

JSMC

Journal of Satkhira Medical College

VOLUME 13

NUMBER 02

JULY 2026

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ISSN 2790-2501

BMDC Approved

Official Journal of Satkhira Medical College Teachers Association

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JOURNAL of SATKHIRA MEDICAL COLLEGE

JSMC Volume 13 Number 02 July 2026

Official Journal of Satkhira Medical College Teachers Association
JSMC is published twice a year in the month of January and July

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Date of Publication: July 2026



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EDITORIAL

Measles: The Recent Outbreak, Concerns and Strategies for its Control

Dr. Md. Marufuzzaman¹

The recent outbreak of measles is the most public concern. Every day, the future of the country, the children are dying in suspected measles. This outbreak is not only prevailed in Bangladesh, but also in many developed countries that have been declared measles free. A countrywide measles outbreak occurred in Bangladesh since March 2026. Till the end of June 2026, Bangladesh has recorded about 10,000 suspected measles cases including 12,286 laboratory confirmed infections with 724 combined suspected and confirmed measles-related deaths. [1] The resurgence of measles infection is multifactorial including declining global immunization rates, international travel, and vaccine hesitancy. Vaccine hesitancy is a major contributor. The coronavirus disease- 2019 (COVID-19) pandemic exacerbated these challenges, causing disruptions to routine immunization programs and leading to a decrease in vaccination rates, especially among infants born during 2020-2021. [2] This decline in vaccination coverage undermines herd immunity and increases the risk of outbreaks. When population immunity falls below 95%, measles outbreak can occur.

Measles is a highly infectious illness caused by an RNA paramyxovirus spread through large respiratory droplets from infected individuals. [3] Measles typically presents with a prodromal phase characterized by fever, cough, coryza, and conjunctivitis, indicating the onset of the disease without the characteristic rash of a measles infection. [4] The prodromal phase presents 2–4 days prior to the rash in which the measles virus is most contagious, making rapid diagnosis critical to prevent spread. Koplik's spot typically presents in 70% cases during this phase. Following the prodromal phase, the characteristic maculopapular rash begins with the initial appearance of the rash on the face and neckline, progressing to the trunk

and extremities. The rash may persist from 3 to 5 days with resolution occurring in the same manner of appearance. In uncomplicated cases of measles, the infection typically resolves within 1 week. In some cases, a cough can persist for 10 days. [5]

Because the measles virus targets epithelial cells and infects multiple organs, complications have been reported in all organ systems. [6] The most common complications from a measles infections are otitis media, pneumonia, vitamin A deficiency, diarrhea, immunosuppression and malnutrition. Other less common but severe complications include encephalitis, subacute sclerosing panencephalitis, and acute disseminated encephalomyelitis, which may lead to severe neurologic impairments or death. The most common cause of death is due to pneumonia due to the measles virus with or without another viral infection or a bacterial superinfection. [7]

Immunity against measles can be achieved through vaccination or natural infection. Measles infection usually provides lifelong immunity. Natural infection produces stronger and more durable immunity; antibody levels decline gradually over 20 years. Vaccine-induced immunity is long-lasting but may wane over time.

As measles is a highly contagious viral disease and only supportive treatment is available, the goal to protect vulnerable individuals is targeted to achieve herd immunity. The highly effective measles live attenuated vaccine provides 93% protection from the first dose and 97% after the recommended second dose. The WHO recommends the first measles vaccine dose at 9 months and the second dose between 15 and 18 months in countries with ongoing transmission to reduce infant mortality. [8] The vaccine comes in two forms, MMR (measles, mumps, rubella) and MMRV (measles, mumps, rubella, and varicella),

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which are similarly effective. [9] In the event of a measles outbreak, immunization guidance allows for more aggressive administration in cases of ongoing exposure. Initiating the MMR vaccine can be considered in infants as young as 6 months of age, rather than 12 months of age, which is typically recommended.

Though mostly clinical, serological tests can be done to detect measles. The most common method is detection of anti-measles IgM which is detectable 3 days after rash onset and undetectable 30 days after rash. Anti-measles IgG rises after 7 days and peaks around 14 days. RT-PCR can also be done from throat or nasopharyngeal swabs or urine. Viral culture is also available in higher centers.

High risk for developing complication of measles includes infants and children aged <5 years, adults aged >20 years, pregnant women and people with weakened immune systems, such as from leukemia and HIV infection.

The strategies for measles infection prevention & control are isolation in a negative pressure room, educating respiratory etiquette such as using face mask and its proper disposal and hand hygiene. Other measures include health workers immunization, health workers training, ensuring early recognition, notification and outbreak response immunization.

Prevention of fatal outcome can be achieved by vaccination, vitamin A supplementation and early treatment of complications. So, the Government of Bangladesh should give priority to immunization against measles and give health education.

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Original Article

Occurrence of Domestic Accidents with its Outcome and its Relation with Socio-demographic Status among the People in Rural Community of Khulna

*Silvia Paroi¹, Professor Zoha Mohammad Meherwar Hossian², Tamanna Amatullah Haque³, Mohsina Tasfia⁴, Md. Nazrul Islam⁵, Preya Ghosh⁶

Abstract

Background: Domestic accidents are the major public health concern, particularly in developing countries like Bangladesh, where unsafe housing conditions, limited awareness and overcrowding increase household risks. **Objectives:** The study was done to determine the occurrence of domestic accidents and its outcomes, as well as to find out their relation with the socio-economic and education among the people in rural community of Khulna. **Methodology:** This cross-sectional type of descriptive study was conducted among 630 residents of Pachani Colony, Rupsha Upazila, Khulna, from September 3 to 8, 2025, Data were collected through face-to-face interviews using a pretested semi-structured questionnaire and analyzed by SPSS version 27. **Results:** The present study revealed that 60% of respondents had experienced some form of domestic accident in their life. The most common types were falls (18.1%), burns (17.0%) and injuries (13.7%), followed by animal bites (5.1%), drowning (4.8%), electrocution (2.5%) and poisoning (0.8%). Females (62.2%) experienced more accidents than males (37.8%) and they faced burns (36.6%) most of all. It was also found that the majority of victims belonged to the 21–49-year age group (61.7%) and in the occupation group of homemakers (63.9%). Occurrence of domestic accidents was observed more in the Rich class (67.7%) and up to SSC (65.4%) group of the respondents and least occurrence was found in above SSC group (57.7%). **Conclusion:** The findings highlighted that domestic accidents remain frequent and largely preventable. Community-based health education, improvement of household safety and awareness campaigns can significantly reduce the burden of such accidents in rural communities of Bangladesh.

Keywords: Domestic accidents, Socio-economic status, Education level, Rural people.

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Introduction

A domestic accident is an unintentional injury occurring at home or its immediate surroundings, which can result in property damage and/or temporary or permanent impairment of health or death. These accidents are common in all countries but are more frequent in low and middle-income nations where housing conditions and safety awareness are poor. Domestic injuries may cause minor wounds or severe outcomes (other than

property damage) such as fractures, burns, poisoning, disability etc. with ultimate fate of loss of work days and thereby loss of income.

The Government of Bangladesh is working through DGHS and Community Clinics to reduce domestic accidents by promoting awareness and conducting health education sessions. So, this study aims to identify the occurrence and outcomes of domestic accidents in the study area and to see the relation with socio-economic status and education of them.

It also aims to explore people's awareness and preventive practices at the household level. The findings are expected to help to develop effective community interventions to reduce home-related accidents and improve the safety and well-being of families in Bangladesh.

Home accidents are a major cause of death and injury. Every domestic accident brings a varying measure of distress to the victim as well as the family members. The consequences may be disastrous both for the individual and the society when the accident results in permanent disability, as the victim loses his earning capacity and may not be able to enjoy a normal productive life [1].

Methodology

This cross-sectional type of descriptive study was conducted at department of Community Medicine and Public Health, Ad-Din Akij Medical College, Khulna. The sample size was 630 which were selected by convenient sampling method & data were collected through face-to-face interviews of the residents of Pachani Colony, Rupsha Upazila, Khulna, from September 3 to 8, 2025 using a pretested semi-structured questionnaire and analyzed by SPSS version 27. Statistical significance was found by applying relevant statistical tests at appropriate probability level ($p=.05$ or $p=.01$).

This research work has been followed the ethical guidelines of the research such as the purpose and nature of the study, its benefits were explained in details to the respondents and their written consent was taken before starting the interview. The questionnaire was consisted of socio-demographic information such as age, sex, literacy status, occupation etc. and other questions regarding outcomes of domestic accidents. Prior to the commencement of the study, the research protocol was approved by the research proposal approval committee of the Ad-Din Akij Medical College, Khulna was obtained.

Result

It was observed that out of 630 respondents 378 (60%) respondents had experienced domestic accidents while the rest 252 did not (Figure-1). This result gives a bitter truth that more than half the population faced domestic accidents in their life

which remains very silent in our community.

This study revealed that out of all the types of domestic accidents, fall occurred most of all and it happened in case of 114 (18.1%) respondents following burn which occurred next to it – in case of 107 (17.0%) respondents. The least in this list was poisoning, which occurred in case of only 5 (0.8%) respondents (Table: I).

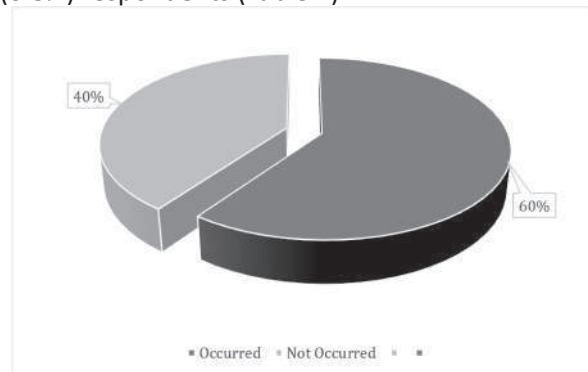


Figure 1. Distribution of the respondents according to the occurrence of domestic accidents.

Table I. Distribution of the respondents according to the types of domestic accidents experienced.

Types of domestic accidents	Frequency n (%)
Drowning	30 (4.8)
Burn	107 (17)
Fall	114 (18.1)
Injury	86 (13.7)
Poisoning	5 (0.8)
Animal bite	32 (5.1)
Electrocution	16 (2.5)
No Domestic Accident	240 (38.1)
Total	630 (100)

Out of a total 384 female respondents, 235 (61.2%) experienced domestic accidents, on the other hand, 58.1% of the total 246 male respondents faced the problem (Table II). So, it was found that females had experienced more domestic accidents than the males.

Table II. Occurrence of Domestic Accidents in relation with sex of the respondents.

Sex	Domestic Accidents		Total
	Occurred	Not occurred	
Male	143 (58.1%)	103 (41.9%)	246 (100%)
Female	235 (61.2%)	149 (38.8%)	384 (100%)
Total	378 (60.0%)	252 (40.0%)	630 (100%)

Table III. Occurrences of domestic accidents in relation with age of the respondents.

Age (years)	Domestic Accidents		Total
	Occurred	Not occurred	
~12	28 (60.9%)	118 (39.1%)	46 (100%)
13-20	59 (60.8%)	38 (39.2%)	97 (100%)
21-49	219 (61.7%)	136 (38.3%)	355 (100%)
≥50	72 (54.5%)	60 (45.5%)	132 (100%)
Total	378 (60.0%)	252 (40.0%)	630 (100%)

This table presents that 28 out of 46 (60.9%) children up to 12 years, 59 out of 97 (60.8%) from 12–20 years, 219 out of 355 (61.7%) from 20–49 years and 72 out of 132 (54.5%) respondents aged 50 years and above experienced domestic accidents (Table III). The highest proportion is among adults aged 21–49 yrs, likely because they are the most active group at home and work.

Table IV. Occurrence of domestic accidents in relation with socio-economic status of the respondents.

Socio-economic status	Domestic Accidents		Total
	Occurred	Not occurred	
Poor	219 (60.0%)	146 (40.0 %)	365 (100%)
Mid. Class	138 (59.0 %)	96 (41.0 %)	234 (100%)
Rich	21 (67.7 %)	10 (32.3 %)	31 (100%)
Total	378 (60%)	252 (40%)	630(100%)

This study showed 219 (60.0 %) respondents from the poor class, 138 (59.0 %) from the middle class and the rest 21 (67.7%) from the rich class experienced domestic accidents (Table IV). Although the percentage among the rich appears slightly higher, poor families are most affected numerically due to their larger representation in the population.

Table V. Occurrence of Domestic Accidents in relation with literacy levels of the respondents.

Literacy levels	Domestic Accidents		Total
	Occurred	Not occurred	
Illiterate Up to PSC	90 (58.1%)	65 (41.9%)	155 (100%)
Up to SSC	132 (58.7%)	93 (41.3%)	225 (100%)
Above SSC	100 (65.4%)	53 (34.6%)	153 (100%)
Total	378 (60.0%)	252 (40.0%)	630 (100%)

Among respondents with 'no literacy' 90 (58%) experienced domestic accidents, for 'up to PSC' 132

(58.6%), 'up to SSC' 100 (65.4%) and for 'above SSC', 56 (57.7%) respondents experienced the problem (Table V). These results suggest that literacy level does not drastically reduce accident risks, though slightly fewer incidents were observed among more educated individuals.

Table VI. Occurrence of domestic accidents in relation with occupation of the respondents.

Occupation	Domestic Accidents		Total
	Occurred	Not occurred	
Job seeker	18 (81.8%)	4 (18.2%)	22 (100%)
Student	70 (63.1%)	41 (36.9%)	111 (100%)
Homemaker	156 (63.9%)	88 (36.1%)	244 (100%)
Business	29 (43.3%)	38 (56.7%)	67 (100%)
Service	11 (73.3%)	4 (26.7%)	15 (100%)
Farmer	18 (60.0%)	12 (40.0%)	30 (100%)
Laborer	56 (55.4%)	45 (44.6%)	101 (100%)
Others	20 (50.0%)	20 (50.0%)	40 (100%)
Total	378 (60.0%)	252 (40.0%)	630 (100%)

Domestic accidents were found to be most common among Homemaker 156 (63.9%), followed by students 70 (63%), laborers 56 (55.4%) and businessmen (43%) (Table VI). Occupations involving household or manual activities show higher accident rates, highlighting a direct link between daily chores and injury risk.

Discussion

Any accident that occurs at home or in its immediate vicinity is considered a domestic accident, as are all incidents unrelated to vehicles, traffic, or sports in general. Domestic accidents are a global public health concern.

Falls were the most often reported type of mishap. Age and sex were shown to be related to the incidence of falls.

According to Bhandari DJ et al. (2008), women and people in extreme age categories reported home accidents at a much greater rate [1]. In their 2019 study, López-Soto, P. J. et al. also noted that 460 (7.1%) seniors experienced domestic accidents, with women accounting for the majority (78.5%) [2]. According to a different study, home accidents were three times more common among women, 2.7 times more common among those who lived with children, and 2.3 times more common among

the elderly. Falls were the most often reported form of accident (76.6%), with 60 participants (9.9%) reporting a home accident in the preceding month [3].

That finding also similar to the finding of my study. The study revealed that 60% of respondents had experienced some form of domestic accident in their life. The most common types were falls (18.1%), burns (17.0%) and injuries (13.7%), followed by animal bites (5.1%), drowning (4.8%), electrocution (2.5%) and poisoning (0.8%). Females (62.2%) experienced more accidents than males (37.8%). It was also found in my study that the majority of victims belonged to the 21–49-year age group (61.7%) and that finding not similar to previous study.

There was a statistically significant correlation between women and homemakers. Families with more than four rooms accounted for the majority of accidents. 31.9% of homes with an indoor kitchen experienced domestic mishap, while 36.7% of homes with an outdoor bathroom had such incidents [4].

It was found in my study that majority of domestic accident occurred in the occupation group of homemakers (63.9%). That finding also support to the observation of previous study.

Both the lowest and highest income families had more accidents in their homes, however only the parents of the lowest income families and younger parents had less understanding of how to recognize household dangers. Parental awareness of risks was linked to observed home accidents across family socioeconomic class [5, 6].

Home accidents were less common among participants with higher education levels than those with lower education levels. Additionally, individuals who performed household chores and prepared meals on their own were more likely to experience home accidents.

I had also found in my study that domestic accidents was more in the rich class (67.7%) and 219 (60.0%) respondents from the poor class and the education level up to SSC (65.4%) group of the respondents and least occurrence was found in above SSC group (57.7%).

Conclusion

The frequency of home accidents was found to be influenced by socioeconomic and educational characteristics. The majority of those impacted came from low-income households with lower literacy rates, which may have increased vulnerability due to a lack of resources, cramped housing, and a lack of safety awareness. The most common result was physical injuries. Among other things, it was suggested that medical experts create parent education programs, particularly for women, on home accidents and how to handle them. This is due to the discovery that there is a statistically significant correlation between home accidents and schooling.

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Original Article**Diagnostic Yield of Routine Fundoscopy in Severe Headaches and the Prevention of CVST Misdiagnosis: A Cross-Sectional Study from a Primary Clinical Setting**

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Abstract

Background: Headache is a common presentation in primary care. While mostly benign, secondary causes like Cerebral Venous Sinus Thrombosis (CVST) are frequently misdiagnosed in community settings where MRI/MRV is unavailable. **Methods:** A cross-sectional observational study was conducted on 321 selected patients (from an initial pool of 998) with severe headaches. at the Medicine OPD of Brahmanbaria District Hospital. All patients were subjected to clinical examination and direct ophthalmoscopy followed by NCCT (National Center for Competency Testing). While fundoscopic findings were intended to guide imaging, nearly all patients underwent NCCT scans due to patient pressure, which provided a cross-check for fundoscopic efficacy. **Results:** Abnormal fundoscopy was identified in 9 (2.8%) subjects with papilledema in 7, sub-hyaloid hemorrhage in 1, and optic atrophy in 1. Fundoscopy successfully identified all cases of CVST (Cerebral Venous Sinus Thrombosis) (n=5) and IIH (n=2) via the presence of papilledema, highlighting its critical role in detecting raised intracranial pressure when initial CT scans were normal. In these instances, fundoscopy was the primary tool that prevented misdiagnosis. It was also applicable for a headache patient where the underlying cause was glaucoma. Yield was lower for SAH (Sub-arachnoid Hemorrhage) (5%) and ICSOL (Intracranial Space-Occupying Lesion) (0%). Logistic analysis identified significant correlations of abnormal fundoscopy with female gender ($p=0.041$), age >30 ($p=0.032$), and visual disturbances ($p<0.001$). **Conclusion:** Routine fundoscopy is a vital, low-cost screening tool that enhances patient safety. It is particularly effective for catching CVST and IIH (Idiopathic Intracranial Hypertension) in community settings where gold-standard imaging is unavailable and initial CT scans may appear normal.

Keywords: Headache, Fundoscopy, Papilledema.

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Introduction

Headache is one of the most ubiquitous clinical presentations in primary healthcare, accounting for approximately 4% of all emergency department visits and a substantial proportion of outpatient consultations. [1] While the vast majority of these cases represent primary headache disorders—such as migraine or tension-type headaches—a small but critical subset stems from life-threatening secondary etiologies, including intracranial hemorrhage, cerebral venous sinus thrombosis (CVST), and idiopathic intracranial hypertension (IIH). [2,3]

The diagnostic challenge for the primary care physician lies in the "grey zone" where secondary headaches mimic the features of primary disorders like migraine or tension-type headaches. [4,5] While "red flag" screening tools (e.g., SNNOOP-10) are widely advocated, their specificity remains variable. [6] In many resource-limited settings, non-contrast computed tomography (NCCT) of the brain is the primary neuroimaging modality due to its availability and lower cost. However, NCCT is insensitive to early-stage raised intracranial pressure (ICP) and is frequently normal in the initial stages of CVST and IIH. [7]

Direct fundoscopy, or ophthalmoscopy, has traditionally been the bedside "window" into the intracranial environment. The detection of papilledema, swelling of the optic disc due to axoplasmic flow stasis, indicates elevated ICP. [8,9] Despite its inclusion in standard physical examination protocols, its routine use has declined due to the operator-dependent nature of this technique and perceived superiority of neuroimaging. However, in patients where MRI/MRV is unaffordable or inaccessible, the omission of fundoscopy may lead to catastrophic delays in diagnosing conditions that may appear normal in CT scan. [10, 11] This study aimed to evaluate the diagnostic yield of routine fundoscopic examination in a primary care setting and to identify clinical markers and associated demographic factors that necessitate its application.

Methodology

The cross-sectional observational study was carried out at medicine OPD, district sadar hospital, Brahmanbaria from 01 July 2022 to 30 December 2023.

Participants: About 1,000 headache patients were encountered. The study included 321, who were aged above 18 years with headache severe enough to impair daily life, or those with chronic and recurrent headache with progressive increase in frequency and severity. The study included both males and females who attended the outpatient and emergency units.

Excluded from the study were those with pre-existing documented optic pathway lesions or those who had prior intracranial surgery, those with head trauma in the last three months, and those who had media opacities that would preclude sufficient fundoscopic examination, including dense cataracts and vitreous hemorrhage.

All enrolled patients underwent a standardized clinical evaluation, including a detailed history-taking with a focus on headache features and accompanying red-flag symptoms.

Fundoscopy Technique

Clinical examination was performed using a standard handheld direct ophthalmoscope.

Non-mydriatic fundoscopy (without pupillary dilation) was prioritized for clinical efficiency and patient throughput. The examination focused primarily on the optic nerve head (ONH) to identify signs of papilledema, such as blurring of disc margins, loss of spontaneous venous pulsations, and splinter hemorrhages [12]. While pupillary dilation with 1% tropicamide is often recommended for comprehensive retinal screening, it was deemed non-essential for the primary goal of detecting raised intracranial pressure (ICP) in an outpatient setting, as macular and peripheral retinal pathologies are rarely causal in primary or secondary headache disorders [13].

Diagnostic Protocol

While clinical red flags and fundoscopic findings were intended to guide the need for imaging, the decision to perform NCCT in nearly all cases—including those with low clinical suspicion—was often driven by significant pressure from patients and their families for definitive "visual" proof of health. This comprehensive imaging approach, however, provided a unique research advantage, allowing for a systematic cross-check of fundoscopy's effectiveness against neuroimaging results. [5]. In cases where NCCT was normal but papilledema was present, patients were escalated to MRI and MRV to evaluate for Cerebral Venous Sinus Thrombosis (CVST) or Idiopathic Intracranial Hypertension (IIH) [14].

Demographic variables such as age, sex, and the use of hormonal contraceptives among females, together with clinical features, fundoscopic findings, and neuroimaging findings where applicable, were recorded. Final diagnoses were rendered by a combination of clinical features, fundoscopic examination, and neuroimaging findings, where necessary. Data were entered and analyzed using SPSS version 26, and a p-value <0.05 was taken as statistically significant.

Results

The study included a total of 321 patients, with a high female predominance of 67.9% (n=218), while 32.1% (n=103) were male. The most prevalent age group was 40–49 years (31.6%), followed by those > 50 years (28.7%). Among female participants, 18.3% (n=40) were using hormonal contraceptives.

Table I: Baseline Demographic Characteristics of Study Population (N = 321).

Variable	Category	Frequency n (%)
Age Group (years)	18-29 years	66 (20.6)
	30-39 years	62 (18.9)
	40-49	101 (31.6)
	≥ 50	92 (28.7)
Sex	Male	103 (32.1)
	Female	218 (67.9)
Hormonal Contraceptive Use (Females only, n=218)	Yes	40 (18.3)
	No	178 (81.7)

The most common symptom was severe throbbing headache, present in 77.6% (n=249) of the cohort. "Red-flag" symptoms, such as "worst-ever" headaches, were reported by 9.2% (n=30). Associated features included nausea/vomiting (21.6%), visual disturbances (12.6%), and rare neurological deficits (1.8%).

Table II: Clinical Presentation and Initial Assessment.

Clinical Feature	Frequency n (%)
Severe/Throbbing Headache	249 (77.6)
Chronic/Recurrent Headache	57 (17.8)
Visual Disturbances	40 (12.6)
Nausea/Vomiting	69 (21.6)
Neurological Deficits	6 (1.8)
Red Flag Symptoms (e.g., worst-ever headache)	30 (9.3)

Fundoscopy Yield and Diagnostic Correlation:

Abnormal fundoscopic findings were identified in 9 out of 321 subjects (2.8%). These included papilledema (n=7), sub-hyaloid hemorrhage (n=1), and optic atrophy (n=1).

Table III shows that the most common diagnoses were primary headache disorders with normal funduscopy and neuroimaging (n = 263, 81.9%). Five cases of CVST/IIH were diagnosed exclusively by the presence of fundoscopic evidence of papilledema, despite normal imaging at the outset. Two cases of hydrocephalus were with papilledema on fundoscope that was confirmed later on CT scan. Only one case of the 20 subarachnoid hemorrhage cases revealed subhyaloid hemorrhage on funduscopy. Thirty intracranial space-occupying lesions evidenced mainly by abnormal imaging were normal on funduscopy -indicating the absence of raised intracranial pressure even if the lesion is in subtentorial space and large enough for pressure effect. Optic atrophy was identified in one case of

glaucoma; it had been initially misdiagnosed as a primary headache with normal CT brain, which pointed out the diagnostic utility of ophthalmoscopy.

Table 4 shows that funduscopy consistently identified papilledema in all recorded cases of CVST/IIH and hence was very effective in diagnosing those with elevated intracranial pressure. Nevertheless, the detection rate for the subarachnoid hemorrhage was much lower at 5% because subhyaloid hemorrhage is a relatively rare occurrence. Funduscopy did not detect any of the 30 intracranial space-occupying lesions (detection rate 0%), and this is most likely a reflection of the fact that such lesions were not large enough to interrupt CSF circulation and produce elevated intracranial tension.

Table 5 depicts that Papilledema was only observed in females and in the 30-39-year-old group; it was related to users of hormonal contraceptives. Normal fundoscopic examinations are well represented in both genders (218 in females and 103 in males). Optic atrophy due to glaucoma was noted in one female patient. Subhyaloid hemorrhage due to subarachnoid hemorrhage was only present in the male group (n=103).

Table 6 demonstrates that several variables were predictive of abnormal funduscopy findings.

Female Gender (p=0.041): While there were more females in the study, they held a disproportionate share of the abnormalities (7 out of 9), often linked to hormonal contraceptive use.

Age: greater than 30 years (p = 0.032).

Visual Disturbances (p<0.001): This is the strongest predictor because 6 of the 9 abnormal cases reported visual symptoms, compared to only 34 of the 312 normal cases [21].

Red-flag symptoms (p<0.001) and the presence of neurologic deficits (p<0.001) were strongly predictive of abnormal findings. Nausea/vomiting was significantly associated (p=0.018). These observations indicate that selective funduscopy in patients with the aforementioned findings could optimally maximize diagnostic utility while sparing patients in the absence of headache or discomfort of an additional examination.

Table III: Neuroimaging Findings Compared to Fundoscopy.

Final Diagnosis	Total Cases	Fundoscopy Finding	CT Result	Additional Note
Primary Headache (Migraine/Tension)	263	Normal	Normal	Diagnosis confirmed; low risk group
CVST / IIH	5	Papilledema	Normal	Missed by CT; confirmed by MRI and MRV
Hydrocephalus	2	Papilledema	Abnormal	Diagnosis suspected before CT
SAH	20	Subhyaloid Hemorrhage (1)	Abnormal	Fundoscopy caught only 1/20 cases
Intracranial Space-Occupying Lesions (ICSOL)	30	normal	abnormal	Fundoscopy is insensitive in diagnosis of ICSOL at least at primary stage
Glaucoma	1	Optic atrophy	normal	Headache associated glaucoma may be mistaken for primary headache even after CT brain if fundoscopy is not used

Table IV: Diagnostic yield of fundoscopy by condition.

Diagnosis	Total Cases	Detected via Fundoscopy	Detection Rate (%)
CVST / IIH	5	5	100
Hydrocephalus	2	2	100
SAH	20	1	5
ICSOL	30	0	0
Primary Headache	263	0 (true negative)	N/A
Glaucoma	1	1	Incidental finding

Table V: Fundoscopy Findings by demographic profiles.

Variable	Papilledema (n=7)	Normal Fundus (n=312)	Optic Atrophy (n=1)	Subhyaloid Hemorrhage (n=1)
Age	18-29	1	65	0
	30-39	5	55	0
	40-49	1	100	0
	>50	0	92	1
Sex	Female	6	211	1
	Male	1	101	0
Hormonal pill Use	5	35	0	0

Table VI: Factors Associated with Abnormal Fundoscopic Findings.

Variable	Abnormal fundus (n=09)	Normal fundus (n=312)	Total patients (n=321)	p value
Female sex	7	211	218	0.041
Male sex	2	101	103	
Age ≥30 years	7	248	255	0.032
Age <30 years	2	64	66	
Visual disturbance	6	34	40	<0.001
Nausea/vomiting	5	64	69	0.018
Red-flag symptoms	8	22	30	<0.001
Neurological deficit	3	3	6	<0.001

Discussion

This cross-sectional study of 321 patients highlights the indispensable role of fundoscopy in bridge-building between clinical suspicion and definitive neuroimaging. Our finding of a 2.8% prevalence of abnormal fundoscopy findings, while numerically low, is clinically profound. Every instance of detected papilledema led to a diagnosis that would have likely been missed or delayed by a reliance on NCCT alone.

The Diagnostic Utility of Fundoscopy in CVST and IIH.

While fundoscopy successfully identified all five cases of CVST and IIH in our cohort, we acknowledge that claiming "100% sensitivity" is limited by our small sample size for these specific pathologies. Rather than absolute sensitivity, these results emphasize the high specificity of papilledema as an indicator of raised intracranial pressure (ICP). These conditions frequently present in young, female patients—often those using hormonal contraceptives, as seen in 5 out of our 7 papilledema cases [12,13]. The pathophysiology of CVST involves obstructed venous outflow, leading to increased ICP while the brain parenchyma initially remains structurally normal on NCCT [14]. Our results mirror the work of Moss et al., who emphasize that optic disc edema is often the only objec-

tive sign of pathology in the early stages of these syndromes [15]. Relying solely on CT in these demographics creates a "false sense of security" that funduscopy effectively mitigates.

Physiological limitations in Acute Vascular and Space-Occupying Lesions

Conversely, our study confirms the limitations of funduscopy in acute vascular events and early-stage space-occupying lesions (ICSOLs). The low yield for subarachnoid hemorrhage (5%) and ICSOLs (0%) underscores that papilledema is a late-developing sign of mass effect [16]. In cases of SAH, Terson's syndrome (intraocular hemorrhage) occurs in only 13–50% of cases and is associated with higher mortality, but it is not a sensitive screening marker for the hemorrhage itself [17]. Therefore, a normal fundus should never be used to rule out an acute bleed or a tumor if other red flags are present.

Risk-Stratified Screening in Primary Care

Our analysis identified female gender, age ≥ 30 , visual disturbances, and the use of hormonal contraceptives as significant predictors of abnormal funduscopy. These findings support a "risk-stratified" approach. While funduscopy may not be sensitive enough to serve as a universal "rule-out" tool for all secondary headaches, it remains a mandatory, high-specificity screen for the "high-risk phenotype"—the young female patient on hormonal therapy with a migraine-like presentation [18]. Furthermore, the incidental detection of optic atrophy in a glaucoma patient highlights the "collateral benefit" of the exam. Headache is a known symptom of subacute angle-closure glaucoma; without funduscopy, these patients risk irreversible vision loss while being treated for a "primary headache" [19,20].

A notable aspect of our study was the high volume of neuroimaging performed despite benign clinical presentations. In many primary care settings, physicians face immense pressure from patients to order CT scans for reassurance. While this often leads to over-utilization of resources, in this study, it served to validate the diagnostic yield of the ophthalmoscope. Our findings demonstrated that while CT was the "requested" test, it was frequent-

ly "blind" to the early stages of raised ICP of CVST and IIH.

By cross-checking every fundoscopic exam with a CT scan, we confirmed that funduscopy did not miss any cases of raised ICP that a CT might have picked up; conversely, funduscopy caught five critical cases (CVST/IIH) that the CT scans missed entirely. This reinforces that while a CT scan might satisfy a patient's demand for imaging, it is the fundoscopic exam that often provides the more life-saving data in the community setting

Limitations of the Study: This study was limited by the use of direct ophthalmoscopy, which has inherent operator dependency and may have reduced sensitivity for subtle papilledema compared to advanced techniques like optical coherence tomography or fundus photography. Additionally, the single-center design and lack of long-term follow-up may limit generalizability and assessment of false-negative cases.

Conclusion

Routine funduscopy remains a vital, low-cost safety net in the evaluation of headaches. It is particularly superior to NCCT in detecting conditions of raised intracranial pressure, such as CVST and IIH, which are otherwise easily overlooked. We recommend that funduscopy be considered an essential component of the physical exam for all headache patients presenting with red flags, and a mandatory screen for young women on hormonal contraceptives, regardless of the absence of focal neurological deficits. In the era of high-cost imaging, the "old-fashioned" ophthalmoscope remains one of the most cost-effective tools for ensuring patient safety and the judicious use of MRI/MRV resources.

Recommendations: Future studies should examine the cost-effectiveness of non-mydratic fundus photography as a screening modality and formulate clinical decision rules for variable risk factors for funduscopy. A multi-center prospective study would be of great help for determining risk factors for evaluating headaches for long-term follow-up.

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Original Article

Effects of Hamstring Strengthening Exercises over Quadriceps Strengthening Exercises in Osteoarthritis Knee

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Abstract

Background: Osteoarthritis (OA) ranks as the 11th leading cause of disability worldwide, with a 3.8% global prevalence of symptomatic knee OA in 2010, according to the WHO. Musculoskeletal illnesses, accounting for 6.8% of Disease Adjusted Life Years (DALYs), affect 15% of individuals over 60 and are increasing, as indicated by rising hip and knee replacements. **Objectives:** To evaluate the effects of Hamstring Strengthening Exercises in addition to quadriceps Strengthening on Pain and Functional Disability in Knee Osteoarthritis Patients. **Methods:** Before starting the study, formal ethical approval was obtained from the IRB of BSMMU. Patients were selected according to inclusion and exclusion criteria and informed written consent was taken after explaining the study's aims and procedures. Diagnosis of knee OA was based on ACR criteria and radiographic evidence (Kellgren and Lawrence grade $\leq$ II). Seventy participants were divided into two groups by lottery: Group A (intervention) received hamstring and quadriceps strengthening exercises with NSAIDs and Group B (control) received only quadriceps exercises with NSAIDs, both for 4 weeks. During follow up 4 patients lost. The study employed a semi-structured, pre-tested questionnaire alongside a Visual Analogue Scale (VAS) for pain assessment, a validated Bengali-language WOMAC questionnaire, an electronic scale, and a stadiometer for comprehensive data collection and evaluation of participants' responses and physical measurements. Baseline demographic and clinical data were collected using a semi-structured questionnaire. BMI was measured, and pain, physical function, stiffness and ROM were evaluated using the Visual Analogue Scale (VAS) and WOMAC index in Bengali. Follow-ups were recorded at each week for one month. T-tests and Chi square tests assessed differences in continuous and categorical variables, respectively. Paired T-tests evaluated changes in pain, physical function, and stiffness from baseline to end-point, and Student's T-test or Mann-Whitney U test assessed differences between groups. A p-value of less than 0.05 indicated statistical significance. **Results:** This study of 66 participants, evenly split between Group A and Group B, reveals no significant differences in age (mean ages: 49.27 ± 10.37 for Group A and 51.42 ± 9.77 for Group B, $p = 0.389$). Following treatment, Group A demonstrates greater improvements compared to Group B in pain reduction (VAS scores: 1.21 ± 1.11 vs. 2.27 ± 1.00 , $p < 0.001$), functional status (WOMAC scores: 26.96 ± 10.04 vs. 31.74 ± 7.99 , $p = 0.036$), and range of motion (flexion: 1.75 ± 2.16 vs. 3.45 ± 2.35 , $p = 0.003$; extension: 146.66 ± 4.78 vs. 143.18 ± 4.17 , $p = 0.002$). **Conclusion:** In conclusion, Group A demonstrated superior post-treatment outcomes in pain reduction, functional improvement, and range of motion compared to Group B.

Keywords: Knee osteoarthritis, hamstring strengthening, quadriceps strengthening, Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), Visual Analog Scale (VAS), rehabilitation.

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Introduction

Osteoarthritis (OA) is recognized by the World Health Organization (WHO) as a major public health problem and one of the leading causes of pain, disability, and reduced quality of life worldwide [1]. With the progressive ageing of the global population—particularly in low- and middle-income countries—the prevalence of OA is expected to rise substantially. Knee osteoarthritis, the most common form of OA affecting weight-bearing joints, has a profound impact on physical function and daily activities [2]. According to the Global Burden of Disease Study 2010, musculoskeletal disorders account for approximately 6.8% of disability-adjusted life years (DALYs), affecting up to 15% of individuals over 60 years of age [1]. OA is more prevalent in women than in men, and its increasing burden is strongly associated with population ageing and obesity (WHO Scientific Group on Rheumatic Diseases, 1992). Projections suggest that by 2050, more than 20% of the global population will be over 60 years of age, with nearly 15% experiencing symptomatic OA and one-third suffering from severe disability. This corresponds to an estimated 130 million individuals with OA worldwide, including approximately 40 million with significant functional impairment [3]. In addition to physical disability, OA imposes a substantial economic burden through healthcare costs, assistive devices, surgical interventions, and productivity loss [4].

Osteoarthritis is a progressive degenerative joint disorder characterized by deterioration of articular cartilage, alterations in subchondral bone, and involvement of the synovial joint capsule. It has a multifactorial etiology and affects nearly 60% of individuals above the age of 50 years [5]. Age-related degeneration and repetitive mechanical stress play a central role in disease development, while sex, anatomical alignment, and increased body mass index are recognized as major contributory factors. Clinically, knee OA presents with joint pain, stiffness, reduced range of motion, muscle weakness—particularly of the quadriceps—along with impaired proprioception and functional instability [6]. Patients may also demonstrate abnormal gait patterns, limb

malalignment, limping, and audible crepitus due to irregular joint surfaces⁵. The medial compartment of the tibiofemoral joint is most frequently affected in knee OA, making it the commonest weight-bearing joint involved [7]. As a result, patients often report difficulty with activities of daily living such as walking, stair climbing, and household tasks [8].

Radiographic joint space narrowing is commonly used as an indicator of disease progression, and plain radiography remains the conventional gold standard for classifying OA in clinical research. However, its limitations in accurately and reproducibly measuring joint space width—particularly in knee OA—have been well documented [9]. Increasing evidence suggests that the pathogenesis and progression of knee OA are not solely structural but are also influenced by neuromuscular dysfunction [10]. Muscle weakness, particularly of the quadriceps, and imbalance between quadriceps and hamstring strength—commonly expressed as the quadriceps-to-hamstring (Q:H) ratio—may adversely affect knee joint biomechanics. The musculature of the lower limb functions as a natural dynamic brace for the knee joint, contributing to load distribution and joint stability [11].

Current management of osteoarthritis is primarily aimed at symptom control, as no definitive curative treatment exists. The principal objectives of therapy include pain reduction, improvement of joint stability, and enhancement of functional performance. Rehabilitation and physiotherapy interventions, especially therapeutic exercise, are strongly recommended to counteract muscle wasting, atrophy, and functional decline associated with OA. Exercise programs may include aerobic conditioning, flexibility training, and muscle strengthening, delivered through land-based or aquatic modalities [5]. Among the muscle groups supporting the knee joint, the quadriceps and hamstrings play a pivotal role in controlling knee stability and movement. Due to their respective abduction and adduction moment arms, both muscle groups contribute to dynamic frontal plane knee stability [12]. Neuromuscular biomechanical

models further demonstrate that coordinated activation of the quadriceps and hamstrings supports moments in the frontal plane and along the abduction–adduction axis, thereby enhancing joint compression and stability [13]. Balanced co-contraction of these muscle groups may therefore play a critical role in optimizing knee joint mechanics in individuals with knee OA [5].

Although quadriceps strengthening has traditionally been emphasized in rehabilitation programs for knee osteoarthritis, emerging evidence highlights the importance of hamstring strength and optimal quadriceps–hamstring balance. However, strengthening the hamstring muscles alone may be insufficient to reduce perceived knee pain or improve functional limitations in patients with knee OA. This underscores the need to systematically evaluate and compare the effects of hamstring strengthening exercises versus quadriceps strengthening exercises on pain and functional outcomes in individuals with knee osteoarthritis.

Methods

This study was conducted as a randomized controlled trial (RCT) in the then Department of Physical Medicine and Rehabilitation, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, over a one-year period from July 2023 to June 2024. The study population comprised patients diagnosed with knee osteoarthritis attending the inpatient department (IPD), outpatient department (OPD), and the specialized clinic for Osteoarthritis, Osteoporosis, and Postmenopausal Muscle and Bone Health within the same department during the study period.

A total of 70 participants were enrolled using purposive sampling after fulfilling predefined inclusion and exclusion criteria. Eligible participants were randomly allocated into two groups. The first eligible participant was assigned to either the intervention group (Group A) or the control group (Group B) using a lottery method. Subsequently, alternate allocation was used to assign participants to each group to maintain randomization.

Participants in Group A (experimental group) received non-steroidal anti-inflammatory drug (NSAID) therapy in combination with hamstring and quadriceps strengthening exercises. Participants in Group B (control group) received NSAID therapy along with quadriceps strengthening exercises only.

Each exercise session lasted 30 minutes and was conducted over a four-week period.

Hamstring strengthening exercises were performed in the prone position, where participants flexed the knee from full extension toward the thigh and then slowly returned it to the extended position. Quadriceps strengthening exercises consisted of seated knee extension from a sitting position and straight leg raise (SLR) exercises performed in the supine position. The same quadriceps strengthening exercises were administered to participants in the control group⁵.

Participants aged over 40 years who were diagnosed with knee osteoarthritis according to the American College of Rheumatology (ACR) criteria and had radiographic evidence of knee OA of Kellgren–Lawrence grade II or below were included in the study. Both unilateral and bilateral knee osteoarthritis cases were eligible; however, in cases of bilateral involvement, only the more symptomatic knee was considered for analysis. Eligible participants were required to be able to ambulate independently for at least 10 meters, follow verbal instructions, and provide written informed consent prior to participation.

Participants were excluded if they had any serious medical condition that contraindicated participation in exercise therapy or had engaged in a structured muscle-strengthening exercise program within the preceding few months. Individuals with a history of knee trauma within the last three months, radiographic evidence of grade IV knee osteoarthritis requiring total knee replacement, or those who had received intra-articular knee injections within the previous three months were also excluded. Additionally, participants who had altered their pain medication regimen within one month prior to enrollment were not eligible for inclusion.

Baseline data including demographic characteristics, comorbidities, knee involvement, and anthropometric measurements (height, weight, and body mass index) were collected using a pre-tested semi-structured questionnaire. Pain, stiffness, and physical function were assessed weekly for four weeks using the Visual Analogue Scale (VAS) and the Bengali version of the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Measurements were obtained using standardized instruments, including an electronic weighing scale, stadiometer, and goniometer.

Data were collected, coded, and analyzed using Statistical Package for the Social Sciences (SPSS) version 26. Continuous variables were expressed as mean $\pm$ standard deviation (SD) or median (range), while categorical variables were presented as frequencies and percentages. Between-group comparisons were performed using independent t-tests and Chi-square tests. Within-group comparisons were analyzed using paired t-tests, and Mann-Whitney U tests were applied for non-parametric data. A p-value < 0.05 was considered statistically significant. Results were presented using tables and graphical representations.

Ethical approval for the study was obtained from the Institutional Review Board (IRB) of Bangabandhu Sheikh Mujib Medical University. Written informed consent was obtained from all participants prior to enrollment. All procedures were conducted in accordance with the Declaration of Helsinki. Participant adherence was monitored using attendance records and exercise logbooks. Missing data were handled using the last observation carried forward (LOCF) method. Participant recruitment, allocation, follow-up, and analysis are presented in a CONSORT flow diagram.

Results

The age distribution between Group A and Group B, showing no statistically significant differences. Group A includes 1 person (3%) aged ≤ 30 , 6 people (18.2%) aged 31-40, 14 people (42.4%) aged 41-50, 7 people (21.2%) aged 51-60, and 5 people (15.2%) aged 61-70. Group B includes no one aged ≤ 30 , 5

people (15.2%) aged 31-40, 10 people (30.3%) aged 41-50, 13 people (39.3%) aged 51-60, and 5 people (15.2%) aged 61-70. The mean age is 49.27 ± 10.37 for Group A and 51.42 ± 9.77 for Group B. The p-values for the chi-square test (0.469) and t-test (0.389) indicate that the age differences between the groups are not significant.

Pre-treatment VAS scores are similar (5.69 ± 1.13 vs 6.15 ± 0.71 , $p=0.056$), but post-treatment VAS scores indicate greater pain reduction in Group A (1.21 ± 1.11 vs 2.27 ± 1.00 , $p<0.001$) (Table I). Pre-treatment WOMAC scores are comparable (48.38 ± 9.54 vs 46.73 ± 6.04 , $p=0.407$), while post-treatment WOMAC scores show better functional improvement in Group A (26.96 ± 10.04 vs 31.74 ± 7.99 , $p=0.036$). ROM in flexion and extension is similar pre-treatment (flexion: 6.60 ± 3.58 vs 6.96 ± 2.87 , $p=0.651$; extension: 137.75 ± 7.59 vs 134.93 ± 4.94 , $p=0.080$). Post-treatment, Group A exhibits significantly better ROM improvements in both flexion (1.75 ± 2.16 vs 3.45 ± 2.35 , $p=0.003$) and extension (146.66 ± 4.78 vs 143.18 ± 4.17 , $p=0.002$). Overall, Group A shows greater post-treatment improvements in pain, function, and range of motion compared to Group B.

Initially, there was no significant difference in VAS scores between Group A (5.69 ± 1.13) and Group B (6.15 ± 0.71) before treatment ($p=0.056$, not significant). However, significant differences were observed after treatment: Group A showed consistently lower scores compared to Group B after the 1st week (4.18 ± 1.23 vs. 5.15 ± 0.83 , $p<0.001$), 2nd week (3.06 ± 1.11 vs. 4.06 ± 0.86 , $p<0.001$), 3rd week (2.06 ± 1.17 vs. 3.03 ± 0.84 , $p<0.001$), and 4th week (1.21 ± 1.11 vs. 2.27 ± 1.01 , $p<0.001$) (Table II). This indicates that Group A experienced a more significant reduction in pain intensity over the course of treatment compared to Group B.

Initially, there were no significant differences in WOMAC scores between Group A (48.38 ± 9.54) and Group B (46.73 ± 6.04) before treatment ($p=0.407$, not significant). Over the course of treatment, no significant differences were observed after the 1st week (Group A: 43.45 ± 10.19 , Group B: 42.65 ± 6.36 , $p=0.715$), 2nd week

(Group A: 37.27 ± 9.98 , Group B: 38.09 ± 8.31 , $p=0.720$), and 3rd week (Group A: 30.81 ± 9.96 , Group B: 34.75 ± 8.20 , $p=0.094$). However, by the 4th week, Group A (26.96 ± 10.04) showed significantly lower WOMAC scores compared to Group B (31.74 ± 7.99 , $p=0.036$) (Table III). This suggests that while both groups initially had similar scores, Group A experienced a more significant improvement in WOMAC scores after four weeks of treatment compared to Group B.

Initially, there were no significant differences in ROM between Group A (6.60 ± 3.58) and Group B (6.96 ± 2.87) before treatment ($p=0.651$, not significant). However, significant improvements in ROM were observed over the course of treatment for both groups. By the 4th week, Group A showed a significant increase in ROM (1.75 ± 2.16) compared to Group B (3.45 ± 2.35 , $p=0.003$), indicating a more pronounced improvement in

flexion ability for Group A following treatment (Table IV). This suggests that the treatment regimen in Group A may have been more effective in enhancing flexion ROM compared to Group B over the four-week period.

Initially, there were no significant differences in ROM between Group A (137.75 ± 7.59) and Group B (134.93 ± 4.94) before treatment ($p=0.080$, not significant). However, significant improvements in ROM were observed consistently over the four-week period for both groups. By the end of the treatment period, Group A demonstrated significantly greater ROM in extension compared to Group B: 146.66 ± 4.78 versus 143.18 ± 4.17 ($p=0.002$) (Table V). This indicates that while both groups started with similar ROM levels, Group A experienced a more substantial improvement in extension ROM following treatment compared to Group B.

Table I. Pre- and post-intervention (4th week) comparison of variables by group (N=66).

Variables	Group A (n=33) Mean $\pm$ SD	Group B (n=33) Mean $\pm$ SD	p value
Pre-treatment VAS	5.69 ± 1.13	6.15 ± 0.71	0.056 ^{ns}
Post treatment VAS	1.21 ± 1.11	2.27 ± 1.00	<0.001 ^s
Pre-treatment WOMAC score	48.38 ± 9.54	46.73 ± 6.04	0.407 ^{ns}
Post treatment WOMAC score	26.96 ± 10.04	31.74 ± 7.99	0.036 ^s
Pre-treatment ROM (flexion)	6.60 ± 3.58	6.96 ± 2.87	0.651 ^{ns}
Post treatment ROM (flexion)	1.75 ± 2.16	3.45 ± 2.35	0.003 ^s
Pre-treatment ROM (extension)	137.75 ± 7.59	134.93 ± 4.94	0.080 ^{ns}
Post treatment ROM (extension)	146.66 ± 4.78	143.18 ± 4.17	0.002 ^s

Data presented as frequency and percentage over columns. Unpaired t-test performed for normally distributed continuous (quantitative) variables. ns = non- significant s = significant.

Table II. Pre- and post-intervention (week by week) comparison of VAS by group (N=66).

VAS	Group A (n=33) Mean $\pm$ SD	Group B (n=33) Mean $\pm$ SD	p value
Pre-treatment	5.69 ± 1.13	6.15 ± 0.71	0.056 ^{ns}
After 1st week	4.18 ± 1.23	5.15 ± 0.83	<0.001 ^s
After 2nd week	3.06 ± 1.11	4.06 ± 0.86	<0.001 ^s
After 3rd week	2.06 ± 1.17	3.03 ± 0.84	<0.001 ^s
After 4th week	1.21 ± 1.11	2.27 ± 1.01	<0.001 ^s

Data presented as frequency and percentage over columns. Unpaired t-test performed for normally distributed continuous (quantitative) variables. ns = non- significant s = significant.

Table III. Pre- and post-intervention (week by week) comparison of WOMAC by group (N=66).

WOMAC	Group A (n=33) Mean $\pm$ SD	Group B (n=33) Mean $\pm$ SD	<i>p</i> value
Pre-treatment	48.38 $\pm$ 9.54	46.73 $\pm$ 6.04	0.407 ^{ns}
After 1st week	43.45 $\pm$ 10.19	42.65 $\pm$ 6.36	0.715 ^{ns}
After 2nd week	37.27 $\pm$ 9.98	38.09 $\pm$ 8.31	0.720 ^{ns}
After 3rd week	30.81 $\pm$ 9.96	34.75 $\pm$ 8.20	0.094 ^{ns}
After 4th week	26.96 $\pm$ 10.04	31.74 $\pm$ 7.99	0.036 ^s

Data presented as frequency and percentage over columns. Unpaired t-test performed for normally distributed continuous (quantitative) variables. ns = non- significant s = significant.

Table IV. Pre- and post-intervention (week by week) comparison of ROM (flexion) by group (N=66).

ROM (flexion)	Group A (n=33) Mean $\pm$ SD	Group B (n=33) Mean $\pm$ SD	<i>p</i> value
Pre-treatment	6.60 $\pm$ 3.58	6.96 $\pm$ 2.87	0.651 ^{ns}
After 1st week	5.81 $\pm$ 3.21	6.24 $\pm$ 2.63	0.560 ^{ns}
After 2nd week	4.24 $\pm$ 2.98	5.09 $\pm$ 2.96	0.251 ^{ns}
After 3rd week	2.60 $\pm$ 2.37	4.18 $\pm$ 2.56	0.012 ^s
After 4th week	1.75 $\pm$ 2.16	3.45 $\pm$ 2.35	0.003 ^s

Data presented as frequency and percentage over columns. Unpaired t-test performed for normally distributed continuous (quantitative) variables. ns = non- significant s = significant.

Table V. Pre- and post-intervention (week by week) comparison of ROM (extension) by group (N=66).

ROM (extension)	Group A (n=33) Mean $\pm$ SD	Group B (n=33) Mean $\pm$ SD	<i>p</i> value
Pre-treatment	137.75 $\pm$ 7.59	134.93 $\pm$ 4.94	0.080 ^{ns}
After 1st week	140.48 $\pm$ 6.60	136.63 $\pm$ 4.90	0.009 ^s
After 2nd week	143.51 $\pm$ 5.99	139.84 $\pm$ 4.59	0.007 ^s
After 3rd week	147.72 $\pm$ 8.01	141.90 $\pm$ 4.42	0.001 ^s
After 4th week	146.66 $\pm$ 4.78	143.18 $\pm$ 4.17	0.002 ^s

Data presented as frequency and percentage over columns. Unpaired t-test performed for normally distributed continuous (quantitative) variables. ns = non significant s = significant.

Discussion

In this study, age distribution of study participants, indicating no significant difference between Group A (n=33) and Group B (n=33) ($p=0.469$). Group A had an average age of 49.27 ± 10.37 years, while Group B averaged 51.42 ± 9.77 years ($p=0.389$). Hafez et al. (2013) found that the age of their participants ranged between 50 and 65 years, with a mean age of 57.65 ± 4.78 years [5]. This did not support our findings as the age range of our study participants was 49-51 years. Sadeghi et al.

observed that the mean age of the all participants was 52.70 ± 9.15 years [14]. The results showed no significant difference between intervention and control groups considering age, which supported our findings.

This study showed significant improvements in Group A post-treatment in VAS (5.69 ± 1.13 to 1.21 ± 1.11), WOMAC (48.38 ± 9.54 to 26.96 ± 10.04), ROM flexion (6.60 ± 3.58 to 1.75 ± 2.16), and ROM extension (137.75 ± 7.59 to 146.66 ± 4.78) ($p < 0.001$ for all). This study revealed significant improve-

ments in Group B post-treatment in VAS (6.15 ± 0.71 to 2.27 ± 1.00), WOMAC (46.73 ± 6.04 to 31.74 ± 7.99), ROM flexion (6.96 ± 2.87 to 3.45 ± 2.35), and ROM extension (134.93 ± 4.94 to 143.18 ± 4.17) ($p < 0.001$ for all).

Al-Johani et al. (2014) observed significant differences between pre- and post- intervention measures in both groups, particularly in pain assessed by VAS, functional walking speed (FWS), muscle strength, and WOMAC scores [15]. The first group showed more pronounced improvements in WOMAC scores (pain, stiffness, physical function, total) compared to the second group, as well as greater gains in quadriceps muscle strength, likely due to enhanced muscle balance between quadriceps and hamstring muscles. Improved range of motion (ROM) observed may be attributed to the stretching exercises, which enhance muscle flexibility, reduce shortening, alleviate pain, and increase ROM. Strengthening exercises likely sustained this improvement, enabling patients to engage in more activities of daily living and enhancing functional performance.

Evidence suggests that stretching and strengthening exercise decrease pain and improve muscular strength, functional ability and psychological well-being [16]. Exercise increases muscle endurance, improves proprioceptive acuity and decreases arthrogenic muscle inhibition of the quadriceps [17]. Sufficient quadriceps and hamstrings strength, both isometric and dynamic, is essential for undertaking basic activities of daily living such as standing and walking [18]. Muscle strength testing has revealed that those with knee OA have a 25% to 45% loss of knee extension strength and a 19% to 25% loss of knee flexion strength [19-22]. The strengthening exercises on the hamstring muscle has been found to enhance the functional ability of a deficient knee [23, 24]. This is probably due to an overall increase in both the hamstring and quadriceps strength, increase in the hamstring to quadriceps ratio (H:Q), and minimization of anterior-lateral subluxation of the tibia [25]. The stretching exercises should be carried out in conjunction with strengthening exercises. If a specific muscle group is restricted, more emphasis may be placed on that area, but there must be

stretching of all the major muscle groups of the lower limb, because they all have an effect on the biomechanics of the knee. Patients should be instructed to hold a stretch for 20–30 seconds in order for it to be effective [26]. In addition to its sedative effect, stretching exercise increases knee capsule extensibility and joint range of motion [27]. Stretching of hamstrings muscles increases the ROM of end extension of the knee giving more power and stability to the joint, thereby decreasing pain, and increasing ROM resulting in improvement of activities of daily living. The strength relationship between the quadriceps femoris and hamstring muscles has been measured and reported by various researchers, and it is important for the stability of the knee and for protection from excessive stress [28].

This study compared both groups, showing similar pre-treatment VAS scores but significantly lower post-treatment VAS in Group A (1.21 ± 1.11 vs. 2.27 ± 1.00 , $p < 0.001$). Post-treatment WOMAC scores were better in Group A (26.96 ± 10.04 vs. 31.74 ± 7.99 , $p = 0.036$). Group A also showed greater improvements in ROM flexion (1.75 ± 2.16 vs. 3.45 ± 2.35 , $p = 0.003$) and extension (146.66 ± 4.78 vs. 143.18 ± 4.17 , $p = 0.002$).

Hafez et al. (2013) found significance differences between pre-treatment and post- treatment measures of pain intensity (measured by VAS), the 50-ft walk test time, muscle strengths, and WOMAC scores [5]. There was a significant difference between pre- treatment and post-treatment measures of pain due to the increase in the power of the quadriceps muscles and stretching of the hamstring muscles. This breaks down the cycle of pain by decreasing muscle spasm, increasing muscle strength and improving circulation, which decreases the concentration of metabolites. The increased power of the quadriceps muscles also improves ROM and functional performance. The improvement in ROM of knee extension occurs secondary to pain reduction, which is responsible for the improvement in muscle function. The improvement in ROM may be due to the influence of the stretching exercises, which increase muscle flexibility, leading to reduced muscle shortening, decreased pain and increased ROM. When main-

tained by strengthening exercises, this may lead to increased practice of activities of daily living and, therefore, improved functional performance. These findings suggest that inclusion of hamstring strengthening in rehabilitation programs can enhance knee joint stability and functional outcomes, supporting its integration into standard OA management protocols

Limitations of the Study

1. Small sample size of 66 participants may limit generalizability.
2. Lack of blinding among participants and researchers could introduce bias.
3. Short duration of the intervention may not capture long-term effects.
4. Reliance on self-reported measures for pain and functional assessments introduces subjectivity.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this study. The study was conducted independently, and no financial or personal relationships with individuals or organizations influenced the design, conduct, analysis, or reporting of the results.

Conclusion

Strengthening the hamstring muscles in addition to strengthening the quadriceps muscles proved to be beneficial for perceived knee pain, range of motion, and decreasing the limitation of functional performance of patients with knee OA.

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Original Article

Comparison of Maternal Outcome in Between Term & Preterm PROM

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Abstract

Background: Pre-labor rupture of membranes (PROM) is the term for fetal membrane rupture that occurs before labor begins. PROM is found in 3–15% of pregnancies worldwide and in 30–40% of occurrences of premature labor. Due to the longer time until delivery and fetal immaturity, preterm PROM (Premature Rupture of Membranes) carries significantly higher risks of severe infections (chorioamnionitis, endometritis), sepsis, placental abruption, hemorrhage, and even death. Although term PROM increases the risk of infection, it is advised to deliver the baby as soon as possible (usually within 12 to 24 hours) in order to minimize these difficulties, even though this may lead to a higher percentage of C-sections. **Objective:** To compare maternal outcome in between term & preterm PROM. **Materials and methods:** From December 2024 to June 2025, the Department of Obstetrics & Gynecology at Dhaka Medical College Hospital conducted a cross-sectional observational study. Premature rupture of membranes caused all pregnant women to be admitted to the Obs & Gyne Department at DMCH Hospital. This study comprised a total of 100 patients. **Results:** According to this study, the mean $\pm$ SD for preterm PROM was 26.30 ± 4.53 years, while the mean $\pm$ SD for term PROM was 25.56 ± 4.86 years. Between rupture of membranes and delivery, 44% of PROM patients experienced labor pain within 24 hours in preterm PROM, 16% went into labor within 12 hours, and 22% of PROM patients never experienced labor pain in per-term PROM. However, in preterm PROM, 38% of patients experienced labor pain within 24 hours, 18% went into labor within 12 hours, and 30% of PROM patients never experienced labor pain in term PROM. The most common cause of maternal morbidity (56%) was puerperal sepsis. However, 10% had chorioamnionitis, 56% had puerperal sepsis, and 34% had normal PROM. **Conclusion:** medical professionals should focus on women with pregnancy-related risks and promote counseling, early identification, and treatment of infections in order to reduce pre-labor rupture of membranes and improve maternal health.

Keywords: Premature rupture of membranes (PROM), maternal outcomes, Term PROM, preterm PROM.

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Introduction

Premature rupture of membrane (PROM) is described as rupture of the membrane before to the commencement of labor; if this occurs before 37 weeks of gestation, it is referred to as preterm PROM; if it occurs beyond 37 weeks, it is referred to as term PROM [1-4]. Shearing pressures from uterine contraction mixed with physiological changes may cause the membrane to deteriorate at term [5-7]. Preterm prom is most likely caused

by the same mechanism. Additionally, early PROM seems to be associated with underlying pathologic processes, most likely as a result of membrane infection or inflammation.

Lower socioeconomic level, sexually transmitted diseases, past premature delivery (particularly from PROM), vaginal hemorrhage, cervical colonization, and cigarette smoking during pregnancy are all linked to an increase in PROM. However, PROM can frequently happen in the absence of known

risk factors. PROM is the delivery method in 30–40% of premature newborns and occurs in 2-3.5% of pregnancies [8-11].

PROM is caused by a complex pathological process. The pathogenesis of PROM may be significantly influenced by infection, with ascending vaginal infection leading to membrane rupture from decidua infection, chorioamnionitis, or fetal infection. PROM may result from the amnion and chorion being weakened by collagenases, mucinases, and proteases produced by vaginal bacteria. The danger of intrauterine infection, which rises with the length of membrane rupture, is the biggest maternal risk of term PROM. 9, 12, 13, 14 Umbilical cord compression and maternal infection are two perinatal morbidities linked to PROM. because of oligohydramnios, abruptio placenta, newborn infection, and morbidities associated with preterm birth, such as sepsis, necrotizing enterocolitis, intraventricular hemorrhage, and respiratory distress syndrome [9, 12-15].

Chorioamnionitis, endometritis, placentitis, increased operational interference, and puerperal sepsis are the main side effects of PROM. Although it is rare, premature membrane rupture in the middle trimester (16–26 weeks) can happen with or without bleeding and infection [16].

Due to the longer time until delivery and fetal immaturity, preterm PROM (Premature Rupture of Membranes) carries significantly higher risks of severe infections (chorioamnionitis, endometritis), sepsis, placental abruption, hemorrhage, and even death. Although term PROM increases the risk of infection, it is advised to deliver the baby as soon as possible (usually within 12 to 24 hours) in order to minimize these difficulties, even though this may lead to a higher percentage of C-sections.

Materials & methods

It was a cross-sectional comparative analysis. Dhaka Medical College Hospital's obstetrics and gynecology department. between December 2024 and June 2025. Every pregnant patient who had an early rupture of membranes was admitted to the Department of Obstetrics & Gynecology at Dhaka Medical College. This study comprised a total of 100 patients. Purposive sequential sampling was

the method used. Pre-designed data collection sheets were used to collect the data. The statistical package for social science (SPSS) for Windows version 20 was used to examine the data.

Confidentiality was upheld. The subjects received a thorough explanation of the study's goals and objectives. No research or interventions were carried out without the subjects' permission. The research participants gave their informed, free agreement to participate in the study.

Result

It was found that out of 50 patients 19 cases were negative vaginal swab culture 31 cases were positive high vaginal swab culture in preterm PROM. On other hand in term PROM out of 50 patients 21 cases were negative vaginal swab culture 29 cases were positive high vaginal swab culture. Only aerobic culture was done of them E.coli was found most common pathogen 17 cases (34%) in preterm PROM and 19 cases (38%) in term PROM (Table-I). The difference was statistically not significant ($P>0.05$).

It was shown that 44% of PROM patients had developed labor pain within 24 hours in preterm PROM and 16% patients went to labor less than 12 hours and 22% PROM patients never have had labor pain in Per-term PROM. On the other hand 38% of PROM patients had developed labor pain within 24 hours in preterm PROM and 18% patients went to labor less than 12 hours and 30% PROM patients never have had labor pain in term PROM (Table-II).

It was found that time interval between rupture membrane and delivery, 24% were <12 hours, 52% were 12-24 hours, 10% were 24-48 hours and 14% were > 48 hours in preterm PROM. On other hand in term PROM 28% were <12 hours, 56% were 12-24 hours, 6% were 24-48 hours and 10% were > 48 hours (Table-III). The difference was statistically not significant ($P>0.05$).

In case of maternal outcome, 34% were no complication, 56% were puerperal sepsis and 10% were chorioamnionitis in preterm PROM. On the other hand, in term PROM 34% were normal, 56% were puerperal sepsis and 10% were chorioamnionitis. So, it indicated that maternal complication was more in preterm PROM than term PROM (Table-IV) but the difference was statistically not significant ($P>0.05$).

Table I. High vaginal swab culture of patient with PROM (n=140).

Cause	Preterm PROM n (%)	Term PROM n (%)	p value
Negative swab culture	19 (38)	21 (42)	0.728
Positive swab culture	31 (62)	29 (58)	0.723
Escherichia coli	17 (34)	19 (38)	0.731
staphylococcus	4 (8)	5 (10)	0.739
Group B Streptococcus	3 (6)	2 (4)	0.672
Proteus	1 (2)	1 (2)	0.100
Klebsiella	1 (2)	0 (0)	-
Others	5 (10)	2 (4)	0.257

Data were analysis using chi-square and fisher exact test.

Table II. Interval between PROM and onset of labor pain (=150).

Latent period (hours)	Preterm PROM n (%)	Term PROM n (%)	p value
<12	8 (16)	9 (18)	0.744
12-24	22 (44)	19 (38)	0.721
>24-48	5 (10)	4 (8)	0.747
>96	4 (8)	3 (6)	0.743
No pain	11 (22)	15 (30)	0.433

Data were analysis using chi-square and fisher exact test.

Table III. Time interval between rupture membrane and delivery.

Duration between PROM & delivery (hours)	Preterm PROM n (%)	Term PROM n (%)	p value
<12	12 (24)	14 (28)	0.719
12-24	26 (52)	28 (56)	0.699
24-48	5 (10)	3 (6)	0.449
>48	7 (14)	5 (10)	0.631

Data were analysis using chi-square test.

Table IV. Maternal outcome (100).

Maternal outcome	Preterm PROM n (%)	Term PROM n (%)	p value
No complication	17 (34)	28 (56)	0.083
Puerperal sepsis	28 (56)	18 (36)	
Chorioamnionitis	5 (10)	4 (8)	

Data were analysis using chi-square and fisher exact test.

Discussion

The majority of patients who have a term pregnancy with PROM will go into labor and give birth on their own. In this study, 44% of preterm PROM patients experienced labor pain within 24 hours of rupture of the membranes, 16% experienced labor within 12 hours, and 22% of per-term PROM patients never experienced labor pain. However, in

preterm PROM, 38% of patients experienced labor pain within 24 hours, 18% went into labor within 12 hours, and 30% of PROM patients never experienced labor pain in term PROM. These results were in line with the earlier investigation [17].

When opposed to the PROM group, the PPROM group had a noticeably longer latency period, which increased with the lower gestational age

(28+0–31+6 weeks).

According to my research, in preterm PROM, 24% of the time gap between rupture membrane and birth was less than 12 hours, 52% was between 12 and 24 hours, 10% was between 24 and 48 hours, and 14% was more than 48 hours. However, in terms of PROM, 28% were less than 12 hours, 56% were between 12 and 24 hours, 6% were between 24 and 48 hours, and 10% were more than 48 hours. The gestational age at which membrane rupture occurs has a significant impact on the prognosis.

Results are usually good after PROM at term. At least 50% of patients with preterm PROM give birth within 7 days of membrane rupture. Although it is uncommon, fluid leaking can stop and the amniotic fluid volume can return to normal with positive results. Pre-term PROM carries a comparatively significant risk of complications. The risk of maternal infection rises as the latency period lengthens, although neonatal problems linked to severe prematurity fall [18-20]. PROM is a serious obstetric issue. It produces significant maternal morbidity and is the cause of almost all premature deliveries. Puerperal sepsis accounted for 56% of maternal morbidity in my study.

However, 10% had chorioamnionitis, 56% had puerperal sepsis, and 34% had normal PROM. It's possible that bacteria that invade the endocervix are more frequently found there. In her study, Begum et al. [21] found that puerperal sepsis was approximately 21.6% and maternal morbidity was 29%. In her study, Tran et al. [22] reported 47% maternal morbidity, of which 31% had chorioamnionitis and 7% had puerperal sepsis.

Medical professionals should be aware that maternal sepsis can quickly lead to death. For instance, a French study on maternal mortality found that the median period between PPROM and the onset of infection was five days, but the median time between infection diagnosis and death was just eighteen hours [23].

Conclusion

According to this study, multipara respondents made up the majority. Therefore, in order to lower the incidence of preterm PROM, numerous pregnancies should be avoided. There is evidence linking genital tract infections to an increased risk of preterm PROM. Therefore, using oral antibiotics

during prenatal visits may lower the risk of preterm PROM. Use of the healthcare services that are accessible and practicing better cleanliness would help to avoid preterm PROM issues and guarantee a better pregnancy outcome.

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Original Article

Sociodemographic Characteristics of Childhood Asthma in Bangladeshi Population: An Observational Study

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Abstract

Background: Childhood asthma is a growing public health concern in Bangladesh. Understanding the sociodemographic profile of affected children is essential for targeted preventive and management strategies. **Objectives:** To describe the sociodemographic and early-life characteristics of children with asthma attending a tertiary care hospital in Bangladesh. **Methods:** This hospital-based cross-sectional observational study was conducted at the Department of Paediatrics, Rajshahi Medical College Hospital. A total of 104 children aged <12 years with physician-diagnosed asthma were enrolled over twelve months. Sociodemographic and early-life variables were collected through structured interviews and analyzed using SPSS version 24. Continuous variables were expressed as mean $\pm$ SD and categorical variables as frequency and percentage. **Result:** The mean age of children was 7.97 ± 2.06 years. The majority (43.3%) were aged 8–<10 years. Male children constituted 55.8% (male: female ratio 1.26:1). Most parents were aged 30–40 years (59.6%). Urban residence was observed in 70.2% of cases. Regarding parental education, 27.9% completed higher secondary certificate (HSC), 26% below SSC, and 18.3% were illiterate. Monthly family income was most commonly 10,000–20,000 BDT (39.4%). Cesarean section delivery was reported in 58.7% of children. Only 38.5% had exclusive breastfeeding for six months. Family history of asthma was present in 32.7% of cases. Most families (63.5%) had two children. **Conclusion:** Childhood asthma in this tertiary-care cohort was more common among school-aged boys, urban residents, and middle-income families. A considerable proportion had cesarean birth history and lacked exclusive breastfeeding. These findings highlight potential sociodemographic and early-life patterns relevant for asthma risk profiling in Bangladesh.

Keywords: Childhood asthma, sociodemographic profile, Bangladesh, observational study, paediatric epidemiology.

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Background

Asthma is one of the most common chronic respiratory diseases affecting children worldwide and it represents a major public health challenge, mainly in low- and middle-income countries. It is characterized by chronic airway inflammation, variable airflow limitation, and recurrent episodes of wheezing, chest tightness, cough, and shortness of breath. [1, 2] Globally, approximately 300 million individuals are affected by asthma, and this number is projected to increase to 400 million by 2025. [3] The International Study of Asthma and Allergies in Childhood (ISAAC) reported a global prevalence of 11% among children aged 6–7 years

and 14% among those aged 13–14 years. [4]

In South Asia, the burden of childhood asthma is increasing steadily. In Bangladesh, asthma remains a significant contributor to pediatric morbidity. A community-based study in a coastal area of Bangladesh reported a childhood asthma prevalence of 11.8%, [5] while the National Asthma Prevalence Study identified asthma symptoms in 7.3% of children aged 5–14 years. [6] Asthma is associated with substantial school absenteeism, activity limitation, and impaired quality of life. [7] Poorly controlled asthma during childhood may also predispose individuals to chronic obstructive pulmonary disease later in life. [8, 9]

Sociodemographic and early-life factors are increasingly recognized as important determinants of asthma risk and disease expression. Urban residence has been linked with higher asthma prevalence, possibly due to environmental pollution and lifestyle changes. [10, 11] Mode of delivery, particularly cesarean section, has been associated with altered immune development and increased risk of allergic diseases, including asthma. [12] Exclusive breastfeeding has been suggested to have a protective effect against allergic sensitization and respiratory illnesses. [13] Furthermore, genetic predisposition plays a role, as family history remains a recognized risk factor. [14]

Despite the growing burden of childhood asthma in Bangladesh, limited hospital-based data exist describing the sociodemographic distribution and early-life characteristics of affected children. Understanding these patterns is essential for risk stratification, targeted prevention strategies, and resource allocation. Therefore, this study aimed to describe the sociodemographic characteristics of children with asthma attending a tertiary care hospital in Bangladesh.

Materials and Methods

This hospital-based cross-sectional observational study was conducted in the Department of Pediatrics at Rajshahi Medical College Hospital, Bangladesh, over a twelve-month period (February 2022 to January 2023) following ethical approval from the Ethical Review Committee (Ref.-RMC/ER-C/2022/57). A total of 104 children aged less than 12 years with physician-diagnosed bronchial asthma along with their parents, who attended inpatient and outpatient department of Pediatrics, were enrolled using purposive sampling after fulfilling inclusion and exclusion criteria. All the patients Children with asthma for at least one year whose parents provided informed written consent were included, while those with significant comorbidities such as cystic fibrosis, tuberculosis, cardiac disease, or immunodeficiency were excluded. Data were collected through direct, in-person interviews utilizing a predesigned and structured questionnaire. Socio-demographic variables included child's age, gender, mode of delivery, exclusive breastfeeding history, family history of asthma, number of siblings, parental age, education, monthly family

income, and place of residence (urban/rural). All collected data were checked, coded, and entered into SPSS version 24.0 for analysis. Continuous variables were expressed as mean with standard deviation, and categorical variables were presented as frequencies and percentages. A p-value of less than 0.05 was considered statistically significant where applicable.

Results and Observation

A total of 104 children with physician-diagnosed asthma were included in the study. The mean age of the children was 7.97 ± 2.06 years, with the majority (43.3%) belonging to the 8–<10 years age group, followed by 22.1% in the 6–<8 years group, 21.2% in the 10–12 years group, and 13.5% in the 2–<6 years group (Figure 1). Male children constituted 55.8% of the study population, while females accounted for 44.2%, yielding a male-to-female ratio of approximately 1.26:1 (Figure 2). Most parents (59.6%) were aged between 30–40 years, followed by 26.9% aged 20–30 years and 13.5% aged over 40 years (Figure 3). Regarding residence, 70.2% of the children were from urban areas, whereas 29.8% were from rural areas (Figure 4). In terms of educational status, 27.9% of parents had completed higher secondary education (HSC), 26% had education below SSC, 21.1% had completed SSC, 18.3% were illiterate, and only 6.7% were graduates or above (Figure 5). Monthly family income was most commonly between 10,000–20,000 BDT (39.4%), followed by less than 10,000 BDT (26%), more than 40,000 BDT (20.2%), and 20,000–40,000 BDT (14.4%) (Figure 6). Cesarean section was the mode of delivery in 58.7% of cases, while 41.3% were delivered by normal vaginal delivery (Figure 7). Only 38.5% of children had a history of exclusive breastfeeding for the first six months, whereas 61.5% received mixed feeding (Figure 8). Most families (63.5%) had two children, 22.1% had one child, and 14.4% had more than two children (Figure 9). Family history of asthma was present in 32.7% of cases, while 67.3% reported no such history (Figure 10).

Overall, childhood asthma in this tertiary-care cohort was predominantly observed among school-aged male children from urban, middle-income families, with a notable proportion having cesarean birth history and absence of exclusive breastfeeding.

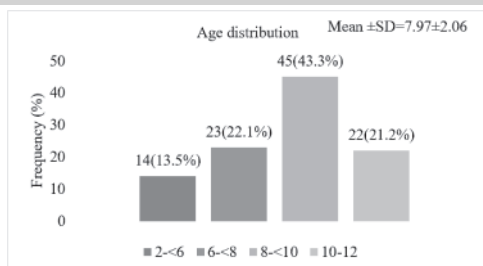


Figure 1: Age distribution of the study participants (n=104).

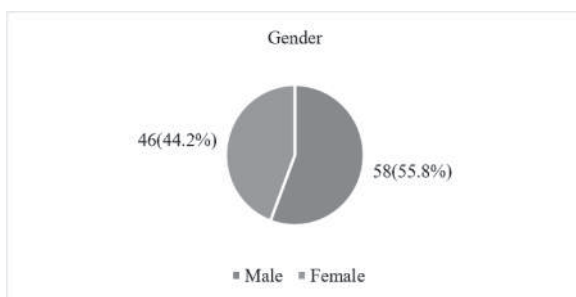


Figure 2: Gender distribution of the study participants (n=104).

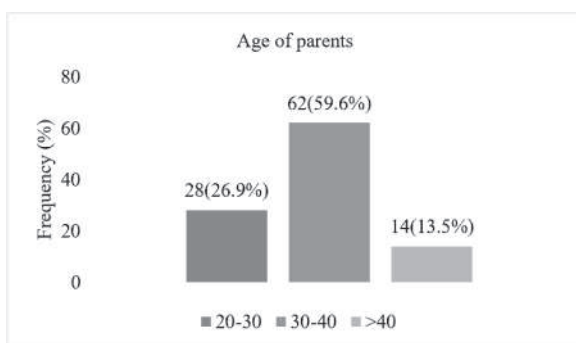


Figure 3: Age distribution of the parents of study participants (n=104).

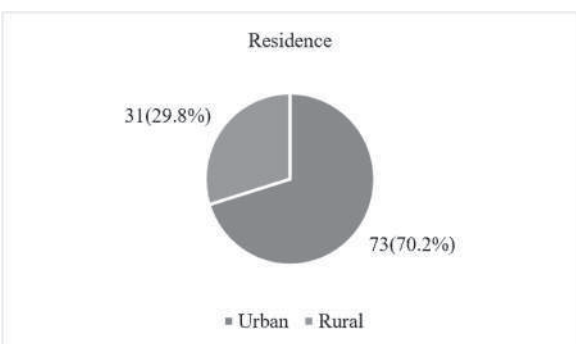


Figure 4: Residence of the parents of study participants (n=104).

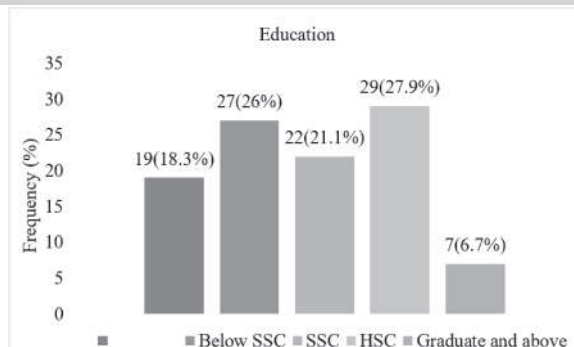


Figure 5: Education of the parents of study participants (n=104).

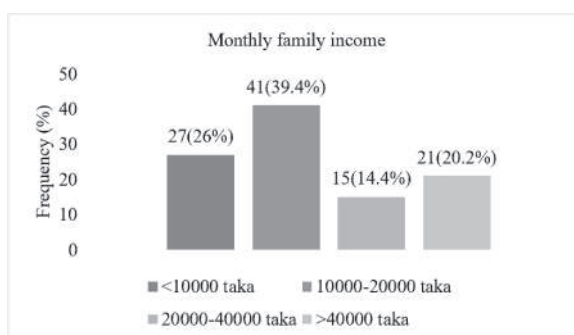


Figure 6: Monthly family income of the parents of study participants (n=104).

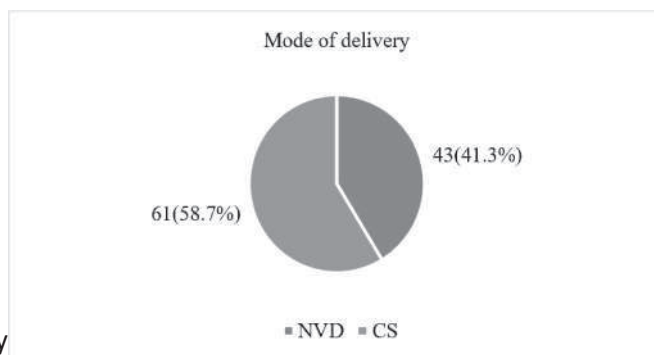


Figure 7: Mode of delivery of the study participants (n=104).

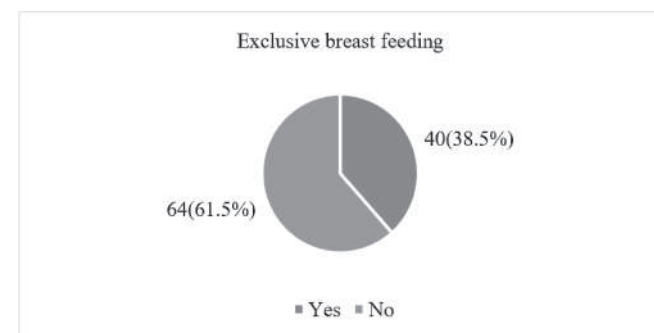


Figure 8: Exclusive breast feeding history of the study participants (n=104).

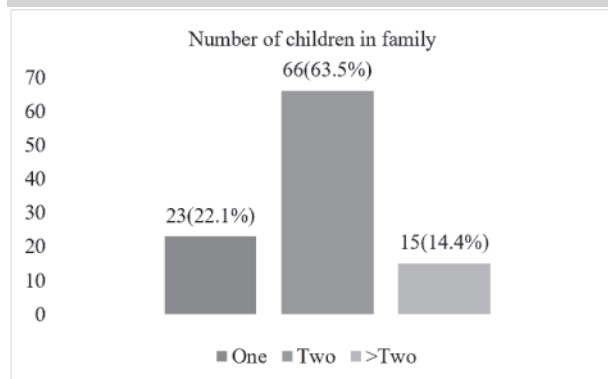


Figure 9: Number of children in a family (n=104)

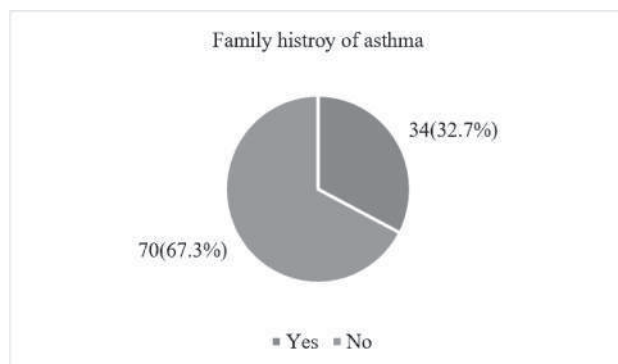


Figure 10: Family history of asthma in the study participants (n=104).

Discussion

This observational study describes the sociodemographic and early-life characteristics of children with asthma attending a tertiary care hospital in Bangladesh. The findings indicate that childhood asthma in this cohort was more common among school-aged children, males, urban residents, and middle-income families, with notable proportions having cesarean birth history, absence of exclusive breastfeeding, and positive family history of asthma.

In the present study, the mean age of affected children was approximately eight years, with the highest proportion (43.3%) belonging to the 8–<10 years age group. This aligns with global epidemiological data indicating that asthma prevalence peaks during school age, when environmental exposure and school-related triggers become more prominent.⁴ Male predominance (55.8%) was observed, consistent with previous reports suggesting higher asthma prevalence in boys during childhood, potentially due to smaller airway caliber relative to lung size and hormonal influences. [4, 14]

Urban residence accounted for 70.2% of cases,

supporting evidence that urbanization is associated with higher asthma prevalence. Studies have demonstrated that exposure to air pollution, traffic-related nitrogen dioxide (NO₂), indoor allergens, and lifestyle changes contribute to increased asthma incidence in urban populations. [10, 11] In Bangladesh, rapid urbanization and environmental pollution may similarly contribute to this observed distribution.

Regarding parental sociodemographic status, most parents were aged 30–40 years and had secondary to higher secondary education. Although this study was descriptive, previous literature suggests that parental education and socioeconomic status can influence health-seeking behavior, environmental exposure, and disease recognition. [2]

The high rate of cesarean delivery (58.7%) among asthmatic children in this cohort is noteworthy. Several studies have reported an association between cesarean section and increased risk of asthma and allergic diseases, potentially mediated by altered neonatal gut microbiota and immune development. [12, 15] The lack of exposure to maternal vaginal flora during cesarean birth may affect immune maturation and predispose children to atopic disorders.

Exclusive breastfeeding was reported in only 38.5% of cases. Breastfeeding has been shown to confer immunological protection and may reduce the risk of respiratory infections and allergic diseases. A systematic review and meta-analysis demonstrated a protective association between breastfeeding and reduced asthma risk in early childhood. [13] Although causality cannot be inferred from this study, the relatively low rate of exclusive breastfeeding highlights a potentially modifiable early-life factor.

Family history of asthma was present in 32.7% of cases, supporting the role of genetic predisposition. Asthma is recognized as a multifactorial disease influenced by both genetic susceptibility and environmental exposure. [14] The presence of familial clustering reinforces the need for early monitoring in children with positive family history. [16]

Monthly family income in most participants ranged between 10,000–20,000 BDT, representing a middle-income group. Socioeconomic status may influence living conditions, environmental exposures, indoor pollution, and access to healthcare. However, both low and high socioeconomic settings have been associated with asthma through

different mechanistic pathways, including hygiene hypothesis, pollution exposure, and lifestyle factors. [10, 17, 18]

Taken together, this study highlights identifiable sociodemographic patterns in childhood asthma within a Bangladeshi tertiary-care setting. Urban residence, male sex, cesarean birth, limited exclusive breastfeeding, and positive family history appear as prominent characteristics. While the cross-sectional nature of this study prevents causal inference, the findings are consistent with international literature and underscore the importance of early-life and environmental influences in asthma epidemiology.

Conclusion

Childhood asthma in this Bangladeshi tertiary-care population was predominantly observed among urban, school-aged male children from middle-income families. High cesarean delivery rates and low exclusive breastfeeding prevalence were notable early-life characteristics. These findings provide baseline sociodemographic evidence that may inform national pediatric asthma risk profiling and preventive interventions.

Limitations

This study has several limitations that should be acknowledged. First, as a single-center investigation, the findings may not be fully generalizable to the broader pediatric population. Second, the relatively small sample size may limit the statistical power of the results. Finally, because data were collected using self-administered questionnaires, the possibility of recall bias cannot be entirely excluded.

Recommendations

Future research should incorporate multicenter approaches with larger sample sizes and population-based study designs to validate these findings. Such investigations would facilitate a more comprehensive understanding of the observed associations and assist in developing appropriate prevention strategies suited to the Bangladeshi population.

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Original Article**Outcomes of Interlocking Intramedullary Nailing for Tibial Shaft Fractures: A Prospective Analysis of 105 Cases**

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Abstract

Background: Tibial shaft fractures represent one of the most common long bone injuries in orthopedic trauma practice, often resulting from high-energy mechanisms such as road traffic accidents and falls. Interlocking intramedullary nailing has emerged as the preferred surgical modality due to its ability to provide stable fixation, preserve periosteal blood supply, and facilitate early postoperative mobilization.

Objectives: To evaluate the clinical and radiological outcomes of interlocking intramedullary nailing for tibial shaft fractures and to analyze demographic characteristics, injury patterns, and complication rates.

Methods: This prospective observational study was conducted at Satkhira Medical College Hospital from May 2024 to April 2025. A total of 105 patients with tibial shaft fractures treated with interlocking intramedullary nailing were enrolled. Data on demographic characteristics, mechanism of injury, fracture type, surgical procedure, and postoperative outcomes were collected using structured data collection forms. Patients were followed clinically and radiologically at regular intervals. Statistical analysis was performed using SPSS version 22, with results presented as frequencies, percentages, means, and standard deviations. **Results:** Among 105 patients, the majority were aged 18–30 years (36.2%), with a mean age of 36.8 ± 11.4 years. Males comprised 78.1% of the study population. Road traffic accidents were the predominant mechanism of injury (63.8%). Closed fractures accounted for 70.5% of cases, and the right tibia was involved in 55.2%. Radiological union was achieved within 16–20 weeks in 45.7% of patients. No postoperative complications were observed in 70.5% of cases. Functional outcomes were excellent in 43.8% and good in 35.2% of patients. Overall, 86.7% achieved successful union, while delayed union occurred in 8.6% and non-union in 4.8% of cases. **Conclusion:** Interlocking intramedullary nailing is an effective treatment modality for tibial shaft fractures, offering high union rates, favorable functional outcomes, and a low complication profile.

Keywords: Tibial shaft fracture, interlocking intramedullary nailing, union rate, functional outcome, delayed union, road traffic accident.

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Background

Tibial shaft fractures represent one of the most common long bone injuries encountered in orthopaedic trauma practice, accounting for approximately 2% of all adult fractures and constituting the most frequent diaphyseal fractures [1]. These injuries exhibit a bimodal distribution, with low-en-

ergy spiral patterns predominating in older populations and high-energy transverse or comminuted fractures occurring more frequently in younger individuals [2]. The management of tibial shaft fractures has evolved considerably over recent decades, with surgical intervention increasingly favoured to restore alignment, facilitate early

mobilisation, and optimise functional recovery [3]. Intramedullary nailing (IMN) has emerged as the standard of care for surgically managed tibial shaft fractures, offering several distinct advantages over alternative fixation methods [4]. This technique enables minimal soft tissue disruption, preserves the periosteal blood supply crucial for fracture healing, and allows for early weight-bearing and joint mobilization [5]. Contemporary interlocking intramedullary nails provide rotational and axial stability, expanding the indications for nailing to include complex fracture patterns and proximal or distal metaphyseal extensions [6]. The reported union rates following IMN are generally favourable, with timely union achieved in approximately 90% of cases [7]. Despite the widespread acceptance of intramedullary nailing, several controversies and challenges persist. Anterior knee pain remains the most commonly cited complication, with reported incidence rates ranging from 10% to 80% depending on the surgical approach and follow-up duration [8]. The optimal insertion technique—whether traditional infrapatellar or suprapatellar continues to generate debate within the literature [9]. Recent meta-analyses suggest that suprapatellar approaches may offer advantages in terms of reduced post-operative pain and improved functional outcomes, although long-term comparative data remain limited [10, 11]. Furthermore, risk factors for complications following tibial nailing are incompletely understood. Active smoking, the presence of open fractures, and residual interfragmentary gaps exceeding 5 mm have been identified as significant predictors of non-union and infectious complications [12]. The influence of fracture morphology, soft tissue injury severity, and patient-related factors on outcomes warrants continued investigation to refine patient selection and surgical decision-making [13]. While numerous retrospective series have documented outcomes following tibial nailing, prospective data from large, consecutive patient cohorts remain relatively scarce [14]. Prospective study designs minimize selection bias and enable comprehensive collection of perioperative variables, facilitating more robust analysis of factors influencing fracture healing and functional recovery [15].

Objectives

General Objective: The general objective of this study was to evaluate the outcomes of interlocking intramedullary nailing in the management of tibial shaft fractures among patients treated at Satkhira Medical College Hospital, Satkhira.

Specific Objectives:

- To assess the demographic characteristics of patients with tibial shaft fractures including age, gender, and occupation.
- To identify the common causes and mechanisms of tibial shaft fractures among the study population.
- To evaluate the types and patterns of tibial shaft fractures presenting to the hospital.

Methods

Study Design: This prospective observational study was conducted at Satkhira Medical College Hospital, Satkhira, Bangladesh. The study period extended from May 2024 to April 2025. The study population consisted of 105 patients diagnosed with tibial shaft fractures who were treated with interlocking intramedullary nailing at the orthopedic department of the hospital. Patients admitted during the study period and fulfilling the eligibility criteria were included and followed prospectively to evaluate the clinical and radiological outcomes of the procedure.

Data Collection and Study Procedure: Data were collected prospectively from patients admitted with tibial shaft fractures who underwent treatment with interlocking intramedullary nailing. After admission, detailed history regarding age, sex, occupation, mechanism of injury, and clinical presentation was recorded. Physical examination and necessary investigations including radiographic evaluation of the tibia were performed to confirm the diagnosis and assess fracture characteristics. All eligible patients underwent surgical fixation using interlocking intramedullary nailing under appropriate anesthesia following standard orthopedic surgical techniques. Postoperative management included antibiotics, pain control, early mobilization, and regular follow-up visits. Patients were followed clinically and radiologically to evaluate

fracture union, functional outcome, and possible complications. All relevant information was recorded using a structured data collection form.

Inclusion Criteria: Patients aged 18 years and above presenting with tibial shaft fractures who were treated with interlocking intramedullary nailing at Satkhira Medical College Hospital during the study period were included in the study. Both closed fractures and selected open fractures (Gustilo-Anderson Grade I and II) were considered eligible. Patients who provided informed consent and were willing to participate in follow-up evaluations were enrolled in the study.

Exclusion Criteria: Patients with pathological fractures, fractures associated with severe neurovascular injury, or open fractures of Gustilo-Anderson Grade III were excluded from the study. Patients with polytrauma requiring alternative treatment approaches, previous surgery on the same tibia, or serious systemic illnesses preventing surgery were also excluded. Additionally, patients who were unwilling to participate or lost to follow-up were not included in the final analysis.

Statistical Analysis: All collected data were checked for completeness and entered into a computer database for analysis. Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) version 22. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to summarize demographic characteristics, fracture patterns, treatment outcomes, and complications. The results were presented in the form of tables and figures where appropriate. A significance level of $p < 0.05$ was considered statistically significant where applicable.

Ethical Consideration: Ethical approval for the study was obtained from the Ethical Review Committee of Satkhira Medical College Hospital prior to the initiation of the research. Written informed consent was obtained from all participants after explaining the purpose, procedures, potential benefits, and risks of the study. Confidentiality of patient information was strictly maintained, and all data were used solely for research purposes. The study was conducted in accordance with the principles of the Declaration of Helsinki for medical

research involving human subjects.

Results

Table I. Demographic Characteristics of the Study Population (n = 105).

Variable		Frequency n (%)
Age Distribution	18–30 years	38 (36.2)
	31–40 years	29 (27.6)
	41–50 years	21 (20)
	51–60 years	11 (10.5)
	>60 years	6 (5.7)
	Mean $\pm$ SD	36.8 $\pm$ 11.4
Occupation Gender	Male	82 (78.1)
	Female	23 (21.9)
	Laborer	34 (32.4)
	Farmer	26 (24.8)
	Service holder	18 (17.1)
	Student	15 (14.3)
	Housewife	12 (11.4)

Table I shows the demographic characteristics of the study participants. The majority of patients were between 18–30 years (36.2%), followed by 31–40 years (27.6%), indicating that tibial shaft fractures were more common among young adults. The mean age was 36.8 ± 11.4 years. Most participants were male (78.1%), reflecting the higher exposure of men to trauma. Regarding occupation, laborers (32.4%) and farmers (24.8%) constituted the largest groups, suggesting that physically demanding activities and outdoor work increase the risk of tibial fractures.

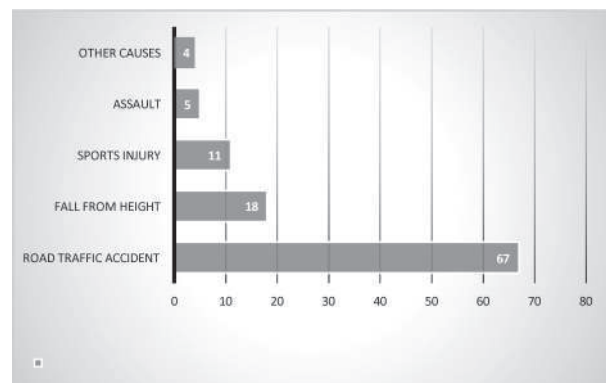


Figure 1: Mode of Injury.

Figure 1 demonstrates the distribution of the mode of injury among patients. The majority of fractures were caused by road traffic accidents (67%), which is the leading cause of high-energy trauma worldwide. Falls from height accounted for 18%, while

sports injuries (11%) represented a smaller portion. Assault and other causes were relatively rare.

Table II. Type of Tibial Shaft Fracture (n=105).

Type of Fracture	Frequency n (%)
Closed fracture	74 (70.5)
Open fracture Grade I	21 (20)
Open fracture Grade II	10 (9.5)

Table II presents the fracture types observed in the study population. The majority were closed fractures (70.5%), while open fractures accounted for 29.5%. Among open fractures, Grade I injuries (13.3%) were the most common, followed by Grade II (9.5%) and Grade III (6.7%) injuries.

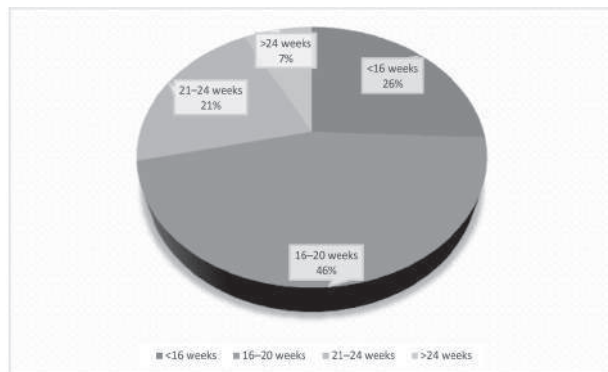


Figure 2: Time to Radiological Union.

Figure 2 presents the time required for radiological union following interlocking intramedullary nailing. Most fractures united within 16–20 weeks (45.7%), while 25.7% united earlier than 16 weeks. Only 7.6% of patients required more than 24 weeks for union.

Table III. Side of Injury in study population (n=105).

Side of Injury	Frequency n (%)
Right tibia	58 (55.2)
Left tibia	47 (44.8)

Table III illustrates the side of tibial involvement. Slightly more than half of the fractures occurred in the right tibia (55.2%), whereas 44.8% involved the left tibia. The difference between sides was relatively small.

Table IV. Postoperative Complications (n=105).

Complication	Frequency n (%)
No complication	74 (70.5)
Superficial infection	12 (11.4)
Delayed union	9 (8.6)
Non-union	5 (4.8)
Implant failure	3 (2.9)
Deep infection	2 (1.9)

Table IV shows the postoperative complications following surgery. The majority of patients (70.5%) experienced no complications. The most frequent complication was superficial infection (11.4%), followed by delayed union (8.6%). Non-union and implant failure were relatively uncommon.

Table V. Functional Outcome (Johner and Wruhs Criteria) (n=105).

Functional Outcome	Frequency n (%)
Excellent	46 (43.8)
Good	37 (35.2)
Fair	15 (14.3)
Poor	7 (6.7)

Table V demonstrates the functional outcomes based on Johner and Wruhs criteria. Most patients achieved excellent (43.8%) or good (35.2%) outcomes, indicating satisfactory functional recovery following interlocking intramedullary nailing. Only a small proportion had fair or poor results.

Table VI. Overall Treatment Outcome (n=105).

Treatment Outcome	Frequency n (%)
Successful union	91 (86.7)
Delayed union	9 (8.6)
Non-union	5 (4.8)

Table VI summarizes the overall treatment outcomes. A high proportion of patients (86.7%) achieved successful fracture union following surgery. However, 8.6% experienced delayed union and 4.8% developed non-union. These findings indicate that interlocking intramedullary nailing is an effective treatment method for tibial shaft fractures with high union rates.

Discussion

The demographic analysis of our study revealed that tibial shaft fractures predominantly affected young adults, with 63.8% of patients aged between 18–40 years and a mean age of 36.8 ± 11.4 years. This predilection for the younger population reflects their greater exposure to high-energy trauma and outdoor activities. Similar demographic patterns have been reported by Raza et al., who observed that 71% of their patients with tibial shaft fractures were below 40 years of age, with a mean age of 38.2 years [16]. The male predominance in our series (78.1%) aligns consistently with the published literature, attributable to the higher risk-taking behaviour and occupational exposure of men to traumatic situations. Bauwens et al. reported a comparable male predominance of 74.5% in their cohort of 184 consecutive tibial fractures treated with intramedullary nailing [17]. The occupational distribution in our study, with laborers (32.4%) and farmers (24.8%) constituting the largest groups, underscores the vulnerability of individuals engaged in physically demanding outdoor occupations, a finding corroborated by Patel et al. in their epidemiological study of tibial fractures in developing nations [18]. Road traffic accidents (63.8%) emerged as the predominant mechanism of injury in our series, followed by falls from height (17.1%) and sports injuries (10.5%). This distribution reflects the high-energy nature of tibial shaft fractures in the contemporary trauma setting. Mundi et al. reported that road traffic accidents account for approximately 43% of tibial shaft fractures globally, with higher rates observed in low and middle-income countries [19]. The proportion of open fractures in our study (29.5%) falls within the range of 15–45% reported in the literature for tibial shaft fractures, with Gustilo Grade I injuries (20%) being the most common. Turley et al., in their systematic review of open tibial fractures treated with intramedullary nailing, found that open fractures constituted 30–40% of cases, with Grade I injuries predominating [20].

The radiological union outcomes in our study demonstrate the efficacy of interlocking intramedullary nailing, with 71.4% of fractures uniting within 20 weeks and a mean union time of 18.4

weeks. These findings are comparable to those reported by Stacey et al., who documented a mean union time of 16–20 weeks in their prospective analysis of 112 tibial fractures treated with reamed intramedullary nailing [21]. The delayed union rate of 8.6% in our series compares favorably with the 9.7% pooled non-union rate reported by Turley et al. in their systematic review of open tibial fractures [20]. Our non-union rate of 4.8% is also consistent with the 5.4–7.3% range reported by Hoy et al. for closed tibial fractures treated with intramedullary nailing [22]. Superficial infection (11.4%) was the most common postoperative complication in our series, while deep infection was notably absent. This infection rate is slightly higher than the 8.1% pooled infection rate reported by Turley et al., potentially reflecting the inclusion of open fractures in our cohort [20]. Importantly, our infection rate remains within acceptable limits when compared to historical series and underscores the importance of meticulous soft tissue handling and perioperative antibiotic prophylaxis. Kumar et al. reported a superficial infection rate of 9.5% in their prospective study of 105 tibial fractures treated with interlocking nailing, with no cases of deep infection requiring implant removal [23]. The functional outcomes assessed using the Johnner and Wruhs criteria revealed that 79.0% of patients achieved excellent or good results, indicating satisfactory functional recovery. This proportion is consistent with the 70–85% excellent-to-good outcomes reported in contemporary series. Ramaswamy et al. documented excellent or good functional outcomes in 82% of their patients following intramedullary nailing for tibial shaft fractures, with residual anterior knee pain being the most common cause of suboptimal functional scores [24]. The overall union rate of 86.7% in our study, while slightly lower than some published series, reflects the inclusion of complex fracture patterns and open injuries. Li et al. reported a union rate of 91% in their meta-analysis of intramedullary nailing outcomes, with higher failure rates observed in severe open fractures and patients with comorbidities [25].

Conclusion

The findings of this study indicate that interlocking

intramedullary nailing is an effective and reliable method for the management of tibial shaft fractures. The majority of patients achieved satisfactory fracture union and favorable functional outcomes, with a high rate of successful union and relatively low complication rates. Early stabilization, preservation of blood supply, and the ability to allow early mobilization contribute to the effectiveness of this surgical technique in improving patient recovery and functional results.

Limitations of the Study: Despite its findings, the study has several limitations. It was conducted in a single tertiary care hospital with a relatively limited sample size, which may restrict the generalizability of the results to broader populations. Additionally, the duration of follow-up was limited, and long-term outcomes such as persistent anterior knee pain or late complications could not be fully evaluated. Future multicenter studies with larger sample sizes and longer follow-up periods are recommended to validate these findings.

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Original Article

Role of FNAC along with Different Tumor Markers and Viral Serological Marker for Diagnosing Malignant Tumor of Liver

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Abstract

Background: Serological markers play a critical, non-invasive role in the screening, early diagnosis, prognosis assessment and post-treatment monitoring of malignant liver tumors, specifically hepatocellular carcinoma (HCC). While imaging and FNAC are fundamental; serological assays for tumor-associated proteins and viral markers are essential for identifying early-stage cancer and monitoring disease progression.

Material and method: This cross-sectional study was carried out in Pathology department of then Bangabandhu Sheikh Mujib Medical University from March 2017 to December 2018 with the aim to analyze the detailed cytomorphology of hepatocellular carcinoma and metastatic carcinoma in liver and to see the association of tumor markers and viral markers with HCC and metastatic carcinoma. **Results:** In this study, mean age was 52.3 ± 15.1 years. Among the 40 study cases, most (62.5%) of the cases were diagnosed as hepatocellular carcinoma. Among the diagnosed HCC cases, 52% cases had significantly raised AFP level ($>400\text{ng/ml}$) and 48% cases had mild to moderate raised AFP level. Among the metastatic carcinoma, 64.2% cases had normal AFP level and 35% cases had mildly raised AFP level. Seventy two percent cases of HCC had positive HbsAg viral marker and 8.0% patients had positive anti-HCV. Majority of metastatic carcinoma cases (79%) had negative viral marker but showed raised other serum tumor markers like CA-125 and CA 19.9. **Conclusion:** The distinction between HCC & metastatic carcinoma is often difficult by cytology alone. The application of adjunct diagnostic tools such as viral markers and tumor markers estimation can supplement the results.

Keywords: HCC (Hepatocellular carcinoma), Viral markers, Tumors markers, FNAC (Fine needle aspiration cytology).

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Introduction

Liver cancer is one of the most serious cancers that lead to death around the world. The total survival rate for all stages of liver cancer is 15% at five years after diagnosis, and this can be affected by the available therapy. Primary liver cancer includes hepatocellular carcinoma (HCC) and intrahepatic cholangiocarcinoma. The major risk factors for HCC are chronic infection with hepatitis B virus (HBV) or hepatitis C virus (HCV), aflatoxin-contaminated foodstuffs, heavy alcohol intake, obesity, smoking and type 2 diabetes. [1]

Hepatocellular carcinoma (HCC) is known to be the

most prevalent primary malignant tumor of the liver and several studies have been conducted to improve the management approach in the early and late stages. Chronic liver diseases are the most common setting for emergence of HCC. The most important underlying factors in hepatocarcinogenesis are viral infections (HBV, HCV) and toxic injuries (aflatoxin, alcohol). Metabolic diseases such as hereditary hemochromatosis and $\alpha 1\text{AT}$ deficiency markedly increase the risk of HCC. The metabolic syndrome associated with obesity, diabetes mellitus, and non-alcoholic fatty liver disease, all of which increase the risk of HCC. [2]

Bangladesh lies in the intermediate zone regarding the prevalence of HBV. The Prevalence of HCC is 35% among all liver diseases in Bangladesh. The prevalence of HBsAg and HCV positivity are 5.4% and 0.8% respectively in healthy population. [3] The incidence rate of liver cancer in Bangladesh is 2.39% and the number of new cases and deaths annually are 3128 and 2841 respectively. Among all cancers, liver cancer is in the 11th position. [4]

Liver is also a common site for metastatic tumors, accounting for 25% of all metastases to solid organs. Common primary sites from which metastasis occurs are stomach, colon, lung, breast, thyroid and kidney. The comparative morphologic evaluation of HCC and their mimics is often a challenging issue for definitive diagnosis. [5]

Biomarkers are a useful tool for early diagnosis, disease progression, prognosis, and targeted therapy for patients with liver cancer. The most important biomarker that has been studied is alpha-feto-protein (AFP), which is elevated in 70% of patients with liver cancer.

Fine-needle aspiration cytology (FNAC) of the liver under ultrasound or computed tomography guidance has been used in the routine diagnosis of masses of the liver to establish a diagnosis. Because it is a less-invasive method with relatively low cost, rapid turnaround time and complication rate lower than that of core needle biopsy. [6] It has high sensitivity (100%) but low specificity (63.3%). [7] Although 80% of malignant lesions of the liver can be correctly diagnosed through cytomorphological analysis and good clinico-radiologic correlation, around 20% can pose differential diagnostic problems. [8] A clear distinction between HCC and metastatic tumors in the liver is clinically important as it carries a significant impact on subsequent prognosis and therapeutic management. [9] The distinction between these tumors is often difficult by cytology alone. The application of adjunct diagnostic tools such as viral markers and tumor markers estimation can supplement the results.

Methodology

This was a cross-sectional observational study carried out at the Department of Pathology, Bangabandhu Sheikh Mujib Medical University

(BSMMU), Dhaka, Bangladesh; from March 2017 to December 2018. Permission for the study was taken from the concerned departments and Institutional Review Board (I.R.B.) of BSMMU, Dhaka. The sample size was 40 and non-random purposive sampling method was followed.

Selection criteria:

Inclusion criteria:

- Patients with suspected malignant hepatic mass detected by radiology and imaging and physically fit to sustain FNA procedure.

Exclusion criteria:

- Cases which are benign in cytologic smear.
- Inadequate material.
- Patients having bleeding disorders.
- Non-cooperative patient.
- Cases not accompanied by complete clinical information.

Selections of patients:

A total of 40 cases having suspected malignant hepatic SOL with good coagulation profile were selected for USG guided FNAC. Informed written consent was taken from the patients or from their guardians in all cases. According to standard protocol, FNAC was done by an expert physician under local anesthesia in the Hepatology and Radiology department, BSMMU and also in the Radiology department, DMCH.

Clinical information:

Relevant clinical information was taken. These include- Age and sex of the patients, Relevant history, Clinical features, Laboratory data and Radiological & imaging findings. The data were obtained either directly from the patients or from history sheets in a pre-designed proforma before doing aspiration. All the necessary and relevant data were recorded methodically in a prepared proforma.

Sample collection:

Under ultrasonographic guidance, FNAC was performed by an expert pathologist, radiologist or hepatologist. Cytology smears were made from the aspirated material and immediately fixed in 95% ethanol.

Sample processing:

Several cytologic smears were prepared and fixed immediately in 95% alcohol. The smears were left in alcohol for at least 30 minutes at room tempera-

ture before staining.

Cytological examination:

1. Staining:

Smears prepared from FNA were stained by Papanicolaou and hematoxylin & eosin stain according to the standard staining procedure followed at the department of pathology, BSMMU.

2. Cytopathological examination:

The stained slides were examined on the next day. Satisfactory smears containing adequate number of representative cells were examined to evaluate the nature of the lesions and presence of malignant cells. Cases were diagnosed according to well established morphologic criteria related to the pattern of cellular arrangement, cellular and nuclear details, background characteristics.

Tumor marker and serological markers assay:

Tumor marker (serum AFP, CEA and CA 19.9) and serological markers (HbsAg, Anti HCV) were also assessed.

Analysis of result:

Statistical analysis of the results was obtained by using window-based computer software device with statistical Packages for Social Sciences (SPSS-20). Categorical data were expressed in percentage or number. Parametric data were expressed in mean $\pm$ SD. The results were calculated by using statistical formulas and presented in tables, figures and diagrams.

Results

This cross-sectional study was carried out in Pathology department of Bangabandhu Sheikh Mujib Medical University from March 2017 to December 2018 with the aim to study the detailed cytomorphology of hepatocellular carcinoma and metastatic carcinoma in liver and to see the association of AFP and other serological marker to diagnose malignant tumor of liver. Out of total 40 cases, most of the study patients (45%) were in age between 31-50 years. The mean age was 52.3 ± 15.1 years with age ranging from 26 to 85 years. (Figure 01). In this study, 32 (80%) cases were male with a male to female ratio of 4:1. The detailed cytomorphology of HCC and metastatic carcinoma were also assessed. A total of 40 patients having radiologically suspected malignant hepatic mass and physically fit to sustain the FNAC procedure and fulfilling the other selection criteria were

included in this study. Among the 40 study cases, 25 (62.5%) cases were diagnosed as hepatocellular carcinoma, 9 (22.5%) were metastatic carcinoma, 1 (2.5%) was hepatocellular dysplasia and 1 (2.5%) was negative for malignancy. Four (10%) cases were positive but not categorized as HCC or metastatic carcinoma. These were diagnosed as adenocarcinoma either primary or metastatic (Figure 02). In case of HCC patients, the predominant cytomorphological features were high cellularity (80%), trabecular pattern (76%), hepatocytic appearance of tumor cells (88%), naked nuclei (84%), transgressing capillaries (44%), high N:C ratio (100%), intranuclear inclusions (40%), prominent nucleoli (64%), macronucleoli (12%) and intracellular bile (20%). In case of metastatic carcinoma patients, the predominant features were clusters (92%) and acinar or glandular pattern (64%) arrangement of tumor cells, high N:C ratio (92%), nuclear pleomorphism (100%), benign hepatocytes (42.8%), necrosis (50%) in background and intracellular mucin (14%). (Table I). Of the total 40 cases, 10 (25%) cases had normal AFP level (AFP <20 ng/ml), 17 (42.5%) cases had mild to moderate raised AFP level (AFP 20-400 ng/ml) and 13 (32.5%) cases had significantly raised AFP level (AFP > 400 ng/ml) (Figure 03). Among the finally diagnosed 25 HCC cases, 13 (52%) cases had significantly raised AFP level and 12 (48%) cases had mild to moderate raised AFP level. None of the HCC patients showed normal AFP level. Among the 14 cases of metastatic carcinoma, nine (64.2%) cases had normal AFP level and five (35%) cases had mildly raised AFP level. One finally diagnosed hepatocellular dysplasia case had normal AFP level. Study showed that, hepatocellular carcinoma is associated with significantly raised AFP level which is statistically significant (Table II). HbsAg was positive in 21 patients. Among them 18 (72%) cases had HCC and three (21.5%) had metastatic carcinoma. Anti HCV was positive in two patients and they both had HCC. Serum CEA and CA19.9 were raised in six and eight patients respectively. All of these patients had metastatic carcinoma. The current study has shown that patients with HCC are more associated with positivity of viral markers (HbsAg, Anti HCV) and patients with metastatic carcinoma are associated with raised other serum tumour markers like CEA

and CA 19.9 (Table III).

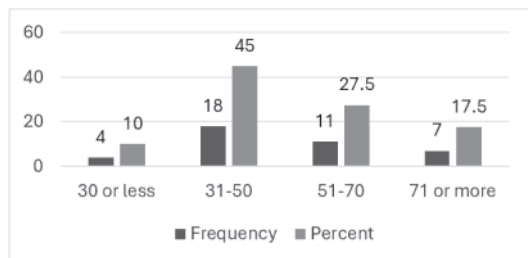


Figure 01: Age of the study cases, (n=40).

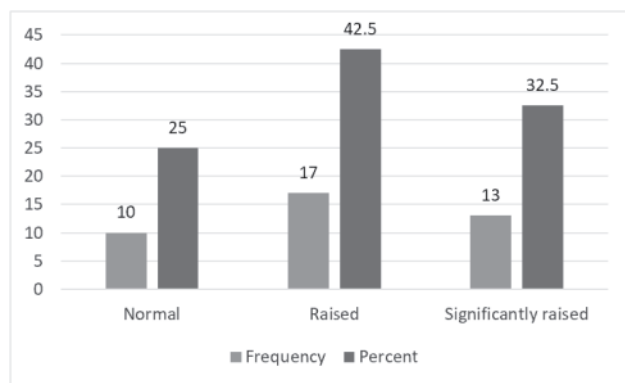


Figure 03: Alpha fetoprotein level (AFP) in study patients, (n=40).

Table II: Association of AFP with HCC, Metastatic carcinoma and Hepatocellular dysplasia (n=40).

AFP value	Hepatocellular carcinoma n (%)	Metastatic carcinoma n (%)	Hepatocellular dysplasia n (%)	Total	p value
Normal (< 20 ng/ml)	0 (0)	9 (64.2)	1 (100)	10	
Raised (20-400 ng/ml)	12 (48)	5 (35)	0 (0)	17	<0.001
Significantly raised (>400 ng/ml)	13 (52)	0 (0)	0 (0)	13	
Total	25	14	1	40	

Table III: Association of serological markers with HCC and Metastatic carcinoma.

Serum markers	Hepatocellular carcinoma (25)	Metastatic carcinoma (14)	Total	p value
HbsAg positive, n (%)	18 (72)	3 (21.4)	21	0.004
Anti HCV positive, n (%)	2 (8)	0 (0)	2	0.517
CEA raised, n (%)	0 (0)	6 (42.8)	6	0.001
CA 19.9 raised, n (%)	0 (0)	8 (57.1)	8	<0.001

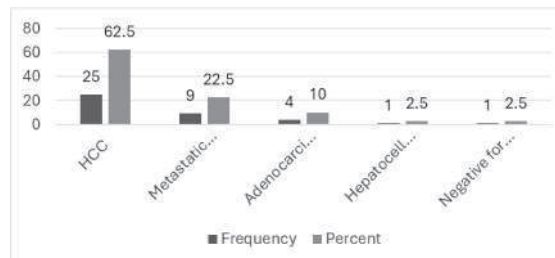


Figure 02: FNAC diagnosis of the study patients, (n=40).

Table I: Cytomorphological features of HCC and Metastatic carcinoma in sample cases, (n=40).

Features	Hepatocellular carcinoma n=25	Metastatic carcinoma n=14
Cellularity		
Moderate	5	9
High	20	5
Cell pattern		
Trabecular	19	0
Clusters	22	13
Singly	23	5
Acinar/ glandular	2	9
Benign hepatocytes	2	6
Hepatocytic appearance	22	1
Transgressing capillaries	11	0
Naked nuclei	21	3
N:C ratio increased	25	13
Prominent nucleoli	16	6
Nuclear pleomorphism	24	14
Macronucleoli	3	0
Intranuclear inclusions	10	1
Intracellular bile	5	0
Bile duct epithelium	0	2
Background cirrhosis	10	0
Necrosis	2	7
Mucin	0	2

Discussion

This cross-sectional study was carried out in Department of Pathology, Bangabandhu Sheikh Mujib Medical University from March 2017 to December 2018. In this study, the detailed cytomorphology of HCC and metastatic carcinoma and association of AFP level and viral markers with HCC and metastatic carcinoma were assessed.

A total number of 40 patients having radiologically suspected malignant hepatic mass, physically fit to sustain the FNAC procedure and fulfilling the other selection criteria were included in this study. More than three fourths (80%) of the patients were male and 20% were female. Male to female ratio was 4:1. This indicates that hepatocellular carcinoma is predominant in male patients.

In this study, it was observed that 45% of the patients were in 4th decade and above. The mean age was 52.3 ± 15.1 years with age ranging from 26 to 85 years. In case of HCC patients, the majority of patients (40%) belonged to age group 31-50 years and the lowest (12%) patients belonged to age ≤ 30 years. In case of metastatic carcinoma, the maximum and minimum patients were in the same age group like hepatocellular carcinoma.

Alpha-fetoprotein (AFP) has long been regarded as a tumor marker for HCC. It is the most widely used marker, although it has relatively low sensitivity (40%–60%) and specificity (80%–90%) for early HCC, (as it can be elevated in chronic hepatitis or cirrhosis). It is useful in screening and monitoring tumor volume, especially in high-risk patients (e.g., HBV/HCV carriers). In this current study, out of 40 cases AFP was raised in 75% of cases, among them 42.5% patients had mild to moderate increased AFP (20-400 ng/ml) and 32.5% had significantly raised AFP (>400 ng/ml) level. Among the 25 HCC cases, 13 (52%) cases had significantly raised AFP level (>400 ng/ml). Among the 14 metastatic carcinoma cases, majority nine (64.5%) cases had normal level of AFP level (<20 ng/ml) and three (35%) cases had mildly raised AFP level. Ahuja, et al., (2007) reported that, AFP level elevation was detected in 72.0% cases of HCC. [10] Bell, H. (1982) showed that AFP was moderately raised in 26% of metastatic carcinoma. [11]

In this current study, it was observed that, out of

25 hepatocellular carcinoma cases, 18 (72%) cases had positive HbsAg viral marker and two (8.0%) patients had positive anti-HCV antibody. Five (20%) patients of HCC had no evidence of viral markers. Out of 14 cases of metastatic carcinoma, 11 (78.6%) cases had negative HbsAg. In another study, Choudhury et al. (2009) showed, HbsAg was positive in 28 (61.9%) cases of HCC. [12] In our country, Gani et al. (2013) observed that, 62.0% patients had HbsAg positive sera and anti-HCV antibody was detected in 6.0% patients. [13] In India and Pakistan, a group of authors showed the association of HCC with HBV infection is about 71% and 67% respectively. [14] So, study showed that HBV infection is the most common etiological factor in the causation of HCC in the subcontinent.

This study showed that, among the 14 cases of metastatic carcinoma, 6 (42.8%) patients had raised serum CEA level and 8 (57.1%) had raised serum CA 19.9 level. These markers were normal in HCC cases.

Cytological diagnosis of HCC was made on the basis of cellular patterns, including trabecular or acinar arrangement of cells, high cellularity of smears, polygonal cells with central nuclei, abundant granular cytoplasm, coarse granular chromatin, increased nucleo-cytoplasmic ratio, prominent nucleoli, atypical stripped nuclei, intranuclear pseudoinclusions, presence of bile in the cytoplasm and interspersed sinusoidal endothelial cells. [6, 15] In the current study, the predominant cytomorphological features of HCC were high cellularity (80%), trabecular pattern (76%), hepatocytic appearance of tumor cells (88%), naked nuclei (84%), transgressing capillaries (44%), high N:C ratio (100%), intranuclear inclusions (40%), prominent nucleoli (64%), macronucleoli (12%) and intracellular bile (20%).

In metastatic carcinoma tumor cells are usually columnar or cuboidal with mucin secretion. Trabecular arrangement is suggestive of HCC carcinoma, whereas acinar or glandular arrangement is more favorable to adenocarcinoma. In this study, the predominant features of metastatic carcinoma were clusters (92%) and acinar or glandular pattern (64%) of tumour cells. Also seen were high N:C ratio (92%),

nuclear pleomorphism (100%), benign hepatocytes (42.8%), necrosis (50%) and intracellular mucin (14%). Most of the patients had relevant previous history of a primary malignancy and associated radiological and serological findings.

In the current study, according to cytomorphological features, 25 (62.5%) cases were diagnosed as hepatocellular carcinoma, 9 (22.5%) cases as metastatic carcinoma, one (2.5%) as hepatocellular dysplasia and one (2.5%) case as negative for malignancy. In four (10%) cases the features were overlapping between HCC and metastatic tumor. These indeterminate cases could not be categorized. These were diagnosed as adenocarcinoma either primary or metastatic. Zaakook et al. (2013) showed in their study, 70% of lesions were diagnosed as HCC, representing the majority of the cases and 30% cases were diagnosed as metastatic carcinoma. [8] Similarly, Ligato et al. (2008) reported that 58.5% of malignant hepatic tumors were HCC and 41.5% were metastatic origin. [16]

Conclusion

In conclusion, HCC has a poor prognosis and survival rate is very low after diagnosis. Therefore, improving early diagnosis methods is needed. Along with FNAC, Tumor markers (AFP, CEA, CA 19.9) are helpful tools for diagnosis of HCC and for differentiating it from metastatic carcinoma. The application of viral markers can supplement the results. All of these markers are useful tools for diagnosis, prediction of prognosis and management of HCC.

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Original Article

Assessment of the Role of Serum Uric Acid Level as a Predictor of Pre-eclampsia

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Abstract

Background: Pre-eclampsia is a pregnancy-specific hypertensive disorder contributing significantly to maternal and perinatal morbidity and mortality worldwide. Early prediction remains a challenge, particularly in resource-limited settings. Serum uric acid has emerged as a potential biochemical marker due to its association with oxidative stress and endothelial dysfunction. **Objective:** This study aimed to evaluate the role of serum uric acid levels as a predictive biomarker for pre-eclampsia among pregnant women. **Methods:** A prospective observational study was conducted over two years at Satkhira Medical College Hospital. A total of 1000 pregnant women in their second trimester were enrolled and followed until delivery. Serum uric acid levels were measured and correlated with the development of pre-eclampsia. Statistical analysis included sensitivity, specificity, and predictive value calculations. **Results:** Among the participants, 160 (16%) developed pre-eclampsia. The mean serum uric acid level was significantly higher in the pre-eclampsia group (6.8 ± 1.2 mg/dL) compared to normotensive women (4.3 ± 0.9 mg/dL). Elevated uric acid levels (>5.5 mg/dL) showed a sensitivity of 82% and specificity of 76% in predicting pre-eclampsia. A strong positive correlation ($r = 0.68$) was found between serum uric acid levels and severity of the disease. **Conclusion:** Serum uric acid is a reliable and cost-effective predictor of pre-eclampsia. Its routine measurement may aid early detection and improve maternal outcomes, especially in low-resource settings.

Keywords: Pre-Eclampsia, Serum Uric Acid, Pregnancy, Biomarker, Hypertension.

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Introduction

Pre-eclampsia is a multisystem disorder characterized by hypertension and proteinuria occurring after 20 weeks of gestation. It remains a major public health concern, particularly in developing countries where access to early diagnostic tools is limited. Globally, it complicates approximately 5–8% of pregnancies and contributes significantly to maternal and neonatal mortality [1]. The pathophysiology of pre-eclampsia is complex and not fully understood. However, it is widely accepted that abnormal placentation, endothelial dysfunction, oxidative stress, and systemic inflammation play central roles in disease development [2].

These processes lead to widespread vascular damage, resulting in hypertension and organ dysfunction. Serum uric acid, the final product of purine metabolism, has been increasingly studied as a potential biomarker in pre-eclampsia. Elevated levels are thought to reflect oxidative stress, reduced renal clearance, and tissue ischemia [3]. Uric acid may also contribute directly to endothelial dysfunction by promoting inflammation and reducing nitric oxide availability [4]. Several studies have demonstrated a significant association between elevated serum uric acid levels and the development of pre-eclampsia. It has been suggested that uric acid elevation may precede

clinical symptoms, making it a useful early predictor [5]. Furthermore, higher levels have been correlated with disease severity and adverse fetal outcomes, including intrauterine growth restriction and preterm birth [6]. In low-resource settings like Bangladesh, access to advanced diagnostic tools is often limited. Therefore, identifying a simple, cost-effective, and reliable marker is crucial for early detection and management. Serum uric acid testing is widely available, inexpensive, and easy to perform, making it a practical option for routine antenatal screening. Despite growing evidence, the predictive value of serum uric acid remains controversial due to variations in study design, population characteristics, and cutoff values. Therefore, this study aims to assess the role of serum uric acid as a predictor of pre-eclampsia in a large cohort of pregnant women in a tertiary care setting.

Methods

This prospective observational study was conducted at Satkhira Medical College Hospital over a period of two years, from January 2024 to December 2025, to evaluate the predictive role of serum uric acid levels in the development of pre-eclampsia.

Study Design and Population: A total of 1000 pregnant women attending the outpatient department antenatal care of Satkhira Medical College Hospital were consecutively recruited. Eligible participants were women aged between 18 and 40 years with singleton pregnancies between 20 and 27 weeks of gestation at the time of enrollment. Women with pre-existing hypertension, renal disease, diabetes mellitus, cardiovascular disorders, gout, or multiple pregnancies were excluded to avoid confounding effects on serum uric acid levels.

Sampling Technique: A purposive sampling method was applied to include all eligible participants during the study period until the desired sample size was achieved. Written informed consent was obtained from all participants prior to enrollment.

Data Collection Procedure: Baseline demographic and clinical data, including age, parity, body mass index (BMI), and obstetric history, were recorded using a structured questionnaire. Blood pressure was measured using a standard mercury sphygmo-

manometer following appropriate guidelines. Urine samples were collected for protein estimation using dipstick and, where necessary, 24-hour urinary protein assessment.

Venous blood samples (5 mL) were collected under aseptic conditions for the estimation of serum uric acid levels. The analysis was performed using an enzymatic colorimetric method in the hospital laboratory. A cutoff value of >5.5 mg/dL was considered elevated based on previous literature.

Follow-Up and Outcome Measures: Participants were followed regularly through antenatal visits until delivery. The primary outcome was the development of pre-eclampsia, defined as systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg on two separate occasions at least 4 hours apart after 20 weeks of gestation, along with proteinuria (≥ 300 mg in 24-hour urine or $\geq 1+$ on dipstick).

Statistical Analysis: Data were entered and analyzed using Statistical Package for Social Sciences (SPSS) version 25. Continuous variables were expressed as mean $\pm$ standard deviation, while categorical variables were presented as frequencies and percentages. The Student's t-test was used to compare means between groups, and the chi-square test was applied for categorical variables. Pearson correlation analysis was performed to assess the relationship between serum uric acid levels and severity of pre-eclampsia. Diagnostic performance was evaluated by calculating sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV). A p-value of <0.05 was considered statistically significant.

Results

A total of 1000 pregnant women were included in this study and followed until delivery. Among them, 160 (16%) developed pre-eclampsia, while the remaining 840 (84%) remained normotensive throughout pregnancy. The findings are presented below in tabular form along with descriptive analysis.

Table I: Baseline Characteristics of the Study Population.

Variable	Pre-eclampsia (n = 160)	Normotensive (n = 840)	p value
Mean Age (years)	27.4 ± 4.2	26.9 ± 3.8	0.18
Primigravida (%)	96 (60%)	403 (48%)	0.01
Multigravida (%)	64 (40%)	437 (52%)	—
BMI (kg/m ²)	26.1 ± 2.5	24.3 ± 2.2	<0.001

The baseline characteristics show that the mean age of participants was comparable between the two groups, with no statistically significant difference ($p = 0.18$). However, a significantly higher proportion of primigravida women developed pre-eclampsia compared to normotensive women (60% vs 48%, $p = 0.01$). Additionally, the mean BMI was significantly higher in the pre-eclampsia group (26.1 ± 2.5 kg/m²) compared to the normotensive group (24.3 ± 2.2 kg/m²), indicating that increased BMI may be a contributing risk factor.

Table II: Comparison of Serum Uric Acid Levels among the Study Population.

Group	Serum Uric Acid (mg/dl) (mean ± SD)	p value
Pre-eclampsia	6.8 ± 1.2	<0.001
Normotensive	4.3 ± 0.9	—

There was a highly significant difference in serum uric acid levels between the two groups. Women who developed pre-eclampsia had markedly elevated levels (6.8 ± 1.2 mg/dL) compared to normotensive women (4.3 ± 0.9 mg/dL), with a p-value of <0.001. This finding suggests a strong association between elevated serum uric acid levels and the occurrence of pre-eclampsia.

Table III: Diagnostic Performance of Serum Uric Acid (>5.5 mg/dL).

Parameter	Value (%)
Sensitivity	82%
Specificity	76%
Positive Predictive Value (PPV)	45%
Negative Predictive Value (NPV)	94%

Using a cutoff value of >5.5 mg/dL, serum uric acid demonstrated good diagnostic performance. The sensitivity was 82%, indicating that most cases of

pre-eclampsia were correctly identified. The specificity was 76%, reflecting a moderate ability to correctly identify normotensive individuals. Notably, the negative predictive value was high (94%), suggesting that women with normal uric acid levels are unlikely to develop pre-eclampsia. However, the positive predictive value was relatively lower (45%), indicating that elevated levels alone are not sufficient for definitive diagnosis.

Table IV: Serum Uric Acid Levels According to Severity of Pre-eclampsia.

Severity of Pre-eclampsia	Number of Cases	Mean Uric Acid (mg/dL)	Standard Deviation
Mild	70	5.9	± 0.8
Moderate	50	6.7	± 1.0
Severe	40	7.5	± 1.3

A progressive increase in serum uric acid levels was observed with increasing severity of pre-eclampsia. Women with mild pre-eclampsia had a mean level of 5.9 mg/dL, while those with moderate and severe disease had mean levels of 6.7 mg/dL and 7.5 mg/dL, respectively. Statistical analysis showed a strong positive correlation ($r = 0.68$, $p < 0.001$) between serum uric acid levels and disease severity. This indicates that higher uric acid levels are associated not only with the occurrence but also with the progression of pre-eclampsia.

Discussion

The findings of the present study demonstrate a clear and statistically significant association between elevated serum uric acid levels and the development of pre-eclampsia, reinforcing the observations reported in earlier research [1, 7, 8]. The incidence of pre-eclampsia in this cohort (16%) is comparable to rates observed in similar hospital-based studies in developing countries, highlighting its ongoing clinical importance. A key observation in this study was the markedly higher mean serum uric acid level among women who developed pre-eclampsia (6.8 mg/dL) compared to normotensive pregnant women (4.3 mg/dL). This substantial difference suggests that serum uric acid may serve as a useful early biochemical marker. Previous studies have also indicated that uric acid levels tend to rise before the clinical onset of hypertension and proteinuria, supporting its role in

early prediction [9]. This temporal relationship enhances its value in antenatal screening, particularly where advanced diagnostic tools are unavailable. The diagnostic performance of serum uric acid in this study further strengthens its clinical relevance. With a sensitivity of 82% and specificity of 76%, it demonstrates a reasonably good ability to identify women at risk of developing pre-eclampsia. More importantly, the high negative predictive value (94%) indicates that women with normal serum uric acid levels are highly unlikely to develop the condition. This makes it a valuable screening tool to rule out disease and prioritize high-risk cases for closer monitoring [10]. However, the relatively lower positive predictive value (45%) suggests that elevated uric acid alone should not be used as a definitive diagnostic criterion but rather as part of a broader clinical assessment. Another important finding is the strong positive correlation between serum uric acid levels and the severity of pre-eclampsia ($r = 0.68$). Women with severe disease exhibited significantly higher uric acid levels compared to those with mild or moderate forms. This supports the hypothesis that uric acid is not merely a marker but may also play a contributory role in disease progression. Elevated uric acid levels have been linked to endothelial dysfunction, oxidative stress, and inflammation—key mechanisms in the pathogenesis of pre-eclampsia [11]. Uric acid may reduce nitric oxide bioavailability, leading to vasoconstriction, increased vascular resistance, and ultimately hypertension. The study also identified important demographic and clinical risk factors. A higher proportion of primigravida women developed pre-eclampsia, which is consistent with established epidemiological data [12]. This may be related to immunological maladaptation during the first pregnancy. Additionally, the significantly higher body mass index (BMI) observed in the pre-eclampsia group aligns with existing evidence that obesity contributes to metabolic and vascular changes that predispose to hypertensive disorders of pregnancy. One of the major strengths of this study is its large sample size and prospective design, which enhances the reliability and generalizability of the

findings. The inclusion of 1000 participants provides adequate statistical power, while the follow-up until delivery ensures accurate outcome assessment. However, certain limitations should be acknowledged. Being a single-center study, the findings may not fully represent the broader population. Furthermore, serum uric acid levels were measured at a single time point; serial measurements could have provided better insight into trends and temporal relationships. Despite these limitations, the study has important clinical implications, particularly for low-resource settings. Serum uric acid testing is inexpensive, widely available, and technically simple, making it a feasible option for routine antenatal screening. In countries like Bangladesh, where access to advanced biomarkers may be limited, incorporating serum uric acid measurement into standard antenatal care could facilitate early identification of high-risk pregnancies and improve maternal and fetal outcomes.

In summary, this study supports the growing body of evidence that serum uric acid is a valuable predictor of pre-eclampsia, with both diagnostic and prognostic significance.

Conclusion

Serum uric acid is a significant and independent predictor of pre-eclampsia. Elevated levels are associated with both occurrence and severity of the disease. Routine screening of serum uric acid during pregnancy may facilitate early diagnosis and timely intervention, ultimately improving maternal and fetal outcomes.

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Original Article

Occurrence of Cell-phone Abuse among the High School Children of Dumuria Upazilla, Khulna and its Relationship with Some of the Socio-demographic Characteristics

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Abstract

Introduction: Cellphone abuse is increasing day by day even among the high school children in our country. This situation should be assessed immediately as it may lead our society in a vulnerable condition in a future not very far from this position. **Methodology:** It was a cross-sectional type of descriptive study, conducted upon 477 children of a pre-selected high school of which 52.62% were boys. A semi-structured interviewer administered questionnaire formed following DSM-5 was used as a research instrument to collect data by face-to-face interview. Data obtained were inserted in the SPSS program (version 16) and analyzed thereby. **Result:** In this study cellphone abuse were found in 81.34% respondents, of which mild abuse were found in 48.43%, moderate abuse in 31.03% and severe abuse in 1.70% respondents. Girls showed higher abuse (86.28%) than the boys which were statistically significant at $p < 0.05$. Cellphone abuse was observed to increase with the increase of age; the youngest age-group (up to 12 years) had 64.08%, the middle age-group (12 years to below 15 years) had 83.59% and the oldest age-group (15 years and above) had 91.30% cellphone abuse and the difference was statistically significant. Regarding occurrence of cell phone abuse in different socio-economic strata, it was observed to increase with more solvency. Though no significant difference was found statistically at $p < 0.05$ – it was 78.82% in the poor status, 84.34% in the middle class and 91.30% in rich status of the society. **Conclusion:** Cellphone abuse among the high school children is not a healthy environment in our society. So, the concerned authority should take initiative immediately to combat the situation.

Keywords: Cellphone abuse, Rural Bangladesh, High School Children, Addiction in adolescents.

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Introduction

In the digital age, Cell phones have become an integral part of daily life, offering unprecedented access to information, communication, and entertainment. Among adolescents, particularly high school students, cell phone usage has surged, often becoming deeply embedded in their academic, social, and personal routines. While these devices provide numerous benefits—such as enhanced learning tools, safety, and connectivity—they also pose significant risks when misused or overused. The phenomenon of cell phone abuse among high school students has emerged as a growing concern for parents, educators, and mental health profes-

sionals alike.

Cell phone abuse refers to the use of cell phone for the purpose other than its primary purpose of communication or to the excessive or inappropriate use of Cell devices in ways that can interfere with normal functioning, such as during classroom learning, social interactions, or rest periods. This behavior is often linked to various adverse outcomes, including declining academic performance, reduced attention span, sleep disturbances, and increased exposure to cyberbullying and harmful content. Moreover, the compulsive use of phones, particularly for social media and gaming, may contribute to anxiety, depression, and other

mental health challenges in adolescents [1]. (Thomee et al 2011).

This study aims to explore the occurrence of cell phone abuse among the high school children of a rural part of Khulna City, its level of severity and also to find out its relationship with sex, age and socio-economic status of the respondents.

Materials and methods

It was a cross-sectional type of descriptive study, conducted upon the high school children of Dumuria Upazilla, Khulna. Convenient sampling was done and all the 477 students (251boys and 226 girls) of a pre-selected high school, willing to participate in the study, were included here with their consent and also with the permission of the school authority. A semi-structured interviewer administered questionnaire formed following DSM-5 was used as a research instrument to collect data by face-to-face interview. Data obtained were inserted in the SPSS program version 16 and analyzed thereby.

Results

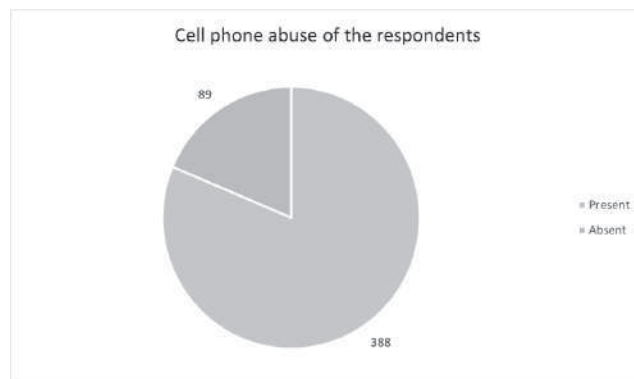


Figure 1: Cell phone abuse of the respondents.

Table I: Levels of severity of the problem of cell phone abuse among the respondents.

Levels	Frequency n (%)
No abuse	90 (18.9)
Mild abuse	231 (48.4)
Moderate abuse	148 (31)
Severe abuse	8 (1.7)
Total	477 (100)

Table II: Distribution of occurrence of cell phone abuse among the sex of the respondents.

Sex of the respondents	Cell phone abuse of the respondents		Total
	Present	Absent	
Boys	193 (76.89%)	58 (23.11%)	251 (100%)
Girls	195 (86.28 %)	31 (13.72%)	226 (100%)
Total	388 (81.34%)	89 (18.66%)	477 (100%)

$$\chi^2 = 6.9, df = 1, p < 0.05.$$

Table III: Distribution of occurrence of cell phone abuse among different age-groups of the respondents.

Age groups of the respondents	Cell phone abuse of the respondents		Total
	Present	Absent	
~ 12 years	66 (64.08%)	37 (35.92%)	103 (100%)
12 - <15 years	219 (83.59%)	43 (16.41%)	262 (100%)
≥ 15 years	103 (91.96%)	9 (8.04%)	112 (100%)
Total	388 (81.34%)	89 (18.66%)	477 (100%)

$$\chi^2 = 29.42, df = 2, p < 0.05.$$

Table IV: Distribution of occurrence of cell phone abuse among different socio-economic status.

Socio-economic Status	Cell phone abuse		Total
	Present	Absent	
Poor	227 (78.82%)	61 (21.18%)	288 (100%)
Middle Class	140 (84.34%)	26 (15.66%)	166 (100%)
Rich	21 (91.30%)	2 (8.70%)	23 (100%)
Total	388 (81.34%)	89 (18.66%)	477 (100%)

$$\chi^2 = 3.69, df = 2, p > 0.05.$$

This study revealed that 388 (82.34%) children had the problem of cell phone abuse out of a total 477 (Figure 1). It was also found that 90 (18.90%) children had no problem of cell phone abuse, but of the rest 377 children having problem of cell phone abuse – 231 (48.43%) had mild problem, 148 (31.03%) had moderate and the rest 8 (1.70%) had severe problem of cell phone abuse (Table I).

This study also showed that the girls were more affected by the problem of cell phone abuse than the contemporary boys as 76.89% boys (out of total 251) had the problem of cell phone abuse, whereas 86.28 % (out of 226) girls were having the problem. The difference was highly significant

statistically at $p < 0.05$ (Table II).

Abuse of cell phone increases with the increase of age. The youngest age-group i.e. age-group of 'up to 12 years' of this study showed occurrence of cell phone abuse in 66 (64.08%) respondents out of 103. It was in 219 (83.59%) respondents in the middle age-group (age-group of '12 years plus to below 15 years') out of 262 and 103 (91.96%) out of 112 respondents in the oldest age-group (age-group of '15 years and more'). There was distinct differences statistically between the groups at $p < 0.05$ (Table III).

Regarding occurrence of cell phone abuse in different socio-economic state, no significant difference was found statistically at $p < 0.05$ (Table IV). It was 78.82% in the poor status, 84.34% in the middle class and 91.30% in rich status of the society.

Discussion

In this study, cell phone abuse was seen in 388 (81.34%) students out of the total 477 respondents. Abed SN, Abd RK, Salim ID and Jamal NAR (2017) stated in their study that 60% students were addicted with cell phone [2]. Though those students were not high school children, the scenario of both the studies is not very different at all.

In another study by Alotaibi et al (2022), it was seen as 67.0% among the young adults [3]. It is also a little lower than the present study. But in Rasht region of northern Iran, the high school children showed a very high prevalence of mobile phone addition as explored by Parashkouh et al (2016) [4]. It was 99.48%.

Levels of severity of the abuse in this study were shown as mild abuse 48.40%, moderate abuse 31.0% and severe abuse as 01.70% with respondents having no abuse as 18.90%. To compare this finding with the result of the study by Parashkouh et al (2016), it was found that severity of the addiction was 4.65% for low, 77.62% for moderate and the rest 17.73% for high level of the problem [4]. No similarity was found between these two studies.

Occurrence of cell phone abuse was clearly seen higher among the girls than that among the boys in this study. This result found very much similar to

the study by Sinaga, Mahaedhie, Basry and Lolan (2024), where they also observed higher rate of smart phone addiction among the female than the male respondents [5]. Sajidah, Jayanti, Rahman and Yulianto (2024) also found the females having higher addiction of smart phone addiction [6]. But a Taiwanese study revealed no relationship of smart phone addiction with gender [7]. Bhardwaj and Ashok (2015) also found no significant difference of cell phone addiction among the male and female respondents [8].

This study also showed that occurrence of the cellphone abuse increases with the increase of age. Gezgin (2018) also found the similar result in his study and declared that there was a positive correlation between smartphone addiction and age of high school students at a level of 0.05 significance ($r = 0.157$, $p < 0.05$) [9]. Bhandari, Pandya and Sharma (2021) also reported that the problem of cellphone abuse increases with the increase of age [10]. On the contrary Pearson and Hussain (2016) found no relation between age and cell phone abuse [11].

Regarding occurrence of cell phone abuse among different socio-economic status, this study showed no difference between the different socio-economic status of the respondents. But Thomas, Heinrich, Kühnlein and Radon (2010) reported that children with low socio-economic status (SES) used their mobile phone 2.4 times longer per day than children with a high SES (OR 2.4, 95% CI: 1.1-5.4). Self-reported duration of cellphone use per day by the adolescents was also observed significantly higher (OR: 3.4; 95% CI: 1.4-8.4) with a low SES in comparison to a high SES [12].

Contrary to this study, a south Indian study showed statistically significant relation of cellphone addiction with higher socio-economic status [13] and similarly an Iranian study also reported that phone and tablet use activities were higher in adolescents with high socioeconomic status [14].

Conclusion

This study demonstrates a high prevalence of cellphone abuse among the respondents, with more than four-fifths being affected. The majority of cases were of mild to moderate severity, while

severe abuse was relatively uncommon. Cellphone abuse was significantly more common among girls than boys. A clear and statistically significant increasing trend of cellphone abuse with advancing age was observed, with the highest prevalence among the oldest age group. Although cellphone abuse appeared to increase with improving socio-economic status, this association was not statistically significant. Overall, the findings indicate that cellphone abuse is a widespread and growing concern, particularly among older adolescents and girls, highlighting the need for early preventive strategies, awareness programs, and appropriate interventions targeting school-aged children and adolescents.

Acknowledgement: Students of third year MBBS (K-26 batch) collected data as part of their course curriculum. Hearty thanks to them.

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Original Article

Clinical Profile, Indications, Operative Findings and Outcomes of Colostomy: A Prospective Study of 31 Cases at Satkhira Medical College Hospital

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Abstract

Background: Colostomy is a commonly performed surgical procedure involving exteriorization of a segment of the colon through the abdominal wall to divert fecal contents. It is indicated in a wide range of clinical conditions including intestinal obstruction, colorectal malignancy, traumatic bowel injury, perforation peritonitis, and congenital anomalies. In emergency settings, colostomy serves as a life-saving intervention by relieving obstruction, reducing contamination, and stabilizing the patient. Despite its importance, it is associated with complications such as wound infection, peristomal skin excoriation, prolapse, retraction, and parastomal hernia, with reported incidence ranging from 20% to 50%. Therefore, an observational study is conducted to see especially the complications and outcomes. **Methods:** This was a prospective observational study was conducted on 31 patients undergoing colostomy from January 2024 to December 2024 in the department of Surgery of Satkhira Medical College Hospital. **Results:** Intestinal obstruction (32.3%) was the most common indication. The overall complication rate was 29%, with no mortality. **Conclusion:** Colostomy remains a safe, effective, and life-saving procedure with acceptable morbidity.

Keywords: Colostomy, Intestinal Obstruction, Colorectal Cancer, Stoma, Surgical Outcomes.

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Introduction

Colostomy is a surgically created opening of the colon onto the anterior abdominal wall that allows diversion of fecal contents either temporarily or permanently. [1] It is an essential procedure in general and colorectal surgery and is widely used in both emergency and elective settings.

In emergency conditions such as intestinal obstruction, perforation peritonitis, and abdominal trauma, colostomy serves as a life-saving intervention by decompressing the bowel and preventing further contamination. [2, 3] In elective cases, it is often used as a protective stoma or as a permanent diversion in advanced colorectal malignancies.

Over the past decades, there has been a global shift toward minimally invasive surgery and primary anastomosis, reducing the need for colostomy in developed countries. However, in developing countries like Bangladesh, colostomy remains widely practiced due to delayed presentation, lack of screening programs, limited healthcare resources, and high emergency surgical burden. [4, 5]

Despite its clinical importance, colostomy is associated with a range of early and late complications, including wound infection, skin excoriation, stoma prolapse, retraction, stenosis, and parastomal hernia. [6-8] These complications can significantly affect patient outcomes and quality of life, emphasizing the need for proper surgical technique and postoperative care.

Materials and Methods

We did a prospective observational study in the department of Surgery of Satkhira Medical College Hospital from January 2024 to December 2024. This study included 31 patients who underwent colostomy during the study period. All eligible patients were consecutively enrolled. Patients with incomplete data or lost to follow-up were excluded. Data were collected prospectively using a structured data collection sheet including demographic characteristics, clinical indications, type of colostomy, intraoperative findings, postoperative complications, hospital stay, and mortality.

Results

A total of 31 patients were included. The mean age was 42.5 ± 14.2 years (range 10-75 years). There was male predominance (64.5%), with a male-to-female ratio of 1.8:1. Most of the patients (45.2%) underwent loop colostomy and bowel distension was observed in most (38.7%) of cases. The most frequent complication was wound infection (12.9%). Mean hospital stay was 7.2 ± 2.5 days with no mortality.

Table I: Indications of colostomy (n = 31).

Indication	Frequency n (%)
Intestinal obstruction	10 (32.3)
Colorectal malignancy	8 (25.8)
Trauma	6 (19.4)
Perforation peritonitis	4 (12.9)
Congenital anomaly	3 (9.6)

Table II: Type of colostomy (n = 31).

Type of Colostomy	Frequency n (%)
Loop colostomy	14 (45.2)
End colostomy	10 (32.3)
Double barrel	7 (22.5)

Table III: Operative Findings of the patients (n =31).

Findings	Frequency n (%)
Bowel obstruction with distension	12 (38.7)
Colorectal malignancy	8 (25.8)
Perforation with contamination	7 (22.6)
Traumatic bowel injury	4 (12.9)

Table IV: Post-operative complications of the patients (n =31).

Complication	Frequency n (%)
Wound infection	4 (12.9)
Skin excoriation	3 (9.6)
Stoma prolapse	1 (3.2)
Retraction	1 (3.2)
No complication	22 (71)

Discussion

The present study demonstrates that colostomy remains an essential surgical procedure in resource-limited settings. Intestinal obstruction was the most common indication, consistent with findings reported by Duchesne JC and other authors. [3, 9]

Colorectal malignancy was the second most common indication, similar to studies by Park JJ2. However, unlike developed countries where primary anastomosis is preferred, colostomy remains more common in our setting due to delayed presentation and limited facilities. [4, 5]

The overall complication rate of 29% is comparable to previously reported rates ranging from 25% to 40% [1,6]. Shellito PC reported wound infection as the most common complication, which aligns with our findings. Skin excoriation was the second most common complication, reflecting challenges in stoma care. [6-8]

Stoma-related complications such as prolapse and retraction were low, suggesting proper surgical technique and postoperative care. No mortality was observed, indicating safety of the procedure when performed with appropriate perioperative management. [5]

Conclusion

Colostomy is a safe, effective, and life-saving surgical procedure with acceptable complication rates. Improved surgical technique, early diagnosis, and proper postoperative care can further enhance patient outcomes.

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Original Article

Effects of Oat Supplementation on HDL-cholesterol and LDL-cholesterol in Type 2 Diabetes Patients

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Abstract

Background: Type 2 Diabetes mellitus (DM) is a major global health problem. Overweight, obesity, unhealthy diet and sedentary lifestyle are strongly linked with increasing prevalence of diabetes mellitus. Lifestyle modification including healthy diet and regular physical activity plays an important role in the management of type 2 DM. Oat consumption is claimed to reduce the risk of cardiovascular diseases and other complications of type 2 DM by lowering serum lipid. **Objectives:** The aim of this study was to observe the effects of oat supplementation on HDL-cholesterol (HDL-C) and LDL-cholesterol (LDL-C) in type 2 Diabetes Mellitus patients. **Methods:** A prospective interventional study was done in Dhaka Medical College from July 2021 to June 2022. Total eighty diagnosed type 2 DM patients of both genders age ranging 35-60 years were selected on the basis of inclusion and exclusion criteria. Among them forty type 2 DM patients without oat supplementation were considered as control group. Another forty age and gender matched type 2 DM patients with oat supplementation (60 gm/day) for 12 weeks were considered as study group. Serum high density lipoprotein cholesterol (HDL-C) and serum low density lipoprotein cholesterol (LDL-C) were estimated at the beginning of the study and after 12 weeks of study period in control and study groups. **Results:** LDL-C levels were significantly decreased and HDL-C was significantly increased in study group after 12 weeks of oats supplementation in comparison to that of their baseline value than the control group. **Conclusion:** Regular supplementation of oats improves lipid profile in type 2 Diabetes Mellitus patients.

Keywords: Diabetes mellitus, oat, high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C).

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Introduction

Diabetes mellitus (DM) is characterized by chronic hyperglycemia due to different degrees of deficiency in insulin secretion, and/or in insulin action [1]. The causes of type 2 DM are not understood completely but type 2 DM has a strong link with increasing age, overweight, obesity, ethnicity and family history [2].

The modified diagnostic criteria for diabetes are: (one or more of the following criteria are met) Fasting plasma glucose: ≥ 7.0 mmol/L (126 mg/dL), 2-hour plasma glucose after 75 g oral glucose load

(oral glucose tolerance test (OGTT)): ≥ 11.1 mmol/L (200 mg/dL), HbA1c: ≥ 48 mmol/mol (equivalent to 6.5%), Random plasma glucose in the presence of symptoms of hyperglycemia: ≥ 11.1 mmol/L (200 mg/dL) [2, 3].

Bangladesh has 13.1 million people with diabetes. The prevalence of diabetes in adults (20-79 years) is slightly lower in women (10.2%) than in men (10.8%) [2]. Appropriate lifestyle measures, insulin and non-insulin agents are used to control diabetes [1].

Oat is a good nutritive cereal grain with the benefit

of the dietary fiber due to presence of β -glucan [4]. Whole grain oat reduces low-density lipoprotein (LDL) cholesterol by 0.12 mmol/L which comprises 5% reduction [5]. Supplementation of oat reduces the risk of cardiovascular diseases and type 2 diabetes mellitus [6].

Pino et al. (2020) observed that oat supplementation reduced HDL cholesterol significantly in study group in comparison to control group [7]. Tessari and Lante (2017) found no significant differences in HDL and LDL level between the two groups during study period [8]. Li et al. (2016) observed a significant reduction in LDL cholesterol in oat intervention group [9]. Reyna et al. (2003) found that following treatment with oat, low density lipoprotein cholesterol were reduced non-significantly but high density lipoprotein cholesterol was increased significantly in the study group in comparison to the control group [10].

The observations of the above studies are contradictory and not conclusive regarding the effect of oat supplementation on HDL-cholesterol and LDL-cholesterol level of type 2 Diabetes Mellitus patients. Therefore, the aim of this study was to evaluate the effects of oat supplementation on HDL-cholesterol and LDL-cholesterol level in type 2 Diabetes Mellitus patients.

Materials and Methods

After obtaining ethical clearance from concerned departments, Research Review Committee and Ethical Review Committee of Dhaka Medical College, Dhaka, a prospective interventional study was conducted in the Department of Physiology, Dhaka Medical College, Dhaka from July 2021 to June 2022. A total 80 diagnosed type 2 Diabetes Mellitus patients of both genders age ranging 35-60 years were selected from outpatient Department of Endocrinology, Dhaka Medical College Hospital, Dhaka. Among them 40 type 2 Diabetic Mellitus patients without oat supplementation were included as control group. Another age and gender matched 40 patients of type 2 Diabetes Mellitus with oat supplementation (60 gm/day) for 12 weeks were included as study group. Study subjects were allocated in the study group and control group randomly.

Inclusion criteria

Inclusion criteria were diagnosed patients of type 2 Diabetes Mellitus according to World Health Organization (WHO) and International Diabetes Federation (IDF) 2021 of both genders with age ranging 35-60 years. All the diabetic patients were on same oral hypoglycemic drug (Metformin).

Exclusion criteria

Exclusion criteria was pregnancy and lactation, patients who were on insulin therapy, steroid and OCP, patients with endocrine disorder other than DM, patients with recent or past history of myocardial infarction, heart failure, severe hypertension (BP >180/110 mmHg), renal and liver disorders, patients with concurrent acute illness including infectious diseases and malignancy, smoking and alcohol intake and known allergic to oat.

Study procedure

All the patients of type 2 Diabetes Mellitus of the study group were supplemented orally 60 gm of oats per day (60 gm/day) for 12 weeks [11]. Oats were purchased from local market. The brand of oat was Quaker oats. One kg oats container pot of Quaker oats and a measuring cup was given to the study group for every 17 days interval and they were encouraged to consume the supplied oat daily. Sixty gm oats were measured by supplied measuring cup. A person can consume 1 kg of oat for 17 days. Each subject of the study group was supplied a total of 5 kg oats (5 container of 1 kg Quaker oats) during 12 weeks of study period. A regular telephonic contact and periodic visit was taken to supply oats and to ensure compliance with intervention. Empty containers of oat and the amount of oats in the container were checked to understand that the subjects were consuming the oats regularly.

With all aseptic precaution, 6 ml of venous blood was collected from ante-cubital vein by 10 cc disposable plastic syringe from each subject after an overnight fast (at least 12 hours). The blood was transferred in a de-ionized glass test tube and was kept in slanted position till formation of clot. Then blood sample was centrifuged at a rate of 3000 rpm for 10 minutes for separation of serum. After

that, supernatant serum was collected in labeled eppendorf tube and preserved in a refrigerator below -20 until analytical measurement of serum HDL-cholesterol and LDL-cholesterol, serum creatinine and serum ALT were done. Serum creatinine and serum ALT were done to exclude renal and liver disease respectively. Analytical measurement was done into the Department of Laboratory Medicine, Dhaka Medical College Hospital, Dhaka. Measurement of HDL-cholesterol and LDL-cholesterol were done in all the subjects of both control and study groups, at the beginning of the study (baseline) and after 12 weeks of oat supplementation in the study group and without any oat supplementation for 12 weeks in the control group. Fasting serum HDL cholesterol was estimated by Abell-Kindall method. Fasting serum LDL cholesterol was calculated by enzymatic Friedwald formula. The formula developed in 1972 in the most frequently used indirect method for estimating LDL-C concentration. By using this formula LDL-C is calculated as follows: $LDL-C = TC - (HDL-C + TG/5)$.

Statistical analysis

Statistical analysis was performed by using a computer based statistical program SPSS (Statistical package for social science) version 23. Results were expressed as mean and standard deviation SD (mean $\pm$ SD). p value <0.05 was considered as level of significance. Paired student's 't' test was performed to compare quantitative data between baseline and after 12 weeks within group and unpaired student's 't' test was performed to compare quantitative data between control and study groups. Chi square test was performed to compare qualitative data between control and study groups.

Results

In this study, total 80 patients were included.

Table I. General Characteristics of the subjects in control and study groups (N=77).

Parameters	Control Group (n=40)	Study Group (n=37)	p value
Age (years)	46.7 $\pm$ 7.7 (35-59)	46.4 $\pm$ 7.6 (31-59)	$>0.05^{NS}$
Male	18 (53%)	16 (47%)	$>0.05^{NS}$
Female	22 (51%)	21 (49%)	
Systolic BP (mmHg)	124.5 $\pm$ 6.4 (110-130)	122.8 $\pm$ 8.4 (110-140)	$>0.05^{NS}$
Diastolic BP (mmHg)	79.8 $\pm$ 7.3 (70-90)	79.9 $\pm$ 5.3 (70-90)	$>0.05^{NS}$

Among them 77 patients completed this study. Three patients from the study group were excluded due to their personal reason. General characteristics of the study population was shown by age (years), gender (percentage), systolic blood pressure (mmHg) and diastolic blood pressure (mmHg). (Table-I)

Serum high density lipoprotein cholesterol showed no significant difference in the control group after 12 weeks in comparison to their baseline value and also in comparison to the study group. High density lipoprotein cholesterol increased significantly in the study group after 12 weeks of oat supplementation in comparison to their baseline value but showed no significant difference in comparison to the control group (Table-II).

Serum low density lipoprotein cholesterol significantly decreased after 12 weeks in the control group in comparison to their baseline value but showed no significant difference in comparison to the study group. Low density lipoprotein cholesterol significantly decreased in the study group after 12 weeks of oat supplementation in comparison to their baseline value but showed no significant difference in comparison to the control group (Table-III).

In Table I, results were expressed as mean $\pm$ SD. Unpaired Student's 't' test was performed to compare age, systolic BP and diastolic BP between control and study groups. Chi Square test was performed to compare gender between control and study groups. The test of significance was calculated and p value <0.05 was accepted as level of significance. N = total number of study population, n=number of study subjects in each group.

Table II. Serum HDL-C in study and control groups (N=77).

Serum HDL-C	Control Group (n=40)	Study Group (n=37)	p value
At baseline	50.2 ± 6.5 (45-58)	49.2 ± 3.4 (45-80)	0.703 ^{NS}
After 12 weeks	50.1 ± 6.6 (42-60)	51.1 ± 4.9 (42-80)	0.521 ^{NS}
p value	0.515 ^{NS}	0.001 ^S	

Table III. Serum LDL-C in study and control groups (N=77).

Serum LDL-C	Control Group (n=40)	Study Group (n=37)	p value
At baseline	76.9 ± 31.3 (50-175)	85.8 ± 31.1 (60-266)	0.601 ^{NS}
After 12 weeks	78.7 ± 31.6 (50-175)	83.3 ± 30.3 (65-266)	0.521 ^{NS}
p value	0.000 ^S	0.000 ^S	

In Table II, results were expressed as mean ± SD. Paired t test was performed for comparison between baseline and after 12 weeks within group. Unpaired t test was performed to compare between control and study groups. p value <0.05 was accepted as level of significance. N = total number of subjects, n=number of study subjects in each group .

In Table III, results were expressed as mean ± SD. Paired t test was performed for comparison between baseline and after 12 weeks within group. Unpaired t test was performed to compare between control and study groups. p value <0.05 was accepted as level of significance. N = total number of subjects, n=number of study subjects in each group.

Discussion

The objective of this present study was to observe the effects of oat supplementation on HDL-cholesterol and LDL-cholesterol in type 2 Diabetes Mellitus patients. In this present study, serum high density lipoprotein cholesterol increased significantly and LDL-C decreased significantly in the study group after 12 weeks of oat supplementation in comparison to their baseline value. These findings are compatible with some studies [12]. It may be due to the fact that oat β-glucan entrap whole micelles containing bile acid in intestine which reduces its reabsorption and increases fecal excretion of it due to high viscosity. Oat also causes activation of cholesterol 7α-hydroxylase

that increases up-regulation of low-density lipoprotein receptor (LDLR). This facilitates transfer of LDL to hepatocyte and reduce blood LDL cholesterol. Some other studies proposed that fermentation capacity of oat produced SCFA which inhibit cholesterol synthesis in liver [13-15].

On the contrary, Tessari and Lante (2017) observed no significant differences in HDL and LDL cholesterol level between the control and the study groups. In this study lack of any change in HDL-C and LDL-C level possibly due to the already near-normal lipid values of the subjects [8].

One of the strengths of the study was that the study subjects were randomly allocated in the study group as well as in the control group and the period of observation was long (12 weeks) for better interpretation of the effect of oat supplementation. However, the number of the study population was small and male and female were not taken on equal ratio in both groups.

Conclusion

Findings of the present study proves that oat supplementation for 12 weeks decreases low density lipoprotein the levels and increases high density lipoprotein levels. As a result, oat supplementation may be recommended in Diabetes Mellitus patients for better management of the disease and to minimize the complications of the disease.

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Original Article

A Study on Surgical Site Infections and Associated Risk Factors in Surgeries

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Abstract

Background: Surgical site infection (SSI) is the second most common health care-associated infection causing increased morbidity, mortality, length of hospital stays, and healthcare cost. Surgical site infection accounts for 14% to 16% of hospital-acquired infections. Reported surgical site infection rates ranged from 0.5% to 13%, depending on the type of surgery and patient characteristics. These are further complicated by an increasing prevalence of multidrug-resistant organisms. Associated risk factors also play a role in contribution of SSIs. However, the identification of factors causing SSIs remains an important area of research. **Objectives:** To investigate the risk factors for SSI together with the identification of the aetiological bacterial agents and their antimicrobial susceptibility. **Methods:** A cross-sectional study was carried out on 143 patients who underwent surgery in a tertiary hospital. Only the surgeries falling under clean and clean-contaminated categories were included in the study. SSI was determined by positive bacterial culture, and resistant pattern was determined by Kirby–Bauer disc diffusion method. **Results:** Out of 25 different surgical procedures in 143 cases, four cases developed SSI due to *Escherichia coli* and *Staphylococcus aureus*. Diabetes, obesity, and smoking were the associated risk factors in these cases. **Conclusion:** Prevention of SSI is complex and requires the integration of a range of preventive measures before, during, and after surgery.

Keywords: Surgical site infection (SSI), The National Healthcare Safety Network (NHSN), Centers for Disease Control and Prevention (CDC) *E. coli: Escherichia coli*, *S. aureus: Staphylococcus aureus*; MRSA: methicillin-resistant *Staphylococcus aureus*.

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Introduction

Surgical site infections (SSI) are a leading cause of morbidity and mortality around the world. Around 5.6% of surgical procedures develop SSIs, mostly in developing countries [4]. To track healthcare-associated infections, the National Healthcare Safety Network (NHSN) uses standardised infection ratio, which compares the number of observed infections with the number of predicted infections [5].

Each year, a significant amount of morbidity and mortality is caused by infection at or around the surgical site, which occurs within 30–90 days of an

operative procedure [6]. A Centers for Disease Control and Prevention (CDC) survey from 2015 estimated approximately 110,800 SSIs among inpatient surgeries [7]. There was 5% reduction in SSIs in 2020 when compared with 2015 data as baseline among all NHSN operative procedure categories combined [8].

Despite improvements in surgical techniques, sterilisation of instruments, operation theatre practices, and the best efforts of infection prevention strategies, SSIs remain a major cause of hospital-acquired infections [9].

These are further complicated by an increasing prevalence of multidrug-resistant organisms. Most of the time, it is the patient's endogenous flora that is responsible for many SSIs, and the commonly isolated pathogens include *Staphylococcus aureus*, coagulase-negative staphylococci, *Enterococcus* spp., and *Escherichia coli* [10]. However, the identification of factors that cause or predict these SSIs remains an important area of research. The authors aim to investigate the risk factors for SSIs, together with the identification of the aetiological bacterial agents and their antimicrobial susceptibility in a tertiary hospital.

Methods

A cross-sectional study was carried out on 143 patients who underwent surgery in Satkhira Medical College Hospital, Satkhira, Bangladesh. The study was conducted over a period of 2 months between August–September 2025. The degree of surgical wound contamination was assessed by the operating team at the time of surgical procedure. The wounds were classified into clean, clean-contaminated, contaminated, and dirty/infected, based on NHSN wound classifications [11]. The study included patients who underwent elective surgeries falling under clean and clean-contaminated cases with at least 7 days of hospital stay post-operatively, and who experienced signs and symptoms such as redness, pain, swelling around the surgical site, tenderness over the site, fever, delayed healing, etc. A written informed consent was obtained from the patients who agreed to participate in the study. Wounds falling under the categories of contaminated and dirty/infected were excluded from the study. Data was collected using a specially designed case report form.

Sample Collection and Processing of Specimens

Two swabs were collected from the surgical site taking aseptic precautions and transported immediately to the laboratory in a sterile container to be added. One swab was subjected to Gram stain, for the presence of pus cells and organisms. Another swab was cultured on blood agar media, MacConkey agar media, and Thioglycolate broth. Interpretation of the cultures and identification of the organisms was done as per standard protocol, and

antibiotic sensitivity was done using Kirby–Bauer disc diffusion method.

Statistical analysis

Demographic variables were summarised using means for continuous variables. To know the significant difference between risk factor and presence or absence of SSI, analyses were done using the Z-test. The p value of <0.05 was considered statistically significant.

Results

A total of 481 cases were admitted for surgery during the study period. Of these, 338 cases were excluded from the study group as the wound belonged to contaminated or dirty/infected classification.

A total of 143 cases were included in the study as per inclusion criteria (Figure 1). The mean patient age ranged from 15–75 years; however, the majority (81.8%) of the study group were aged between 35–65 years. The majority of the patients were male (76%). Out of 143 cases, 79 (55.2%) had patient-related risk factors, and 64 (44.8%) cases did not have associated risk factors. Among the study group, 36.4% had uncontrolled diabetes, 17.8% had obesity, 10.2% were smokers, and 7.6% had associated hypertension (Figure 2).

Out of 79 cases with risk factors, four (5.06%) patients developed SSI. These four patients had diabetes with history of tobacco chewing, diabetes with chronic cough, and diabetes with obesity, and hypertension, respectively, as an associated risk factor. A significant result with $p<0.05$ was noted when analysis was done for the presence of risk factors, and their association with SSI, using Z-test for proportions (Table 1)

A total of 25 different surgical procedures were done under clean and contaminated wound category on 143 cases during the study period. Of these, nine cases showed symptoms of redness and discharge at the site of incision. Wound swabs collected showed culture positive in four (2.8%) cases. These cases had undergone hernioplasty, mastectomy, lower segment Caesarean section, fenestration, and discectomy surgeries, respectively. Out of four positive cultures, *E. coli* was

isolated from two patients (2.5%) and *S. aureus* in the other two cases (2.5%). Out of the two strains of *S. aureus*, one was Methicillin-resistant *S. aureus*. Antibiotic susceptibility pattern of *E. coli* isolates showed resistance to ampicillin (100%), β -lactams (50%), cephalosporins (50%), and ciprofloxacin (50%), and were sensitive to aminoglycosides (100%) and carbapenems (100%). Both isolates of *S. aureus* were sensitive to linezolid, vancomycin, and clindamycin (100%). A case-wise SSI summary is shown in Table 2.

All SSI cases were treated with appropriate antibiotic coverage and subsequently discharged home after wound healing and without any further complication.

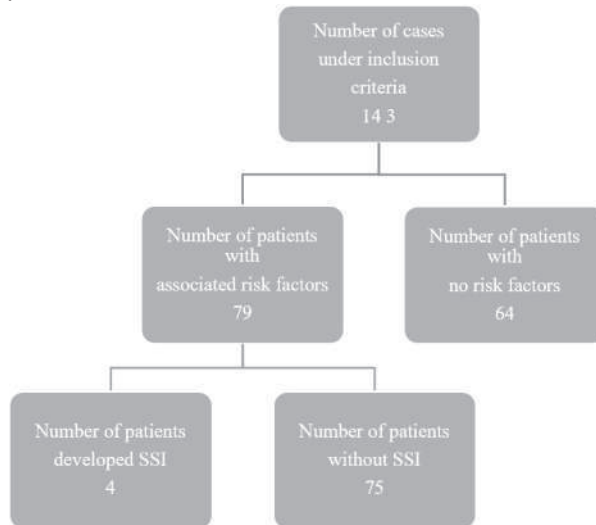


Figure 1: Flowchart depicting study methodology.

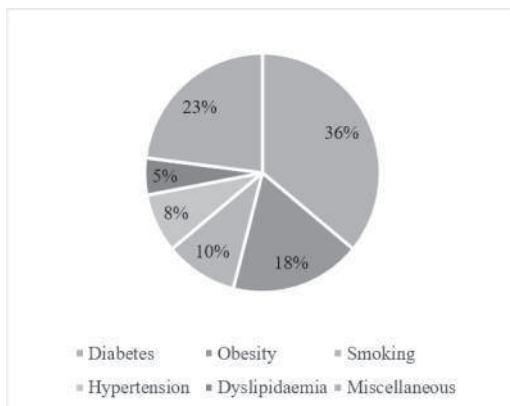


Figure 2: Surgical cases with associated risk factors.

Table 1: Analysis using Z-test for proportion of risk factors present, associated with surgical site infection.

Risk Factors of SSI		Total	z value	p value
Present	Absent			
4	75	79	11.29	<0.00001

Discussion

SSIs are the infections that occur following a surgery at surgical site within 30–90 days of surgical procedure. Infection could be superficial, involving skin and subcutaneous tissues, or a serious infection involving deeper tissues, organs, or the implant itself [12]. In low-and middle income countries, SSIs are the most surveyed and most common type of infection, with incidence rates ranging from 1.2–23.6 per 100 surgical procedures [13].

Several studies have reported SSI rates ranging from 0.04–22.00% [14, 15]. The authors' study reported 2.8% of SSIs, which is like a study by Satyanarayana et al.[16] SSIs are a major cause of morbidity and mortality worldwide, affecting 5.6% of surgical procedures, mostly in developing countries.

Mangram et al. [17] have demonstrated several patient characteristics like diabetes, smoking, obesity, and remote site infections to have a significant, independent association for SSI prediction. A systemic review and meta-analysis by Martin et al. [18] reported significant association between diabetes and SSI that was consistent across multiple types of surgeries. Similar association was noted in the authors' study, where three out of four patients who had developed SSI had diabetes.

As the number and complexity of surgical procedures performed today are increasing, so does the cost of human life and financial burden if a person develops SSI, especially if there are associated comorbidities. Numerous studies have proven increased financial implications and increased average length of hospital stay among patients with SSI when compared to non-infected patients with similar surgeries.

Table II. Case-wise surgical site infection summary.

SSI no.	Diagnosis	Surgery	Signs and symptoms	Organisms isolated	Sensitive to	Associated risk factors	Root cause analysis
1.	Inguinal hernia (43 yr; male)	Hernioplasty	Redness, wound discharge POD (4)	<i>E. coli</i>	Third generation cephalosporins, ciprofloxacin, aminoglycosides, carbapenems.	Diabetes	High glycaemic index
2.	Pre-eclampsia (23 yr; female)	Lower segment C-section	Redness, wound discharge, fever, tenderness, increased leucocyte count POD (2)	<i>E. coli</i>	Aminoglycosides, carbapenems.	Hypertension	Pre-operative surgical prophylaxis was not given
3.	Radiculopathy (24 yr; male)	Fenestration and discectomy	Redness, wound discharge, fever, tenderness, increased leucocyte count POD (5)	<i>S. aureus</i>	β -lactams, cefoxitin, clindamycin, linezolid, vancomycin	Diabetes, obesity	Glycaemic monitoring was not done during surgery
4.	Ca-breast (52 years; female)	Mastectomy	Redness, wound discharge, fever, tenderness, increased leucocyte count POD (4)	MRSA	Linezolid, vancomycin	Diabetes, chewing of tobacco	Immuno-compromised state

In the present study, SSIs were recorded in the age group 22–65 years, which was also seen in the similar study by Keith et al. [19]. However, gender was not a significant factor for prediction of SSI risk in the authors' study, which is like study by Berard et al.

In many SSIs, infections are mainly because of patients' endogenous flora. The aetiological agents will also depend on the type and location of the surgery. Various studies have reported *E. coli* and *S. aureus* as the frequent microbial flora associated with SSI, like the authors' study.

In a hospital setting, various factors like poor infection control practices, inadequate sanitary conditions, and irrational use of antibiotics will

favour development and spread of antimicrobial resistance. Hence, understanding the sensitivity pattern of the causative agent is crucial to initiate appropriate treatment. In the present study, *E. coli* was found to be 100% sensitive to aminoglycosides and carbapenems. *S. aureus* was sensitive to linezolid, vancomycin, and clindamycin (100%), which is comparable to studies by Mundhada et al. and Dessie et al.

High rates of methicillin-resistant *S. aureus* in clinical isolates from various studies have been documented, with rates as high as 41% reported. In the authors' study, one of the two isolates of *S. aureus* was methicillin resistant.

Various factors influence the incidence of SSIs, such

as pre-operative care, environment of operation theatre, efficient central sterile supply department, post-operative care, type of surgery, and associated host factors. Along with that, the factors that influence surgical wound healing and determine the potential for infection also play a vital role.

Numerous studies have estimated that approximately 60% of SSIs can be prevented by using evidence-based guidelines. Berríos-Torres et al. [20] have recommended preoperative full body bath; surgical prophylaxis as per clinical practice guidelines; surgical site skin preparation using alcohol-based agent; maintaining glycaemic levels less than 200 mg/dL; maintaining normothermia; and administration of increased fraction of inspired oxygen during surgery and after extubation in a patient undergoing surgery under general anaesthesia with endotracheal intubation and administration of blood products if required for preventing SSI. These guidelines can be incorporated into quality improvement programs to have a holistic approach in prevention of SSIs and to improve patient safety.

In this regard, it is important that with multidisciplinary approaches and available preventive guidelines, improved antibiotic policy and addressing modifiable patient comorbidities before, during, and after surgery will help in prevention of SSI. Determining the antimicrobial patterns of the bacterial agents causing SSIs will help institutions to improvise antibiotic policy and restrict the use of antimicrobials in preventing the spread of drug resistance in a hospital.

Conclusion

This study demonstrates significant association between patient-related risk factors and the development of SSIs.

Modifiable patient factors in the form of glycaemic control in diabetes, managing hypertension, and cessation of nicotine for weeks prior to surgery will facilitate the prevention of SSIs, which will assist in better management of surgical cases by reducing the length of stay in the hospital, and thereby reduce financial burden following surgery.

The early identification of SSI, supplemented with microbial cultures, will aid in initiation of early treatment with appropriate antibiotics, which will further prevent emergence of multidrug-resistant strains.

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Original Article

Early Clinical Outcome after Total Hip Replacement for Advanced Osteoarthritis

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Abstract

Background: Total hip replacement (THR) is a highly effective surgical procedure for managing advanced osteoarthritis of the hip, providing significant pain relief and functional improvement. With increasing life expectancy, the burden of hip osteoarthritis is rising globally. Early clinical outcomes following THR are important indicators of surgical success, including pain reduction, mobility, and complication rates. Evaluating these outcomes helps optimize patient care and improve overall treatment strategies. **Objectives:** To evaluate early clinical outcomes, demographic characteristics, pain severity, and radiological grading in patients undergoing total hip replacement. **Methods:** This prospective observational study was conducted at Satkhira Medical College and private hospitals from January to December 2025, including 18 patients with advanced hip osteoarthritis undergoing total hip replacement. Data were collected through clinical evaluation and radiological assessment. Eligible patients met inclusion criteria, while exclusions were applied accordingly. Data were analyzed using SPSS version 25, applying descriptive statistics. Ethical approval and informed consent were obtained prior to study commencement. **Result:** Out of 18 patients, most were aged 60–69 years (33.3%) with a mean age of 61.4 ± 8.2 years; males comprised 61.1%. Right hip involvement was 55.6%. Grade IV osteoarthritis was present in 61.1%. Cemented prostheses were used in 66.7%. Severe pain was reported in 66.7% ($p = 0.041$). No complications occurred in 77.8%. Excellent outcomes were seen in 38.9%. Hospital stay was 8–10 days in 50%. **Conclusion:** Total hip replacement is a safe and effective procedure, providing significant pain relief, functional improvement, and low complication rates in advanced osteoarthritis.

Keywords: Total hip replacement (THR), Advanced osteoarthritis, Pain relief, Cemented prosthesis, Functional improvement.

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Introduction

Total hip replacement (THR) is widely regarded as one of the most successful surgical interventions in modern medicine, consistently demonstrating significant improvements in pain relief, functional recovery, and quality of life for patients with end-stage osteoarthritis (OA) [1-3]. As the global burden of hip osteoarthritis continues to rise with an aging population, understanding the early clinical outcomes following this procedure has become increasingly important for surgeons,

healthcare systems, and patients alike [4, 5]. Advanced osteoarthritis, characterized radiographically by Kellgren-Lawrence grades 3 or 4 with severe joint space narrowing, subchondral sclerosis, and osteophyte formation, represents the predominant indication for primary THR in contemporary orthopaedic practice [6]. However, functional measures such as daily step count and stair climbing require three months and one year, respectively, to reach comparable improvements. Physical performance, as measured by the Short

Physical Performance Battery (SPPB), has been shown to improve by a median of two points within three months following THR in orthogeriatric populations [7]. The importance of appropriate patient selection cannot be overstated when evaluating early clinical outcomes. Sharrock and colleagues reported that patients with advanced OA achieved a significantly greater percentage of possible improvement in Oxford Hip Scores compared to those with early radiographic disease (75.8% versus 50.4%; $P < 0.0001$), although complication and readmission rates did not differ significantly between groups. This finding underscores the particular benefit of THR for patients with advanced degenerative changes. Surgical technique continues to evolve, with recent comparisons of the femoral-release-first technique versus traditional approaches in direct anterior approach THR demonstrating reduced operative time, decreased hemoglobin drop, and superior early pain and functional scores during the first two postoperative months. These technical refinements contribute to the favorable early outcome profile observed in contemporary practice. However, it is important to note that patient-reported outcomes following revision THR demonstrate significantly lower rates of improvement and higher rates of clinical worsening compared to primary procedures, highlighting the importance of achieving optimal outcomes from the initial arthroplasty [8]. Other factors influencing early outcomes include body mass index, with underweight patients showing higher complication rates, and surgical approach, where the direct anterior approach demonstrates faster early functional recovery compared to posterior approach [9, 10]. Additionally, enhanced recovery protocols have been shown to reduce length of hospital stay without compromising patient satisfaction [11]. Preoperative patient education programs are associated with reduced postoperative anxiety and improved early mobility [12]. The use of dual-mobility cups in high-risk patients has demonstrated lower early dislocation rates [13]. Patient age and comorbidity burden remain significant predictors of early adverse events [14]. Finally, outpatient THR protocols in appropriately selected patients have shown comparable safety and efficacy to

inpatient procedures, with high patient satisfaction scores at six weeks postoperatively [15]. This review examines the current evidence regarding early clinical outcomes after total hip replacement for advanced osteoarthritis, with particular focus on pain relief, functional recovery, complication profiles, and factors predictive of successful early results.

Objectives of the study

General Objective: To evaluate the early clinical outcomes after total hip replacement in patients with advanced osteoarthritis of the hip.

Specific Objectives

- To assess the demographic characteristics (age, gender, occupation) of patients undergoing total hip replacement.
- To evaluate the preoperative clinical status of patients, particularly pain severity and functional limitation.
- To determine the radiological severity of osteoarthritis among the study population.

Methods

Study Design: This was a hospital-based prospective observational study conducted at Satkhira Medical College and selected private hospitals in Satkhira, Bangladesh. The study population consisted of 18 patients diagnosed with advanced osteoarthritis of the hip who underwent total hip replacement. The study was carried out over a period of one year, from January 2025 to December 2025.

Data Collection and Study Procedure: Data were collected using a structured questionnaire and clinical assessment form. All patients were evaluated preoperatively through detailed history taking, physical examination, and radiological assessment including X-ray of the hip joint. The severity of osteoarthritis was graded, and baseline functional status was recorded using standardized scoring systems. Total hip replacement surgery was performed under appropriate anesthesia following standard surgical protocols. Postoperative follow-up was conducted to assess early clinical outcomes, complications, and functional improvement. All relevant data were recorded systematically for analysis.

Inclusion Criteria: Patients included in the study were those diagnosed with advanced osteoarthritis of the hip (Grade III and IV), aged 40 years and above, and who underwent primary total hip replacement during the study period. Only patients who provided informed consent and were willing to participate in follow-up evaluations were considered eligible for inclusion.

Exclusion Criteria: Patients were excluded if they had hip pathology due to causes other than osteoarthritis such as trauma, infection, or malignancy. Patients who were medically unfit for surgery, had previous hip replacement surgery, or were unwilling to participate in the study or follow-up were also excluded.

Statistical Analysis: All collected data were compiled, coded, and analyzed using statistical software such as SPSS version 25. Descriptive statistics including mean, standard deviation, frequency, and percentage were used to summarize the data. Results were presented in tables and charts where appropriate. Continuous variables were expressed as mean $\pm$ standard deviation, while categorical variables were expressed as frequencies and percentages. Ethical Consideration: Ethical approval for the study was obtained from the institutional ethical review committee of Satkhira Medical College. Written informed consent was obtained from all participants prior to inclusion in the study. Confidentiality of patient information was strictly maintained, and all procedures were conducted in accordance with the principles of the Declaration of Helsinki.

Results

Table I shows the demographic profile of the study population. The majority of patients were in the 60–69 years age group (33.3%), followed by 50–59 years (27.8%). The mean age was 61.4 ± 8.2 years, indicating that most patients were elderly. Male patients (61.1%) predominated over females (38.9%). Regarding occupation, housewives constituted the largest group (33.3%), followed by farmers (27.8%), reflecting a relatively low-to-moderate activity population.

Figure 1 illustrates the side of hip involvement. The right hip was more commonly affected (55.6%)

Table I. Demographic characteristics of study population (n = 18).

Variable	Category	Frequency n (%)
Age (years)	40–49	3 (16.7)
	50–59	5 (27.8)
	60–69	6 (33.3)
	≥ 70	4 (22.2)
Mean Age $\pm$ SD		61.4 $\pm$ 8.2 years
Gender	Male	11 (61.1)
	Female	7 (38.9)
Occupation	Service holder	4 (22.2)
	Business	3 (16.7)
	Farmer	5 (27.8)
	Housewife	6 (33.3)

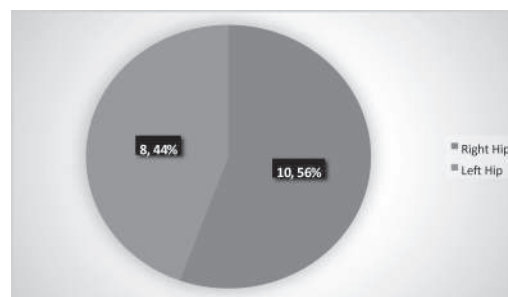


Figure 1: Laterality of hip involvement.

compared to the left hip (44.4%), showing a slight predominance but relatively balanced distribution.

Table II. Severity of osteoarthritis (radiological grading) (n = 18).

Grade (Kellgren-Lawrence)	Frequency n (%)
Grade III	7 (38.9)
Grade IV	11 (61.1)

Table II demonstrates that the majority of patients had Grade IV osteoarthritis (61.1%), indicating advanced disease at presentation, while 38.9% had Grade III disease.

Table III. Type of prosthesis used (n=18).

Prosthesis Type	Frequency n (%)
Cemented	12 (66.7)
Uncemented	6 (33.3)

Table III shows that cemented prostheses were used in most cases (66.7%), while uncemented

prostheses were used in 33.3% of patients, suggesting a preference for cemented fixation in this cohort.

Table IV. Preoperative clinical status (pain level) (n=18).

Pain Severity	Frequency n (%)	p value
Moderate	6 (33.3)	0.041*
Severe	12 (66.7)	

Table IV shows that the majority of patients (66.7%) presented with severe pain prior to surgery, whereas 33.3% had moderate pain. The difference in pain severity distribution was found to be statistically significant ($p = 0.041$), indicating that severe pain was significantly more prevalent among the study population before undergoing total hip replacement.

Table V. Postoperative complications (n=18).

Complication	Frequency n (%)
No complication	14 (77.8)
Superficial infection	2 (11.1)
Dislocation	1 (5.6)
Deep vein thrombosis	1 (5.6)

Table V shows that the majority of patients (77.8%) had no postoperative complications. Among complications, superficial infection was most common (11.1%), while dislocation and deep vein thrombosis were rare (5.6% each).

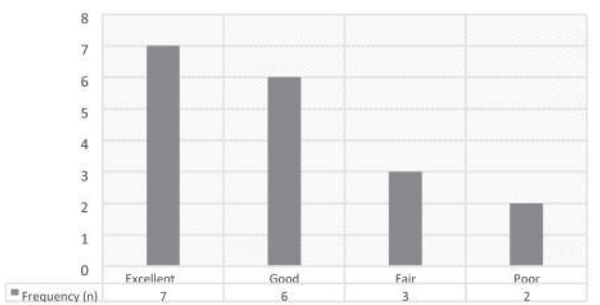


Figure 2: Functional Outcome (Harris Hip Score).

Figure 2 demonstrates functional outcomes using the Harris Hip Score. Most patients achieved excellent (38.9%) or good (33.3%) outcomes, indicating satisfactory early clinical results following total hip replacement.

Table VI. Duration of hospital stay (n=18).

Duration	Frequency n (%)
≤7 days	5 (27.8)
8–10 days	9 (50)
>10 days	4 (22.2)

Table VI shows that half of the patients (50.0%) stayed in the hospital for 8–10 days, while 27.8% stayed ≤7 days. A smaller proportion (22.2%) required longer hospitalization (>10 days), possibly due to complications or slower recovery.

Discussion

In the present study, the majority of patients were in the 60–69 years age group (33.3%) with a mean age of 61.4 ± 8.2 years, and males predominated (61.1%). This finding is comparable with other studies where the mean age ranged from 58 to 65 years and a male predominance was observed in patients undergoing total hip replacement for osteoarthritis [16]. The current study demonstrated that the right hip was more commonly affected (55.6%) than the left (44.4%). Similar findings have been reported in previous studies where unilateral involvement showed a slight predominance of the right hip, although the distribution was generally balanced [17]. Regarding disease severity, most patients (61.1%) had Grade IV osteoarthritis, indicating late presentation. This is consistent with findings from similar studies in developing countries, where more than 60% of patients presented with advanced-stage osteoarthritis at the time of surgery due to delayed healthcare access [18]. In this study, cemented prostheses were used in 66.7% of cases, showing a preference for cemented fixation. Comparable studies have reported higher use of cemented implants, especially in elderly patients, due to better initial fixation and early weight-bearing advantages [19]. Preoperatively, 66.7% of patients had severe pain, which was statistically significant ($p = 0.041$). Similar studies have also shown that the majority of patients undergoing total hip replacement present with severe pain, often exceeding 60%, highlighting the need for surgical intervention at advanced stages [20]. Postoperative complications were relatively low in

this study, with 77.8% of patients experiencing no complications. Among complications, superficial infection was most common (11.1%), while dislocation and deep vein thrombosis were rare (5.6% each). These findings are consistent with previous reports where complication rates ranged between 10% and 25%, with infection being the most frequent early complication [21]. Functional outcomes assessed by Harris Hip Score showed that 38.9% had excellent and 33.3% had good results, indicating satisfactory outcomes in over 70% of patients. Similar studies have reported good-to-excellent outcomes in approximately 70–85% of patients following total hip replacement [22]. Regarding hospital stay, 50% of patients stayed for 8–10 days, while 22.2% required more than 10 days. Comparable studies have shown average hospital stays ranging from 7 to 12 days, depending on postoperative recovery and complications [23]. Overall, the present study demonstrates favorable early clinical outcomes following total hip replacement, with significant pain relief, functional improvement, and low complication rates. These findings are in agreement with previously published literature supporting the effectiveness and safety of total hip replacement in advanced osteoarthritis [24].

Conclusion

The present study demonstrates that total hip replacement is an effective and reliable surgical intervention for patients with advanced osteoarthritis of the hip. The majority of patients in this study experienced significant improvement in pain relief and functional outcome, as evidenced by a high proportion achieving excellent to good results based on postoperative assessment. Most patients presented at an advanced stage of disease with severe pain, highlighting delayed healthcare-seeking behavior. The use of predominantly cemented prostheses, low complication rates, and acceptable duration of hospital stay further support the safety and effectiveness of the procedure.

Limitations of the Study: Despite these encouraging findings, the study has several limitations. The sample size was small ($n = 18$), which may limit the generalizability of the results. The study was

conducted in a single center with a relatively short follow-up period, restricting the evaluation to early clinical outcomes only and not long-term implant survival or complications.

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Original Article

Atrial Fibrillation in Valvular and Non-valvular Heart Disease: Clinical Correlates

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Abstract

Background: Atrial fibrillation is the most common sustained cardiac arrhythmia, linked to increased stroke, heart failure and mortality risk. Its global burden grows due to aging populations and rising cardiovascular risk factors. Valvular and non-valvular atrial fibrillation differ in etiology, clinical characteristics and cardiac abnormalities. Understanding atrial fibrillation's clinical correlates and echocardiographic features is crucial for improving risk stratification and management. This study evaluated the clinical correlates and echocardiographic characteristics of valvular and non-valvular atrial fibrillation in patients at a tertiary care hospital. **Methods:** This cross-sectional observational study was conducted in the Department of Cardiology, Satkhira Medical College and Hospital, Bangladesh from January to December 2024. A total of 105 patients diagnosed with atrial fibrillation were included. Socio-demographic characteristics, clinical risk factors and echocardiographic findings were collected retrospectively from hospital records. Statistical analysis was performed using SPSS version 25.0. **Results:** The mean age of participants was 59.8 ± 13.4 years. Non-valvular atrial fibrillation was more common (54.3%) than valvular atrial fibrillation (45.7%). Rheumatic mitral stenosis was the most common valvular lesion (43.8%). Hypertension and ischemic heart disease were significantly associated with non-valvular atrial fibrillation ($p < 0.05$). Left atrial enlargement was highly prevalent in both groups. Moderate to severe mitral regurgitation was significantly higher in valvular atrial fibrillation ($p = 0.032$). **Conclusion:** Non-valvular atrial fibrillation predominates in this population, with hypertension as a major associated risk factor. Echocardiographic abnormalities are common in both groups. Early identification of risk factors and structural heart disease may improve clinical outcomes.

Keywords: atrial fibrillation, valvular heart disease, echocardiography, hypertension.

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Introduction

Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia encountered in clinical practice and is associated with substantial morbidity and mortality worldwide. The global burden of AF has increased significantly over recent decades due to population aging and improved survival from cardiovascular diseases [1,2]. AF contributes to an increased risk of stroke, heart failure, systemic thromboembolism and all-cause mortality, posing a major public health challenge [3]. Epidemiological data suggest that AF affects millions of individuals globally, with increasing prevalence in both developed and

developing countries [1,4]. The rising incidence of AF has been attributed to increased life expectancy, improved detection methods and a growing prevalence of cardiovascular risk factors such as hypertension, diabetes mellitus and obesity [2,5].

AF is broadly categorized into valvular atrial fibrillation (VAF) and non-valvular atrial fibrillation (NVAF), based on the presence or absence of significant valvular heart disease. Valvular AF is commonly associated with rheumatic heart disease, particularly mitral stenosis, which remains highly prevalent in low- and middle-income countries [6,7]. Rheumatic valvular lesions contribute significantly to structural remodeling of

the atria, increasing susceptibility to arrhythmogenesis and thromboembolic complications [8,9]. In contrast, non-valvular AF is frequently associated with hypertension, ischemic heart disease, cardiomyopathy and degenerative valvular conditions [10,11].

The pathophysiology of AF involves complex electrical and structural remodeling of the atrial myocardium. Chronic pressure or volume overload leads to atrial dilation, fibrosis and altered conduction pathways, which predispose to sustained arrhythmia [12,13]. Echocardiographic abnormalities such as left atrial enlargement, left ventricular hypertrophy and reduced left ventricular ejection fraction are recognized predictors of AF and are associated with adverse clinical outcomes [14]. Structural heart disease contributes to progressive atrial remodeling and increases the risk of thrombus formation, particularly within the left atrial appendage [15].

Several epidemiological studies have identified clinical risk factors associated with AF including advanced age, hypertension, diabetes mellitus, ischemic heart disease, heart failure, obesity and smoking [2,16]. The Framingham Heart Study demonstrated that hypertension and structural heart disease significantly increase the risk of developing AF [2]. Similarly, global registry data have shown substantial variation in the distribution of valvular and non-valvular AF across different populations, reflecting regional differences in rheumatic heart disease prevalence and cardiovascular risk profiles [4].

In developing countries, rheumatic heart disease remains an important cause of valvular AF, particularly among relatively younger patients compared to non-valvular AF populations [7,17]. Limited data are available regarding the comparative clinical characteristics and echocardiographic profiles of patients with valvular and non-valvular AF in Bangladesh. Understanding the distribution of risk factors and structural cardiac abnormalities is important for improving risk stratification, management strategies and prevention of complications such as stroke and heart failure [18]

Although several international studies have

explored the epidemiology and clinical correlates of AF, regional data from resource-limited settings remain scarce. Differences in socioeconomic status, healthcare access and prevalence of rheumatic heart disease may influence the clinical presentation and disease progression [4,17]. Therefore, this study aimed to evaluate the clinical correlates, risk factors and echocardiographic characteristics of valvular and non-valvular atrial fibrillation among patients attending a tertiary care hospital in Bangladesh. The findings of this study may contribute to improved understanding of AF patterns in this population and support evidence-based clinical management strategies.

Materials & Methods

This cross-sectional observational study was conducted in the Department of Cardiology, Satkhira Medical College and Hospital, Satkhira, Bangladesh. The study period extended from January 2024 to December 2024. The study population consisted of patients diagnosed with atrial fibrillation attending the cardiology department during the study period. A total of 105 patients fulfilling the eligibility criteria were included in the study.

Inclusion criteria

- Patients diagnosed with atrial fibrillation based on electrocardiographic findings.
- Patients aged 18 years and above.
- Patients with either valvular or non-valvular heart disease.
- Patients who underwent echocardiographic evaluation.
- Patients with complete clinical and diagnostic records.

Exclusion criteria

- Patients with transient or reversible causes of atrial fibrillation.
- Patients with severe systemic illness affecting study variables.
- Patients with congenital heart disease.

Data collection procedure

Data were collected retrospectively from hospital records of patients diagnosed with atrial fibrillation in the Department of Cardiology, Satkhira Medical College and Hospital. Diagnosis of atrial fibrillation was confirmed through electrocardiography findings documented in patient records.

Relevant clinical data were extracted using a structured data collection sheet designed specifically for this study to ensure uniformity and consistency of information.

Socio-demographic characteristics including age, gender, residence and body mass index were obtained from medical records. Clinical history related to hypertension, diabetes mellitus, ischemic heart disease, heart failure, dyslipidemia, smoking status and previous stroke or transient ischemic attack was recorded. Classification of atrial fibrillation into valvular and non-valvular types was based on documented clinical diagnosis and echocardiographic findings.

Echocardiographic parameters including left atrial size, left ventricular hypertrophy, left ventricular ejection fraction, pulmonary hypertension, presence of thrombus and severity of mitral regurgitation were obtained from echocardiography reports performed by qualified cardiologists using standard imaging protocols. Left atrial enlargement was defined according to standard echocardiographic reference values. Reduced left ventricular ejection fraction was defined as less than 50 percent.

All data were carefully reviewed for completeness and accuracy before entry into the database. Patient confidentiality was maintained by anonymizing identifying information and using coded identification numbers.

Statistical analysis

Data were analyzed using Statistical Package for Social Sciences (SPSS) version 25.0. Continuous variables were expressed as mean and standard deviation. Categorical variables were presented as frequency and percentage. Comparisons between valvular and non-valvular atrial fibrillation groups were performed using the chi-square test. A p-value less than 0.05 was considered statistically significant.

Results

Table I presents the socio-demographic characteristics of the study participants. The majority of patients were aged 60–69 years (29.5%), followed by 50–59 years (25.7%) and ≥70 years (21.0%). The

mean age of the study population was 59.8 ± 13.4 years. Male participants constituted 55.2%, while females accounted for 44.8%. Most participants were from rural areas (56.2%) compared to urban residents (43.8%). Regarding body mass index, 46.7% had normal BMI, 34.3% were overweight and 19.0% were obese.

Table I. Socio-demographic characteristics of the study population (n = 105).

Variable		Frequency n (%)
Age group (years)	<40	9 (8.6)
	40–49	16 (15.2)
	50–59	27 (25.7)
	60–69	31 (29.5)
	≥70	22 (21)
Mean age (years)		59.8 ± 13.4
Gender	Male	58 (55.2)
	Female	47 (44.8)
Residence	Urban	46 (43.8)
	Rural	59 (56.2)
BMI category (kg/m ²)	Normal (18.5–24.9)	49 (46.7)
	Overweight (25–29.9)	36 (34.3)
	Obese (≥30)	20 (19)

Table II. Distribution of Valvular and Non-Valvular Atrial Fibrillation with underlying cardiac pathology (n = 105).

Type of atrial fibrillation	Frequency n (%)
Valvular AF	48 (45.7)
Non-valvular AF	57 (54.3)

Table II shows the distribution of valvular and non-valvular atrial fibrillation along with underlying valvular pathology. Non-valvular atrial fibrillation was slightly more common (54.3%) than valvular atrial fibrillation (45.7%).

Table III. Subtypes of valvular heart disease (n = 48).

Valvular lesion	Frequency n (%)
Rheumatic mitral stenosis	21 (43.8)
Mitral regurgitation	11 (22.9)
Aortic valve disease	7 (14.6)
Mixed valvular lesion	6 (12.5)
Prosthetic valve	3 (6.2)

According to table III, among patients with valvular atrial fibrillation, rheumatic mitral stenosis was the most frequent lesion (43.8%). Mitral regurgitation accounted for 22.9%, followed by aortic valve disease (14.6%). Mixed valvular lesions were observed in 12.5% of cases, while prosthetic valve involvement was present in 6.2%.

Table IV. Clinical risk factors associated with valvular and non-valvular AF (n = 105).

Clinical variable	Valvular AF n (%) (n=48)	Non-valvular AF n (%) (n=57)	p-value
Hypertension	18 (37.5)	36 (63.2)	0.008
Diabetes mellitus	9 (18.8)	19 (33.3)	0.092
Ischemic heart disease	6 (12.5)	17 (29.8)	0.041
Heart failure	20 (41.7)	16 (28.1)	0.148
Previous stroke/TIA	7 (14.6)	11 (19.3)	0.512
Smoking	11 (22.9)	19 (33.3)	0.239
Dyslipidemia	10 (20.8)	21 (36.8)	0.079

Table IV describes the clinical risk factors associated with valvular and non-valvular atrial fibrillation. Hypertension was significantly more common in non-valvular atrial fibrillation (63.2%) compared to valvular atrial fibrillation (37.5%) ($p=0.008$). Ischemic heart disease was also significantly higher in the non-valvular group (29.8% vs 12.5%) ($p=0.041$). Diabetes mellitus, dyslipidemia, smoking and previous stroke showed higher prevalence in non-valvular atrial fibrillation but without statistical significance. Heart failure was more frequent in valvular atrial fibrillation (41.7%) than non-valvular atrial fibrillation (28.1%), although the difference was not statistically significant.

Table V. Echocardiographic characteristics of patients with atrial fibrillation (n = 105).

Echocardiographic parameter	Valvular AF n (%) (n=48)	Non-valvular AF n (%) (n=57)	p-value
Left atrial enlargement (>40 mm)	39 (81.3)	41 (71.9)	0.261
Left ventricular hypertrophy	19 (39.6)	30 (52.6)	0.182
Reduced LVEF (<50%)	14 (29.2)	20 (35.1)	0.516
Pulmonary hypertension	17 (35.4)	13 (22.8)	0.147
LA/LAA thrombus	8 (16.7)	5 (8.8)	0.214
Moderate-severe MR	16 (33.3)	9 (15.8)	0.032

Table V presents the echocardiographic characteristics of patients with atrial fibrillation. Left atrial enlargement was highly prevalent in both valvular

(81.3%) and non-valvular atrial fibrillation (71.9%). Left ventricular hypertrophy was observed in 39.6% of valvular and 52.6% of non-valvular atrial fibrillation cases. Reduced left ventricular ejection fraction was present in 29.2% and 35.1% of valvular and non-valvular atrial fibrillation respectively. Pulmonary hypertension was more common in valvular atrial fibrillation (35.4%). Moderate to severe mitral regurgitation was significantly higher in valvular atrial fibrillation (33.3%) compared to non-valvular atrial fibrillation (15.8%) ($p=0.032$). Left atrial or left atrial appendage thrombus was detected in 16.7% of valvular atrial fibrillation patients and 8.8% of non-valvular atrial fibrillation patients.

Discussion

The present study evaluated the clinical correlates and echocardiographic characteristics of valvular and non-valvular atrial fibrillation among patients attending a tertiary care hospital. The findings demonstrate that non-valvular atrial fibrillation was slightly more prevalent than valvular atrial fibrillation, with significant associations between hypertension and ischemic heart disease in the non-valvular group. Echocardiographic abnormalities such as left atrial enlargement and reduced left ventricular function were common in both groups, highlighting the structural cardiac changes associated with atrial fibrillation.

In this study, the mean age of the participants was 59.8 years, with the highest proportion observed in the 60–69 year age group. Increasing age has consistently been identified as one of the strongest predictors of atrial fibrillation. Benjamin et al. demonstrated that advancing age significantly increases the incidence of atrial fibrillation due to progressive atrial remodeling and accumulation of cardiovascular risk factors [2]. Chugh et al. also reported a substantial increase in AF prevalence among elderly populations globally [1]. The predominance of older individuals in the present study is consistent with previous epidemiological findings indicating that degenerative cardiac changes contribute to arrhythmia development [11].

The study observed a slightly higher proportion of

male patients compared to females. Previous registry data have similarly reported male predominance in atrial fibrillation populations. Lip et al. found sex-related differences in the clinical presentation of AF, with males demonstrating higher prevalence rates in several cohorts [19]. However, females may experience a higher risk of complications such as stroke, emphasizing the importance of early identification and management [20].

Non-valvular atrial fibrillation was more common than valvular atrial fibrillation in this study. This finding is consistent with global trends indicating a decline in rheumatic valvular heart disease in many populations and an increasing contribution of non-valvular risk factors such as hypertension and ischemic heart disease. Rahman et al. reported that lifestyle-related cardiovascular risk factors have contributed significantly to the rising burden of non-valvular AF worldwide [4]. However, rheumatic mitral stenosis remained the most common valvular lesion among patients with valvular AF in this study. Diker et al. demonstrated that rheumatic mitral valve disease is strongly associated with atrial enlargement and arrhythmia development [8]. Rheumatic heart disease continues to contribute substantially to AF burden in developing countries [7].

Hypertension was significantly more common among patients with non-valvular atrial fibrillation. This observation is supported by findings from the Framingham Heart Study, which identified hypertension as a major independent risk factor for atrial fibrillation due to increased left ventricular stiffness and atrial dilation [2]. Similarly, Conen et al. reported that elevated blood pressure contributes to structural cardiac remodeling, thereby increasing susceptibility to arrhythmia [21]. Ischemic heart disease was also significantly associated with non-valvular AF in this study. Myocardial ischemia contributes to atrial fibrosis and electrical instability, promoting arrhythmogenesis [22].

Heart failure was more frequently observed among patients with valvular atrial fibrillation, although the difference was not statistically significant. Ariyaratnam et al. reported that structural abnormalities in valvular heart disease can impair ventricular function and increase the risk of heart

failure in patients with AF [23]. The coexistence of AF and heart failure may further worsen prognosis due to impaired hemodynamic function [24].

Echocardiographic findings in this study revealed a high prevalence of left atrial enlargement in both valvular and non-valvular AF groups. Vaziri et al. demonstrated that increased left atrial size is a strong predictor of atrial fibrillation development and recurrence [14]. Seko et al. also reported significant associations between atrial enlargement and structural cardiac remodeling [25]. Enlargement of the left atrium contributes to electrical instability and thrombus formation, increasing the risk of stroke [15].

Moderate to severe mitral regurgitation was significantly more common in valvular AF patients in this study. Mitral valve pathology leads to volume overload and progressive atrial dilation, facilitating arrhythmogenesis [26]. Bouzas-Mosquera et al. demonstrated that increased left atrial size is associated with a higher risk of stroke and mortality [27].

Pulmonary hypertension and reduced left ventricular ejection fraction were observed in both groups, reflecting advanced structural heart disease. Previous studies have shown that ventricular dysfunction contributes to adverse clinical outcomes in patients with AF [28]. Structural remodeling of the myocardium leads to electrical heterogeneity, increasing the likelihood of persistent arrhythmia [12].

Overall, the findings of this study are consistent with existing literature indicating that atrial fibrillation is associated with multiple cardiovascular risk factors and structural cardiac abnormalities. Differences between valvular and non-valvular AF highlight the importance of identifying underlying etiological factors to guide clinical management. Early detection of risk factors and echocardiographic abnormalities may improve risk stratification and reduce complications associated with atrial fibrillation.

Limitations and Recommendations

The study was limited by single-center design and relatively small sample size. Multicenter studies with larger populations are recommended to

validate findings. Prospective studies evaluating long-term outcomes and treatment responses may improve clinical management strategies for atrial fibrillation patients.

Conclusion

This study demonstrates that non-valvular atrial fibrillation is slightly more prevalent than valvular atrial fibrillation in the studied population. Hypertension and ischemic heart disease were significantly associated with non-valvular atrial fibrillation, while rheumatic mitral stenosis remained the most common cause of valvular atrial fibrillation. Echocardiographic abnormalities, particularly left atrial enlargement, were highly prevalent in both groups. Identification of underlying structural heart disease and cardiovascular risk factors is essential for early risk stratification and prevention of complications.

Conflicts of interest: There are no conflicts of interest.

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Original Article

Role of Transvaginal Sonography in Combination with β -hCG in Early Detection of Ectopic Pregnancy: A Quasi-Experimental Study from a Tertiary Care Hospital in Bangladesh

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Abstract

Background: Ectopic pregnancy remains one of the major causes of maternal morbidity and mortality during the first trimester of pregnancy. Early diagnosis through transvaginal sonography (TVS) combined with serum β -human chorionic gonadotropin (β -hCG) measurement significantly improves patient outcome and reduces complications. **Objective:** To evaluate the role of transvaginal sonography in combination with serum β -hCG in the early detection of ectopic pregnancy in a tertiary care hospital in Bangladesh. **Methods:** This quasi-experimental study was conducted in the Department of Radiology and Imaging, Satkhira Medical College Hospital, Bangladesh, from January 2023 to June 2024. A total of 100 clinically suspected cases of ectopic pregnancy were included using purposive sampling. All patients underwent transvaginal sonography and serum β -hCG estimation. The collected data were analysed using descriptive statistical methods. **Results:** Among the 100 suspected cases, 76% were diagnosed as ectopic pregnancy. The highest frequency of ectopic pregnancy was observed in the age group of 21–25 years (60%). Tubal pregnancy constituted 90% of all ectopic pregnancies. The β -hCG discriminatory cutoff value was 6500 mIU/ml in most cases, while in selected cases a value as low as 1500 mIU/ml aided diagnosis. TVS demonstrated high diagnostic accuracy in identifying adnexal masses, gestational sacs, and free pelvic fluid. **Conclusion:** The combined use of TVS and serum β -hCG is highly effective for the early diagnosis of ectopic pregnancy. Early identification helps reduce morbidity, prevent tubal rupture, and improve reproductive outcomes.

Keywords: Ectopic pregnancy, Transvaginal sonography, β -hCG, Tubal pregnancy, Early diagnosis.

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Introduction

Ectopic pregnancy refers to implantation of a fertilized ovum outside the endometrial cavity and represents a life-threatening gynaecological emergency. It accounts for approximately 1–2% of all pregnancies and remains a significant contributor to maternal mortality during the first trimester [1]. Early detection is essential to prevent rupture, haemorrhage, infertility, and maternal death.

Transvaginal sonography (TVS) has become the cornerstone for early diagnosis because of its superior resolution and ability to detect small adnexal masses and extrauterine gestational sacs [2]. Serum β -human chorionic gonadotropin

(β -hCG) is another important diagnostic tool. The discriminatory zone of β -hCG refers to the serum concentration above which an intrauterine pregnancy should be visualized by TVS [3].

The combined use of TVS and β -hCG enhances diagnostic accuracy and facilitates prompt management decisions [4]. In Bangladesh, limited data are available regarding the combined diagnostic role of TVS and β -hCG in ectopic pregnancy. Therefore, this study was undertaken to assess their role in a tertiary care setting.

Materials and Methods

We did a hospital-based quasi-experimental study in the Department of Radiology and Imaging at

Satkhira Medical College Hospital, Bangladesh between the periods of January 2023 to June 2024. We included 100 women of reproductive age presenting with clinical suspicion of ectopic pregnancy in the emergency and gynaecology departments by purposive sampling.

Inclusion Criteria

- Positive urine or serum pregnancy test.
- Amenorrhea with lower abdominal pain.
- Vaginal bleeding during early pregnancy.
- Clinically suspected ectopic pregnancy.
- Hemodynamically stable patients.

Exclusion Criteria

- Confirmed viable intrauterine pregnancy.
- Patients unwilling to participate.
- Incomplete clinical or laboratory records.
- Hemodynamically unstable patients requiring immediate surgery.

Detailed clinical history and physical examinations were performed in all patients. Serum β -hCG levels were measured using standard laboratory techniques. Transvaginal sonography was subsequently performed using high-frequency endovaginal probes.

The sonographic findings assessed included empty uterine cavity, adnexal mass, tubal ring sign, extra-uterine gestational sac, yolk sac or foetal pole and free fluid in pouch of Douglas. Most cases showed β -hCG values above 6500 mIU/ml. However, selected clinically suspicious cases with β -hCG levels around 500 mIU/ml were also considered significant when supported by TVS findings.

Outcome Variables

The primary outcome variable was confirmed diagnosis of ectopic pregnancy based on combined TVS and β -hCG findings.

Statistical Analysis

Data were analyzed using descriptive statistical methods. Results were expressed in frequency, percentages, tables, and charts.

Results

Table I: Age Distribution of Patients.

Age Group (Years)	Number	Percentage
16–20	12	12%
21–25	60	60%
26–30	20	20%
31–35	8	8%

Table II: Diagnostic Outcome.

Diagnosis	Frequency n (%)
Ectopic Pregnancy Detected	76 (76)
Not Detected	24 (24)

Table III: Site of Ectopic Pregnancy.

Site	Frequency n (%)
Tubal Pregnancy	68 (90)
Other Sites	8 (10)

Table IV: β -hCG Findings.

β -hCG level	Cases
≥ 6500 mIU/ml	68 (90)
Around 500 mIU/ml	8 (10)

Discussion

Ectopic pregnancy remains one of the leading causes of first-trimester maternal mortality worldwide. Prompt diagnosis is essential to reduce complications such as tubal rupture, hemoperitoneum, infertility, and maternal death. The present study evaluated the role of transvaginal sonography combined with serum β -hCG in the early diagnosis of ectopic pregnancy.

In this study, 76% of clinically suspected cases were diagnosed as ectopic pregnancy. This finding is comparable to the study conducted by Barnhart et al., who demonstrated that combined TVS and β -hCG significantly improves diagnostic accuracy in suspected ectopic pregnancy cases [5].

The highest incidence was observed in the age group of 21–25 years, accounting for 60% of cases. Similar age predominance has been reported in previous studies because ectopic pregnancy commonly affects women in the most active reproductive age group [6].

Tubal pregnancy constituted 90% of all ectopic pregnancies in the present study. This observation is consistent with established literature showing that fallopian tubes are the most common implantation site for ectopic gestation [7].

Serum β -hCG remains a valuable biochemical marker in early pregnancy assessment. The discriminatory zone of β -hCG helps determine

when an intrauterine gestational sac should be visualized on TVS. Most of the patients in this study had β -hCG levels ≥ 6500 mIU/ml. However, several patients demonstrated ectopic pregnancy at lower values around 500 mIU/ml. This indicates that reliance on β -hCG alone may lead to missed diagnosis and that sonographic correlation is essential.

Transvaginal sonography proved highly useful in identifying adnexal masses, extrauterine gestational sacs, and pelvic free fluid. TVS offers superior spatial resolution and earlier detection compared with transabdominal ultrasonography [8].

The combined use of TVS and β -hCG reduced diagnostic uncertainty and facilitated timely management decisions. Early diagnosis allows conservative treatment options including methotrexate therapy and fertility preservation [9].

The findings of the present study support the routine use of combined TVS and serum β -hCG in all clinically suspected ectopic pregnancy cases, particularly in resource-limited tertiary hospitals in Bangladesh.

Ectopic pregnancy is a common obstetric emergency requiring prompt diagnosis and treatment. In the present study, 76% of clinically suspected patients were diagnosed with ectopic pregnancy using combined TVS and serum β -hCG. Similar findings were reported by Barnhart et al., who emphasized the importance of TVS in early pregnancy assessment [5].

The majority of patients belonged to the 21–25 years age group, indicating that younger reproductive-age women are more vulnerable. Tubal pregnancy was the predominant type, accounting for 90% of cases, which is consistent with previous studies [6].

The β -hCG discriminatory zone plays a critical role in diagnosis. Most cases in this study showed β -hCG levels above 6500 mIU/ml. However, a few patients demonstrated ectopic pregnancy even at lower levels around 500 mIU/ml, suggesting that clinical judgment and sonographic findings should always complement biochemical parameters.

TVS was highly effective in detecting adnexal

masses, extrauterine gestational sacs, and pelvic free fluid. Combination with β -hCG significantly improved diagnostic confidence and reduced unnecessary delays in treatment.

Conclusion

The combination of transvaginal sonography and serum β -hCG is highly valuable in the early diagnosis of ectopic pregnancy. TVS provides rapid and reliable visualization of adnexal pathology, while β -hCG assists in diagnostic confirmation. Early detection facilitates timely intervention, reduces maternal morbidity, and preserves fertility.

Conflict of Interest

The authors declare no conflict of interest.

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Original Article**Outcome of Preemptive Analgesia, Balanced Analgesia and Early Dynamic Pain Relief in Case of Laparoscopic Cholecystectomy**

***Md. Rafayet Ullah Siddique¹, Md. Moniruzzaman², Gazi Shafiqur Rahman³, Ripan Kumar Ghosh⁴, Mahfuza Khanam⁵**

Abstract

Background: The concept of multimodal analgesia and early dynamic pain relief in perioperative period is an essential component of fast-track surgery in case of major abdominal procedure. Many hospitals worldwide have already adopted the standard protocol of balanced analgesia to such goals with best outcome. Here in this study, we are going to evaluate the result of using such analgesic protocol in case of laparoscopic cholecystectomy under general anesthesia. Aims: The objective of this study was to find out the effectiveness of the concept of multimodal early dynamic pain in operative period of laparoscopic cholecystectomy. Methodology: This prospective study was carried out in the Department of Anesthesiology and ICU, Khulna Medical College & Hospital, Khulna from January 2025 to December 2025. Total 65 patients of routine laparoscopic cholecystectomy were selected as the study. After recruitment, patients were divided into two groups; 25 patients were included in group A (where standard protocol of multimodal analgesia was maintained), 40 patients were included in Group B (where standard protocol of multimodal analgesia was not maintained properly). Outcomes of different types of analgesia was assessed. Results: Results of this study were highly suggestive that in case of group A (where the theme of standard multimodal balanced analgesia was used) outcome was more attractive and tremendously good than group B in terms of analgesia, recovery, postoperative complications and length of hospital stay. Pain at postoperative period and at discharge was significantly lower in group A in contrast to group B. And the goals of fast-track surgery or enhanced recovery after surgery were properly fulfilled. Approximately 96.0% of patients were released from hospital within 24-48 hours after surgery in group A, whereas it was 42.5% in patients of group B. Conclusion: Using standard analgesic protocol can be associated with the best postoperative outcomes. This improves recovery and reduces postoperative unwanted scenario. Therefore, adaptation of this protocol is necessary in each hospital by the department of Anesthesia, ICU and Surgery.

Keywords: Analgesia, pain relief, laparoscopic cholecystectomy.

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Introduction

Early dynamic pain relief is an essential key to best perioperative outcome in case of major surgery and an important tool of fast-track surgery or ambulatory surgery [1, 2]. As it said in different research journal worldwide that "pain is the mother of all postoperative complications" like atelectasis and pulmonary complication, infective

complications, fever, septicemia, DVT, pulmonary embolism etc. [1]. That is why ambulatory surgery, like day case or fast-track surgery, stands on the ground of effective anesthetic and analgesic principles [3, 4]. Fast-track surgery, also known as Enhanced Recovery After Surgery (ERAS), is a multidisciplinary approach that combines medical, surgical, and nutritional interventions to minimize surgical stress [1]. Danish surgeon Henrik Kehlet

et. al. first used this concept in case of major colorectal surgery in 1990s [1, 2].

Balanced analgesia, also known as multimodal analgesia, is a pain management strategy that combines multiple medications and techniques with different mechanisms of action. By attacking pain through various neurological pathways, this synergistic approach provides superior pain relief while allowing for lower, safer doses of potent drugs like opioids [5]. Preemptive analgesia is the administration of pain medication before a planned noxious stimulus (such as a surgical incision). The goal is to block the neural pathways before the initial injury occurs, thereby preventing the nervous system from becoming hypersensitized [6].

To achieve such goals, we had adopted our own local standard protocol with perioperative analgesia in our hospital. This included the principle of preemptive analgesia (use of overnight preoperative sedative and analgesic), balanced multimodal analgesia like using IV, IM, per-rectal analgesic along with using local anesthetic (long acting) at incision site, using epidural analgesia (where indicated) etc. Combined synergistic use of central, peripheral and local acting medications were used in this protocol. Other than the analgesia, early ambulation and oral feeding were included in this standard protocol of our hospital.

Methods

This study was conducted as a prospective study with routine laparoscopic cholecystectomy in Khulna Medical College Hospital by the Department of Anesthesiology and ICU. This research was conducted from January to December 2025 with 65 patients. patients were divided into two groups; 25 patients group A (where standard protocol of multimodal analgesia was maintained), 40 patients were included in Group B (where standard protocol of multimodal analgesia was not maintained properly). A comparative analysis was made between these two groups on the basis of postoperative outcomes. Patients of this study were included based on inclusion and exclusion criteria using convenient purposive sampling. Patients with severe comorbidities were excluded

from the study population. Pain score and visual analogue scale were used as assessment tools for this study. Informed consent was taken from the patients, and ethical clearance was obtained from “Medical Research and review unit” of Khulna Medical College Hospital.

Results

The age and sex distribution of the study population is shown in table 1. Mean age was 40.4 and 38.4 years in respective groups. Average weight was 57.5±6.3 and 55.6±7.7 Kg in both groups.

Table I: Demographic characteristics of both study groups.

Variable	Group-I (n=25)	Group-II (n=40)	p value
Age (Mean ± SD) (year)	40.4 ± 8.2	38.4 ± 9.1	0.099
Weight (Kg)	57.5 ± 6.3	55.6 ± 7.7	0.073
Sex (Male/female)	05/20	12/28	0.244
BMI* (Kg/m ²)	30.1 ± 4.2	27.8 ± 5.2	0.161
ASA** (Grade II/ III)	15/10	23/17	-----

BMI stands for Body Mass Index and ASA stands for American Society of Anesthesiologists grade [7] or ASA Physical Status Classification [8].

Pain score (00-10) was used as an assessment tool in this study to evaluate the postoperative pain and tenderness in both groups [9]. The results are depicted in figure 1. At least 06 hours of postoperative routine follow up was done in each patient.

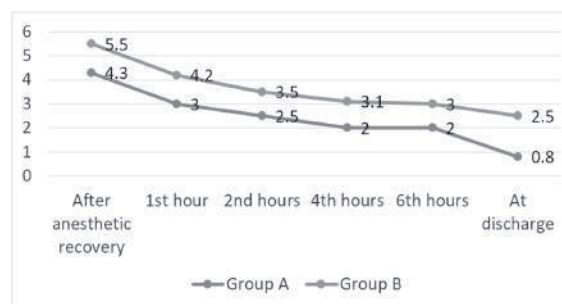


Figure 1: Average postoperative pain score in respective groups using pain score (00-10).

Visual analogue scale [10, 11] (00-10) was another effective tool of this study to assess the postoperative analgesia. At least 06 hours of postoperative follow up was done in each patient routinely. Results are shown in figure 2.

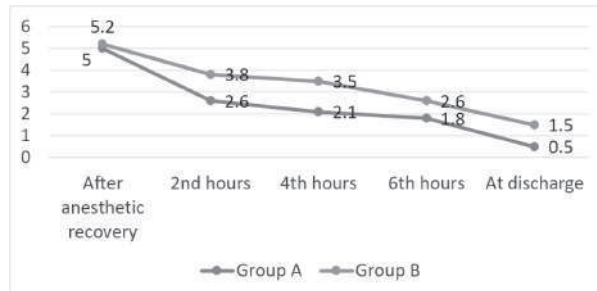


Figure 2: Average visual analogue score in respective groups using pain score (00-10).

Table II: Average length of hospital staying in research groups.

Time of discharge	Group A (n=25)	Group B (n=40)	p value
Within 12 hours	02 (8.0%)	00 (00%)	0.011
Within 12-24 hours	07 (28.0%)	02 (5.0)	0.021
Within 24-48 hours	15 (60.0%)	15 (37.5%)	0.181
Within 48-72 hours	01 (4.0%)	20 (50.0%)	0.210
After 72 hours	00 (00%)	03 (7.5%)	0.015

Average time of discharge from hospital after surgery in both groups is mentioned in table II.

Discussion

Demographic profile of the research population suggests that mean $\pm$ SD (standard deviation) of age was 40.4 ± 8.2 and 38.4 ± 9.1 years in group A and B respectively. Approximately 73.8% (48 out of 65) patients were female. Most of the patients in both groups had ASA II (American Society of Anesthesiologists grade) profile of comorbid status [7, 8]. In case of group A, after optimization of patient with pre-anesthetic check up, patients were admitted on the day before surgery. Preemptive analgesia was maintained on the night before surgery in the form of analgesia and sedation. This technique reduces the operation related stress and alteration of body physiology before nerve sensitization. In addition, it reduces the dose of analgesics at the time of perioperative period. This reduces the pain and complication rate significantly [12, 13].

Operation table analgesia was started soon after induction of anesthesia in case of group A. After laparoscopic cholecystectomy, port site incisions were infiltrated with inj. Bupivacaine. This is a quite effective technique to reduce the port site postoperative pain significantly, reflected in several researches [14, 15]. Balanced use of analgesia with

central and peripheral acting drug in different administration routes (such as IV, IM and per-rectal) [16] was done in the patients with group A. This method is also very effective in reducing postoperative pain with better outcome [17, 18]. Early ambulation and enhanced oral feeding were adopted in each patient of group A in early postoperative period [2, 3]. In case of patients with group B, every step of balanced multimodal analgesia and early dynamic pain relief was not maintained properly and sequentially. At least 06 hours of routine postoperative follow up was done in each patient of both groups.

Pain and tenderness were significantly lower in group A. At the time of hospital discharge, average pain score was 2.5 and 8 in respective study groups using the pain score (out of 10). Same results were observed in case of visual analogue score [10, 11]. Postoperative general, analgesic, pulmonary and infective complications rates were less in case of group A than group B. In case of hospital stay, 96.0% (24 out of 25) patients in group A were discharged with good outcomes within 24-48 hours of surgery, whereas in case of group B, it was merely 42.5% (17 out of 40). Therefore, post-surgical recovery was best in case of using the standard analgesic protocol with balanced analgesia.

Conclusion

The overall results are more attractive in the patients where standard multimodal analgesic protocol had been applied.

Recommendations

The postoperative scenario can be changed with this effective tool in terms of analgesic outcome; incidence of adverse events and length of hospital stay. Therefore, every hospital must have local standard protocol for early dynamic pain relief in perioperative periods to enhance postoperative recovery by the department of Anesthesia, ICU and Surgery. It is strongly recommended.

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Original Article

Comparison of Free Thyroxine and Tri-iodothyronine between Combined Oral Contraceptive Pill Users and Non-Users in Rajshahi City

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Abstract

Background: Two major hormones thyroxine and tri-iodothyronine secreted by thyroid gland, both profoundly increase the metabolic rate of the body. The body normally maintains a delicate balance between free and bound thyroxine, however combined oral contraceptives that contain progesterone and oestrogen can change this balance. **Methods:** The Department of Physiology at Rajshahi Medical College, Rajshahi conducted this cross-sectional comparative study between January-2022 to December-2022 on 120 married women aged 18-40 years. Out of these 120 women, 60 were combined oral contraceptive pill (COCP) non-users and 60 were users of combined oral contraceptives and they were selected by purposive sampling technique. The auto-analyzer equipment was used to estimate the free thyroxine and tri-iodothyronine parameter. SPSS software, version-24 was used to analyze the data and all tests were deemed statistically significant if the p value was less than 0.05. **Results:** Free T3 and T4 were lower in COCP user women (5.85 ± 1.86 fmol/ml and 14.99 ± 5.44 fmol/ml, respectively) than COCP non-user women (5.96 ± 1.91 fmol/ml and 15.27 ± 4.67 fmol/ml, respectively) but they were not statistically significant ($p > 0.05$). But TSH level in COCP user women was higher than the COCP non-user women and it was statistically significant ($p < 0.01$). **Conclusions:** Routine monitoring of thyroid function status is a time demanding issue as widespread use of combined oral contraceptive now-a-days. Early detection of hypothyroidism might reduce complications and give women a healthy life.

Keywords: Combined oral contraceptive pill, free thyroxine and free tri-iodothyronine.

Abbreviations: COCP=Combined oral contraceptive pill, T3= Triiodothyronine, T4= Thyroxine.

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Introduction

Combined oral contraceptive pill use is associated with various physiological and biochemical changes that have effects on various systems in our body especially endocrine system [1]. Increased thyroid binding globulin due to the effect of combined oral contraceptive pill causes reduction of free triiodothyronine (T3), free thyroxine (T4) and increase of thyroid stimulating hormone (TSH) [2]. As a result, one may develop hypothyroidism. Hypothyroidism is one of the most common important health problems in women especially in reproductive life due

to use of combined OCP that not only gives rise to morbidity but also markedly reduces the quality of life of women [3]. It is fact that global use of COCP is increasing day by day specially in developing countries like Bangladesh. So, health issue of COCP user women is a time demanding issue. Estrogen and progestogen component of COCP may alter serum TSH, T3 and T4 level that can lead to increased risk of hypothyroidism [4]. So, it is imperative to know the changes in thyroid function status of COCP user women. To the best of our knowledge a very few studies had been addressed

this problem in the context of Bangladesh. The study was conducted to assess and compare the free thyroxine (T4) and free tri-iodothyronine (T3) values between oral contraceptive pill users and non-user women. Moreover, the study might be helpful for the clinicians and gynecologists in management of hypothyroidism due to use of combined oral contraceptive pill.

Methods

In order to determine the relationship between the use of combined oral contraceptives and thyroid stimulating hormone levels among married women in Rajshahi City, a cross-sectional comparative study was carried out in the Department of Physiology, Rajshahi Medical College, Rajshahi from January 2022 to December 2022. Married women in Rajshahi city between the ages of 18 to 40 years made up the study population. The ultimate sample size was 120 using a purposive sampling strategy. One group had 60 women between the ages of 18 to 40 years who were under combined OCP while another group purposefully contained a comparable number of women between the ages of 18 to 40 years who were not under combined OCP. The screening process included women who attended the Rajshahi Maternity and Child Welfare Center for services, as well as neighbours, relatives and other residents of Rajshahi. The questionnaire was created for the study after consulting the guidance and looking over earlier published works. Respondents were informed of the study's objectives prior to data collection, and their informed written agreement was obtained. A thorough history and physical examination were conducted after obtaining informed written consent and the results were entered into a pre-made data sheet. Dietary factors, thyroid binding globulin, estrogen, progesterone, FSH and LH levels were the confounding variables. The participants were then allowed to sit comfortably in a chair while a blood sample was taken from the median cubital vein in the antecubital fossa. Five milliliters of blood were drawn into EDTA-coated vacutainers using a sterile DISPOVAN syringe and sterile precautions. The free T3 and T4 parameters were then determined using an auto-analyzing system such as ELISA method.

Inclusion criteria:

- i) Married women aged 18-40 years using combined oral contraceptive pill at least last 1 year were included in one group and age matched married women without under oral contraceptive pill were included in another group.
- ii) With regular menstrual cycle.
- iii) Women who gave informed consent to participate in the study.

Exclusion criteria:

- i) Women under mini pill, depo-provera and norplant.
- ii) Women under emergency pill in last 6 months.
- iii) Known case of thyroid disorders, renal diseases and liver diseases.
- iv) Women under thyroid medication.
- v) Chronic use of drugs such as steroid therapy, antipsychotic, lithium, amiodarone, statin or thiazide use.
- vi) Women taking any hormone replacement therapy.
- vii) Pregnant and breastfeeding women.
- viii) Smoker, alcoholic and hypertensive individuals.
- ix) Women with other endocrine and metabolic disease that affect thyroid function such as PCOS.

Results

There was statistically significant difference between the COCP users and non-user women groups in terms of educational status ($p < 0.01$) and monthly family income ($p < 0.001$) with mean duration of COCP 6.62 ± 3.46 years (Table-I). Free T3 & T4 in COCP users and non-user women revealed that in COCP users group, most (91.70%) of the women had normal, 5% had high and 3.3% had low free T4 level. Most (85%) of the women had normal, 11.70% had low and 3.30% had high free T3 level. On the other hand, in the COCP non-users group, most (95%) of the women had normal, 3.30% had low and 1.70% had high level of free T4. Most (93.30%) of the respondents had normal, 5% had low and 1.70% had high level of free T3. Regarding TSH, 58 (96.7%) had normal in COCP users' group and 56 (93.3%) in COCP non-users' group (Table-II).

Table-III showed the comparison of free T4 level between COCP users and non-user women. Among the COCP user women free T4 level was 14.99 ± 5.44 fmol/ml and among the COCP non-user women free T4 level was 15.27 ± 4.67 fmol/ml. So, it was clear that free T4 level in COCP user women was lower than the COCP non-user women (mean difference 0.28, 95% CI [-1.55, 2.11]), t (df=118) = 0.30 but it was statistically non-significant ($p > 0.05$).

Table-IV showed the comparison of free T3 level between COCP users and non-user women.

Among the COCP user women free T3 level was 5.85 ± 1.86 fmol/ml and among the COCP non-user women free T3 level was 5.96 ± 1.91 fmol/ml. So, it was clear that free T3 level in COCP user women was lower than the COCP non-user women (mean difference 0.11, 95% CI [-0.57, 0.79]), t (df=118) = 0.32 but it was statistically non-significant ($p > 0.05$).

TSH level in COCP user women was higher than the COCP non-user women and it was statistically significant ($p < 0.01$) (Table-V).

Table I: Comparison of baseline variables between the two groups (n=60 in each group).

Comparison of baseline variables between the two groups (n=68 in each group).				
Variables		Group		p value
		COCP user women	COCP non-user women	
Educational status	Illiterate/ Read & write	16 (26.70%)	7 (11.70%)	< 0.01*
	Primary	13 (21.70%)	4 (6.70%)	
	Secondary and higher secondary	22 (36.70%)	36 (60.00%)	
	Graduate & above	9 (15.00%)	13 (21.70%)	
Monthly family income (Tk)		68600.00±43294.89	44400.00±20676.85	< 0.001#
Mean duration (Years)		6.62 ± 3.46		

*Chi-squared Test was done to analyze the data and were presented as frequency (%). #Data were analyze using Unpaired t-Test and were presented as mean ± SD.

Table II: Estimation of free T3 & T4 in COCP users and non-user women (n=60 in each group).

Parameter	Group	Below the normal ranges	Normal ranges	Above the normal ranges
		Frequency (%)		
Free T ₄	COCP users	2 (3.3)	55 (91.7)	3 (5)
	COCP non-users	2 (3.30)	57 (95)	1 (1.70)
Free T ₃	COCP users	7 (11.7)	51 (85)	2 (3.30)
	COCP non-users	3 (5)	56 (93.30)	1 (1.70)
TSH	COCP users	2 (3.30)	58 (96.7)	0 (0)
	COCP non-users	4 (6.7)	56 (93.3)	0 (0)

Table III: Comparison of free T4 level between COCP users and non-user women (n=60 in each group).

Group	Free T ₄ (fmol/ml)		t-value	p-value
	mean ± SD	Range		
COCP user women	14.99 ± 5.44	3.20 to 31.47	0.30	> 0.05
COCP non-user women	15.27 ± 4.67	8.30 to 25.70		

Data were analyzed by Unpaired t-Test and were presented as mean ± SD. p value < 0.05 was considered as significant.

Table IV: Comparison of free T3 level between COCP users and non-user women (n=60 in each group).

Group	Free T ₃ (fmol/ml)		t-value	p-value
	mean $\pm$ SD	Range		
COCP user women	5.85 $\pm$ 1.86	2.20 to 14.25	0.32	> 0.05
COCP non-user women	5.96 $\pm$ 1.91	2.20 to 8.80		

Data were analyzed by Unpaired t-Test and were presented as mean $\pm$ SD. p value < 0.05 was considered as significant.

Table V: Comparison of TSH level between COCP users and non-user women (n=60 in each group).

Group	TSH (μ IU/ml)		t-value	p-value
	mean $\pm$ SD	Range		
COCP user women	2.25 $\pm$ 0.65	0.88 to 4.20	3.56	< 0.01
COCP non-user women	1.35 $\pm$ 0.62	0.09 to 3.50		

Data were analyzed by Unpaired t-Test and were presented as mean $\pm$ SD. p value < 0.05 was considered as significant.

Discussion

In this study, mean duration of pill use 6.62 ± 3.46 years. Similar findings were found in a study done by Deischinger et al. where mean duration of contraceptive use was 5.2 ± 3.3 years [5]. In the present study, among the COCP users' group, 36.70% of the respondents were secondary and higher secondary pass, 26.70% were illiterate or had ability to read & write, 21.70% were primary pass, 8.30% were honors or master's degree holder and remaining 6.70% were graduate plus. On the other hand, in the COCP non-users' group, 60% of the respondents were secondary and higher secondary pass, 13.30% were honors or master's degree holder, 11.70% were illiterate or had ability to read & write, 8.30% were graduate plus and remaining 6.70% were primary pass. Qiu et al. reported that in the pill users' women 37.50% were less than high school diploma, 24.10% were high school diploma, 23.40% completed college education and 14.90% read in college or more [6]. And in pill non-users' women 32.90% completed college education, 22.90% were less than high school diploma pass, 22.80% read in college or more and 21.40% were high school diploma pass. There were large variations in educational parameters of this study from our study might be due to Qiu et al. conducted the study in China [6].

In this study, free T4 level in COCP user women was 14.99 ± 5.44 fmol/ml and in non-user women was 15.27 ± 4.67 fmol/ml but it was not statistically significant ($p > 0.05$). Similar findings were found in a study done by Al-Youzbaki and Mahmood [7] in Iraq where free T4 level in COCP user women was 11.64 ± 1.53 Pmol/L and in COCP non-user women

was 11.83 ± 1.75 Pmol/L and it was statistically non-significant ($p > 0.05$). Duijkers et al., Khali, Wiegratz et al. and Sanger et al. [8-11] showed statistically non-significant difference between COCP users and non-user women in terms of free T4 which were also similar with the study findings. But Knudsen et al. [12] in their study in Denmark found that free T4 level was higher oral contraceptive pill non-user women (14.76 pmol/l) than the oral contraceptive pill user women (13.92 pmol/l) and it was statistically significant ($p < 0.001$) which findings were not similar with the study findings. An increased serum binding globulin leads to a reduction of the free proportion of thyroid hormones [10].

These dissimilarities may be due to an increased turnover of thyroid hormones with increased estrogen levels is likely due to increased activity of deiodinase responsible for the formation of T3 from T4 and the degradation to inactive metabolites [13]. Another major difference is the increased serum thyroid binding globulin (TBG), responsible for increased levels of total circulating thyroid hormones, as the fraction of free hormones is relatively constant. Free T4 is a pro-hormone which dissociates inside the target tissue and converts to free T3 which exerts physiological effect. Moreover, it is under negative feedback control according to body needs.

In the present study, free T3 level in COCP user women was 5.85 ± 1.86 fmol/ml and non-user women were 5.96 ± 1.91 fmol/ml and it was not statistically significant ($p > 0.05$). Similar findings were found in a study done by Al-Youzbaki and Mahmood [7]. in Iraq where free T3 level in COCP user women was 4.74 ± 0.90 Pmol/L and in COCP

non-user women was 4.68 ± 0.81 Pmol/L and it was statistically non-significant ($p > 0.05$). Similar findings also found with the studies done by Duijkers et al., Khali and Wiegratz et al. [8-10] where there was no statistically significant difference between COCP users and non-user women in terms of free T3. But contradictory findings were found in a study done by Knudsen et al. [12] in Denmark where serum free T3 level was higher in COCP users (5.31 pmol/l) than non-user women (5.10 pmol/l) which was statistically significant ($p < 0.001$). This dissimilarity might be due to variations of life style in different geographic region and it may affect thyroid function status.

FT3 and FT4 were not statistically significant between the two groups. This might be due to small sample size, short duration of COCP intake and the potential for individual variations. So, long term effects warrant clinical vigilance to prevent hypothyroid complications.

Conclusion

As TSH level was significantly higher in COCP users' group, measurement of free T4 & free T3 level should be done to assess the thyroid function of the OCP users because FT4 & FT3 is the physiologically active form.

Acknowledgements: Contribution of Institute of Nuclear Medicine & Allied Sciences, Rajshahi was acknowledged for co-operation in caring laboratory investigations in preparation of this manuscript.

Authors' contributions: EAL, LH: Concept and design, data acquisition, interpretation, drafting and final approval. EAL and MNK: Data acquisition, interpretation, drafting, final approval and agree to be accountable for all aspects of the work.

Declarations

Funding: The authors received no financial support for the research, authorship and/or publication of this article.

Conflict of interest: None.

Ethical approval: Ethical approval of the study was obtained from the Ethical Review Committee, Rajshahi Medical College, Rajshahi. Informed consent was taken from all participants. All the study methodology was carried out following the relevant ethical guidelines and regulations.

Consent for publication: Taken.

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Original Article

Surgical Site Infection in Obstetric and Gynecological Surgeries: A Prospective Observational Study

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Kaniz Fatema⁴, Pushpanjali Roy⁵, Mansura Yeasmin⁶, Rita Rani Paul⁷, Nazia Muzahid⁸

Abstract

Background: An infection at an incisional site that develops within 30 days after surgery, or within a year if a prosthetic is implanted, is referred to as a surgical site infection (SSI). They are mainly caused by exogenous and/or endogenous microbes that penetrate the surgical site during surgery (primary infection) or after the procedure (secondary infection). The prevention of SSI should be the ultimate goal of the surgery team and hospital administration. **Methodology:** The prospective observational study of SSI consisted of 880 patients who were admitted and underwent surgery in Obstetrics & Gynaecology department of Satkhira Medical College Hospital, Satkhira between the periods of January 2024 and April 2025. After a complete examination, a detailed proforma for the collection of data pertaining to patients in this study was prepared, and patients were included as per the inclusion and exclusion criteria. **Results:** The study demonstrated significant results in terms of the association of body mass index (BMI), hemoglobin, and blood sugar level with the SSI status ($p < 0.05$) and nonsignificant results in terms of emergency/elective surgery, type of surgery, and type of incision ($p > 0.05$). **Conclusion:** The overall rate of SSI was 8.8% in the present study. The major reasons involved are inadequate infrastructure facilities, different antibiotics policies, and non-uniform pre-, intra-, and post-operative measures that add woes and result in an increased incidence of SSI.

Keywords: obstetric surgery, gynecological surgery, microorganisms, comorbidities, surgical site infections.

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Introduction

The second most frequent cause of maternal mortality in obstetrics and gynecology, after post-partum hemorrhage, is infection. [1] Surgical site infections (SSIs), which account for 38% of hospital-acquired infections among surgical patients in the obstetrics and gynecology department, are the most prevalent nosocomial infections. The percentage of SSI varies between 2.5% and 41.9%, according to various reports in the international literature. [2, 3]

An infection at an incisional site that develops within 30 days after surgery, or within a year if a prosthetic is implanted, is referred to as an SSI. Even though this complication is common but nearly rarely fatal, it prolongs the healing of the incision and raises morbidity. [4] Despite recent advances in pathophysiology knowledge and prophylactic measures, SSIs continue to be a major contributor to post-operative morbidity, higher treatment costs, and extended hospital stays. [5] These infections almost never pose a life-threaten-

ing hazard, and they have no effect on the overall success of the surgery. However, the patient, her family, and the hospital are troubled by the extended morbidity and extra costs. [2, 6]

Exogenous and/or endogenous microbes penetrate the surgical site during surgery (primary infection) or after the procedure (secondary infection). [7, 8] Primary infections typically appear five to seven days after surgery and are more dangerous. [9] The majority of SSIs are straightforward infections that just affect the subcutaneous tissue and the skin, although they can occasionally develop into necrotizing infections. [10] Surgical wounds that are infected typically appear with pain, warmth, swelling, pus development, and erythema. [11]

The prevention of SSI is the primary responsibility of the surgical team and hospital administration. [12] We have planned to undertake this topic as there is very scanty literature pertaining to surgical site infections in obstetrics and gynecology. Also, within institutions, different units follow their own customized protocols for pre-operative workup, intra-operative techniques, and post-operative care measures to manage SSI.

This study aimed to ascertain the various factors responsible for the causation of SSI and the proportion of SSI. Hence, the present study was conducted to evaluate the modes and methods to reduce SSI, thereby reducing the cost of treatment, patient dissatisfaction, possible litigation, and prolonged morbidity related to this complication.

Materials & Methods

This prospective observational study of SSI was carried out at Satkhira Medical College Hospital in the obstetrics and gynecology department. Eight hundred eighty patients who were admitted and underwent surgery between January 2024 and April 2025, a span of one year and four months, were included in the study.

The study was initiated after approval by the Institutional Ethics Committee (IEC) and Scientific Research Committee of Satkhira Medical College, Satkhira. After admitting the patients and taking

proper history related to past, medical and surgical, clinical examination including systemic examination, along with vital parameters, a provisional diagnosis was made.

After conducting all required pathological and radiological interventions, a confirmatory diagnosis of the patient was made, and the required intervention was decided. After confirming the required surgical intervention and mode of surgery, pre-operative investigations were sent, and a pre-anesthetic checkup was done.

A detailed proforma for the collection of data pertaining to patients in this study was prepared, and patients were included as per the inclusion and exclusion criteria. Patients undergoing elective or emergency obstetric or gynecological abdominal surgery and patients with SSI occurring within 30 days after the operation were involved in the study. Patients not willing to participate, patients who underwent re-exploration surgery, and patients who were operated on elsewhere and were referred for SSI or any other reason were not involved in the study.

Broad measures that were followed in all the patients involved the following: skin preparation was done by removing the hairs by shaving with a razor immediately before the operation in emergency cases. In elective cases, skin preparation was done the night before by shaving, and all patients were given pre-operative intravenous antimicrobial prophylaxis one hour to four hours before the surgery in the recovery room. A third-generation cephalosporin was usually employed, followed by pre-operative skin preparation done with povidone-iodine; care was taken to achieve complete hemostasis at the site of operation with electrocautery. In all cases, povidone-iodine was applied before applying skin sutures; in obese patients, either the subcutaneous fat was approximated with interrupted absorbable sutures or a subcutaneous drain was kept, and abdominal drains were used whenever needed.

Post-operatively, the patient's wound was examined in all the cases by an assigned senior surgeon, and the findings were recorded on the case sheet. The initial post-operative inspection of the wound

was performed after 72 hours or even sooner if there was soakage, there was discomfort at the wound site, or there is high body temperature. Thereafter, it was performed on the 10th day or as and when necessary. Patients were followed up for 10 days in case of subcuticular sutures and until suture removal in mattress suture. In case of the presence of signs of surgical site infection, swab was sent for culture and sensitivity.

Patients were informed of the symptoms of SSI and advised to notify the observer right away after seeing the first SSI symptom for a month. The discharged patients were advised for ongoing follow-up care for a month in the outpatient department. Every time a patient was seen during the visit, a thorough examination was performed, and any infections were quickly identified and reported.

Results

Table I: Distribution on the basis of SSI status.

SSI status	Frequency n (%)
Absent	794 (86.81)
Present	86 (9.77)
Total	880 (100)

Table I demonstrated patient classification on the basis of SSI status. The higher proportion of 86.8% was absent, and the lower proportion of 9.77% was present. SSI: surgical site infection.

Table II: Association between BMI range and SSI status.

BMI (kg/m ²)		SSI status		Total
		Absent	Present	
18-24.9	Count	140	27	167
	%	83.83%	16.16%	100.0%
25-30	Count	646	67	713
	%	90.60%	9.39%	100.0%
Total	Count	786	94	880
	%	89.31%	10.68%	100.0%
Pearson chi-square	Value	df	P-value	Result
	6.261a	1	0.012	Significant

According to the distribution on the basis of BMI, the higher proportion of 81.20% was for 25-30 kg/m², and the lower proportion of 18.97% was for 18-24.9 kg/m². Table II demonstrates the association between body mass index (BMI) range and SSI status. BMI, body mass index; SSI, surgical site infection; df, degrees of freedom.

Table III: Association between emergency/elective and SSI status.

Emergency/elective		SSI status		Total
		Absent	Present	
Elective	Count	361	54	415
	%	86.98%	13.01%	100.0%
Emergency	Count	404	61	465
	%	86.88%	13.11%	100.0%
Total	Count	765	115	880
	%	86.93%	13.06%	100.0%
Pearson chi-square	Value	df	P-value	Result
	0.000a	1	0.995	Nonsignificant

According to the distribution of patients on the basis of emergency/elective, the higher proportion of 52.84% was for emergency, and the lower proportion of 47.15% was for elective. Table III demonstrates the association between emergency/elective and SSI status. SSI, surgical site infection; df, degrees of freedom.

Table IV: Association between type of surgery and SSI status.

Type of surgery		SSI status		Total
		Absent	Present	
Gynecological surgery	Count	258	47	305
	%	84.5%	15.40%	100.0%
Obstetric surgery	Count	478	97	575
	%	83.13%	16.86%	100.0%
Total	Count	736	144	880
	%	83.63%	16.36%	100.0%
Pearson chi-square	Value	df	P-value	Result
	2.802a	1	0.094	Nonsignificant

According to the type of surgery performed, a higher proportion of 65.34% was for obstetric surgery, and the proportion of 34.66% was for gynecological surgery. Table IV demonstrates the association between the type of surgery and SSI status. SSI, surgical site infection; df, degrees of freedom.

Table V: Association between the type of incision and SSI status.

Type of incision		SSI status		Total
		Absent	Present	
Laparoscopic port	Count	3	0	3
	%	0.34%	0%	100.0%
Low transverse incision	Count	115	59	174
	%	66.09%	33.90%	100.0%
Midline vertical	Count	9	5	14
	%	64.28%	35.7%	100.0%
Pfannenstiel incision	Count	592	97	689
	%	85.92%	14.07%	100.0%
Total	Count	719	161	880
	%	81.70%	18.29%	100.0%
Pearson chi-square	Value	df	P-value	Result
	5.793a	3	0.122	Nonsignificant

According to the type of incision, a higher proportion of 78.29% was for Pfannenstiel, and the lower proportion of 1.59% was for midline vertical. Table V demonstrates the association between the type of incision and SSI status. SSI, surgical site infection; df, degrees of freedom.

Table VI: Association between the basis of hemoglobin and SSI status.

Hemoglobin (g/dL)		SSI status		Total
		Absent	Present	
<7	Count	0	67	67
	%	0.0%	100.0%	100.0%
7-11	Count	677	65	742
	%	91.23%	8.76%	100.0%
>11	Count	62	9	71
	%	87.32%	12.76%	100.0%
Total	Count	739	141	880
	%	83.97%	16.02%	100.0%
Pearson	Value	df	P-value	Result
chi-square	152.142a	2	0.000	Significant

According to the basis of hemoglobin, a higher proportion of 84.31% was for 7-11, and the lower proportion of 7.61% was for <7. Table VI demonstrates the association between the basis of hemoglobin and SSI status. SSI, surgical site infection; df, degrees of freedom.

Table VII: Association between random blood sugar level and SSI status.

RBS level (mg/dl)		SSI status		Total
		Absent	Present	
<140	Count	651	11	662
	%	98.33%	1.66%	100.0%
≥140	Count	97	121	218
	%	44.49%	55.50%	100.0%
Total	Count	748	132	880
	%	85.00%	15.00%	100.0%
Pearson	Value	df	P-value	Result
chi-square	64.627a	1	0.000	Significant

According to the basis of random blood sugar level and SSI, a higher proportion of 55.50% was for ≥ 140 mg/dl, and the lower proportion of 1.66% was for <140mg/dl random blood sugar level. SSI, surgical site infections; RBS, random blood sugar; df, degrees of freedom.

Table VIII: Distribution on the basis of organisms detected (30% of total sample)

Organism detected	Growth found	Frequency n (%)
<i>E. coli</i>		67 (60.36)
<i>Klebsiella pneumoniae</i>		18 (16.21)
MRSA	111	6 (5.4)
Pseudomonas	(42.04%)	9 (8.1)
Others		11 (9.9)
No growth		153 (57)
Total (send for C/S)		264 (100)

In maximum cases, no growth was detected; second the higher proportion of 60.36% was for *E. coli* organism, and the lower proportion of 5.40% was for methicillin-resistant *Staphylococcus aureus* (MRSA). Table VIII describes the distribution of patients according to the organisms detected. C/S means Culture and Sensitivity. MRSA: methicillin-resistant.

Discussion

From January 2024 and April 2025, 880 patients who underwent abdominal surgery at the obstetrics and gynecology department of Satkhira Medical College Hospital, Satkhira participated in this prospective observational study.

Out of 880 patients SSI was absent in 794 (86.81%) patients and was present in 86 (9.77%) patients which may be attributed due to various factors in the present study.

The overall SSI incidence in the present study was 9.77%, which is comparable to various reports in the Indian literature, that is, 2.5%-41.9%. [13] Compared to rates in the United States of America and other European nations, the incidence rate is significantly greater. [14] Hospitals in Asia have a greater prevalence of SSI, which is a reflection of the region's subpar awareness of related infections and infection control procedures.

Eighty-Six patients had SSI, and of those, 67 (9.39%) had a body mass index (BMI) between 25 and 30 kg/m², whereas 27 (16.16%) had a BMI between 18 and 25 kg/m². These data demonstrate that individuals with a BMI of more than 25 kg/m² had a higher infection rate. BMI>35 kg/m² has been identified by Awan et al. [15] as a risk factor for SSI.

A BMI of more than 27 kg/m² was listed as a risk factor for SSI in the study by Kurmann et al. [16]. In line with earlier studies on SSI, it was found in the current study that having a higher BMI increases the risk of developing SSI.

Fifty-Four individuals (13.01%) with SSI were among the 415 patients who underwent elective surgery. Sixty-One (13.11%) of the 465 emergency surgery patients had SSI. This contradicts numerous studies that indicate increased risks of SSI in emergency procedures by revealing no variation in the likelihood of SSI in emergency versus elective surgeries. In emergency procedures, the incidence of SSI was 13.11%, while in routine surgeries, it was 13.01%. [17] According to Mawalla et al., the incidence of SSI is 20% in normal cases and 27% in emergency cases. [14]

Out of 880 total patients, 305 underwent gynecological surgery, and 575 underwent obstetric surgery, of which 47 (15.40%) and 97 (16.88%) had SSI, respectively. Out of 305 gynecological surgeries, 199 was total abdominal hysterectomy, of which 30 had SSI; 92 was laparotomy, 4.5 had SSI, 2 was exploratory laparotomy, of which 3 was laparoscopic surgeries, of which none had SSI; and six was conventional tubal ligation, of which none had SSI.

Sixty-Seven patients in our study had levels of hemoglobin of <7 g/dL, and notably, all had SSI. Seven hundred forty-two patients had hemoglobin between 7 and 11 g/dL, out of which 65 (8.76%) had SSI. Seventy-one patients had hemoglobin of >11 g/dL, out of which 9 (12.67%) had SSI. Wound infections were higher in patients operated on with hemoglobin of less than 11 g/dL. Statistical analysis shows chi-square of 147, and p-value is less than 0.0001, which was significant; this shows that there was a correlation between hemoglobin and SSI.

Without certainty, patients who have low hemoglobin have a harder time fighting infection. In their study from 2001, Malone et al. demonstrated that anemia, both pre-operative and post-operative, was linked to an increased risk of wound infection. Our observations are consistent with other research on the topic because post-operative anemia was present in 91% of the patients with SSI in their series. [18]

Since many years ago, it has been understood that diabetic surgery patients are more likely to experience severe side effects such as poor wound healing, wound infections, cardiac compromise, and mortality. In our study, 662 patients had blood sugar levels less than or equal to 140 mg/dL, out of which 11 (1.66%) had SSI. Two hundred eighteen patients had blood sugar levels of more than 140 mg/dL, out of which 121 (55.50%) had SSI. Statistically proved significant result and a p-value of <0.002, which was significant; this shows that there was a correlation between RBS and SSI, and this shows that patients with more sugar levels had an increased chance of getting an infection. A retrospective analysis of 995 patients who underwent general and vascular surgery found that for every 40% rise in blood glucose above 110 mg/dL, the prevalence of post-operative infection rose by 30%. [19] Pre-operative fasting blood glucose level (FBGL) was discovered by Kamat et al. to be a statistically significant variable linked with SSI at a tertiary hospital in Goa. According to Kamat et al., the mean FBGL was 153 mg/dL in SSI patients and 115 mg/dL in non-SSI patients. [17] Thus, the current study is comparable. [17-19] Close observation is necessary, and the patients are advised to keep the maximal glucose aim below 180 mg/dL.

In the current investigation, *E. coli* was identified more frequently (60.36%), and the majority of cases showed no growth (57%); this incidence was followed by *Staphylococcus aureus* (16.21%) and *Klebsiella pneumoniae* (5.40%). was identified in numerous research as the most often isolated organism, but the observation was in contrast to various studies. [18] Similar research was conducted by Sahu et al. in 2008 on 200 patients, in which *E. coli* was the most frequently recovered bacterium. [20] In the research by Giri et al. [21] on 230 patients, the infection rate was 23%, with *E. coli* accounting for the majority of the organisms (43.4%).

As the important purpose was to study the rate of SSI in this institution, other parameters representing all the abdominal surgical procedures including the severity of SSI, resulting economical losses, and disfigurement could not be studied probably because of the lack of time and resources. The

second objective involves the type of surgery, for example, gynecological surgery or obstetric surgery, that has a deleterious effect on the healing of the wound, which leads to SSI. Furthermore, underlying diseases such as diabetes, anemia, and obesity affect or impair immune function, which raises the risk of SSI. They are significant contributors to rising pre-operative hospital stays, which in turn raise the rate of SSI.

Inadequate infrastructure facilities, different antibiotics policies, and non-uniform pre-, intra-, and post-operative measures add woes and result in an increased incidence of SSI. In the present study that was undertaken at a teaching and tertiary care center, the SSI incidence is comparatively lower, but with the implementation of correct knowledge and technique, the rate can further be reduced to a large extent. More identical studies are needed by healthcare providers to recognize the local factor so that they can be rectified and the morbidity associated with SSI can be decreased.

Conclusions

In the present study, the overall rate of SSI was 9.77%. In the present institute where the current study was undertaken, *E. coli* was the most commonly isolated organism with SSI. Very few studies are available on this topic in South Asian Countries literature, and the available studies show very high incidences of SSI in our country. This may be attributed to lower socioeconomic and nutritional status and the presence of numerous comorbidities. In the present study that was undertaken at a teaching and tertiary care center, the SSI incidence is comparatively lower, but with the implementation of correct knowledge and technique, the rate can further be reduced to a large extent.

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Original Article

Comparison of Percutaneous Coronary Intervention Outcomes in Hospitalized Patients Based on Mild and Moderate to Severe Left Ventricular Systolic Dysfunction

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Abstract

Background: Left ventricular systolic dysfunction (LVSD) is a major predictor of adverse outcomes in patients undergoing percutaneous coronary intervention (PCI). However, data comparing PCI outcomes across different degrees of LV dysfunction in Bangladesh are limited. This study aimed to evaluate and compare procedural success and in-hospital outcomes of PCI in patients with mild versus moderate to severe LVSD. **Methods:** This prospective comparative study was conducted at Bangladesh Medical University and the National Heart Foundation and Research Institute. A total of 60 patients with coronary artery disease and LVSD undergoing PCI were enrolled. Patients were categorized into Group A (moderate to severe LVSD; LVEF 25–44%) and Group B (mild LVSD; LVEF 45–54%). Clinical characteristics, angiographic findings, procedural success, and in-hospital complications were analyzed. **Results:** Angiographic success was achieved in 90% of Group A and 98% of Group B patients. TIMI grade 3 flow post-stenting was observed in 90% and 93.3% of patients, respectively. In-hospital adverse events, including myocardial infarction, cardiogenic shock, arrhythmia, and bleeding, were infrequent and comparable between groups. In-hospital mortality was higher in Group A (6.7%) than Group B (3.3%), though not statistically significant. **Conclusion:** PCI is safe and effective in patients with both mild and moderate to severe LV systolic dysfunction. With appropriate patient selection and peri-procedural management, reduced LVEF alone should not be considered a contraindication to PCI.

Keywords: Percutaneous coronary intervention (PCI), Left ventricular systolic dysfunction (LVSD), LVEF, Bangladesh Medical University (BMU), National Heart Foundation and Research Institution (NHF&RI).

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Introduction

Cardiovascular diseases (CVD) are the primary cause of global adult mortality, with ischemic heart disease (IHD) representing a significant portion of this burden. While Western countries show declining IHD rates, incidences are rising in Eastern Europe and the Indian subcontinent. It has been predicted that CVD will be the leading cause

of death in the world in the near future [1] and there has been an urgent call for necessary interventions to treat its debilitating complications [2].

In Bangladesh, the prevalence of coronary heart disease (CHD) has increased in recent decades, with a weighted mean prevalence of 4% [3]. This rise is linked to a growing prevalence of risk factors such as smoking, obesity, diabetes, and hyperten-

sion [4].

Percutaneous coronary intervention (PCI) has become the dominant management modality for CHD, surpassing coronary artery bypass graft (CABG) surgery. Since the first intracoronary stent implantation in Bangladesh in 1997, at the National Institute of Cardiovascular Diseases (NICVD), PCI procedures have advanced significantly, recently achieving milestones such as remote robotic stent placement in January 2024 at NICVD. [5, 6] Despite these advancements, patients with reduced left ventricular ejection fraction (LVEF) remain at high risk for adverse outcomes, including higher in-hospital mortality and morbidity [7]. Local research has shown that while PCI can improve LVEF, low postprocedural LVEF remains an independent predictor of major adverse cardiovascular events (MACE). The study found a significant improvement in left ventricular ejection fraction (LVEF) post-procedure, with mean LVEF increasing from 49.92% pre-procedure to 54.84% post-procedure [8].

Methods

It was a prospective comparative study conducted on patients undergoing PCI from January to December 2015 at the Department of Cardiology, University cardiac centre, Bangladesh Medical University & the National Heart Foundation. A total of 60 patients with coronary artery disease (CAD) undergoing percutaneous coronary intervention (PCI) and left ventricular systolic dysfunction were purposively selected based inclusion and exclusion criteria. Inclusion criteria included patients with low ejection fractions undergoing PTCA with stenting of native coronary artery lesions. Exclusion criteria included chronic renal failure (S. Creatinine >2.5-3 mg/dL), hepatic failure, and valvular heart disease. Patients were categorized into two groups based on left ventricular ejection fraction (LVEF): Group A, including patients with moderate to severe LV systolic dysfunction (LVEF 44-25%) and Group B including patients with mild LV systolic dysfunction (LVEF 54-45%) [9, 10]. Approval by an ethics committee was obtained as well as informed consent. Clinical data such as risk factors (hypertension, diabetes,

dyslipidaemia, smoking, family history of CAD) and echocardiographic parameters were collected. Echocardiography was used to determine LVEF, which was confirmed by ventriculography. Preprocedural angiographic data captured the number of stenosed vessels and degree of stenosis. Procedural outcomes comprised minimal luminal diameter, thrombolysis in myocardial infarction (TIMI) flow grades, and instant adverse events. Postprocedural assessments tracked adverse in-hospital events like acute MI, emergency CABG necessity, stroke, bleeding, cardiogenic shock, and mortality. The follow-ups included regular checks such as 12-lead ECG, CKMB levels and echocardiography prior to discharge. Data were analysed using SPSS, with comparisons made using Chi-square, Student's t-test, or Fisher's exact test as appropriate.

Results

A total of 60 patients were enrolled to evaluate the impact of LV ejection fraction on PCI outcomes. Patients were divided into Group A (moderate to severe dysfunction, LVEF 25–44%) and Group B (mild dysfunction, LVEF 45–54%). The mean age was 63.8 ± 8.6 years in Group A and 59.2 ± 6.6 years in Group B. The majority of participants were male (81.7%). Within the cohort, 6.7% had severe dysfunction, 43.3% moderate, and 50% mild LV systolic dysfunction. Mean LVEF was 38.4% for Group A and 48.8% for Group B ($p < 0.05$). (Table 1).

Table I: Age distribution of the patients (n = 60).

Age group (years)	Group-A n =30 n (%)	Group-B n =30 n (%)	p value
<40	0 (0)	1 (3.3)	NS
40-60	9 (30)	13 (43.33)	NS
>60	21 (60)	16 (53.33)	NS

Unpaired T-test was done to determine the level of significance. NS = not significant.

Single-vessel disease (SVD) was the most frequent finding, occurring in 66.6% of Group A and 73.4% of Group B. Group A showed a higher occurrence of LAD lesions (70%) compared to Group B (53.3%), though this was not statistically significant. Stable angina was significantly more frequent in Group B (40%) than in Group A (16.7%, $p = 0.044$).

Table II: Comparison of clinical and anatomical characteristics between moderate to severe LV systolic dysfunction (reduced LVEF) and mild LV systolic dysfunction (Preserved LVEF) (N=60).

Variables		LVEF		p value
		Group-A	Group-B	
		n = 30 n (%) Reduced	n = 30 n (%) Preserved	
Extent of disease	SVD	20 (66.6)	22 (73.4)	0.573
	DVD	8 (26.7)	7 (23.3)	0.766
	TVD	2 (6.7)	1 (3.3)	0.5
Distribution of lesion	LAD	21 (70)	16 (53.3)	0.184
	LCX	7 (23.3)	10 (33.3)	0.39
	RCA	9 (30)	11 (36.7)	0.583
Indication of PCI	Unstable Angina	13 (43.3)	10 (33.3)	0.425
	MI (with in 4 wks)	12 (40)	8 (26.7)	0.237
	Stable Angina	5 (16.7)	12 (40)	0.044

Table III: Distribution of patients by procedural result and post-procedural adverse effects (N=60).

Variables	LVEF		p value
	Group-A	Group-B	
	n = 30	n = 30	
	n (%)	n (%)	
	Reduced	Preserved	
Procedural Result			
Angiographic success	27 (90)	28 (98)	0.64
Procedure success	26 (86.6)	27 (90)	0.687
Clinical success	24 (80)	26 (86.6)	0.53
Adverse outcome complications			
Coronary dissection	1 (3.3)	1 (3.3)	1
Side branch closure	1 (3.3)	0	0.390
Slow flow/no reflow	3 (10)	2 (6.7)	0.5
Adverse outcome			
Post-procedure bleeding	0	1 (3.3)	0.313
Heart failure	2 (6.7)	2 (6.7)	-
Arrhythmia	1 (3.3)	1 (3.3)	-
Cardiogenic shock	2 (6.7)	2 (6.7)	0.533
MI	2 (6.7)	2 (6.7)	-
In-hospital death	2 (6.7)	2 (6.7)	0.533

Angiographic success was achieved in 90% of Group A and 98% of Group B. Clinical success rates were 80% and 86.6%, respectively. Adverse outcomes were infrequent and comparable: Cardiogenic shock: 6.7% in Group A vs. 3.3% in Group B, Myocardial Infarction (MI): 6.7% in Group

A vs. 3.3% in Group B. In-hospital mortality: 6.7% (n=2) in Group A and 3.3% (n=1) in Group B (p = 0.533).

Discussion

intervention (PCI) categorized by left ventricular ejection fraction (LVEF). Group A consisted of 30 patients with moderate-to-severe dysfunction (LVEF 25–44%), while Group B included 30 patients with mild dysfunction (LVEF 45–54%). The cohort was predominantly male (81.7%). The mean age was 63.8 years for Group A and 59.2 years for Group B, with a comparable average BMI across both groups (24.6±1.62 kg/m² vs. 24.9±2.94 kg/m²; p>0.05). While smoking was the most common risk factor, other profiles, including hypertension and dyslipidemia, were similar between the groups. The mean LVEF was significantly lower in Group A (35.4%) compared to Group B (48.8%; p < 0.001). Angiographic success was achieved in 90% of Group A and 98% of Group B. Procedural and clinical success rates were also comparable, reaching 86.6% vs. 90% and 80% vs. 86.6%, respectively. Post-stenting, TIMI Grade 3 flow was achieved in 90% of Group A and 93.3% of Group B (p=0.500).

In this study, Group A had a mean LVEF of 35.4%; Group B, 48.8% (p < 0.001). Although two (6.7%) patients in Group A and one (3.3%) in Group B died in the course of hospitalization, this difference was not statistically significant. The overall incidence of such adverse outcomes is relatively low. This suggests that with appropriate patient selection and peri-procedural management, PCI can be performed safely in patients with varying degrees of LV dysfunction [11].

Procedural outcomes such as angiographic success (90% vs. 98%), procedural success (86.6% vs. 90%), and clinical success (80% vs. 86.6%) were comparable between groups. Postprocedural TIMI Grade 3 flow was achieved in 90% of group A and 93% of group B patients confirming marked improvement in coronary perfusion, corroborating evidence that modern stenting techniques ensure optimal coronary perfusion regardless of baseline LV function[1]. One patient (Group B) developed retroperitoneal bleeding and died; other postprocedural

bleeding complications were few. Major adverse cardiac events (MI/heart failure/cardiogenic shock) were slightly more frequent in patients from Group A, which is statistically not significant.

In fine, Bangladesh, is experiencing a sharp rise of Ischemic Heart Disease (IHD) due to the increasing prevalence of risk factors such as hypertension, diabetes, smoking, and sedentary lifestyles. Therefore, this manuscript is justified by the urgent need to evaluate local interventions like Percutaneous Coronary Intervention (PCI) within this high-risk population. Moreover, by directly comparing outcomes between patients with mild and moderate-to-severe Left Ventricular Systolic Dysfunction (LVSD), this study provides essential clinical data for local cardiologists to better predict and manage in-hospital complications.

Conclusion

This prospective comparative study demonstrates that percutaneous coronary intervention (PCI) is a safe and effective revascularization strategy in patients with ischemic heart disease across varying degrees of left ventricular systolic dysfunction. Procedural success, angiographic outcomes, and in-hospital complication rates were comparable between patients with mild and those with moderate to severe LV dysfunction. Although adverse events and mortality were numerically higher among patients with lower ejection fraction, these differences were not statistically significant, indicating that reduced LVEF alone should not preclude PCI when performed in experienced centers.

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Original Article

Cytomorphological Spectrum of Fine Needle Aspiration Cytology at Jashore Medical College Hospital, Bangladesh: A Retrospective Study

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Abstract

Background: Fine needle aspiration cytology (FNAC) is a rapid, minimally invasive, and cost-effective diagnostic technique widely used for the evaluation of superficial masses and organ lesions. It plays a crucial role in differentiating benign, inflammatory, and malignant conditions, thereby guiding clinical management and reducing the need for unnecessary surgical procedures. **Objective:** To evaluate the cytomorphological spectrum of lesions diagnosed by FNAC in a tertiary care hospital and analyze their demographic and site distribution. **Methods:** This retrospective study included 186 FNAC cases performed in the Department of Pathology at Jashore Medical College. Data regarding patient age, sex, site of aspiration, and cytological diagnosis were retrieved and analyzed. Lesions were categorized into benign, inflammatory, malignant, and suspicious groups. Statistical analysis was performed using descriptive statistics and contingency tables. **Results:** The majority of patients belonged to the 21–40 years age group, and a female predominance was observed. The most frequently involved organ system was the thyroid, followed by lymph nodes, soft tissue lesions and breast. Most lesions were benign, while inflammatory lesions formed a significant proportion. Malignant lesions constituted a small but clinically important percentage of cases. A statistically significant association was observed between the organ system involved and the cytological diagnostic category. **Conclusion:** FNAC remains an invaluable diagnostic modality for the evaluation of superficial lesions. Its simplicity, rapid turnaround time, and high diagnostic accuracy make it an essential first-line investigation in routine clinical practice.

Keywords: Fine needle aspiration cytology; Cytomorphology; Superficial lesions; Thyroid lesions; Retrospective study.

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Introduction

Fine needle aspiration cytology (FNAC) is a widely accepted diagnostic technique for evaluating palpable and superficial lesions. Since its introduction into routine clinical practice, FNAC has gained popularity because of its simplicity, minimal invasiveness, rapid results, and cost-effectiveness. It is particularly useful in the initial assessment of lesions involving the thyroid, breast, lymph nodes, salivary glands, and soft tissues. By providing cytological diagnosis with minimal patient discomfort, FNAC helps clinicians determine the need for further investigations or surgical intervention. [1]

The diagnostic utility of FNAC lies in its ability to distinguish between inflammatory, benign, and malignant lesions, which is essential for appropriate patient management and can significantly reduce the number of unnecessary surgical biopsies. Numerous studies have demonstrated that FNAC has high sensitivity and specificity for diagnosing a wide range of lesions, especially those involving superficial organs. [2]

Among the commonly aspirated sites, thyroid lesions constitute a significant proportion of FNAC samples worldwide. The introduction of standardized reporting systems such as the Bethesda

System for Reporting Thyroid Cytopathology has further improved diagnostic consistency and communication between pathologists and clinicians. [3] In addition to thyroid lesions, FNAC also plays an important role in evaluating lymphadenopathy, breast lumps, salivary gland masses, and various soft tissue swellings. [4] Several studies conducted in different regions have reported variations in the distribution of cytological diagnoses based on demographic factors, prevalence of inflammatory diseases, and regional patterns of malignancy. Therefore, evaluating the cytomorphological spectrum of FNAC cases in a specific population is important for understanding disease patterns and improving diagnostic services. [5] The present study was undertaken to analyze the cytomorphological spectrum of lesions diagnosed by FNAC in a tertiary care hospital and to assess their demographic distribution and site-specific patterns.

Materials and Methods

This retrospective cross-sectional study was conducted in the Department of Pathology at Jashore Medical College, Jashore, Bangladesh. The study included 186 cases of fine needle aspiration cytology (FNAC) performed for evaluation of palpable swellings and superficial lesions during the period from November 2024 to March 2026. Cases with complete demographic and cytological information were included, while cases with incomplete records or inadequate smears were excluded. FNAC was performed using a 22–23-gauge needle attached to a 10 mL disposable syringe under aseptic precautions. The aspirated material was expelled onto clean glass slides and smears were prepared. The smears were immediately fixed in 95% ethanol and stained with Hematoxylin and Eosin (H&E). All stained smears were examined under light microscopy, and cytological diagnoses were made based on established cytomorphological criteria. Patient information including age, sex, site of aspiration, and cytological diagnosis was retrieved from the cytology records. For analysis, age was grouped into five categories: 0–10, 11–20, 21–40, 41–60, and >60 years. Lesions were also categorized according to the organ system involved, including thyroid, lymph node, breast, soft tissue, salivary gland,

vascular, and musculoskeletal lesions. Cytological diagnoses were further classified as benign, inflammatory, malignant, suspicious, or indeterminate. Data were entered into Microsoft Excel and analyzed using Jamovi statistical software. Descriptive statistics were used to determine frequencies and percentages of variables. Associations between categorical variables were analyzed using the Chi-square test, and a p-value <0.05 was considered statistically significant. Ethical approval for this study was obtained from the Institutional Ethical Review Board (IERB) of Jashore Medical College Teachers' Association, Jashore, Bangladesh (Ref No: IERB/JMCTA/2026/003, Date: 10/04/26). As this was a retrospective study based on laboratory records, informed consent from individual patients was waived. All patient information was kept confidential and anonymized during data collection and analysis.

Result

A total of 186 FNAC cases were analyzed in the present study. The patients ranged in age from infancy to over 60 years, with a mean age of 33.45 ± 17.38 years. The majority belonged to the 21–40 years age group (40.3%), followed by the 41–60 years group (27.4%). The detailed age distribution of cases is shown in Table I and Figure 1. Among the study population, 120 patients (64.5%) were female and 66 patients (35.5%) were male, demonstrating a clear female predominance (Figure 2).

Regarding the site of aspiration, the thyroid gland was the most frequently involved organ system (28.5%), followed by lymph nodes (24.2%) and soft tissue lesions (23.7%). Breast lesions accounted for 17.2% of cases, whereas salivary gland, vascular, and musculoskeletal lesions were comparatively less common (Table II, Figure 3). Cytological evaluation showed that 112 cases (60.2%) were benign, 57 cases (30.6%) were inflammatory, 11 cases (5.9%) were malignant, 5 cases (2.7%) were suspicious, and 1 case (0.5%) was indeterminate. Benign and inflammatory lesions were classified as separate categories, with the inflammatory category comprising non-neoplastic inflammatory conditions (Figure 3).

A statistically significant association was observed between the organ system involved and the cytological diagnostic category ($\chi^2 = 116$, $p < 0.001$) (Table III), indicating that the distribution of diagnostic categories differed significantly according to the aspiration site. The spectrum of individual cytological diagnoses observed in the study is summarized in Table IV, with lipoma, reactive lymphadenitis, fibroadenoma, and fibrocystic change being among the most frequent diagnoses. Among the 53 thyroid FNAC cases, the majority were benign Bethesda category II lesions, with nodular goiter with cystic degeneration being the most common diagnosis (35.8%), followed by nodular goiter with thyroiditis (17.0%) and nodular/colloid goiter (15.1%) (Table V).

Table I: Age distribution of patients (n = 186).

Age group (years)	Frequency n (%)
0–10	25 (13.4)
11–20	21 (11.3)
21–40	75 (40.3)
41–60	51 (27.4)
>60	14 (7.5)

Mean age $\pm$ SD: 33.45 $\pm$ 17.38 years.

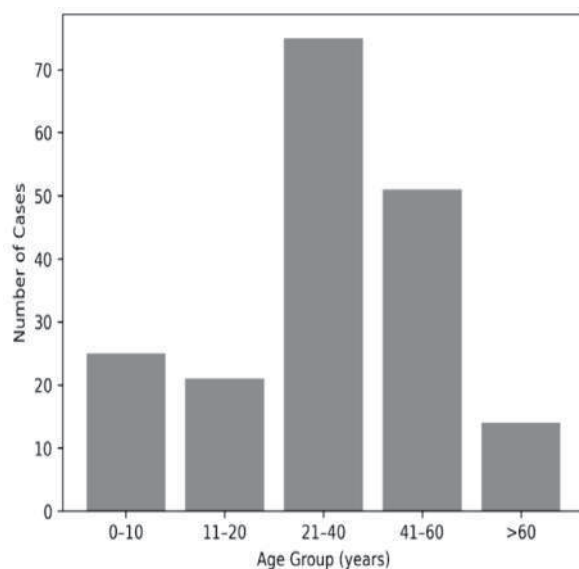


Figure 1: Bar chart showing age group distribution of FNAC cases (n=186).

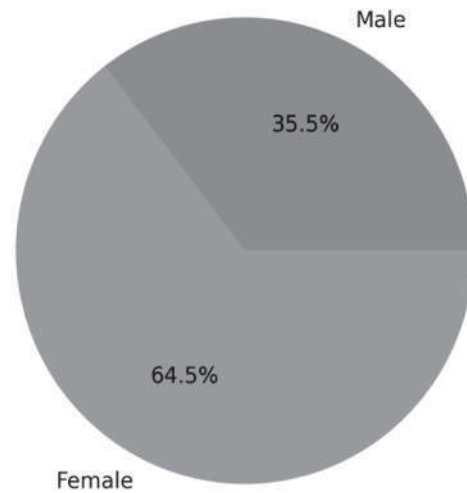


Figure 2: Pie chart showing sex distribution of FNAC cases (n=186).

Table II: Distribution of FNAC cases according to organ system (n=186).

Organ system	Frequency n (%)
Thyroid	53 (28.5)
Lymph node	45 (24.2)
Soft tissue	44 (23.7)
Breast	32 (17.2)
Salivary gland	6 (3.2)
Vascular	4 (2.2)
Musculoskeletal	2 (1.1)

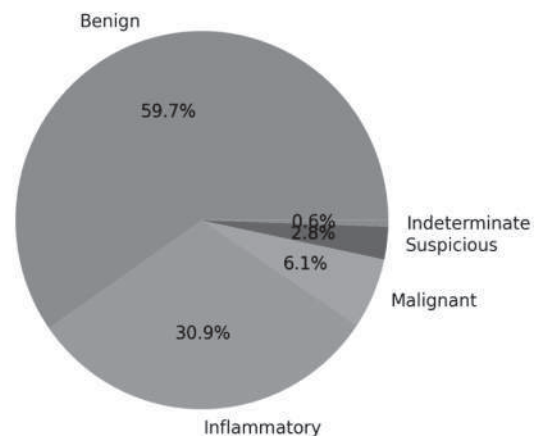


Figure 3: Pie chart showing distribution of cytological diagnoses (n=186).

Table III: Distribution of cytological diagnostic categories across different organ systems (n = 186).

Organ System	Benign n (%)	Indeterminate n (%)	Inflammatory n (%)	Malignant n (%)	Suspicious n (%)	Total
Thyroid	42 (79.2%)	1 (1.9%)	5 (9.4%)	2 (3.8%)	3 (5.7%)	53
Lymph node	0 (0%)	0 (0%)	35 (77.8%)	9 (20.0%)	1 (2.2%)	45
Soft tissue	33 (75.0%)	0 (0%)	10 (22.7%)	0 (0%)	1 (2.3%)	44
Breast	29 (90.6%)	0 (0%)	3 (9.4%)	0 (0%)	0 (0%)	32
Salivary gland	2 (33.3%)	0 (0%)	4 (66.7%)	0 (0%)	0 (0%)	6
Vascular	4 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	4
Musculoskeletal	2 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2
Total	112(60.2%)	1 (0.5%)	57 (30.6%)	11 (5.9%)	5 (2.7%)	186

A statistically significant association was observed between the organ system involved and the cytological diagnostic category ($\chi^2 = 116$, $p < 0.001$) (Table IV), indicating that the distribution of cytological diagnoses varied significantly according to the site of aspiration.

Benign lesions and inflammatory lesions were analyzed as separate categories. "Benign" refers to cytologically benign, non-inflammatory lesions, whereas "inflammatory" refers to non-neoplastic inflammatory conditions.

Table IV: Spectrum of Cytological Diagnoses in FNAC Cases (n = 186).

Cytological Diagnosis	Frequency n (%)
Lipoma	17 (9.1)
Reactive lymphadenitis	15 (8.1)
Fibroadenoma	12 (6.5)
Fibrocystic change	11 (5.9)
Abscess / Suppurative inflammation	11 (5.9)
Chronic nonspecific lymphadenitis	10 (5.4)
Nodular goiter with thyroiditis	9 (4.8)
Cystic goiter	8 (4.3)
Epidermal inclusion cyst	6 (3.2)
Nodular goiter (Bethesda II)	6 (3.2)
Benign mesenchymal lesion	6 (3.2)
Thyroglossal duct cyst	4 (2.2)
Suspicious for papillary thyroid carcinoma (TBS-V)	3 (1.6)
Chronic sialadenitis	3 (1.6)
Metastatic poorly differentiated carcinoma	3 (1.6)
Nodular goiter with cystic degeneration	3 (1.6)
Benign cystic lesion	3 (1.6)
Gynecomastia	3 (1.6)
Papillary thyroid carcinoma (TBS-VI)	1 (0.5)
Anaplastic carcinoma of thyroid (TBS-VI)	1 (0.5)
Other individual diagnoses*	25 (13.4)
Total	186 (100)

*Other individual diagnoses included various rare benign and malignant lesions such as giant cell tumors, hemangioma, granulomatous and tubercular lymphadenitis, salivary gland tumors, metastatic carcinomas, cystic lesions, and other uncommon conditions.

Table V: Cytological diagnosis of thyroid lesions (n = 31).

Thyroid Diagnosis	Bethesda Category	Frequency n (%)
Nodular goiter / colloid goiter	II	8 (15.1)
Nodular goiter with thyroiditis	II	9 (17)
Nodular goiter with cystic degeneration	II	19 (35.8)
Lymphocytic / Hashimoto thyroiditis	II	5 (9.4)
Granulomatous thyroiditis	II	1 (1.9)
Atypia of undetermined significance (AUS)	III	1 (1.9)
Suspicious for papillary thyroid carcinoma	V	3 (5.7)
Papillary thyroid carcinoma	VI	1 (1.9)
Anaplastic carcinoma	VI	1 (1.9)
Other thyroid lesions	II	5 (9.4)
Total		53 (100)

Discussion

Fine needle aspiration cytology (FNAC) has become an indispensable diagnostic modality for the evaluation of palpable and superficial lesions. It is widely used because it is simple, minimally invasive, cost-effective, and provides rapid results with minimal patient discomfort. FNAC plays an important

role in differentiating benign, inflammatory, and malignant lesions and often serves as the first-line investigation before more invasive procedures such as biopsy or surgical excision. Several studies have demonstrated the high diagnostic accuracy and clinical utility of FNAC in the evaluation of lesions involving the thyroid, lymph nodes, breast, salivary glands, and soft tissues. [1-4]

In the present study, the majority of patients belonged to the 21–40 years age group, which is comparable to findings reported in many previous studies. Kumar et al. and Patel et al. also observed that most FNAC cases occurred in the third and fourth decades of life. [2,5] This age distribution may reflect the higher prevalence of benign thyroid nodules, breast lesions, and inflammatory lymph node conditions in this age group. A female predominance was also noted in our study, which is consistent with the observations of Hirachand et al., Bukhari et al., and Tariq et al. [3, 6, 7] The predominance of female patients is largely attributed to the higher frequency of thyroid and breast diseases among women.

In terms of site distribution, the thyroid was the most commonly aspirated organ, followed by lymph nodes and soft tissue lesions. Similar findings have been reported in several FNAC studies where thyroid lesions accounted for the largest proportion of cases. [8, 9] Thyroid nodules are common in the general population, and FNAC is considered the most reliable and cost-effective initial investigation for evaluating these lesions. The diagnostic approach to thyroid cytology has been further standardized with the introduction of the Bethesda System for Reporting Thyroid Cytopathology, which improves communication between cytopathologists and clinicians and helps guide patient management. [10]

The majority of lesions in the present study were benign, followed by inflammatory lesions, while malignant lesions constituted a relatively small proportion of cases. This pattern is consistent with findings from many other FNAC studies where benign and inflammatory conditions accounted for the majority of diagnoses. [6, 7, 11] Among individual diagnoses, nodular goiter and related thyroid lesions were the most common, followed by

reactive lymphadenitis, fibroadenoma, and lipoma. Reactive lymphadenitis represented the most frequent lymph node pathology, which is in agreement with previous studies reporting inflammatory lymph node conditions as the predominant cause of lymphadenopathy. [12, 13] Malignant lesions were relatively infrequent in our study and mainly included metastatic carcinoma and thyroid malignancies. Statistical analysis demonstrated a significant association between the organ system involved and the cytological diagnostic category, further emphasizing the usefulness of FNAC as a reliable diagnostic tool for the evaluation of superficial lesions. [14, 15]

Conclusion

The present study highlights the important role of fine needle aspiration cytology (FNAC) as a reliable, rapid, and minimally invasive diagnostic technique for the evaluation of superficial lesions. The majority of cases in this study were benign, with thyroid lesions representing the most frequently aspirated organ system, followed by lymph node and soft tissue lesions. FNAC proved to be an effective diagnostic tool for distinguishing benign, inflammatory, and malignant conditions, thereby facilitating early diagnosis and appropriate clinical management. Owing to its simplicity, cost-effectiveness, and high diagnostic yield, FNAC remains an invaluable first-line investigation in routine clinical practice.

Limitations of the Study

This study had certain limitations. First, it was a single-center retrospective study, which may limit the generalizability of the findings to other populations. Second, histopathological correlation was not available for all cases, which could have further validated the cytological diagnoses. The study included both palpable and clinically suspected deep-seated lesions; however, image-guided FNAC could not be performed due to logistic limitations in our setting. The availability of image-guided FNAC might have improved sampling adequacy and overall diagnostic accuracy, particularly for deep-seated lesions. Future multicenter studies with larger sample sizes, incorporation of image-guided FNAC, and routine histopathological

correlation would help provide a more comprehensive evaluation of the diagnostic utility of FNAC.

Funding: This research received no external funding.

Conflict of Interest: The authors declare that there is no conflict of interest regarding the publication of this paper.

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Original Article**Management Challenges of Allergic Rhinitis: A Tertiary Care Experience from Satkhira Medical College, Bangladesh*****Harashit Chakrabarty¹, Zahidul Islam², Narayan Prasad Sanyal³, Sutapa Chatterjee⁴****Abstract**

Background: Allergic rhinitis (AR) is a prevalent IgE-mediated inflammatory disease of the upper airway with increasing global burden. Despite effective therapies, disease control remains suboptimal, particularly in developing countries. **Objective:** To evaluate the clinical profile and management challenges of allergic rhinitis in a tertiary care hospital in Bangladesh. **Methods:** This descriptive observational study was conducted in the Department of Dermatology and venereology in conjunction with ENT Department, Satkhira Medical College, Bangladesh. A total of 112 clinically diagnosed allergic rhinitis patients were included from January 2024 to December 2025 on the basis of inclusion and exclusion criteria. Demographic data, clinical features, and management challenges were analysed using descriptive statistics. **Results:** Among 112 patients, 52 (46.4%) were male and 60 (53.6%) were female. Mean age was 29 ± 2.37 years. The most common symptoms were paroxysmal sneezing and clear watery rhinorrhoea triggered by allergen exposure. Major challenges included poor adherence, steroid phobia, limited diagnostic facilities, and environmental allergen exposure. **Conclusion:** Allergic rhinitis remains under-managed in peripheral healthcare settings. Strengthening patient education and healthcare infrastructure is essential for improved outcomes.

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***Address of Correspondence:** Dr. Harashit Chakrabarty, Associate Professor, Dermatology & Venereology, Satkhira Medical College, Satkhira, Bangladesh, Email-dr.harashitc@gmail.com**Introduction**

Allergic rhinitis (AR) is a chronic inflammatory disorder of the nasal mucosa mediated by IgE hypersensitivity reactions. It is characterized by sneezing, rhinorrhoea, nasal obstruction, and itching, significantly affecting quality of life and productivity (1).

Globally, AR affects 10–30% of adults and up to 40% of children, with increasing prevalence in urbanized and industrialized regions (2). In Bangladesh, environmental pollution, dust exposure, and limited healthcare awareness contribute to increasing disease burden (6).

The ARIA (Allergic Rhinitis and its Impact on Asthma) guidelines provide evidence-based recommendations for diagnosis and management (1,2). However, implementation in resource-limited settings remains inconsistent.

This study highlights our institutional experience and explores real-world management challenges in Satkhira Medical College, Bangladesh.

Materials and Methods**Study Design**

Descriptive observational study

Study Setting

Department of Dermatology & Venereology in conjunction with ENT Department, Satkhira Medical College, Bangladesh

Study Period

January 2024 – December 2025

Sample Size

112 patients

Sampling Method

Purposive sampling

Inclusion Criteria

Patients with clinical diagnosis of allergic rhinitis presenting with at least two of the following symptoms:

- Sneezing
- Rhinorrhoea
- Nasal obstruction
- Nasal itching

Exclusion Criteria

- Infective rhinitis
- Nasal polyposis
- Structural nasal deformities

Data Collection

Clinical history, examination findings, and treatment follow-up were recorded in structured forms.

Results**Demographic Profile**

A total of 112 patients were included in the study. Among them, 52 (46.4%) were male and 60 (53.6%) were female. The mean age was 29 ± 2.37 years.

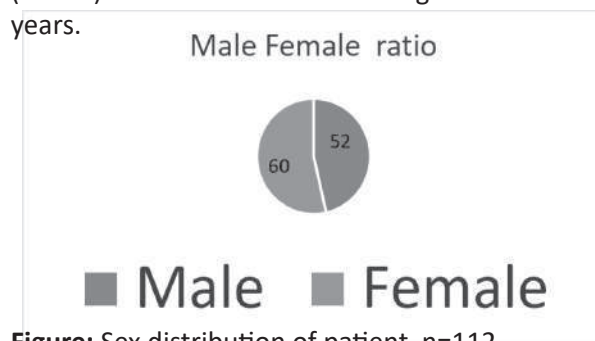


Figure: Sex distribution of patient n=112

Clinical Presentation

The most frequent presenting symptoms were:

- Paroxysmal bouts of sneezing
 - Clear watery nasal discharge (rhinorrhoea)
- Symptoms were typically provoked by exposure to allergens such as dust and environmental irritants, consistent with IgE-mediated hypersensitivity reactions (3,4).

Management Challenges**Patient-related factors**

- Poor adherence to intranasal corticosteroids (5)
- Steroid phobia and misconceptions
- Frequent self-medication

Healthcare-related factors

- Limited availability of allergy testing (skin prick test, serum IgE) (6)
 - Overcrowded outpatient services reducing counselling time
 - Inconsistent application of ARIA guidelines (1,2)
- Environmental factors**
- High dust exposure
 - Urban pollution
 - Seasonal variation in allergen load (3)

Discussion

The present study demonstrates that allergic rhini-

tis predominantly affects young adults, with slight female predominance. Similar demographic findings have been reported in global and regional studies (3,4).

Sneezing and watery rhinorrhoea were the predominant symptoms, consistent with classical descriptions of allergic rhinitis (1).

A major concern identified was poor adherence to intranasal corticosteroids, which remains a global challenge due to fear of side effects and lack of awareness (5).

Limited diagnostic facilities in peripheral health-care centres further complicate precise diagnosis and long-term management (6).

Environmental exposure to dust and pollutants remains a major triggering factor in Bangladesh, particularly in semi-urban regions such as Satkhira (6,7).

Implementation of ARIA guidelines and strengthening patient education are essential to improve disease outcomes (1,2).

Conclusion

Allergic rhinitis is a common chronic condition with significant management challenges in Bangladesh. Poor adherence, environmental exposure, and limited diagnostic facilities are major barriers to effective control. Strengthening awareness programs and healthcare infrastructure is essential.

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Case Report

Congenital Absence of the Penis (Aphallia): A Rare Case Report

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Abstract

Introduction: Aphallia (absent penis) is a condition that is present at birth. It is linked to chromosomal rearrangements and hormone levels and is thought to be caused by either the genital tubercle's incomplete development or its absence. The development of the penis is impacted by the failure of the genital tubercle, which is partially dependent on testosterone released by the testis' Leydig cells. The functions of control and protection may be impacted by chromosomal polymorphisms, which could increase a person's vulnerability to congenital diseases. Herein, an extremely rare case of a congenital absence of the penis is described. **Patient concerns:** A 65-year-old man was transferred to the urology ward after his family members brought him to the emergency department complaining of acute urine retention. Initially, a suprapubic puncture and later a suprapubic cystostomy were used to treat this patient. When asked, the patient revealed that he had not had a penis since birth and that he passed his urine rectally. Upon local examination, the penis was completely absent. There was well development of the scrotum. Bilateral testes were palpable. The location of the anal opening was normal. There was no identified urethral orifice. This patient, however, had not yet made up their mind about accepting any kind of procedure (urethroplasty or phalloplasty). He was neglected as a child and never sought medical attention for his issues.

Keywords: aphallia, congenital anomaly, penis agenesis

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Lessons

We urge active collaboration with physicians to reduce the adverse effects of this deformity, given the uncommon nature of this case and its severe psychosocial ramifications. Confusion and conflict are avoided by assigning genders early. Healthcare providers have diagnosed fewer than 100 people in the world with aphallia. Many of these people aren't yet adults. Treating aphallia in an adult presents more difficulty than treating it in a child.

Abbreviations

ASD = atrial septal defect, CHD = congenital heart disease, CUF = congenital urethrorectal fistula, DHT = dihydrotestosterone, FSH = follicle-stimulating hormone, GnRH = gonadotropin-releasing hormone, HCG = human chorionic gonadotropin, HPG = hypothalamus pituitary gonad, LH = luteinizing

hormone, PDA = patent ductus arteriosus, DSD = disorders of sex development.

Introduction

Penile agenesis is a very uncommon genitourinary condition that affects roughly one in every 30 million babies born. [1] Imminger first identified it in 1853, and as of right now, there are less than 100 cases known globally. [2] The inability of the genital tubercle to form or grow completely results in aphallia. Congenital abnormalities affecting the genitourinary and other major organ systems are widespread, and the clinical appearance is diagnostic. Aphallia patients provide a significant challenge for both short-term and long-term care. Herein, we describe a case of total absence of the penis and discuss briefly the dilemmas associated with the management of such patients.

Ethical statement and consent

We confirm that all methods in the present study were carried out in accordance with the relevant guidelines and regulations. Informed written consent was obtained from the patient for publication of this case report and accompanying images.

Case presentation

A 65-year-old man was transferred to the urology ward after his family members brought him to the emergency ward complaining of acute urine retention. Initially, a suprapubic puncture and later a suprapubic cystostomy were used to treat this patient. When asked, the patient revealed that he had not had a penis since birth and that he passed his urine rectally.

He was very well built and healthy in all respects. His height was 150 cm and his weight 51 kilograms. He is a hawker. His father and mother were 90 and 80 years old respectively. He has 3 brothers and 6 sisters, and all were married and had children. All of these 11 boys and 10 girls were healthy and none showed any physical abnormality or malformation. The patient is the 2nd son of the family and the only one born with a defect in this family. The penile anomaly was observed at birth and no treatment was undertaken. Physical examination revealed the patient to be in perfect condition with the exception of the external genitalia. The blood pressure was 130/80 mmHg and the pulse 88 per minute and regular. He had complete absence of the penis as there was no external evidence of its presence. The pubic hair was abundant and

typically male in texture and distribution. The scrotum was well developed. Each testicle normal in size, shape and consistency was found in each scrotal compartment which was separated by a median raphe. The epididymides and vasa deference were easily palpable on each side and of normal shape and consistency. On rectal examination a normal prostate and an underdeveloped urethrae (represent rudimentary urethrae) were palpated.

The patient had never complained of urinary trouble before. He had had perfect control of the urinary sphincters. Micturition was normal frequency but performed in the sitting or squatting position which apparently did not cause him any inconvenience or embarrassment. The location of the anal opening was normal (figure-1).

No urethral orifice could be identified. There was no other identifiable external anomaly.

Echocardiographic assessment of the patient revealed that he has no congenital heart disease (EF-66%). Ultrasound of the scrotum showed the presence of two normal testes and epididymis, left sided epididymal cyst. Instillation of contrast into the urinary bladder and examination by x ray demonstrated a thin tract opening in the rectum, suggesting a urethrorectal fistula (figure-2). Biochemical investigation serum electrolyte, testosterone are normal. We explained the nature of the abnormality and management options to the patient. However, they did not decide whether to accept treatment.

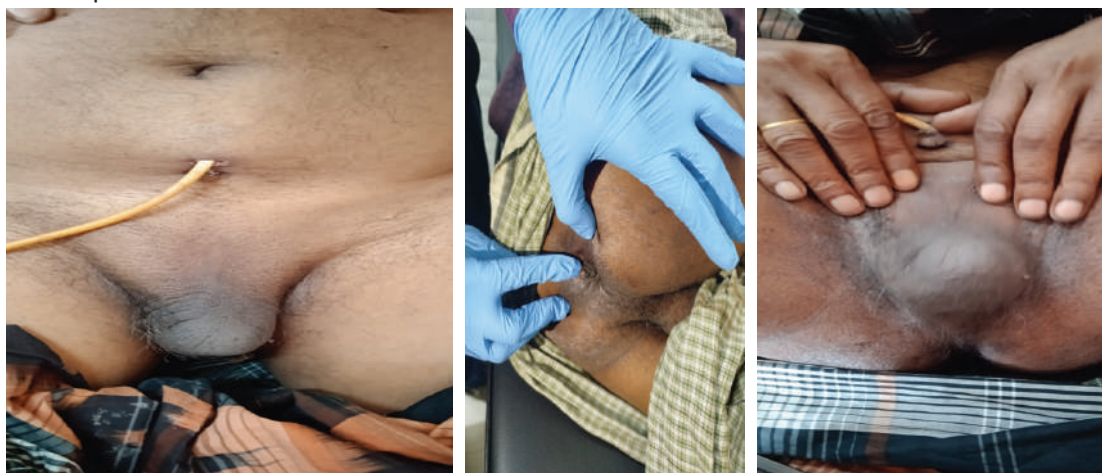


Figure 1: Visual image of Aphalia.

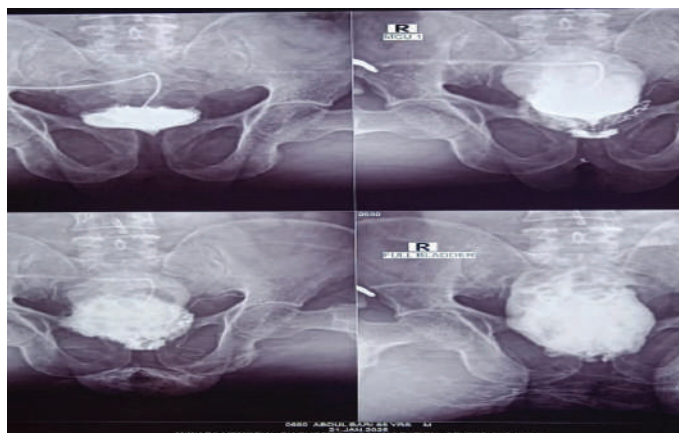


Figure 2(A): Antegrade cystography show contrast passing through rectum.

Discussion

Maternal placental chorionic gonadotropin starts to activate Leydig cells to release testosterone in the eighth week of pregnancy. This testosterone is then transformed into dihydrotestosterone (DHT), which controls penis growth and differentiation. [3, 4] The 12th week of pregnancy marks the completion of penis differentiation. The genital sac shifts to the midline and becomes the scrotum during that period, the genital tubercle differentiates into glans, and the genital fold becomes the body of penis. [5] It has been suggested that either the genital tubercle fails to develop or does not form at all, leading to penile agenesis. [6] During the middle to late stages of pregnancy, androgens influence penis growth. The development of the penis mainly depends on testosterone secreted by Leydig cells of the testis, which is converted into DHT by 5 alpha reductase, targeting androgen receptors. [7]

At the 12th week of pregnancy, the placenta secretes human chorionic gonadotropin (HCG), which promotes Leydig cell development and releases testosterone. [8] The pituitary and hypo-

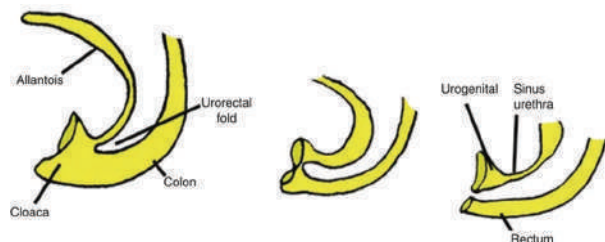


Figure 3(A): Image of development urogenital system.

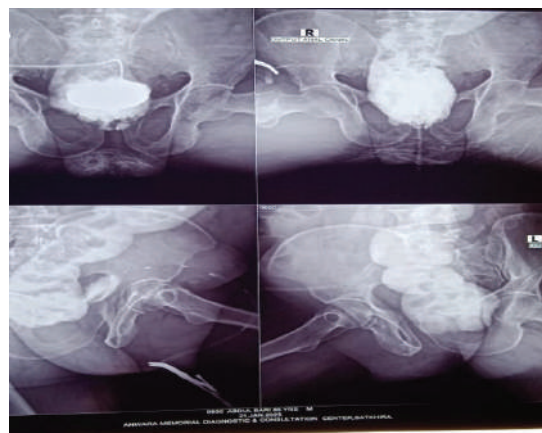


Figure 2(B): Antegrade cystography show contrast passing through rectum.

thalamus mature by week 12. The hypothalamus's gonadotropin-releasing hormone (GnRH) causes the anterior pituitary to release gonadotropins, such as follicle-stimulating hormone (FSH) and luteinizing hormone (LH), which, in conjunction with HCG, stimulate the testis's Leydig cells to secrete testosterone and convert it to DHT, which then binds to receptors on target cells to control penile development and maturation. [9] As a result, any anomalies in the hypothalamus-pituitary-gonad (HPG) axis will hinder penile develop-

Embryonic structures	Males (development driven by DHT)	Females (development driven by estrogen)
Genital tubercle	Glans penis	Clitoris Vestibular bulb's
Urogenital sinus	Bulbourethral gland Prostate gland's Bladder Urethra	Greater vestibular gland's Urethral & paraurethral gland Lower 1/3 rd of vagina Bladder Urethra
Urogenital folds	Penile urethrae Ventral penile shaft	Labia minora
Labioscrotal swelling	Scrotum	Labia majora

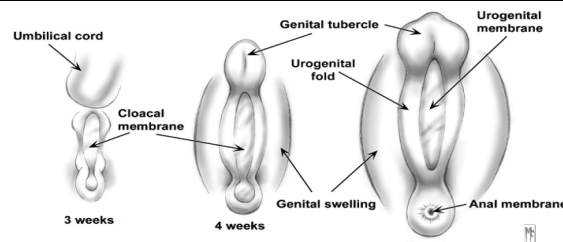


Figure 3(B): Image of development urogenital system.

ment. However, Joshi et al [10] holds that, in most instances, the karyotype is 46, XY with a normal constellation of sex hormones, as the pituitary gonadal axis is intact. Cases of ectopic urethral openings were thought to represent the total absence of the genital tubercle. [11] In the present case, a thin tract opening was found within the rectal wall and would, according to the aforementioned reasoning, represent the absence of the genital tubercle.

Chromosomal polymorphisms follow Mendelian law with an incidence of 2.6%. [14] Research indicates that 9qh+ itself would not affect the health, but it may affect protecting and regulating functions that could lead to hereditary diseases or susceptibility to congenital disease. [15] The above abnormalities may account for the congenital absence of the penis, congenital heart disease (CHD), and congenital urethrectal fistula (CUF) of the patient.

Because there were no other data of gene or hormone levels, we could not make an exact judgment about this patient.

Aphallia should be differentiated from concealed penis, epispadias, hypospadias, micropenis, rudimentary penis, intrauterine amputation of penis, and disorders of sexual development. [16] Sex identity begins at birth with the assignment of sex, and the attitudes of others by daily acts create and reinforce who we are in the ensuing months.

Earlier reports concerning the management of aphallia had advocated phalloplasty; however, the majority of authors recommend unequivocal assignment of the female gender at birth. [17]

The patient in our study wanted to leave our hospital without receiving any additional treatment because they were too elderly to make a decision and had not yet made up their minds about accepting treatment. As a result, it is challenging to follow up with him. Generally speaking, in this scenario, penile reconstruction is done in addition to treating CUF. A urologist, a geneticist, an endocrinologist, and a mental health specialist ought to be on the team. Concerns regarding gender assignment, phalloplasty, or vaginoplasty should be discussed

with parents, who should also be invited to frequent follow-up appointments with the urologist.

Conclusion

This case demonstrates a patient who suffered from the congenital absence of the penis, which, because of its rarity, must be considered exceptional. Follow-up treatment and psychological care are both important. The management of aphallia is a multidisciplinary process with numerous obstacles. Confusion and conflict are avoided by assigning genders early.

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