.9)
Basketball	11 (11.2)
Boxing	06 (6.7)
Table tennis	01 (1.1)
Lone tennis	01 (1.1)
Physical activities done irregularly	14 (15.6)

The table depicts that the majority of college students, 75 (83%), have a normal weight according to their BMI. A total of 9 (10%) students is overweight, while 2 (2%) students are classified as obese. Only 4 (4%) students are underweighting according to their BMI. Overall, the findings indicate that most of the students have a normal nutritional status based on BMI.

Table 4: Nutritional Status According to Body Mass Index (BMI)

Nutritional status according to BMI	Frequency (%)
Obese (>30kg/m2)	02 (2)
Over weight (25-29.9 kg/m2)	09 (10)
Normal weight (18.5-24.9 kg/m2)	75 (83)
Under weight (<18.5)	04 (4)

The analysis using Kendall's tau correlation showed a statistically significant positive relationship between Body Mass Index (BMI) and physical activities among 90 students. The correlation coefficient between BMI and physical activity was 0.155, with a p-value of 0.038, indicating significance at the 0.05 level (two-tailed). This suggests that as physical activity increased, BMI tended to remain within the normal range. Similarly, the correlation coefficient between physical activity and BMI was further supported by another value of 0.220, also significant (p = 0.037). These findings confirm that higher engagement in physical activities was positively associated with healthier BMI status in the study population.

Table 5: Correlation Coefficient

			BMI	Physical activities
Kendall's tau (Ƭ)	BMI	Correlation coefficient	1.000	0.155*
		Significant (2-tailed)		0.038
		Number of students	90	90
	Physical activities	Correlation coefficient	0.155*	1.000
		Significant (2-tailed)	0.038	
		Number of students	90	90
	Physical activities	Correlation Coefficient	0.220*	1.000
		Significant (2-tailed)	0.037	
		Number of students	90	90

*Correlation is significant at the 0.05 level (2-tailed)

Discussion

This study set out to examine the correlation between physical activity and BMI among college students at the University College of Birmingham Sixth Form. These findings showed that increased physical activity tends to be associated with healthier BMI-that is, students who engage more in regular physical activity are less likely to be overweight or underweight-and that a minority (around 31%) have BMI outside the normal range (Table-4).

These results are broadly consistent with previous literature. The correlation coefficient between BMI and physical activity was 0.155, with a p-value of 0.038, indicating significance at the 0.05 level (Table-5). A Norwegian study, Physical Exercise and Body-Mass Index in Young Adults, found that overweight and obesity prevalence among university students increased when exercise frequency, intensity, and duration were low. Students who met higher exercise criteria had lower BMI values.[5] This aligns with our findings, suggesting that higher physical activity is associated with healthier BMI. Similarly, a UK observational cohort characterizing activity, lifestyle behaviours, and health outcomes of university students reported that about 32% of students were overweight or obese, with low physical activity and sedentary behaviour contributing significantly.[6] These UK data strengthen the inference that student populations in regions like Birmingham are likely to show similar correlations between activity and BMI (Table-5).

However, there are studies that complicate the relationship. A study among Chinese university students found that both underweight and obese students had poorer physical fitness indicators compared to normal-weight students. The relationship was not simply linear, showing U-shaped or inverted U-shaped associations.[3] This suggests that underweight status is also problematic, and activity-BMI correlations may vary across BMI categories. Additionally, a Belgian longitudinal study showed that male students gained more weight and BMI over 1.5 years than females, with baseline BMI and waist circumference predicting greater increases.[7] This indicates that gender, baseline BMI, and demographic factors may modify the relationship between activity and BMI.

Limitations

This study includes a cross-sectional design, which limits causal inference. It is unclear whether low physical activity leads to abnormal BMI or vice versa, or whether other confounding variables exist. Data were collected from a single location, limiting generalizability to all students in Birmingham or the UK. Seasonal variations, semester stress, exams, or pandemic effects during the 12-month study period may have influenced activity and BMI but were not controlled.

Conclusion

This study demonstrated a significant and positive correlation between physical activity and BMI among college students in Birmingham. Colleges should integrate structured physical activity programs into daily routines and raise awareness about the importance of balanced nutrition. Policies supporting active lifestyles-such as sports facilities, wellness campaigns, and flexible schedules-can motivate students.

References

1. World Health Organization. BMI-for-age (5-19 years). WHO, 2023.
2. Micha R, Peñalvo JL, Cudhea F, et al. Association Between Dietary Factors and Mortality From Heart Disease, Stroke, and Type 2 Diabetes in the United States. JAMA. 2017; 317(9): 912–924.
3. Zhang L, Wang H, Wang Z, et al. Prevalence of overweight and obesity among Chinese college students, 2011–2015. BMC Public Health. 2018; 18: 1304.
4. Public Health England. Health Survey for England 2021: Adult overweight and obesity. NHS Digital, 2022.
5. Norwegian Institute of Public Health. Physical exercise and body-mass index in young adults. BMC Public Health. 2019; 19:7650.
6. Smith L, Gardner B, Fisher A, Hamer M. Characterising activity, lifestyle behaviours, and health outcomes of UK university students. BMC Public Health. 2024; 24(1): 3501.
7. De Wilde J, Van Royen K, et al. Longitudinal study of BMI changes and predictors in Belgian university students. Eur J Clin Nutr. 2015; 69: 109–115.

Original Article

Clinical Assessment of Risk Factors for the Development of Premature Rupture of Membranes (PROM) at a Tertiary Care Hospital in Bangladesh

Mst. Rebeka Sultana[1], Liza Tasrin[2], Dilruba Yasmin[3], Farhana Dewan[4]

Abstract

Background: Premature Rupture of Membranes (PROM) continues to be an important obstetric problem because of its links with increased maternal and neonatal complications. Identifying factors that predispose women to PROM is crucial, especially in low-resource settings where timely prevention and management can make a significant difference. This study examines the clinical and demographic factors associated with PROM among pregnant women attending a tertiary hospital in Bangladesh.

Objective: The study aimed to assess the major risk factors related to PROM. More specifically, it sought to compare nutritional status, genital tract infections, and past reproductive history between women presenting with PROM and those with intact membranes.

Methods: This case-control study was carried out at Dhaka Medical College Hospital. 75 women diagnosed with PROM were included as cases, and an equal number of pregnant women without PROM served as controls. Information was gathered using structured interviews, clinical assessments, and review of hospital records. Statistical tests were used to determine the significance of associations between various potential risk factors and PROM.

Result: Several factors showed a significant association with PROM, including maternal illiteracy, a past history of abortion, previous PROM, low body mass index, malnutrition, and lower genital tract infections. Conversely, maternal age, occupation, and having regular antenatal check-ups did not show statistically meaningful relationships with PROM in this study group. These results point to the influence of largely preventable or manageable factors.

Conclusion: The study underscores the importance of addressing malnutrition, reproductive health education, and early detection of genital infections to reduce the risk of PROM. Recognizing these risk factors early and intervening appropriately may help improve maternal and neonatal outcomes in similar healthcare settings.

Keywords: Premature Rupture of Membranes (PROM); Genital Tract Infections; Malnutrition; Case-Control Study.

1. Assistant Surgeon, Department of Obstetrics and Gynaecology, Mugda Medical College Hospital, Dhaka
2. Assistant Professor, Department of Obstetrics and Gynaecology, Mugda Medical College Hospital, Dhaka
3. Senior Consultant, Department of Obstetrics and Gynaecology, Mugda Medical College Hospital, Dhaka
4. Professor and Head, Department of Obstetrics and Gynaecology, Ibn Sina Medical ollege Hospital, Dhaka

Correspondence: Dr. Mst. Rebeka Sultana, Assistant Surgeon, Department of Obstetrics and Gynaecology, Mugda Medical College Hospital, Dhaka. Email: rebekasultanahira@gmail.com, Mobile: +8801740996635

Received Date : 13 May 2026
Accepted Date : 19 May 2026

Introduction

Premature rupture of membranes (PROM) stands as a common complication encountered during pregnancy.[1] Spontaneous rupture of the fetal membranes typically occurs during the active phase of labour, but when this happens earlier than usual, it becomes problematic.[1,2] Prelabour rupture of membranes refers to spontaneous membrane rupture beyond the 28th week of pregnancy but before the onset of labour.[2] PROM occurring beyond 37 completed weeks but before labour onset is termed term PROM, affecting approximately 6 to 10 percent of all births.[2,3] Preterm PROM occurs before 37 completed

weeks, affecting about one percent of all pregnancies, and is linked to 30 to 40 percent of preterm births, making it a key cause of prenatal death.[1]

The precise etiology of PROM remains largely unknown, though possible causes involve either a reduction in membrane strength, an increase in intrauterine pressure, or a combination of both.[2,4] Evidence suggests an association between upper genital tract infections and PROM, potentially acting through the ascension of organisms from the placenta and deciduas.[4,5] Organisms found in the vaginal flora, such as Group B *streptococci* and *Staphylococcus aureus*, may degrade collagen and weaken the fetal membranes.[5] Clinically identified risk factors include low socio-economic status, malnutrition, high parity, recurrent genito-urinary infections, and anemia.[5,6]

PROM contributes significantly to perinatal morbidity and mortality, often requiring increased operative procedures.[4,7] While developed countries have seen considerable research into PROM, studies focusing on this subject remain limited in the study's location.8 PROM is frequently observed in local obstetric wards. Therefore, a proper evaluation of associated risk factors, alongside appropriate diagnostic facilities and adherence to a standard management protocol, is essential for improving maternal and fetal outcomes.[6] The purpose of this case-control study was to evaluate and correlate the risk factors for PROM in women presenting at a tertiary care hospital.[6,9] The findings from this hospital-based assessment will subsequently inform the need for larger studies on the general population to fully ascertain the factors influencing PROM development.[1]

Materials and Methods

This case–control study was conducted at Dhaka Medical College Hospital from January 2009 to June 2010 and included 150 pregnant women-75 with PROM before labour (Group A) and 75 matched controls with intact membranes (Group B). Cases were over 31 weeks' gestation, had PROM confirmed on speculum exam, and had cervical dilation under 3 cm. Women already in labour, with malpresentation, severe pre-eclampsia/ eclampsia, or PROM with antepartum hemorrhage were excluded. Data were collected through a structured questionnaire. Gestational age was determined from menstrual history, antenatal records, clinical exam, and ultrasound. PROM was confirmed by observing amniotic fluid pooling or ultrasound signs of low fluid. All participants underwent high vaginal swab culture, blood tests (CBC, blood group, RBS, CRP, HBsAg, VDRL), and urine analysis and culture. Data were analyzed with SPSS, using a significance level of $p < 0.05$. Tests for Ureaplasma Urealyticum, Mycoplasma, and Chlamydia were not done due to limited lab facilities.

Result

Univariate analysis showed several risk factors significantly associated with PROM, including illiteracy, previous history of abortion and PROM, vaginal bleeding in the first trimester, lower genital tract infection, malnutrition, and leucocytosis. Factors not found to be statistically significant included age, occupation, regular or irregular antenatal care (ANC), and C-reactive protein (CRP).

Although age was not a significant risk factor overall, pregnant women with PROM were more common in the extreme age groups (15–25 years and 30–39 years). Gestational age was significantly associated with PROM, with patients in the 34–37 weeks group showing a significantly higher incidence of PROM than controls (Figure 1).

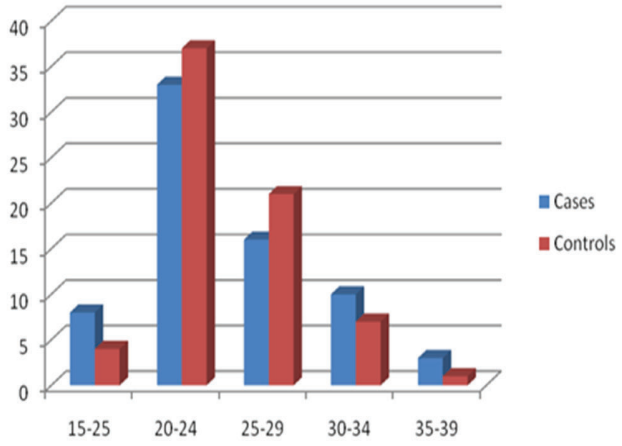


Figure 1: Age Distribution of Cases and Controls

The table shows that maternal educational level differed significantly between Group A and Group B ($p = 0.016$). Illiteracy was more common in Group A, 8 (10.7%), than in Group B, 1 (1.3%). Similarly, a higher proportion of mothers in Group B had higher secondary education or

above 24 (32.0%) compared with Group A 14 (18.7%). Most mothers in both groups had secondary-level education 43 (57.3%) in Group A and 41 (54.7%) in Group B.

Table 1: Educational Level of Mothers

Education	Group A No (%)	Group B No (%)	p-value
Illiterate	8 (10.7)	1 (1.3)	
Primary	10 (13.3)	9 (12.0)	0.016*
Secondary	43 (57.3)	41 (54.7)	
Higher secondary or above	14 (18.7)	24 (32.0)	

*Significant on Chi-square test; Group A= cases (75); Group B = controls (75)

Past obstetric history differed significantly between groups (p=0.002), with "no abnormality" more frequent in Group B. Reported category totals are below 75 in both groups; the test therefore uses the available counts shown in the table.

Table 2: Past Obstetric History

History	Group A No (%)	Group B No (%)	p-value
MR	2 (2.67)	6 (8.00)	
Abortion	12 (16.00)	3 (4.00)	
PROM in previous pregnancy	20 (26.66)	10 (13.33)	0.002*
Preterm delivery	11 (14.67)	6 (8.00)	
No abnormality	30 (40.00)	50 (66.67)	

*Statistically significant at p<0.05. Group A=cases; Group B=controls.

Pearson Chi-square test (4×2) was applied to the reported category counts.

For anaemia severity, a Fisher–Freeman–Halton exact test was used because of sparse cells; the overall distribution was not significant (p=0.065). Pearson Chi-square tests were used for binary features with adequate expected counts, and Fisher's exact test for sexually transmitted disease. Only malnutrition showed a clear significant group difference (p<0.001).

Table 3: Distribution of the Clinical Features

Clinical features	Group A n (%)	Group B n (%)	p-value
Anaemia			0.065
Mild	20 (26.7)	29 (38.7)	
Moderate	19 (25.3)	8 (10.7)	
Severe	2 (2.7)	1 (1.3)	
Absent	34 (45.3)	37 (49.3)	
Hypertension	11 (14.7)	9 (12.0)	0.631
Respiratory disease (Chronic bronchitis)	27 (36.0)	20 (26.7)	0.218
UTI	25 (33.3)	22 (29.3)	0.597
Lower genital tract infection	43 (57.3)	31 (41.3)	0.050
Malnutrition	42 (56.0)	19 (25.3)	<0.001*
Sexually transmitted disease	1 (1.33)	0 (0)	1.000

*Statistically significant at p<0.05. Group A=cases; Group B=controls.

Positive versus negative culture was compared by Pearson Chi-square test and differed significantly between groups (p<0.001). Organism-specific comparisons used Pearson Chi-square when expected counts were adequate and Fisher's Exact test for sparse/zero cells; only Escherichia coli reached p<0.05.

Table 4: High Vaginal Swab Culture

	Group A No (%)	Group B No (%)	p-value
Growth			<0.001*
Negative	47 (62.7)	65 (86.7)	
Positive	28 (37.3)	10 (13.3)	
Escherichia coli	13 (17.3)	5 (6.7)	0.044*
Staphylococcus	4 (5.3)	0 (0)	0.120
Klebsiella	4 (5.3)	0 (0)	0.120
Pseudomonas	6 (8.0)	5 (6.7)	0.754

*Statistically significant at p<0.05. Group A=cases; Group B=controls.

Leucocyte category differed significantly between groups (Pearson Chi-square, p=<0.001). CRP categories were compared using a Fisher–Freeman–Halton exact test because of a sparse middle category and showed no significant difference (p=0.489).

Table 5: Leucocyte Count & CRP Count

Variables	Group A No (%)	Group B No (%)	p-value
Leucocyte count (n=75)			<0.001*
WBC < 10,000	12 (16.0)	36 (48.0)	
WBC > 11,000	63 (84.0)	38 (50.7)	
CRP (n=75)			0.489
Within normal (within 6 mg/dl)	31 (41.3)	37 (49.3)	
Medium increase (6.7-9 mg/dl)	1 (1.3)	2 (2.6)	
Highly increase (>10 mg/dl)	43 (57.3)	36 (48.0)	

*Statistically significant at p<0.05. Group A=cases; Group B=controls.

Discussion

PROM is recognized as a significant obstetric event that may lead to maternal complications, increased operative procedures, and potentially high perinatal morbidity and mortality. Appropriate management requires careful consideration of gestational age, infection status, and the availability of neonatal intensive care.[7]

This study aimed to contribute to the limited literature available in the local context by comparing risk factors in PROM cases against controls.[8] The setting was a tertiary care hospital, a necessity because the true incidence of PROM in the study country is difficult to estimate from hospital data alone, given that an estimated 80 percent of deliveries occur at home.[8,10]

Key findings highlighted the demographic and historical factors associated with PROM. The study confirmed that illiteracy was significantly associated with PROM, suggesting that female education may influence awareness and the timely seeking of medical care.[11,12] The recurrence rate of PROM in a prior pregnancy (26.66%) reinforces that prior PROM is an identified risk factor.[13,14] Consistent with other research, previous abortion history (16%) and preterm delivery history (14.67%) were also identified, highlighting the vulnerability of women with adverse past obstetric histories.[15]

Regarding clinical and nutritional status, low Body Mass Index (BMI) was associated with PROM, confirming findings similar to a study.[16] Furthermore, malnutrition was significantly associated, and the increased prevalence of moderate anemia in cases further supports the role of poor maternal nutritional status.

Infection played a major role; 57.3% of cases had lower genital tract infection, and 37.3% of cases showed positive HVS culture, which was a significant difference compared to controls.[17,18] The identification of *Staphylococcus*, *Klebsiella*, and *Pseudomonas* in HVS cultures as significant factors aligns with the hypothesis that organisms can degrade fetal membranes.[5] The limitation regarding testing for *U. urealyticum*, *Mycoplasma*, and *Chlamydia* means the total infectious burden may be underestimated.[19]

The study showed a significant association between first trimester vaginal bleeding and PROM, a finding supported by other studies.[20,14] While leucocytosis was significantly higher in PROM patients (82.7%), suggesting infection, CRP levels - often used to predict infection development - did not show a significant difference.[21,22]

Conclusion

PROM is a serious maternal complication requiring urgent attention and standardized management. The study successfully identified multiple factors significantly associated with increased risk for PROM, including illiteracy, previous history of abortion or PROM, malnutrition, specific gestational ages (near term), and positive high vaginal cultures. Early identification and management of these predisposing factors are essential steps toward preventing subsequent maternal and fetal complications and promoting healthy pregnancy outcomes.

References

1. Dutta DC. Pre-labor rupture of membranes. In: Textbook of Obstetrics. 6th ed. Calcutta: New Central Book Agency (P) Ltd. 2006; 314.
2. Grant JM, Serle E, Mahmood T, Sarmandal P, Conway DI. Management of prelabour rupture of the membranes in term primigravidae: report of a randomized prospective trial. Br J Obstet Gynaecol. 1992; 99: 557–562.
3. Ohlsson A, Wang E. Analysis of antenatal tests to detect infection in premature rupture of membranes. Am J Obstet Gynecol. 1990; 162: 809–818.
4. Arias F. Practical Guide to High-Risk Pregnancy and

Delivery. 4th ed. Bangalore: Harcourt Brace & Company Asia Pte Ltd. 1993; 101–106.

5. Polzin WJ, Brady K. Mechanical factors in the etiology of PROM. Obstet Gynecol. 1991; 34: 702–714.
6. Cunningham FG, MacDonald PC, Gant NF, Leveno KJ, Gilstrap LC. Williams Obstetrics. 19th ed. Norwalk (CT): Appleton & Lange. 1993; 82–83.
7. Williams PL, Warwick R, Dyson M, Bannister LH. Gray's Anatomy. 37th ed. Edinburgh: Churchill Livingstone. 1989; 385.
8. Blackburn ST, Loper DL. Maternal, Fetal and Neonatal Physiology: A Clinical Perspective. Philadelphia: WB Saunders Company. 1994; 83.
9. Dutta DC. The placenta and fetal membranes. In: Textbook of Obstetrics. 6th ed. Calcutta: New Central Book Agency (P) Ltd. 2006; 28–40.
10. Gaub WA, Kozina TS, Fuhrmann DD. Diamine oxidase in the diagnosis of rupture of fetal membranes. Obstet Gynecol. 1982; 60: 297–300.
11. Medina TM, Hill DA. Preterm premature rupture of membranes: diagnosis and management.Am Fam Physician. 2006; 73(4): 659–664.
12. Erekson ML, Vater C, Susan D. Fetal fibronectin: a method for detecting the presence of amniotic fluid. Obstet Gynecol. 1992; 80: 84.
13. Gibbs RS, Romero R, Hillier SL, et al. Premature birth and infection. Am J Obstet Gynecol. 1992; 166: 1515–1521.
14. James JD, Stelson R, Johnson FF, Williams RA. Factors that precede preterm labor and preterm premature rupture of membranes. Am J Obstet Gynecol. 1990; 162: 486–490.
15. Hofman BC, Wargo JD, Weren SC. Cytology of vernix caseosa cells. Obstet Gynecol. 1987; 10: 656–658.
16. Miodovnik M; NICHD MFMU Network. Risk factors associated with preterm premature rupture of membranes: a case–control study. Bethesda (MD). 2026; 105(3): e47263.
17. Garete TJ.Freeman RR Chorioamnitis in preterm gestation obstet Gynicol. 1992; 59: 539.
18. James L.Green wald, American family physician ; premature rupture of the membranes: diagnostic and management.1993; 4: 56-60.
19. Isolation of amniotic stem cell lines with potential for therapy. Nature Biotechnol. 2007; 9(1): 2-4.
20. Edmonds DK, editor. Dewhurst's Textbook of Obstetrics and Gynaecology. 7th ed. Oxford: Blackwell Science. 2007; 180–189.
21. Marger JH. Comparison of success and morbidity in cervical cerclage procedures. Obstet Gynecol. 1980; 56: 543–547.
22. Haskins IA, Johnson TRB, Winkel CA. Leukocyte esterase activity in human amniotic fluid for rapid detection of chorioamnionitis. Am J Obstet Gynecol. 1987; 154: 730–732.

Original Article

Globus Pharyngeus: A Common Clinical Entity in OPD at a Tertiary-Level Hospital in Bangladesh

Md. Mahmudul Hasan Khan[1], Anower Parvej (Shujon)[2], Md. Arafat Rahman[3], Najiba Kabir[4], Lamia Akter[5]

Abstract

Background: Globus pharyngeus is a persistent or intermittent, non-painful sensation of a lump in the throat without an identifiable structural lesion. Although usually benign, it has a multifactorial etiology, including laryngopharyngeal reflux, chronic pharyngitis, thyroid disorders, and psychological factors, requiring careful evaluation to exclude significant underlying disease.

Objective: To determine the frequency and demographic distribution of globus pharyngeus and related throat conditions among patients attending the outpatient department of a tertiary-level hospital.

Methods: This cross-sectional observational study was conducted in the outpatient department of Ad-din Women's Medical College Hospital, Bangladesh. A total of 100 patients presenting with throat discomfort or foreign body sensation were enrolled. Demographic and clinical data were collected using a structured data collection sheet. Diagnoses were established through detailed history, clinical examination, and ENT specialist assessment. Data were analyzed using SPSS version 23 with descriptive statistics.

Result: Among the 100 patients included, 61 (61%) were female and 39 (39%) were male, indicating a female predominance in throat-related complaints. The highest proportion of patients belonged to the 21–30 years age group 32 (32%), followed by the 31–40 years group 27 (27%), suggesting that young and middle-aged adults were most frequently affected. Laryngopharyngeal reflux was the most common diagnosis in both sexes, accounting for the largest share of cases, while chronic pharyngitis was the second most frequent condition. Globus pharyngeus represented a smaller proportion of the study population but was observed more commonly among middle-aged patients than younger individuals. Overall, the findings demonstrated distinct age- and sex-related differences in the distribution of throat disorders, with reflux-related conditions predominating across most demographic groups.

Conclusion: Laryngopharyngeal reflux was the predominant diagnosis, whereas globus pharyngeus remained a clinically important condition. Early recognition and thorough evaluation are essential for accurate diagnosis, appropriate management, exclusion of serious pathology, and patient reassurance.

Keywords: Globus Pharyngeus; Laryngopharyngeal Reflux (LPR); Chronic Pharyngitis; Cross-Sectional Study.

1. Professor & Head, Department of ENT, Ad-din Women's Medical College Hospital, Dhaka, Bangladesh
2. Assistant Professor, Department of ENT, Ad-din Women's Medical College Hospital, Dhaka, Bangladesh
3. Assistant Professor, Department of ENT, Ad-din Women's Medical College Hospital, Dhaka, Bangladesh
4. Assistant Registrar, Department of ENT, Ad-din Women's Medical College Hospital, Dhaka, Bangladesh
5. Research Officer, Department of ENT & Head Neck Surgery, Ad-din Women's Medical College and Hospital

Correspondence: Dr. Md. Mahmudul Hasan Khan, Professor & Head, Department of ENT, Ad-din Women's Medical College Hospital, Dhaka, Bangladesh. Email: mahmudhk59@gmail.com, Phone: +8801816865770

Received Date : 10 April 2026
Accepted Date : 30 April 2026

Introduction

Hippocrates first noted Globus Pharyngeus approximately 2500 years ago.[1] In 1707, Purcell was the first to describe the condition accurately; he believed that globus resulted from pressure from thyroid cartilage due to contraction of strap muscles of the neck.[2] In the past, globus was described as 'Globus Hystericus' due to its frequent association with menopause or psychogenic factors. However, Kenneth Malcomson first coined the more accurate term "Globus Pharyngeus" in 1968 after discovering that most patients experiencing globus did not have a hysterical personality nor were they predominantly female.[3] He advocated a change in terminology to globus pharyngeus.

Aetiology:

The etiology remains elusive. Although data are limited, previous studies investigated links with chronic pharyngitis, laryngopharyngeal reflux, gastroesophageal reflux disease, esophageal dysmotility, abnormalities of the upper esophageal sphincter, pharyngeal inflammation, enlarged lingual tonsils, upper aerodigestive malignancy, psychological factors, and stress. As globus cannot be assessed by clinical examination, there is a validated questionnaire, the Glasgow Edinburgh Throat Scale (GETS), that can appraise with high probability the incidence and severity of globus.

Gastroesophageal Reflux Disease (GERD):

Although there is still considerable debate about the causative role of GERD in patients with globus, gastroesophageal reflux has been suggested to be a major etiology of this symptom, potentially accounting for 23% to 68% of globus patients. Malcosom was the first to link GERD with globus sensation through the use of barium swallow to uncover the presence of reflux in over 60% of the patients of globus.[3] Moreover, Koufman found that 58% of patients with globus had abnormal pH levels.[4] In a study that performed 24-hour double-probe pH monitoring on 25% of patients with globus and hoarseness, 72% of the patients exhibited pathological reflux, and the globus symptom score was significantly higher in patients with GERD than in those without.[5,6] Additionally, globus sensation improved after 8 weeks of proton pump inhibitor therapy.[7] Several population-based surveys have supported such a potential link between GERD and the globus symptom by demonstrating an increased risk of globus among patients with GERD symptoms.[8,9,10] Two basic mechanisms have been proposed to explain the association between GERD and the globus sensation.[11,12,13] The first mechanism involves direct irritation and inflammation of the laryngopharynx by retrograde flow of gastric contents, also known as laryngopharyngeal reflux (LPR), and the second mechanism involves Vasovagal reflux hypertonicity of the UES triggered by acidification of the distal esophagus.[4,14,15,16]

Laryngopharyngeal Reflux (LPR):

From the aspect of an otorhinolaryngologist, the most important connection of the globus is with thyroid diseases and laryngopharyngeal reflux (LPR). While LPR and GERD are both caused by stomach acid backing up, they differ in where the acid causes symptoms.[17] LPR is known as direct irritation and inflammation of the laryngopharynx by retrograde flow of gastric contents. LPR is also called extra esophageal reflux, because the reflux passes beyond the esophagus.[4] This causes different symptoms from typical acid reflux, so different that one might not realize that it is a type of reflux at all. Instead of causing heartburn and indigestion, LPR tends to irritate the voice, throat, and sinuses. Reflux Finding score (RFS) a quantitative guide for diagnosis and treatment of laryngopharyngeal reflux. This validates morphological changes of laryngeal mucosa, which occur as a result of LPR and can be demonstrated by direct laryngoscopy. This relationship is complex, with varying results across different studies using different diagnostic methods[15]. Treatment for LPR typically begins with lifestyle and dietary modification followed by medications like proton pump inhibitors or alginates.

Chronic Pharyngitis:

Chronic pharyngitis is a long-lasting sore throat that lasts over 10 days or frequently returns. It often indicates an underlying problem that needs addressing.[18] The symptoms include soreness or discomfort in the throat. A sensation of a foreign body or something stuck in the throat, hoarseness of the voice, recurrent coughing, or a persistent urge to clear the throat. Underlying health conditions that cause chronic pharyngitis are GERD or LPR, postnasal drip, infection, and mouth breathing.[11,14] Other factors include environmental irritants such as exposure to dust, smoke, fumes, and harsh chemicals. Lifestyle factors such as excessive smoking, heavy alcohol consumption, and intake of very hot and spicy foods.

Abnormal Upper Esophageal Sphincter Function:

Abnormal upper esophageal sphincter function (UES) has also been suggested to be a cause of globus sensation. Elevated UES pressure is much more frequent in patients with globus sensation than in controls (28% vs 3%), suggesting that hypertensive UES is a background factor for globus.[20]

Thyroid Diseases:

Impalpable, ultrasound detectable abnormalities in the thyroid are known to be more common in patients with globus sensation than in controls.[12] Another study noted that as many as one third of patients with thyroid mass complained of globus sensation. Post thyroidectomy patients may also complain of globus pattern symptoms, but these frequently diminish with time.[20]

Pharyngeal Inflammatory Causes :

Many conditions that cause irritation and inflammation of the pharynx, such as pharyngitis, tonsillitis, and chronic sinusitis with postnasal drip, can be the cause of globus sensation by producing increased local sensitivity.[21,22]

Hypertrophy of The Tongue Base:

Globus can be induced by severe hypertrophy of the tongue base due to follicles touching the posterior wall

of the pharynx. Another study demonstrated that hypertrophied follicles were frequent in patients with signs and symptoms of GERD and that the symptoms of hypertrophy of the tongue base that could be confused with GERD.[20]

Psychological Factors and Stress:

Psychogenic problems are often thought to cause or trigger the globus sensation. Personality studies have found higher levels of alexithymia, neuroticism and psychological distress (including anxiety, low mood and somatic concerns) and lower levels of extraversion in patients presenting with globus.[23,24] Indeed, up to 96% of patients with globus sensation exacerbate during periods of high emotional intensity.[25,26]

Diagnosis

1. History and Examination

A diagnosis of globus pharyngeus is based on history and examination. Patients should be asked how long the feeling has been present and to describe it. The presenting complaint may be described in various ways, including lump or ball in the throat, throat swelling, or itching. The symptoms often come and go but constant or worsening symptoms are more concerning. The symptoms should be concerning. Typically, the feeling is central and suprasternal. Globus sensation is often noticed when the patient swallows their own saliva or eats and drinks, so it may be helpful to ascertain the relationship between food and swallowing. Pain on swallowing is not typical for globus sensation. Ask about reflux symptoms and others such as throat clearing, cough and hoarseness. Consider anxiety and ask about other symptoms such as psychological symptoms, including physical symptoms such as palpitations, poor sleep and feelings of panic.

In general practice, full examination of the head and neck is important. The neck should be palpated, ensuring the thyroid gland and cervical lymph nodes are examined. The nose should be checked for evidence of inflamed mucosa, polyps, pus or postnasal drip.

Investigations

1. Fibre Optic Laryngoscopy (FOL)

Fiber optic laryngoscopy is a minimally invasive procedure to examine the throat, vocal cords, and larynx using a thin, flexible tube with a camera. The scope is inserted through the nose to view the structures and diagnose issues like hoarseness, voice changes, or swallowing difficulties.

2. Reflux Symptom Index (RSI)

After obtaining informed consent from the patients with complaints of globus sensation in the throat, a questionnaire was filled out, followed by general and local examination. For LPR diagnosis, the reflux symptom index was filled out. It was a score that was filled out by the patients themselves according to the severity of their symptoms. It was given to the patient as a form of questionnaire. All individuals with a reflux symptom index score of 13 or more were considered to have features of laryngopharyngeal reflux.

The various features of the reflux symptom index score were as follows:

Within the last month, how has the problem affected you?

0= no problem

5= severe problem

Total score= (minimum 0, maximum 45)

Reflux symptom index> 13= features of LPR present.

Symptoms	Score					
	0	1	2	3	4	5
Hoarseness or problem with voice						
Clearing your throat						
Excess throat mucus or postnasal drip						
Difficulty swallowing food, liquid or pills						
Cough after you eat or after lying						
Down						
Breathing difficulties or choking episodes						
Troublesome or annoying cough						
Sensation of something in your throat						
Heartburn, chest burn or indigestion						

Figure: Reflux symptom index

Materials and Methods

Study Design:

Among patients attending the OPD, this cross-sectional study was conducted at the Outpatient Department (OPD) of Ad-din Women's Medical College Hospital, a tertiary-level healthcare facility in Bangladesh. The study aimed to assess the frequency and distribution of globus pharyngeus.

Study Population and Sample Size:

A total of 100 patients attending the OPD during the study period were included in the study. Patients presenting with symptoms suggestive of throat discomfort or foreign body sensation were evaluated clinically and diagnosed accordingly.

Inclusion Criteria:

Inclusion criteria included patients of both sexes and all age groups who attended the OPD and were clinically diagnosed with globus pharyngeus or other related throat conditions.

Exclusion Criteria:

Exclusion criteria included patients with confirmed malignant lesions of the pharynx or larynx, acute upper respiratory tract infections, or those unwilling to participate.

Data Collection:

Data were collected using a structured data collection sheet. The variables recorded included:

- Age (in years)
- Sex (male/female)
- Diagnosis (Dx), including globus pharyngeus and other related conditions

All diagnoses were made based on clinical evaluation by qualified ENT specialists.

Statistical Analysis:

Data were entered, cleaned, and analyzed using Statistical Package for Social Sciences (SPSS) version 23. Descriptive statistics were used to summarize the data. Categorical variables such as sex and diagnosis were expressed as frequencies and percentages, while age was presented in grouped categories. Cross-tabulation was performed where appropriate to assess the distribution of diagnoses across age and sex.

Ethical approval was obtained from the appropriate institutional authority of Ad-din Women's Medical College Hospital. Informed consent was obtained from all participants before data collection, and confidentiality of patient information was strictly maintained.

Result

Table 1 summarizes the demographic characteristics of the study participants. A total of 100 patients were included in the study. Females constituted the majority of the sample 61 (61%), while males accounted for 39 (39%). Regarding age distribution, the largest proportion of patients belonged to the 21–30 years age group 32 (32%), followed by 31–40 years 27 (27%) and 10–20 years 20 (20%). Smaller proportions were observed in the older age groups, with 13 (13%) aged 41–50 years, 5 (5%) aged 51–60 years, and only 3 (3%) aged above 60 years. Overall, the study population was predominantly female and largely comprised of young to middle-aged individuals.

Table 1: Demographic characteristics of the patients

Variables	Number (%)
Sex	
Male	39 (39)
Female	61 (61)
Age (years)	
10-20	20 (20)
21-30	32 (32)
31-40	27 (27)
41-50	13 (13)
51-60	05 (5)
61-70	02 (2)
71-80	01 (1)

Table 2 shows the distribution of diagnoses according to sex. Laryngopharyngeal reflux (LPR) was the most common diagnosis in both males and females, accounting for 19 (48.7%) of male patients and 32 (52.5%) of female patients. Chronic pharyngitis was the second most frequent diagnosis, observed in 16 (41.0%) of males and 21 (34.4%) of females. Globus was the least common diagnosis in both sexes, though it was slightly more prevalent among females 8 (13.1%) compared to males 4 (10.3%). Overall, LPR predominated across both sexes, with minor variations in the distribution of other diagnoses between male and female patients.

Table 2: Distribution of Diagnoses by Sex

Diagnosis	Sex	
	Male (%)	Female (%)
LPR	19 (48.7)	32 (52.5)
C.Pharyngitis	16 (41)	21 (34.4)
Globus	04 (10.3)	08 (13.1)

Table 3 illustrates the distribution of diagnoses across different age groups. Laryngopharyngeal reflux (LPR) was most frequently observed in the 31–40 years age group 23 (45.1%), followed by 21– 30 years 16 (31.4%) and 41–50 years 9 (17.6%). Chronic pharyngitis was predominantly seen in younger patients, with more than half of the cases occurring in the 10–20 years age group 20 (54.1%), and a substantial proportion in the 21–30 years age group 16 (43.2%). In contrast, globus was more commonly diagnosed in middle-aged and older patients, particularly in the 41–50 years age group 4 (33.3%), followed by 31–40 years and 51–60 years 3 (25%). Overall, the table indicates a distinct age-related pattern of diagnoses, with chronic pharyngitis affecting mainly younger individuals, LPR being most prevalent among young to middle-aged adults, and globus occurring more frequently in middle to older age groups.

Table 3: Distribution of Diagnoses by Age

Age	Diagnosis		
	LPR (%)	C.Pharyngitis (%)	Globus (%)
10-20	0	20 (54.1)	0
21-30	16 (31.4)	16 (43.2)	0
31-40	23 (45.1)	01 (2.7)	03 (25)
41-50	09 (17.6)	0	04 (33.3)
51-60	02 (3.9)	0	03 (25)
61-70	01 (2)	0	01 (8.3)
71-80	0	0	01 (8.3)

Discussion

Globus pharyngeus is a commonly encountered clinical symptom characterized by a persistent or intermittent sensation of a lump or foreign body in the throat in the absence of any structural abnormality. Although the condition is generally benign, it often causes significant anxiety among patients and leads to frequent consultations in otorhinolaryngology clinics.[27] The present cross-sectional study was conducted at the outpatient department of a tertiary-level hospital to evaluate the demographic characteristics and associated clinical conditions among patients presenting with throat discomfort and globus-related symptoms.[28]

In the current study, a total of 100 patients were evaluated. The demographic analysis demonstrated a clear female predominance, with females accounting for 61% of the study population compared to 39% males. This finding is consistent with several previous studies that reported a higher prevalence of globus sensation and related throat symptoms among females.[29] The female predominance may be explained by multiple factors, including hormonal influences, psychological stress, and differences in health-seeking behavior. Additionally, psychological components such as anxiety, emotional stress, and somatic symptom perception are known to be more frequently reported among female patients, which may contribute to the increased reporting of globus-related symptoms.[30]

Age distribution analysis revealed that the majority of patients belonged to the young and middle-aged groups, particularly between 21-30 years and 31-40 years. These two age groups together represented the largest proportion of the study population. This observation suggests that throat-related symptoms and reflux-associated disorders are more prevalent among individuals in their active and productive years.[15] Lifestyle factors such as irregular eating habits, occupational stress, increased consumption of spicy foods, smoking, and caffeine intake may play an important role in the development of reflux-related throat symptoms in these age groups.

Regarding the pattern of diagnosis, laryngopharyngeal reflux (LPR) was found to be the most common clinical condition among the study participants. Nearly half of both male and female patients were diagnosed with LPR, making it the predominant etiology of throat discomfort in this study population. This finding strongly supports the growing body of evidence suggesting that reflux-related disorders are a major contributing factor in patients presenting with globus-like symptoms. Reflux of gastric contents into the laryngopharyngeal region may lead to mucosal irritation, inflammation, and increased sensitivity of the pharyngeal structures, ultimately producing the sensation of the lump in the throat.

Chronic pharyngitis was identified as the second most common diagnosis among the patients. Chronic inflammatory changes of the pharynx. Chronic inflammatory changes of the pharyngeal mucosa may

result from repeated exposure to irritants such as dust, smoke, environmental pollutants, and chemical fumes. Lifestyle habits including smoking, alcohol consumption, and frequent intake of hot or spicy foods may further aggravate pharyngeal irritation.[16] The persistent inflammation and mucosal hypersensitivity associated with chronic pharyngitis may mimic or contribute to globus sensation, making differential diagnosis clinically important.

Interestingly, globus pharyngeus itself constituted a relatively smaller proportion of the diagnosis compared to LPR and chronic pharyngitis. However, the condition was slightly more prevalent among female patients than male patients.[28] This observation suggests that a significant proportion of patients presenting with globus-like symptoms may actually have identifiable underlying conditions rather than true idiopathic globus pharyngeus. Therefore, careful evaluation is necessary to identify possible etiological factors before labelling a patient as having primary globus pharyngeus.

Age-wise analysis of the diagnosis revealed distinct patterns. Chronic pharyngitis was predominantly observed in younger individuals, particularly those in the 10-20-year-old age group. This may be related to increased susceptibility to upper respiratory infections, environmental exposures, and lifestyle habits in younger populations. In contrast, laryngopharyngeal reflux was more commonly observed among patients in the 31-40 years age group, which may reflect the cumulative effect of dietary habits, occupational stress, and gastroesophageal reflux mechanisms that become more prominent with age.

Globus pharyngeus was more frequently diagnosed among middle-aged and older individuals, particularly those in the 41-50 years age group. This finding may indicate that structural, functional, or psychosomatic factors become more prominent contributors to globus sensation in later decades of life. Age-related changes in esophageal motility, upper esophageal sphincter function, and increased prevalence of thyroid abnormalities may also play a role.

The findings of the present study highlight the multifactorial nature of globus sensation. Although the symptoms are often benign, they may arise from a variety of underlying conditions including reflux disease, chronic inflammatory disorders of the pharynx, abnormalities of the upper esophageal sphincter, thyroid disease, and psychological stress. Therefore, a comprehensive clinical evaluation is essential in patients presenting with globus symptoms. Careful history taking, thorough head and neck examination, and appropriate investigations such as fiber-optic laryngoscopy and reflux assessment tools may help in identifying the underlying cause and guiding appropriate management.

Overall, the present study emphasizes the importance of considering reflux-related disorders and chronic inflammatory conditions in the differential diagnosis of globus sensation. Early identification and management of these underlying conditions may improve patient outcomes and reduce unnecessary anxiety associated with the symptoms.

Conclusion

Globus pharygeus is a common benign clinical condition frequently encountered in tertiary care OPD settings. Though its etiology remains uncertain, there is no standard protocol for its diagnosis and management. It predominantly affects young to middle-aged individuals, with a slight female predominance. Laryngopharyngeal reflux appears to be the most significant associated condition, followed by chronic pharyngitis. Accurate diagnosis requires detailed history taking, thorough ENT examination, and selective use of investigations such as fiberoptic laryngoscopy and reflux symptom scoring, which are essential as a first step in managing globus. Reassurance remains a cornerstone of management, as the condition is generally non-malignant.

References

1. Harar RP, Kumar S, Saeed MA, Gatland DJ. Management of globus pharyngeus: review of 699 cases. J Laryngol Otol. 2004; 118(1): 522–527.
2. Purcell J. A treatise of vapours or hysteric fits. 2nd ed. London: Edward Place; 1707. 72–74.
3. Malcomson KG. Globus hystericus vel pharyngis (a recommaissance of proximal vagal modalities) J Laryngol Otol. 1968; 82(3): 219–230.
4. Koufman JA. The otolaryngologic manifestations of gastroesophageal reflux disease (GERD): a clinical investigation of 225 patients using ambulatory 24-hour pH monitoring and an experimental investigation of the role of acid and pepsin in the development of laryngeal injury. Laryngoscope. 1991; 53(1): 1–78.
5. Smit CF, van Leeuwen JA, Mathus-Vliegen LM, Devriese PP, Semin A, Tan J, Schouwenburg PF. Gastropharyngeal and gastroesophageal reflux in globus and hoarseness. Arch Otolaryngol Head Neck Surg. 2000; 126(7): 827–830.

6. Sinn DH, Kim JH, Kim S, Son HJ, Kim JJ, Rhee JC, Rhee PL. Response rate and predictors of response in a short-term empirical trial of high-dose rabeprazole in patients with globus. Aliment Pharmacol Ther. 2008; 27(12): 1275–1281.
7. Tokashiki R, Yamaguchi H, Nakamura K, Suzuki M. Globus sensation caused by gastroesophageal reflux disease. Auris Nasus Larynx. 2002; 29(4): 347–351.
8. Rowley H, O'Dwyer TP, Jones AS, Timon CI. The natural history of globus pharyngeus. Laryngoscope. 1995; 105(10): 1118–1121.
9. Timon C, O'Dwyer T, Cagney D, Walsh M. Globus pharyngeus: long-term follow-up and prognostic factors. Ann Otol Rhinol Laryngol. 1991; 100(5): 351–354.
10. Cho YS, Choi MG, Jeong JJ, Chung WC, Lee IS, Kim SW, Han SW, Choi KY, Chung IS. Prevalence and clinical spectrum of gastroesophageal reflux: a population-based study in Asan-si, Korea. Am J Gastroenterol. 2005; 100(4): 747–753.
11. Park KH, Choi SM, Kwon SU, Yoon SW, Kim SU. Diagnosis of laryngopharyngeal reflux among globus patients. Otolaryngol Head Neck Surg. 2006; 134(1): 81–85.
12. Remacle M. The diagnosis and management of globus: a perspective from Belgium. Curr Opin Otolaryngol Head Neck Surg. 2008; 16(6): 511–515.
13. Baek CH, Chung MK, Choi JY, So YK, Son YI, Jeong HS. Role of salivary function in patients with globus pharyngeus. Head Neck. 2010; 32(2): 244–252.
14. Koufman J, Sataloff RT, Toohill R. Laryngopharyngeal reflux: consensus conference report. J Voice. 1996; 10(3): 215–216.
15. Ford CN. Evaluation and management of laryngo-pharyngeal reflux. JAMA. 2005; 294(12): 1534–1540.
16. Tokashiki R, Funato N, Suzuki M. Globus sensation and increased upper esophageal sphincter pressure with distal esophageal acid perfusion. Eur Arch Otorhinolaryngol. 2010; 267(5): 737–741.
17. Koufman J, Sataloff RT, Toohill R. Laryngopharyngeal reflux: consensus conference report. J Voice. 1996; 10(3): 215–216.
18. Wilson JA, Pryde A, Piris J, Allan PL, Macintyre CC, Maran AG, Heading RC. Pharyngo-esophageal dysmotility in globus sensation. Arch Otolaryngol Head Neck Surg. 1989; 115(9): 1086-1090.
19. Mamede RC, De Mello-Filho FV, Dantas RO. Severe hypertrophy of the base of the tongue in adults. Otolaryngol Head Neck Surg. 2004; 131(9): 378–382.
20. Burns P, Timon C. Thyroid pathology and the globus symptom: are they related? A two year prospective trial. J Laryngol Otol. 2007; 121(3): 242–245.
21. Lee JW, Song CW, Kang CD, Hur BW, Jeen YT, Jeon HJ, Lee HS, Lee SW, Um SH, Choi JH, et al. Pharyngoesophageal motility in patients with globus sensation. Korean J Gastroenterol. 2000; 36(1): 1–9.
22. Batch AJ. Globus pharyngeus: (Part II), Discussion. J Laryngol Otol. 1988; 102(3): 227–230.
23. Wareing M, Elias A, Mitchell D. Management of globus sensation by the speech therapist. Logoped Phoniatr Vocol. 1997; 22(1): 39–42.
24. Deary IJ, Wilson JA, Kelly SW. Globus pharyngis, personality, and psychological distress in the general population. Psychosomatics. 1995; 36(6): 570–577.
25. Harris MB, Deary IJ, Wilson JA. Life events and difficulties in relation to the onset of globus pharyngis. J Psychosom Res. 1996; 40(6): 603-615.
26. Thompson WG, Heaton KW. Heartburn and globus in apparently healthy people. Can Med Assoc J. 1982; 126(1): 46-48.
27. Hill J, Stuart RC, Fung HK, Ng EK, Cheung FM, Chung CS, van Hasselt CA. Gastroesophageal reflux, motility disorders, and psychological profiles in the etiology of globus pharyngis. Laryngoscope. 1997; 107(10): 1373–1377.
28. Koufman JA, Amin MR, Panetti M. Prevalence of reflux in 113 consecutive patients with laryngeal and voice disorders. Otolaryngol Head Neck Surg. 2000; 123(4): 385–388.
29. Chevalier JM, Brossard E, Monnier P. Globus sensation and gastroesophageal reflux. Eur Arch Otorhinolaryngol. 2003; 260(5): 273–276.
30. Oridate N, Nishizawa N, Fukuda S. The diagnosis and management of globus: a perspective from Japan. Curr Opin Otolaryngol Head Neck Surg. 2008; 16(6): 498–502.

Case Report

Langerhans Cell Histiocytosis In Lumbar Spine - A Rare Case Report

Shahidul Islam[1], Ferdous Ara Banu[2], Md. Hasan[3], Fatima Sultana[4], Wayez Mahbub[5], Merina Tanzil[6], Warde Jannat[7], Shammin Mahjabin[8]

Abstract

Background: Langerhans cell histiocytosis (LCH) is an inflammatory myeloid neoplasia caused by mutations in the MAP kinase (MAPK) pathway. It is a rare disorder that can damage tissue or cause lesions in various parts of the body. The disease arises from LCH cells—a type of dendritic white blood cell involved in immune defense.

Objective: To present a rare case of LCH in the lumbar spine for academic discussion.

Methods: This case report was conducted in the Department of Orthopedics and Spine Surgery at Ibn Sina Hospital, Dhanmondi, Dhaka, from October, 2021 to October, 2024. An 11-year-old boy presented with low back pain, bilateral sciatica, weakness of both lower limbs, and inability to walk. Imaging studies, including X-ray, CT scan, and MRI, revealed a solitary osteolytic lesion in the L2 vertebral body, with moderate contrast enhancement on MRI. L2 corpectomy and interbody fusion were performed using a titanium mesh cage with bone grafting. Posterior stabilization was achieved with titanium pedicle screws and rods. Postoperatively, the patient's back pain resolved, and neurological function improved within 2–3 days, allowing ambulation with support. Histopathological analysis confirmed the diagnosis of LCH. No postoperative radiotherapy was administered.

Result: At 10-month follow-up, no local recurrence was observed. Implants and screws were removed. Mesh cage was left in situ. At 3-year follow-up, there was still no recurrence.

Conclusion: In case of lumbar spine LCH, surgery should be considered for neurological deficits or uncertain histological diagnoses. En bloc vertebral resection can alleviate symptoms and prevent local recurrence.

Keywords: Langerhans Cell Histiocytosis; Lumbar Spine; Vertebral Lesion; Histiocytosis; Osteolytic Lesion; Spine Surgery.

1. Professor and Head, Department of Orthopedics and Spine Surgery, Ad-din Women's Medical College, 2, Bara Moghbazar, Dhaka
2. Chief Consultant, Department of Obstetrics and Gynaecology, KB Square Level-5, Barak PRP Medical Centre 736, Sat Masjid Road, Dhaka
3. Associate Professor, Department of Orthopedics and Traumatology, Holy Family Red Crescent Medical College Hospital, 1, Eskatan Garden Road, Dhaka
4. Consultant, Department of Orthopedics and Spine Surgery, Barak PRP Medical Centre, KB Square Level-5, 736, Sat Masjid Road, Dhaka
5. Assistant Professor, Department of Orthopedics and Spine Surgery, Ad-din Women's Medical College, 2, Bara Moghbazar, Dhaka
6. Medical Officer, Department of Orthopedics and Spine Surgery, Barak PRP Medical Centre, KB Square Level-5, 736, Sat Masjid Road, Dhaka
7. Medical Officer, Department of Orthopedics and Spine Surgery, Barak PRP Medical Centre, KB Square Level-5, 736, Sat Masjid Road, Dhaka
8. Medical Officer, Department of Orthopedics and Spine Surgery, Ad-din Women's Medical College, 2, Bara Moghbazar, Dhaka

Correspondence: Dr. Shahidul Islam, Professor and Head, Department of Orthopedics and Spine Surgery, Ad-din Women's Medical College, 2, Bara Moghbazar, Dhaka. Email: drshahid34rmc@gmail.com, Mobile: +8801715111496

Received Date: 01 September, 2025

Accepted Date: 15 September, 2025

Introduction

Langerhans cell histiocytosis (LCH) is a rare proliferative disease originating from dendritic cell family.[1] This disease was named after Paul Langerhans in 1868, after he discovered the epidermal dendritic cells.[2] LCH mainly affects children, mostly in the age range of 1-5 years.[3] The estimated incidence is 1/20000 per year with a male predominance (M:F ratio 2:1).[4] The most common finding of LCH is osseous lesions, with approximately 60% of the patients having one or more lytic osseous lesion, although it can involve multiple systems.[1,5] Skeletal LCH usually affects the skull and femur. In rare cases, it can affect the spine, which eventually results in back pain, radiculopathy, or neurological deficits. Currently, there is no standard treatment protocol for spinal LCH.[1] We report a case of

LCH at L_2 vertebrae, which we treated by L_2 corpectomy. The aim of the study is to present a rare case of Langerhans Cell Histiocytosis (LCH) for academic purposes.

Materials and Methods

This observational study was conducted in the Department of Orthopedics and Spine Surgery in Ibn Sina Hospital, Dhanmondi, Dhaka, over the period of two months from October 2021 to November 2024.

Case Report

An 11-year-old boy, hailing from Thakurgaon, presented to us with complaints of low back pain with bilateral sciatica. The patient developed paraparesis and couldn't walk for the last 15 days. On physical examination, muscle power was grade III. Then he underwent surgery after necessary investigations.

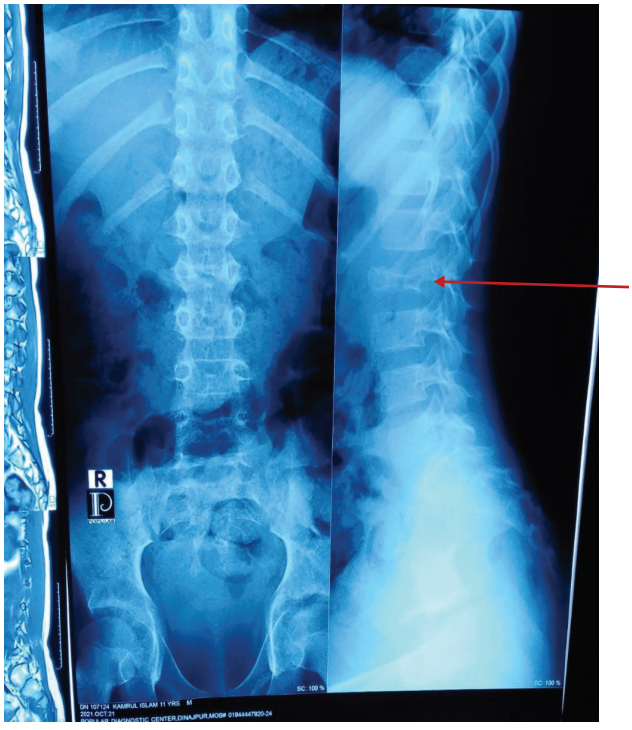


Figure 1: X-Ray of lumbosacral spine revealed vertebra plana of L_2

Vertebra plana is characterized by near-complete collapse and flattening of a vertebral body, with almost total loss of its height. One of the major causes of vertebra plana in children is Langerhans cell histiocytosis.

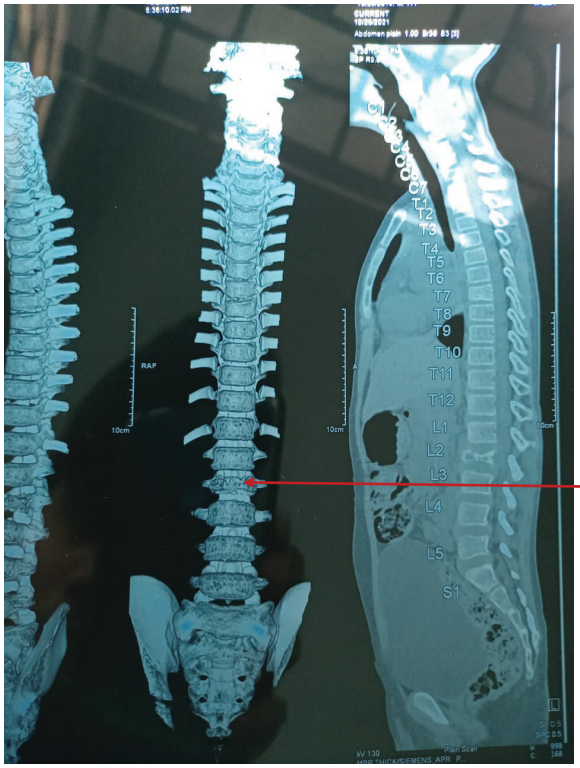


Figure 2: CT scan of whole spine shows solitary osteolytic lesion

Solitary osteolytic lesion affecting L_2 vertebral body, with marked vertebral body destruction/collapse (vertebra plana) and no additional spinal lesions identified.

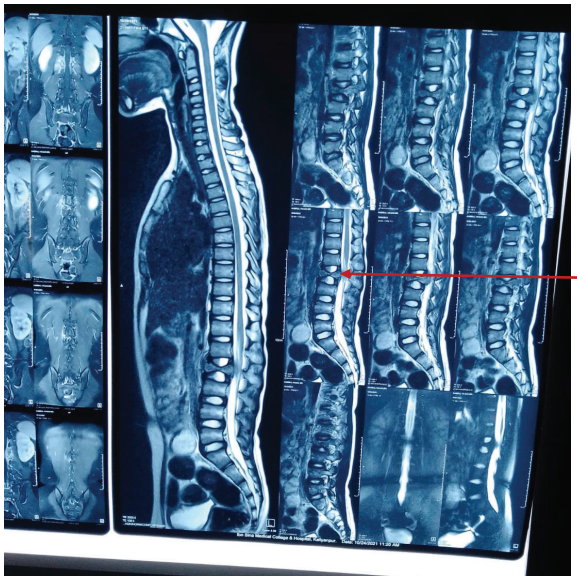
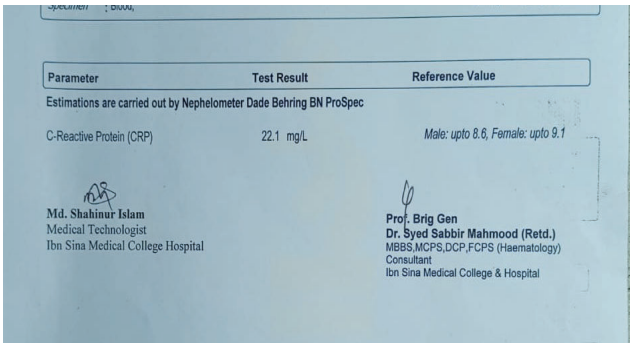


Figure 3: MRI of Spine

MRI revealed vertebra plana of the L2 vertebral body with retropulsion into the spinal canal, causing compression of the thecal sac and cauda equina.



Parameter	Test Result	Reference Value
Estimations are carried out by Nephelometer Dade Behring BN ProSpec		
C-Reactive Protein (CRP)	22.1 mg/L	Male: upto 8.6, Female: upto 9.1

Md. Shahinur Islam
Medical Technologist
Ibn Sina Medical College Hospital

Prof. Brig Gen
Dr. Syed Sabbir Mahmood (Retd.)
MBBS,MCPS,DCP,FCPS (Haematology)
Consultant
Ibn Sina Medical College & Hospital

Figure 4: Patient's CRP was elevated (22.1 mg/dL), indicating inflammation.

The patient underwent L2 corpectomy followed by anterior column reconstruction using a titanium mesh cage packed with autologous bone graft. Posterior stabilization was achieved with titanium pedicle screws and rods.

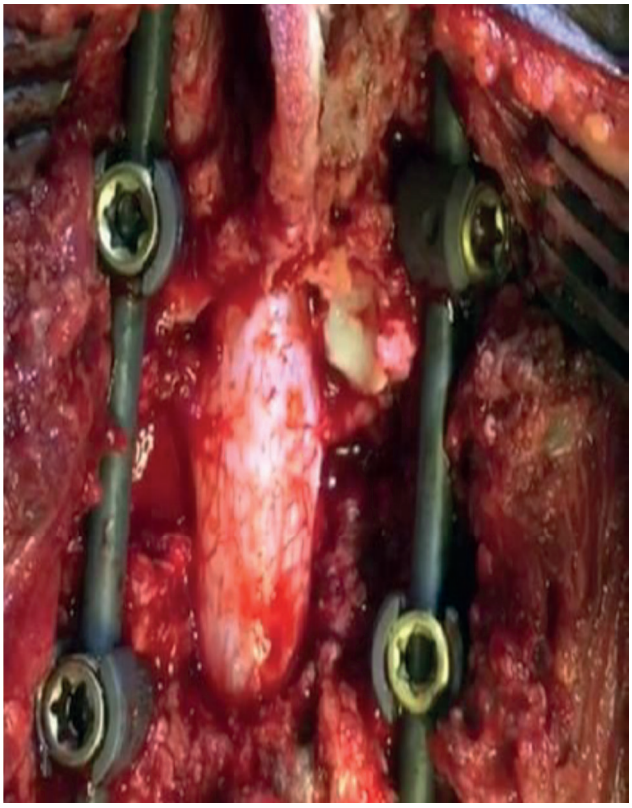


Figure 5: Intraoperative photograph

The photograph is showing posterior spinal instrumentation with titanium pedicle screws and rods following L2 corpectomy. The vertebral defect is reconstructed using a titanium mesh cage filled with bone graft.

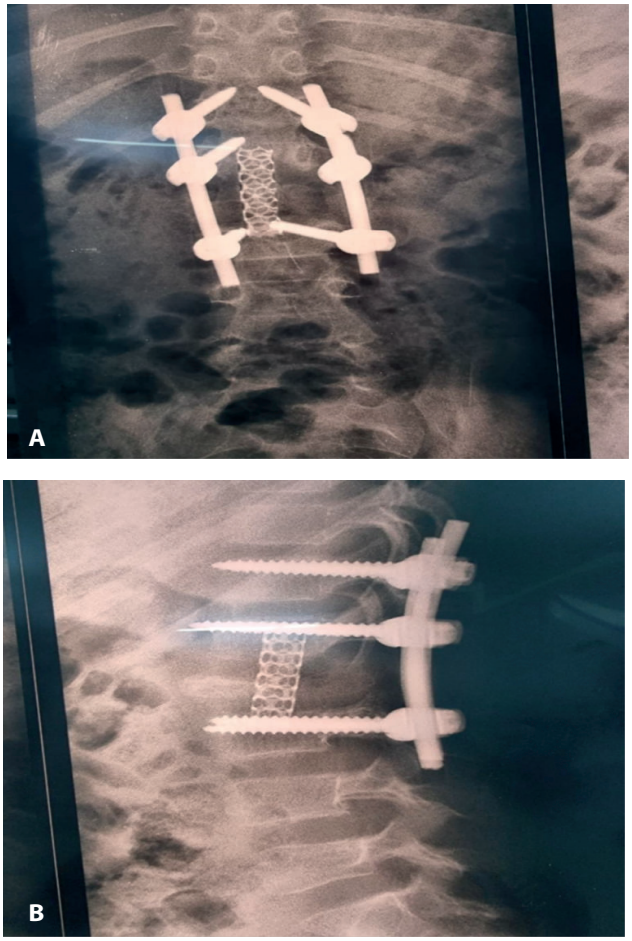


Figure 6: Postoperative anteroposterior (A) and lateral (B) radiographs

It is demonstrating successful reconstruction following L2 corpectomy. Anterior column reconstruction was performed using a titanium mesh cage packed with autologous bone graft, and posterior stabilization was achieved with titanium pedicle screws and rods. The spinal alignment and implant position are satisfactory.



Figure 7: The patient is walking with support

The postoperative course was uneventful. The patient was able to ambulate with support on postoperative day 2. At the 1-year follow-up, the patient had returned to school and was able to ride a bicycle without difficulty.

Discussion

LCH is a rare disease resulting from clonal proliferation of immunophenotypical and functionally immature LCH cells, eosinophils, macrophages, lymphocytes as well, sometimes from multinucleated giant cells.[6] Although the exact etiology is not known yet, it is reported that LCH might be an inflammatory disease and is caused by dysregulation of inflammatory cytokines, eg. interleukin-17.[7] According to a study, more than 50% of LCH cases carry activating mutations in BRAF, and 10% to 28% carry activating mutations of MAP2K1, encoding MEK1.[8]

Langerhans cell histiocytosis, formerly known as histiocytosis X, has three different manifestations: Letterer–Siwe disease, Hand-Schüller-Christian disease, and Eosinophilic Granloma.[9] Among these three clinical subtypes, eosinophilic granuloma involves only bone or lung, having the most favorable outcome with or without local treatment. Almost 80% of LCH lesions in children are of EG type.[10] Hand-Schüller-Christian disease is seen in children over 2-3 years, affects multiple organs, and is often associated with diabetes insipidus, bone gaps, and exophthalmos.[3] Letterer–Siwe disease is clinically rare with poor prognosis.[11] Usually, Letterer–Siwe disease occurs in infants less than 2 years old presenting with fever, skin rash, anemia, hepatosplenomegaly, lymphadenopathy, and bleeding diathesis.[12]

LCH mainly affects children, mostly in the age range of 1-5 years.[3] The estimated incidence is 1/20000 per year with a male predominance (M:F ratio 2:1).[4] This disease can affect any organ of the body, but the skeleton is mostly affected (80%), followed by the skin (33%) and the pituitary (25%). Other organs can also be involved i.e. the liver, spleen, the hematopoietic system and the lungs (15% each), lymph nodes (5–10%), and the central nervous system except for the pituitary (2–4%).[13] In skeletal LCH, the flat bones, the spine, and the long bones are mainly affected.[14] Most frequently involved sites of the skeleton are the skull (26%), vertebrae (7%), ribs (12%), upper and lower jaw (9%), and bones of extremities (11%). In case of spinal LCH, mainly the vertebral bodies are involved, having a predilection for the thoracic spine (54%), followed by the lumbar (35%) and cervical spine (11%).[15] In our patient, L_2 vertebral body was involved. Radiological investigations including plain X-ray, CT scan and MRI revealed vertebra plana and a solitary osteolytic lesion on the L_2 vertebral body, which is compressing the spinal cord.

Radiological investigations identify an osseous lesion but are unable to differentiate between LCH and other osteolytic lesions. A definitive diagnosis is possible by histopathological study of the biopsy.[6] A definitive diagnosis can be made by using CT or C-arm-guided percutaneous needle biopsy in 82-90% of cases. Yet a considerable number of cases cannot be diagnosed accurately in needle biopsy. The reason might be either an inadequate tissue sample obtained in needle biopsy or a lack of typical cellular findings in histological study.[1]

The differential diagnosis of a lytic medullary bone lesion includes non-ossifying fibromas, bone cysts, or osteomyelitis, but also includes malignant tumors, such as metastases, Ewing sarcoma, and lymphoma.[6]

Currently, there are no universally accepted international guidelines available for the diagnosis and treatment of LCH patients. Treatment is usually based on site and extension of the disease.[16] A variety of treatment modalities for spinal LCH have been reported, including conservative management, intralesional steroid injection, radiation therapy, chemotherapy, and curettage with or without reconstructive surgery.[17] Conservative treatment options, such as observation, bracing or immobilization, seem to have a positive impact on the outcome, especially in paediatric patients without neurologic deficit.[18] If there is a solitary bone lesion, neurological involvement, or uncertain histological diagnosis on biopsy, surgical intervention should be considered.[1] Radiation therapy yields a potential risk of developing malignancy in children, but it appears to be safe and effective in adult patients with progressive spinal lesions or neurological impairment.[16] Regarding chemotherapy, prednisolone and vinblastine are preferred by some clinicians.[19] In our case, the patient underwent L_2 corpectomy, where interbody fusion was done by Titanium mesh cage, with bone grafting and stabilization done with titanium pedicle screw & rods through a posterior approach. His low back pain disappeared just after the operation & neurological status was improved after 2/3 days of operation & patient was able to walk with support. A precise diagnosis of LCH was established after a thorough histological study of the removed vertebra. No radiotherapy was given postoperatively.

The prognosis depends on various factors such as the patient, disease, and therapy-related factors. Patients with single-system disease have a better prognosis than

that of multisystem disease.[3] Localized LCH has a prognosis rate of almost 100%, whereas multisystem LCH shows a recurrence rate of ≤50%.[20] Our patient showed a good prognosis during follow-up after 3 years of treatment with no signs of recurrence.

Conclusion

For patients with spinal LCH, neurologic deficit is the main indication for operative treatment to alleviate suffering and prevent further complications. In our patient, low back pain disappeared just after the operation & neurological status was improved after 2/3 days of operation & patient was able to walk with support. LCH was diagnosed after histological study of the specimen. Patient showed satisfactory prognosis with no recurrence after 3 years.

References

1. Chen L, Chen Z, Wang Y. Langerhans cell histiocytosis at L5 vertebra treated with en bloc vertebral resection: a case report. World J Surg Oncol. 2018; 16: 1-6.
2. Langerhans P. Über die Nerven der menschlichen Haut. Arch Pathol Anat Physiol Klin Med. 1868; 44: 325-327.
3. Kouhen F, Benhmiddou N, Afif M, Rais F, Mahdi Y, Khannoussi B, et al. Adult Langerhans cell histiocytosis: a rare etiology of spinal cord compression. Open J Intern Med. 2015; 5(3): 21.
4. Robitaille N, Hume HA. Blood components and fractionated plasma products: preparation, indications and administration. In: Pediatric Hematology. 2006; 32: 691-723.
5. Howarth DM, Gilchrist GS, Mullan BP, Wiseman GA, Edmonson JH, Schomberg PJ. Langerhans cell histiocytosis: diagnosis, natural history, management, and outcome. Cancer. 1999; 85(10): 2278-2290.
6. Dhillon CS, Tantry R, Ega SR, Pophale C, Medagam NR, Chhasatia N. Langerhans cell histiocytosis in the adult lumbar spine: a case report and literature review. J Orthop Case Rep. 2020; 10(9): 28.
7. Badalian-Very G, Vergilio JA, Degar BA, MacConaill LE, Brandner B, Calicchio ML, et al. Recurrent BRAF mutations in Langerhans cell histiocytosis. Blood. 2010; 116(11) :1919-1923.
8. Rollins BJ. Genomic alterations in Langerhans cell histiocytosis. Hematol Oncol Clin North Am. 2015; 29(5): 839-851.
9. Garg S, Mehta S, Dormans JP. Langerhans cell histiocytosis of the spine in children: long-term follow-up. J Bone Joint Surg Am. 2004; 86(8): 1740-1750.
10. Azouz EM, Saigal G, Rodriguez MM, Podda A. Langerhans' cell histiocytosis: pathology, imaging and treatment of skeletal involvement. Pediatr Radiol. 2005; 35: 103-115.
11. Zhou HM, Zeng X, Chen QM. Clinical and pathologic features of Letterer-Siwe disease: a case report and review. West China J Stomatol. 2007; 25(5): 517-519.
12. Aboud MJ, Kadhim MM. Langerhans-cell histiocytosis (LCH): a presentation of two siblings with two different entities. Springerplus. 2015; 4: 351.
13. Haupt R, Minkov M, Astigarraga I, Schäfer E, Nanduri V, Jubran R, et al. Langerhans cell histiocytosis (LCH): guidelines for diagnosis, clinical work-up, and treatment for patients till the age of 18 years. Pediatr Blood Cancer. 2013; 60(2): 175-184.
14. Khung S, Budzik JF, Amzallag-Bellenger E, Lambilliotte A, Soto Ares G, Cotten A, et al. Skeletal involvement in Langerhans cell histiocytosis. Insights Imaging. 2013; 4: 569-579.
15. Kim MC, Sung SH, Cho Y. Langerhans cell histiocytosis of the thoracic spine in an adult. Korean J Spine. 2017; 14(3): 109.
16. Girschikofsky M, Arico M, Castillo D, Chu A, Doberauer C, Fichter J, et al. Management of adult patients with Langerhans cell histiocytosis: recommendations from an expert panel on behalf of Euro-Histio-Net. Orphanet J Rare Dis. 2013; 8: 72.
17. Hassan BW, Moon BJ, Kim YJ, Kim SD, Choi KY, Lee JK. Langerhans cell histiocytosis in the adult lumbar spine: case report. Springerplus. 2016; 5: 1-5.
18. Vielgut I, Liegl-Atzwanger B, Bratschitsch G, Leithner A, Radl R. Langerhans-cell histiocytosis of the cervical spine in an adult patient: case report and review of the literature. J Orthop. 2017; 14(2): 264-267.
19. Lim CS, Cho JH. Spinal epidural involvement in adult Langerhans cell histiocytosis (LCH): a case report. Medicine (Baltimore). 2020; 99(3): e18856.
20. Hashimoto K, Nishimura S, Sakata N, Inoue M, Sawada A, Akagi M. Treatment outcomes of Langerhans cell histiocytosis: a retrospective study. Medicina (Kaunas). 2021; 57(4): 356.

Review Article

Microplastic Pollution and Human Health: Emerging Evidence and Public Health Implications for Bangladesh

Farid Uddin Ahmed[1], Syeda Rumana Hoque[2]

Abstract

Microplastics are persistent plastic particles increasingly detected in water, air, soil, food, aquatic organisms and human biological samples. Exposure occurs mainly through ingestion and inhalation, with potentially greater occupational contact in textile production, plastic manufacture, recycling and waste handling. Experimental studies indicate biologically plausible effects involving oxidative stress, inflammation, epithelial-barrier dysfunction, mitochondrial injury, immune alteration and genotoxicity. Toxicity may also be influenced by plastic additives, adsorbed pollutants and microorganisms attached to particle surfaces. Microplastics have been reported in human stool, blood, placenta, breast milk and lung tissue, demonstrating gastrointestinal passage, inhalation and possible systemic distribution. However, human investigations are generally small and cross-sectional, and particle detection does not establish disease causation. Evidence concerning respiratory, gastrointestinal, cardiovascular, reproductive, neurological and metabolic outcomes remains largely experimental. Bangladesh may be vulnerable because of rapid urbanisation, inadequate waste management, industrial and textile activities, dense river networks and reliance on aquatic food resources. Local studies have documented contamination in urban lakes, major rivers, coastal environments, drinking-water systems and commonly consumed fish, but nationally representative exposure data and human biomonitoring are unavailable. Public-health priorities include reducing unnecessary plastic use, improving waste segregation and recycling, strengthening wastewater and industrial controls, protecting exposed workers and expanding laboratory and surveillance capacity. A precautionary response is justified, provided uncertain associations are not presented as confirmed human disease.

Keywords: Microplastics; Nanoplastics; Human exposure; Environmental health; Toxicity; Bangladesh.

Introduction

Plastic materials are indispensable in healthcare, food distribution, construction and consumer products, but their durability has created a persistent waste stream. By 2015, an estimated 8.3 billion metric tons of virgin plastic had been produced worldwide, generating about 6.3 billion metric tons of waste, most of which accumulated in landfills or the environment.[1] Weathering, ultraviolet radiation and mechanical abrasion progressively fragment discarded plastics into micro- and nanoplastics. WHO identifies food, water and air as important pathways of human exposure.[2]

Plastic particles have been reported in human blood, placenta and lung tissue, indicating that some may cross biological barriers or remain within internal compartments.[3,4,5] These findings demonstrate exposure rather than toxicity: studies are small, analytical methods differ and contamination control is not uniform. Experimental research supports oxidative, inflammatory and barrier-disrupting mechanisms, but evidence linking typical environmental exposure to specific human diseases remains incomplete.

1. Associate Professor, Department of Community Medicine & Public Health, Rangamati Medical College, Rangamati
2. Professor, Department of Community Medicine & Public Health, Ad-din Women's Medical College, Dhaka

Correspondence: Dr. Syeda Rumana Hoque, Professor, Department of Community Medicine & Public Health, Ad-din Women's Medical College, Dhaka. Phone: +8801711786792, Email: rumana729@yahoo.com

Received Date : 18 June 2026
Accepted Date : 20 June 2026

Bangladesh may face increased exposure because of rapid urbanisation, plastic consumption, textile activity, densely connected rivers and coastal ecosystems, inadequate waste segregation and limited wastewater treatment. Seasonal flooding and drainage congestion may further redistribute poorly managed plastic waste. Microplastics have been detected in fish from the northern Bay of Bengal, while a national action plan promotes reduction, reuse and recycling of plastics.[6,7] The medical significance of these environmental findings remains uncertain because local biomonitoring and longitudinal health studies are lacking. This narrative review summarises sources, exposure, biological effects and human-health evidence, with particular attention to Bangladesh and feasible public-health priorities.

Definition and Classification

Microplastics are generally described as solid, polymer-containing particles smaller than 5 mm, although definitions differ in their lower size boundary and treatment of semi-synthetic materials and additives.[8,9] For this review, microplastics are considered approximately 1 µm to less than 5 mm; smaller particles are termed nanoplastics, whose upper boundary varies between 100 and 1,000 nm.[10]

Primary microplastics are manufactured at small dimensions, such as industrial pellets and microbeads, whereas secondary particles arise from fragmentation of larger products. They occur as fibres, fragments, films, foams, beads and pellets and include polyethylene, polypropylene, polystyrene, polyethylene terephthalate, polyamide and polyvinyl chloride. Size, shape, density, surface charge, weathering and polymer composition influence transport, contaminant adsorption and biological uptake.

Sources and Environmental Distribution

Major sources include degradation of packaging, bottles, bags, paints, construction materials, fishing equipment, agricultural films and healthcare waste. Synthetic textiles release fibres during manufacture, use and laundering, with emission varying by fabric construction, detergent, temperature and washing conditions.[11] Tyre and road wear contributes polymer-containing particles to dust, runoff and drainage networks, particularly in densely trafficked urban areas.[12]

Municipal and industrial wastewater receives particles from households, laundries, surface drainage and plastic-processing facilities. Treatment plants retain many larger particles through screening, settling and sludge separation but do not achieve complete removal, leaving smaller particles in treated effluent.[13] Airborne synthetic fibres have also been documented in urban and suburban fallout, showing that atmospheric transport can redistribute particles beyond their original source.[14]

Microplastics have been reported in tap water, beer, salt, fish and bivalves intended for consumption.[15,16] Particles retained in sewage sludge may enter terrestrial systems through disposal or agricultural application, and repeated application can increase accumulation in soil.[17] After release, particles move between air, water, soil and sediment through runoff, river flow, deposition, settling and resuspension. Such detection confirms environmental and food-chain contamination but does not quantify human retention or health risk. Distribution depends on particle size, density, weathering and biological growth, while evidence for long-term biomagnification remains inconsistent.

Human Exposure and Biological Fate

Ingestion and inhalation are the principal exposure routes. Dietary contact may occur through water, seafood, salt, food processing and plastic packaging; airborne fibres arise from textiles, furnishings, industry and outdoor dust. Indoor environments may be important because people spend prolonged periods near synthetic fabrics and settled dust. Occupational exposure may be greater in textile production, plastic manufacture, recycling and waste handling. Infants, children and pregnant women warrant research attention because of life-stage susceptibility, although increased clinical risk has not been established. Penetration through intact skin remains insufficiently demonstrated.[2]

Microplastics detected in human stool confirm ingestion and gastrointestinal passage, not tissue absorption or toxicity.[18] Lung-tissue findings support inhalation and retention but do not define exposure duration or clinical effects.[5] Larger particles are expected mainly to remain in the gut and be excreted, whereas smaller particles may interact with mucus and epithelial cells or cross barriers through endocytosis, specialised intestinal cells or disrupted junctions. These mechanisms are derived primarily from experimental models.

In vitro uptake of 1-10 µm polystyrene particles was limited, and a related 28-day mouse experiment did not show detectable tissue injury under the selected conditions.[19] This illustrates that uptake does not

inevitably produce measurable damage. Particles crossing respiratory or intestinal barriers may enter blood or lymph; human blood and placental findings indicate systemic availability and maternal-interface exposure but do not prove fetal transfer or harm.[3,4] Biological fate is likely to vary with particle size, shape, surface chemistry and interaction with proteins or lipids. Clearance may occur through faecal elimination, mucociliary transport and immune-cell removal, while long-term human residence and accumulation remain uncertain.

Mechanisms of Potential Toxicity

Potential toxicity depends on particle size, shape, polymer, surface properties, weathering and associated chemicals. Smaller particles have greater surface area relative to mass and may interact more readily with cells. Proposed effects include generation of reactive oxygen species, lipid and protein damage, mitochondrial dysfunction, inflammatory signalling, epithelial-barrier disruption, immune alteration, apoptosis and indirect genotoxicity.[20,21]

Plastic additives, including bisphenols, phthalates, flame retardants and stabilisers, may leach from polymers and contribute effects distinct from the particle itself.[22] Weathered particles can also adsorb metals, persistent organic pollutants and microorganisms, creating a combined exposure to particles, plastic-associated chemicals and environmental contaminants.[23] Some additives interfere with hormone synthesis, transport or receptor signalling, but endocrine effects cannot automatically be attributed to microplastics alone.[24] Biofilms formed on particle surfaces may additionally alter transport and biological interactions. Adsorption, however, does not guarantee release or uptake within the body.

Interpretation requires caution because many studies use pristine spherical polystyrene, high concentrations and short exposure periods that do not represent heterogeneous, aged environmental mixtures. Differences in particle preparation, dose expression, contamination control and experimental species further limit comparison. Current evidence supports biological plausibility, particularly oxidative stress, inflammation and barrier dysfunction, but does not establish that these mechanisms consistently cause clinical disease at typical human exposure levels.

Potential Effects on Human Health

Respiratory Effects

Airborne particles may deposit from the upper airway to the alveoli according to aerodynamic size and shape. Lung-tissue detection confirms that some particles are retained[5]. Experimental studies describe epithelial injury, oxidative stress and cytokine release, and elongated fibres may be more difficult for macrophages to clear than compact fragments. Historical occupational observations in synthetic-fibre industries raise concern about high exposures, but these settings differ markedly from ordinary community exposure. Population-level evidence linking routine exposure with asthma, chronic obstructive pulmonary disease, impaired lung function or fibrosis remains insufficient.

Cardiovascular Effects

Proposed cardiovascular pathways include endothelial injury, oxidative stress, vascular inflammation and altered platelet or lipid activity. In patients undergoing carotid endarterectomy, micro- and nanoplastics detected in plaques were associated with a higher incidence of myocardial infarction, stroke or death during follow-up.[25] The study involved patients with established vascular disease and may be affected by residual confounding and measurement uncertainty. It is important emerging human evidence, but it does not prove that particles independently initiate atherosclerosis in the general population.

Gastrointestinal and Hepatic Effects

Ingested particles encounter intestinal mucus, microbiota and epithelium. Experimental findings include altered tight-junction proteins, permeability, inflammation and microbial composition, although other models show limited uptake without injury.[19,21] In mice, polystyrene exposure disrupted the intestinal barrier and bile-acid metabolism through a proposed gut-liver pathway.[26] Human evidence is largely limited to particle detection in stool and selected tissues. Direct translation to inflammatory bowel, metabolic or liver disease is not justified because dose, duration and environmental particle mixtures differ.

Reproductive, Endocrine and Developmental Effects

Placental, breast-milk and reproductive-tissue findings indicate exposure during sensitive life stages, but human studies are small and cross-sectional and rarely measure clinical outcomes. In mice, chronic polystyrene exposure has been associated with impaired spermatogenesis and testosterone production, while female exposure produced ovarian inflammation, reduced follicle numbers and impaired oocyte maturation.[27,28] Developmental concern is strengthened by the potential for longer lifetime exposure in children, although fetal

transfer and paediatric effects remain uncertain. Endocrine effects may reflect the particle, associated additives or both; experimental reproductive toxicity cannot yet be extrapolated to ordinary human exposure.

Neurological, Immune and Carcinogenic Concerns

Experimental evidence suggests possible neuroinflammation, blood-brain-barrier disturbance and microbiota-gut-brain effects. A chronic mouse study reported learning and memory changes with hippocampal inflammation, although subsequent correction of part of the report reinforces the need for caution.[29] Human evidence linking exposure to cognitive, neurodevelopmental or neurodegenerative disorders remains extremely limited. Microplastics can also activate macrophages, cytokine signalling and other immune pathways in experimental systems, but circulating particles have not been shown to cause immune or haematological disease. Mechanisms relevant to carcinogenesis include persistent inflammation, oxidative DNA damage and exposure to carcinogenic additives or adsorbed pollutants; however, environmental microplastic exposure has not been established as a direct cause of human cancer.[20,22,23]

Human Biomonitoring

Microplastics have been reported in stool, blood, placenta and lung tissue, supporting ingestion, inhalation and possible systemic distribution.[3,4,5,18] Maternal and infant investigations have identified particles in breast milk, placentas, meconium, infant faeces and formula.[30,31] Other studies detected polymers in cirrhotic liver tissue and particles in testicular tissue and semen.[32,33] None establishes that microplastics caused organ dysfunction or adverse development.

Interpretation is constrained by small samples and non-standardised collection, digestion, filtration and analytical thresholds. Fourier-transform infrared and Raman spectroscopy characterise individual particles, whereas pyrolysis-gas chromatography-mass spectrometry estimates polymer mass without preserving morphology. Laboratory air, clothing, gloves and containers can contaminate samples, requiring procedural blanks, filtered reagents and transparent detection limits. Nanoplastics remain especially difficult to measure. Biomonitoring therefore confirms internal exposure but cannot yet provide clinical reference ranges, individual risk estimates or diagnostic thresholds.

Microplastic Pollution in Bangladesh

Bangladesh research is concentrated in aquatic environments. Reviews identify municipal waste leakage, urban drainage, industrial and textile activity, fishing materials and wastewater as likely sources to rivers, lakes, coastal waters and sediments.[34,35] The large ready-made garment sector may contribute synthetic fibres through production and wastewater, although national emission estimates are unavailable. Monsoon runoff, flooding and interconnected waterways may transport particles between urban, agricultural and coastal environments. These data confirm contamination but do not provide a national estimate of human exposure or disease burden.

Microplastics have been detected in water, sediment and fish from major Dhaka lakes, with polyethylene, polypropylene, polyvinyl chloride and polycarbonate among reported polymers.[36] Buriganga River studies found particles in water, sediment, fish, crabs and snails, with some particles carrying metals and metalloids.[37] A multi-compartment study of the Karnaphuli River similarly documented contamination in surface water, sediment and aquatic organisms, while marine fish from the northern Bay of Bengal contained microplastics.[6,38]

Potential dietary pathways are supported by findings in commercial freshwater fish and commonly consumed dried marine fish, where fibres were frequently observed.[39,40] These studies do not quantify absorption by consumers, and particles confined to the gastrointestinal tract may be removed during preparation. In Dhaka, three major drinking-water treatment plants removed approximately 98-99% of particles in the measured 20 µm to less than 5 mm range, although smaller particles and nanoplastics were not assessed.[41]

The 2021 national action plan promotes reduction, reuse, recycling and transition towards a circular economy.[7] Priorities include implementation, source segregation, reliable collection, wastewater and industrial controls, and harmonised monitoring. Monitoring should not be limited to particle counts; polymer identity, size range, sampling contamination and analytical recovery should be reported to allow comparison. Bangladesh still lacks nationally representative data for drinking water, air, soil, common foods and occupational settings, as well as a human biomonitoring programme. Consequently, the environmental problem is evident, but its national clinical burden cannot yet be quantified.

Clinical and Public Health Measures

Public-health action should be precautionary and proportionate: prevent avoidable plastic leakage and exposure without presenting uncertain outcomes as established disease. No validated clinical reference range exists for microplastics in blood, stool or tissue; routine screening of asymptomatic people and unvalidated commercial testing are therefore unjustified. Clinicians should investigate symptoms according to established guidelines rather than attributing non-specific illness to microplastics. Risk communication should explain the difference between detecting particles, demonstrating biological effects and proving clinical harm. It should also discourage unsupported detoxification products, unnecessary anxiety and the substitution of unproven advice for established preventive and medical care.

Healthcare facilities can strengthen segregation at the point of generation, prevent recyclable material from mixing with infectious waste, reduce unnecessary packaging and select reusable alternatives only when sterilisation, infection prevention, cost and patient safety are maintained. Households can limit unnecessary single-use products, use containers suitable for food storage and heating, avoid damaged utensils and segregate waste. Communities require dependable collection, drainage protection, control of open dumping and burning, and accessible recycling.

At municipal and national levels, upstream reduction, reuse, product redesign, recycling and safer alternatives should be combined with wastewater treatment and control of existing waste.[42] Bangladesh should implement extended producer responsibility, regulate industrial and textile discharge, expand laboratory capacity and monitor major rivers, urban lakes, coastal waters, drinking-water systems and commonly consumed fish. Workers in textile production, plastic manufacture, recycling and waste handling require exposure assessment, ventilation and dust control, suitable protective equipment, training and occupational-health surveillance.[43] Environmental objectives in healthcare and other essential sectors must remain compatible with affordability, infection control and safety.

Research Gaps and Future Directions

Progress is limited by inconsistent definitions, particle-size thresholds, sampling methods, contamination control, analytical instruments and reporting units. Nanoplastics remain below the detection capability of many laboratories. Most health evidence comes from in vitro experiments, animal models or small cross-sectional studies; prospective cohorts are needed to relate measured exposure to later biological and clinical outcomes.

Future experiments should use environmentally relevant mixtures, concentrations and exposure durations and investigate dose-response relationships, clearance, tissue persistence and interactions with additives and pollutants. Analytical studies should report procedural blanks, recovery efficiency, particle-size limits and polymer-confirmation methods, allowing laboratories to distinguish genuine findings from contamination or methodological artefact. Priority populations include pregnant women, infants, children and highly exposed workers. Bangladesh requires harmonized national protocols, multicenter surveillance, occupational studies and human biomonitoring linked to epidemiological outcomes. Such studies should collect information on diet, occupation, air pollution and socioeconomic conditions so that potential confounding can be assessed. Policy evaluation should determine whether waste management, wastewater treatment and industrial controls measurably reduce environmental contamination and exposure. Where feasible, protocols should be registered prospectively, and datasets shared to improve transparency, replication and regional comparison.

Conclusion

Microplastics are widely distributed in environmental media, food and human biological samples. Ingestion and inhalation are the principal exposure routes, while occupational contact may be greater in textile, plastics, recycling and waste sectors. Experimental research supports plausible mechanisms involving oxidative stress, inflammation, barrier dysfunction, immune alteration, mitochondrial injury and genotoxicity; plastic additives and adsorbed contaminants may also contribute. Human biomonitoring confirms internal exposure, but current studies do not establish causal relationships with specific respiratory, gastrointestinal, cardiovascular, reproductive, neurological or malignant diseases. Bangladesh has documented contamination in urban lakes, major rivers, coastal systems, drinking water and fish, yet population exposure and health effects remain unquantified. A balanced precautionary response should reduce unnecessary plastic use, improve collection and recycling, strengthen wastewater and industrial controls, protect workers and expand

standardised monitoring and research. Scientific communication should clearly distinguish environmental detection, biological plausibility, statistical association and proven disease.

References

1. Geyer R, Jambeck JR, Law KL. Production, use, and fate of all plastics ever made. Sci Adv. 2017; 3(7): e1700782.
2. World Health Organization. Dietary and inhalation exposure to nano- and microplastic particles and potential implications for human health. Geneva: World Health Organization; 2022.
3. Leslie HA, van Velzen MJM, Brandsma SH, Vethaak AD, Garcia-Vallejo JJ, Lamoree MH. Discovery and quantification of plastic particle pollution in human blood. Environ Int. 2022; 163: e107199.
4. Ragusa A, Svelato A, Santacroce C, Catalano P, Notarstefano V, Carnevali O, et al. Plasticenta: First evidence of microplastics in human placenta. Environ Int. 2021; 146: 3106274.
5. Jenner LC, Rotchell JM, Bennett RT, Cowen M, Tentzeris V, Sadofsky LR. Detection of microplastics in human lung tissue using µFTIR spectroscopy. Sci Total Environ. 2022; 831: e154907.
6. Hossain MS, Sobhan F, Uddin MN, Sharifuzzaman SM, Chowdhury SR, Sarker S, Chowdhury MSN. Microplastics in fishes from the Northern Bay of Bengal. Sci Total Environ. 2019; 690: 821-830.
7. World Bank. Towards a multisectoral action plan for sustainable plastic management in Bangladesh. Washington, DC: World Bank; 2021.
8. Hartmann NB, Hüffer T, Thompson RC, Hassellöv M, Verschoor A, Daugaard AE, et al. Are we speaking the same language? Recommendations for a definition and categorization framework for plastic debris. Environ Sci Technol. 2019; 53(3): 1039-1047.
9. Frias JPG, Nash R. Microplastics: Finding a consensus on the definition. Mar Pollut Bull. 2019; 138: 145 -147.
10. Gigault J, ter Halle A, Baudrimont M, Pascal PY, Gauffre F, Phi TL, et al. Current opinion: What is a nanoplastic? Enviro n Pollut. 2018; 235: 1030-1034.
11. Napper IE, Thompson RC. Release of synthetic microplastic plastic fibres from domestic washing machines: Effects of fabric type and washing conditions. Mar Pollut Bull. 2016; 112(1-2): 39-45.
12. Kole PJ, Löhr AJ, Van Belleghem FGAJ, Ragas AMJ. Wear and tear of tyres: A stealthy source of microplastics in the environment. Int J Environ Res Public Health. 2017; 14(10): 1265.
13. Carr SA, Liu J, Tesoro AG. Transport and fate of microplastic particles in wastewater treatment plants. Water Res. 2016; 91: 174-182.
14. Dris R, Gasperi J, Saad M, Mirande C, Tassin B. Synthetic fibers in atmospheric fallout: A source of microplastics in the environment? Mar Pollut Bull. 2016; 104(1-2): 290-293.
15. Kosuth M, Mason SA, Wattenberg EV. Anthropogenic contamination of tap water, beer, and sea salt. PLoS One. 2018; 13(4): e0194970.
16. Rochman CM, Tahir A, Williams SL, Baxa DV, Lam R, Miller JT, et al. Anthropogenic debris in seafood: Plastic debris and fibers from textiles in fish and bivalves sold for human consumption. Sci Rep. 2015; 5: e14340.
17. Corradini F, Meza P, Eguiluz R, Casado F, Huerta-Lwanga E, Geissen V. Evidence of microplastic accumulation in agricultural soils from sewage sludge disposal. Sci Total Environ. 2019; 671: 411 -420.
18. Schwabl P, Köppel S, Königshofer P, Bucsics T, Trauner M, Reiberger T, Liebmann B. Detection of various microplastics in human stool: A prospective case series. Ann Intern Med. 2019; 171(7): 453 -457.
19. Stock V, Böhmert L, Lisicki E, Block R, Cara-Carmona J, Pack LK, et al. Uptake and effects of orally ingested polystyrene microplastic particles in vitro and in vivo. Arch Toxicol. 2019; 93(7): 1817 -1833.
20. Yong CQY, Valiyaveetill S, Tang BL. Toxicity of microplastics and nanoplastics in mammalian systems. Int J Environ Res Public Health. 2020; 17(5): 1509.
21. Hirt N, Body-Malapel M. Immunotoxicity and intestinal effects of nano- and microplastics: A review of the literature. Part Fibre Toxicol. 2020; 17: 57.
22. Campanale C, Massarelli C, Savino I, Locaputo V, Uricchio VF. A detailed review study on potential effects of microplastics and additives of concern on human health. Int J Environ Res Public Health. 2020; 17(4): 1212.

23. Alijagic A, Suljević D, Fočak M, Sulejmanović J, Šehović E, Särndahl E, et al. The triple exposure nexus of microplastic particles, plastic-associated chemicals, and environmental pollutants from a human health perspective. Environ Int. 2024; 188: e108736.

24. Ullah S, Ahmad S, Guo X, Ullah S, Ullah S, Nabi G, et al. A review of the endocrine disrupting effects of micro and nano plastic and their associated chemicals in mammals. Front Endocrinol. 2023; 13: e1084236.

25. Marfella R, Prattichizzo F, Sardu C, et al. Microplastics and nanoplastics in atheromas and cardiovascular events. N Engl J Med. 2024; 390(10): 900-910.

26. Wen J, Sun H, Yang B, Song E, Song Y, Jiang G. Environmentally relevant concentrations of microplastic exposure cause cholestasis and bile acid metabolism dysregulation through a gut-liver loop in mice. Environ Sci Technol. 2024; 58(4): 1832-1841.

27. Jin H, Yan M, Pan C, et al. Chronic exposure to polystyrene microplastics induced male reproductive toxicity and decreased testosterone levels via the LH-mediated LHR/cAMP/PKA/StAR pathway. Part Fibre Toxicol. 2022; 19: 13.

28. Liu Z, Zhuan Q, Zhang L, Meng L, Fu X, Hou Y. Polystyrene microplastics induced female reproductive toxicity in mice. J Hazard Mater. 2022; 424: e127629.

29. Jin H, Yang C, Jiang C, Li L, Pan M, Li D, et al. Evaluation of neurotoxicity in BALB/c mice following chronic exposure to polystyrene microplastics. Environ Health Perspect. 2022;130(10): e107002.

30. Ragusa A, Notarstefano V, Svelato A, Belloni A, Gioacchini G, Blondeel C, et al. Raman microspectroscopy detection and characterisation of microplastics in human breastmilk. Polymers. 2022; 14(13): 2700.

31. Liu S, Guo J, Liu X, Yang R, Wang H, Sun Y, et al. Detection of various microplastics in placentas, meconium, infant feces, breastmilk and infant formula: A pilot prospective study. Sci Total Environ. 2023; 854: e158699.

32. Horvatits T, Tamminga M, Liu B, Sebode M, Carambia A, Fischer L, et al. Microplastics detected in cirrhotic liver tissue. EBioMedicine. 2022; 82: e104147.

33. Zhao Q, Zhu L, Weng J, Jin Z, Cao Y, Jiang H, Zhang Z. Detection and characterization of microplastics in the human testis and semen. Sci Total Environ. 2023; 877: e162713.

34. Islam T, Li Y, Rob MM, Cheng H. Microplastic pollution in Bangladesh: Research and management needs. Environ Pollut. 2022; 308: e119697.

35. Chowdhury GW, Koldewey HJ, Duncan E, Napper IE, Niloy MNH, Nelms SE, et al. Plastic pollution in aquatic systems in Bangladesh: A review of current knowledge. Sci Total Environ. 2021; 761: e143285.

36. Mercy FT, Alam AKMR, Akbor MA. Abundance and characteristics of microplastics in major urban lakes of Dhaka, Bangladesh. Heliyon. 2023; 9: e14587.

37. Haque MR, Ali MM, Ahmed W, Siddique MAB, Akbor MA, Islam MS, Rahman MM. Assessment of microplastics pollution in aquatic species (fish, crab, and snail), water, and sediment from the Buriganga River, Bangladesh: An ecological risk appraisals. Sci Total Environ. 2023; 857: e159344.

38. Hossain MJ, AftabUddin S, Akhter F, Nusrat N, Rahaman A, Sikder MNA, et al. Surface water, sediment, and biota: The first multi-compartment analysis of microplastics in the Karnafully River, Bangladesh. Mar Pollut Bull. 2022; 180: e113820.

39. Parvin F, Jannat S, Tareq SM. Abundance, characteristics and variation of microplastics in different freshwater fish species from Bangladesh. Sci Total Environ. 2021; 784: e147137.

40. Hasan J, Islam SMM, Alam MS, Johnson D, Belton B, Hossain MAR, Shahjahan M. Presence of microplastics in two common dried marine fish species from Bangladesh. Mar Pollut Bull. 2022; 176: e113430.

41. Islam MS, Islam Z, Jamal AHMSIM, Momtaz N, Beauty SA. Removal efficiencies of microplastics of the three largest drinking water treatment plants in Bangladesh. Sci Total Environ. 2023; 895: e165155.

42. United Nations Environment Programme. Turning off the tap: How the world can end plastic pollution and create a circular economy. Nairobi: United Nations Environment Programme; 2023.

43. International Labour Organization. Hazardous exposures to plastics in the world of work. Geneva: International Labour Organization; 2023.

Abstracts

Advances in stem cell–derived beta-cell therapy: A new frontier in type 1 diabetes treatment

Guisha Zi[1], Lei Zhang[2], Ling Zhou[3], Xiansheng Liu[4], Lingling Wang[5], Runxuan Zhou[6], Pengdou Zheng[7], Jia Wei[8], Xiaoping Chen[9] & Shuang Wei[10]

[1]Department of Respiratory and Critical Care Medicine, National Health Commission Key Laboratory of Respiratory Diseases, Hubei Provincial Clinical Research Center for Chronic Airway Inflammatory Diseases, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, Hubei, China; [2]Hubei Branch of National Clinical Research Center for Infectious Diseases, Wuhan Pulmonary Hospital (Wuhan Tuberculosis Prevention and Control Institute), Wuhan, Hubei, China; [3]Department of Hepatobiliary Surgery, Shanxi Bethune Hospital, Shanxi Academy of Medical Sciences, Tongji Shanxi Hospital, Third Hospital of Shanxi Medical University, Taiyuan, Shanxi, China; [4]Division of Hepato-Pancreato-Biliary Surgery, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, Hubei, China; [5]Department of Respiratory and Critical Care Medicine, Shanxi Bethune Hospital, Shanxi Academy of Medical Sciences, Tongji Shanxi Hospital, Third Hospital of Shanxi Medical University, Taiyuan, Shanxi, China; [6]Cancer Center, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, Hubei, China; [7]Department of Hematology, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, Hubei, China and [8]Immunotherapy Research Center for Hematologic Diseases of Hubei Province, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, Hubei, China

Type 1 diabetes (T1D) is a chronic autoimmune disease characterized by the destruction of pancreatic beta cells (β-cell), leading to lifelong dependence on exogenous insulin. Despite advances in insulin delivery systems and glucose monitoring, achieving tight glycemic control remains a challenge for many patients. In recent years, stem cell–derived β-cell therapy has emerged as a promising strategy for restoring endogenous insulin production. This review explores the progress in differentiating human pluripotent stem cells, such as embryonic stem cells and induced pluripotent stem cells (iPSCs), into functional insulin-secreting β-like cells. We highlight recent breakthroughs in improving cell maturity, graft survival, and immune protection. Delivery approaches, encapsulation technologies, and transplantation strategies are discussed alongside an overview of ongoing clinical trials. The review also addresses current limitations, including immune rejection, cell dedifferentiation, and safety concerns. Finally, we examine future directions, such as genome editing, personalized cell therapy, and the integration of artificial intelligence in monitoring and optimizing treatment. Stem cell–derived β-cell therapy holds transformative potential as a curative approach for T1D, but further research is essential to overcome remaining barriers to its widespread clinical application.

Reference:

Zi G, Zhang L, Zhou L, Liu X, Wang L, Zhou R, Zheng P, Wei J, Chen X, Wei S. Advances and prospects in cell therapy for cancer: explorations from T cells to stem cells. Signal Transduction and Targeted Therapy. 2026; 11(1): 255.

The Impact of Artificial Intelligence Tools on Human Cognitive Abilities: A Comprehensive Review

Sohail Rao[1]

[1]HBond Foundation, 6918 Camp Bullis Road, San Antonio, Texas, USA

Background: The rapid integration of artificial intelligence (AI) tools into daily cognitive tasks has raised questions about their impact on human cognitive abilities.

Objective: This review synthesizes current research on how the use of AI tools affects cognitive domains, including critical thinking, memory, creativity, and decision-making.

Methods: We reviewed empirical studies, including randomized controlled trials, field experiments, and neurophysiological investigations, that examined AI's

cognitive effects across educational and professional settings.

Results: Evidence reveals a complex, non-linear relationship between AI use and cognition. Moderate AI usage shows minimal cognitive impact, while excessive reliance correlates with decreased critical thinking abilities (cognitive offloading effect), reduced metacognitive accuracy, and lower retention on delayed assessments. Field studies with approximately 1,000 students demonstrated improved immediate performance but worse unassisted outcomes following AI removal, particularly with unrestricted AI access. Neurophysiological data showed reduced brain network connectivity during AI-assisted tasks. Age-related differences emerged, with younger users (17-25 years) exhibiting greater dependence and lower critical-thinking scores. However, well-designed AI tutoring systems with scaffolding produced superior learning gains compared with traditional instruction.

Discussion: The findings reveal a fundamental paradox: AI assistance frequently improves immediate task performance while simultaneously undermining durable skill acquisition. Three primary mechanisms mediate these effects: reduced cognitive effort through offloading, diminished metacognitive monitoring, and altered practice patterns. Critically, the cognitive impact of AI is not deterministic but depends on implementation design, with scaffolded AI systems that maintain active engagement producing dramatically different outcomes than those providing direct solutions. Age-related vulnerabilities, particularly among younger users (17-25 years), raise developmental concerns, though higher educational attainment appears to provide protective effects against cognitive offloading tendencies.

Conclusions: AI tools do not inherently impair or enhance cognition; rather, their impact depends critically on implementation design, user agency, and interaction patterns. Strategic use that maintains active cognitive engagement can augment human capabilities, while passive reliance risks skill atrophy. Educational interventions promoting AI literacy and metacognitive awareness are essential for optimizing cognitive outcomes.

Keywords: Artificial Intelligence, cognitive abilities, critical thinking, cognitive offloading, educational technology, metacognition.

Reference:

Rao S. The impact of artificial intelligence tools on human cognitive abilities: A comprehensive review. Innovapath. 2025;1(4): 1-7.

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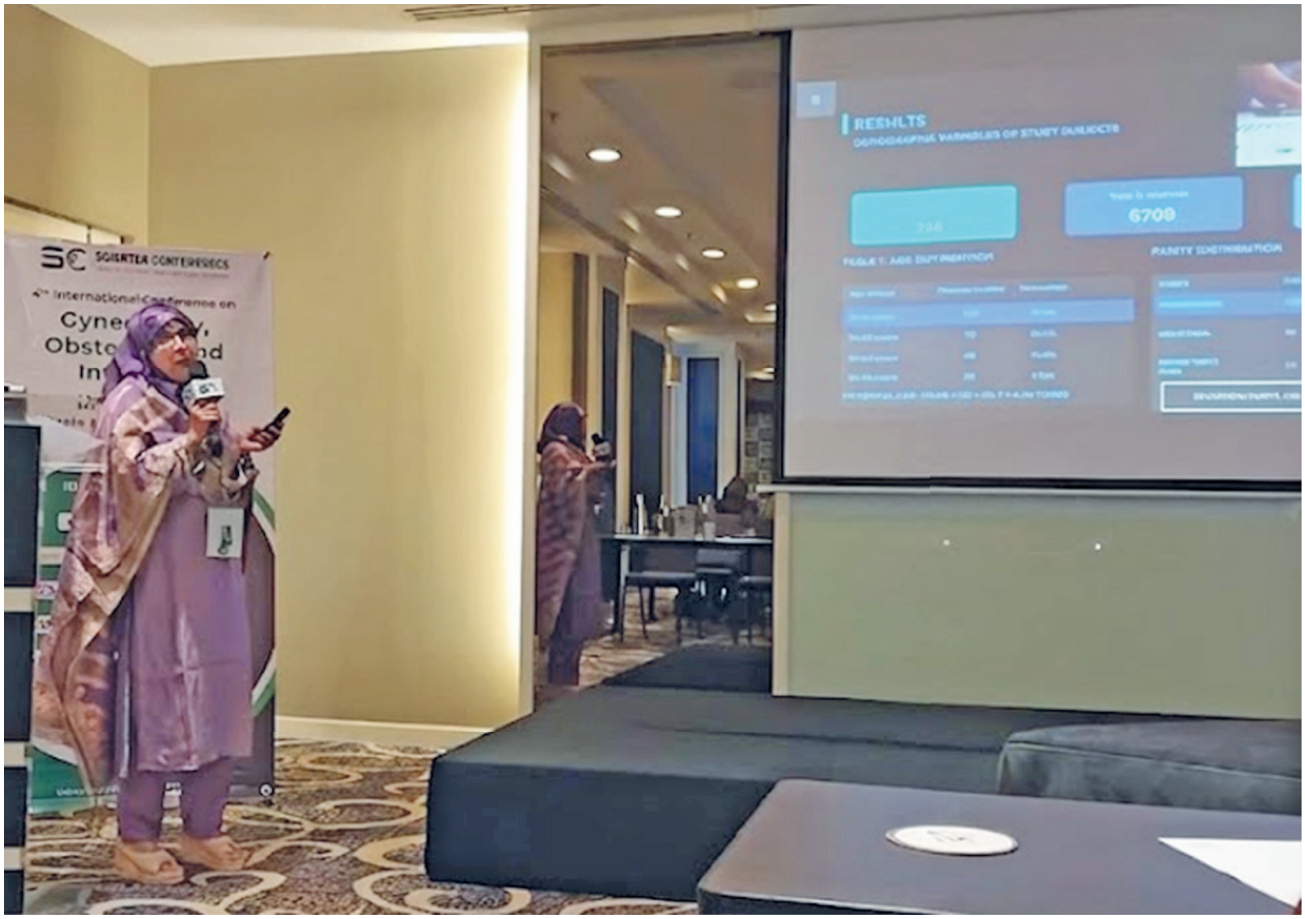

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AWMC thankfully acknowledge the respected reviewers for their eminent contributions to this volume

1. **Dr. Shamima Parvin**
   Professor
   Department of Biochemistry
   Ad-din Women's Medical College

2. **Dr. Tania Noor**
   Associate Professor
   Department of Gynae and Obs
   Ad-din Women's Medical College

3. **Dr. Rahat Bin Habib**
   Associate Professor
   Department of Paediatrics
   Saheed Sayed Nazrul Islam Medical College,
   Kishoreganj, Bangladesh

4. **Dr. Rahima Khatun**
   Associate Professor
   Department of Gynae and Obs
   Ad-din Women's Medical College

5. **Dr. Ripon Kumar Ghosh**
   Assistant Professor
   Department of Orthopedics
   Ad-din Women's Medical College

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