

MEDICINE today

a professional medical journal

VOL. 37

NO. 2

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VOL. 37	NO. 2	July 2025
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Volume 37, July 2025

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Typhoid Conjugate Vaccine Introduction in Bangladesh: Implementation, and Health System Strengthening Strategies

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Introduction:

Enteric fever, primarily caused by *Salmonella Typhi* and *Paratyphi A*, remains a significant public health threat in low- and middle-income countries, especially in regions with inadequate sanitation and unsafe water¹. It is endemic across parts of Asia and Africa and is exacerbated by urbanization, climate change, and rising antibiotic resistance².

Typhoid fever remains a significant public health concern in many developing areas of the WHO African, Eastern Mediterranean, South-East Asia, and Western Pacific regions³. *Salmonella Typhi* causes about 30% of community-acquired bloodstream infections in Asia and 10% in Africa. *Salmonella Paratyphi A* is emerging in Asia, responsible for up to 35% of enteric fever cases in India and Nepal, and over 60% in China⁴. Globally, typhoid fever causes a substantial burden, with an estimated 14.3 million cases and 135,000 deaths annually as of 2019^{1,3}. In 2021, there were over 2 million cases and over 14,000 deaths in South and Southeast Asia solely⁵. Bangladesh is one among the top five nations with the highest per capita incidence, typhoid-related mortality, and DALYs, according to the Global Burden of Disease (GBD) 2019 analysis¹. Typhoid fever remains a significant public health challenge, with the rise of antimicrobial-resistant strains complicating treatment and heightening the risk of future outbreaks.

The typhoid conjugate vaccine (TCV) should be included to routine childhood vaccinations in typhoid-endemic countries, according to a 2017 recommendation by the World Health Organization's (WHO) Strategic Advisory Group of Experts on Immunization (SAGE), with a focus on those with

high disease burden or antibiotic resistance². The WHO presently recommends three vaccines to control endemic and epidemic typhoid fever: Injectable TCV, comprising Vi polysaccharide coupled to a carrier protein, licensed for children as young as 6 months and adults up to 45-65 years, depending on the vaccine. Injectable unconjugated Vi polysaccharide vaccine (Vi-PS) for people aged two years and up; Ty21a vaccine, live attenuated, in capsule form, for children over the age of 6. TCV is preferable for routine usage at all ages because it has a greater immune response, is suitable for young children, and provides longer-term protection. WHO also recommends that immunization campaigns be linked with health education, water and sanitation improvements, and diagnostic and treatment training for healthcare professionals⁶. In 2018, as part of a program scrutiny the TCV was first used in India for public health purposes. In countries like Pakistan (2019-2022), Liberia (2021), Zimbabwe (2021), Nepal (2022), and Samoa (2021-2022), TCV has now been included in national routine immunization regimens for children, typically at 9 months or between 15 and 18 months. With coverage estimates ranging from 63-95%, catch-up initiatives have administered TCV to approximately 75 million children. For instance, TCV was part of integrated campaigns in Nepal, Pakistan, and Zimbabwe that targeted children who were either unvaccinated or undervaccinated and paired it with other standard vaccines^{7,8}. Since 2019, the Global Alliance for Vaccines and Immunization (GAVI) has supported vaccine use in eligible countries, and by March 2023, the WHO prequalified two conjugate vaccines offering long-lasting protection with a single dose for children over six months old³. In March 2024, the SAGE on Immunization convened to discuss vaccination tactics and provide evidence-based guidelines by highlighting its accomplishments and future objectives⁹.

The WHO recommends TCVs in countries with high typhoid burden or drug resistance. While Bangladesh plans to include TCV in its EPI schedule, identifying the most cost-effective strategy remains crucial. To support this, researchers developed a cost-effectiveness model using clinical, economic, and serosurvey data to better estimate typhoid incidence and guide vaccine rollout¹⁰. The WHO recommends TCVs in countries with high typhoid burden or drug resistance. While Bangladesh plans to include TCV in its routine immunization program, identifying the most cost-effective strategy remains crucial. To support this, it is needed to develop a cost-effectiveness model using clinical, economic, and serosurvey data to better estimate typhoid incidence and guide vaccine rollout. The incorporation of TCVs into EPI programs forms a key part of a multi-sectoral strategy to prevent typhoid fever, alongside strengthened national surveillance systems. This approach supports countries in reducing the burden of typhoid-related illness and death. Experiences from countries that have successfully introduced TCVs and conducted catch-up campaigns with integrated health interventions can serve as valuable models for others

planning implementation. Continued financial and technical support at both national and international levels is essential to enhance program delivery, gather accurate national data on typhoid prevalence, and expand TCV coverage. Strengthened surveillance and sustained financial and technical support are also essential to reduce typhoid burden effectively.

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Association of Serum Leptin Level with Preeclampsia

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Abstract

Introduction with Objective: The aim of the present study was to assess the association of serum leptin level with preeclampsia. **Materials and Methods:** This cross-sectional study was conducted from March 2022 to February 2023 in the department of Laboratory Medicine, Fetomaternal Medicine and Obstetrics and Gynaecology, BSMMU. A total 80 cases were selected as study population as per inclusion and exclusion criteria. They were grouped as preeclamptic (group I) and normal pregnant women of more than 20 weeks of gestation (group II). After taking written informed consent, 2.0 ml of random venous blood and 24 hours urine for protein were collected. Serum leptin level was estimated in Laboratory Medicine department and 24 hours urinary protein measured in Biochemistry and Molecular Biology department. After data collection and processing, all statistical analysis were done by SPSS software windows version 26. **Result:** The mean serum leptin level was found 28.3 ± 12.52 ng/ml in group I and 14.24 ± 5.10 ng/ml in group II. The difference was statistically significant ($p < 0.001$) between two groups in unpaired t-test. Mean 24 hours urinary protein was 0.33 ± 0.03 gm and 0.12 ± 0.13 gm in group I and II respectively and the difference was statistically significant (p in unpaired t-test). There was positive linear relationship between 24 hours urinary protein and serum leptin level ($r = +0.225$, $p > 0.05$) found in Pearson's correlation coefficient test. In ROC curve analysis, cut off value of serum leptin was found 21 ng/ml with 80% sensitivity and 90% specificity. The area under curve (AUC) of serum leptin level was 0.904. In our study, 32 preeclampsia patients (80%) had serum leptin level was ≥ 21 ng/ml which considered positive. This finding of the study revealed that increased serum leptin level was associated with preeclampsia. **Conclusion:** Serum leptin level was increased in preeclamptic study group compared to normal pregnancy. Serum leptin level may be used as a biomarker of preeclampsia to help the clinicians for diagnosis.

Keywords: Leptin, preeclampsia, proteinuria.

Number of Tables: 05; Number of Figures: 02; Number of References: 13; Number of Correspondences: 04.

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Introduction:

Preeclampsia is a multisystem disorder of unknown etiology and is associated with maternal and fetal mortality and morbidity. According to the new guideline of National Institute for Health and Care Excellence (NICE) 2019, Preeclampsia can be defined as new onset of hypertension (BP $\geq 140/90$ mm of Hg) after 20 weeks of pregnancy and associated with significant proteinuria or in absence of proteinuria with thrombocytopenia, impaired liver function, new development of renal insufficiency, pulmonary oedema or new onset of cerebral or visual

disturbance. Pre-eclampsia was previously determined by oedema, proteinuria and hypertension; the term is now changed because of very high incidence of generalized oedema in healthy pregnant women¹. Worldwide, the incidence of preeclampsia ranges from 2% to 10% of pregnancies². Incidence of preeclampsia in Bangladesh is 4.3%. The pathogenesis of preeclampsia involves multiple systems like placental, genetic, immunologic, environmental factors³. Some established risk factors for preeclampsia is extreme of age (<18 or >35), primiparity, previous history of preeclampsia, twin pregnancy and family history of hypertension⁴. There is no single, reliable and cost-effective test is available in preeclampsia⁵. Routine screening for preeclampsia is measurement of blood pressure and urine analysis for protein. Various study of different countries showed association of increased level of serum leptin in preeclamptic patient⁶. In pregnancy, leptin is synthesized and secreted from placental trophoblast into maternal circulation in larger amount in comparison to non-pregnant women. Placental leptin exhibits metabolic and physiological functions in normal pregnancy such as regulation of fetal growth, placental growth, angiogenesis and immunomodulation. Thus, placenta is not only the source of leptin it is also the target of leptin action⁷. In preeclamptic placenta, leptin expression is increased that suggested a positive correlation between elevated serum leptin level and preeclampsia⁸. Elevation of leptin level is due to placental stress caused by hypoxia in preeclamptic placenta⁹. As leptin is a strong angiogenic factor, its level increases in preeclampsia to improve the placental blood supply by neovascularization. Leptin also regulates transport of nutrient through placenta so that elevated leptin level in preeclampsia is a compensatory response to enhance nutrient supply to the hypoxic or under perfused placenta of preeclampsia¹⁰.

Materials & Methods:

This cross-sectional study was conducted from March 2022 to February 2023 in the department of Laboratory Medicine, Fetomaternal Medicine and Obstetrics and Gynaecology, BSMMU. A total 80 cases were selected as study population as per inclusion and exclusion criteria. They were grouped as preeclamptic (group I) and normal pregnant women of more than 20 weeks of gestation (group II). After taking written informed consent, 2.0 ml of random venous blood and 24 hours urine for protein were collected. Serum leptin level was estimated in Laboratory Medicine department and 24 hours urinary protein measured in Biochemistry and Molecular Biology department. After data collection and processing, all statistical analysis were done by SPSS software windows version 26 to assess the association of serum leptin level with preeclampsia. The study was approved by the institutional ethical committee.

Results:

In this study, the patients were divided into four age groups. The mean ($\pm$ SD) age was 25.1 $\pm$ 5.2 years and 24.9 $\pm$ 4.9 years in preeclamptic and normal pregnant women respectively. The mean age difference was not statistically significant ($p>0.05$) between two groups in unpaired t-test. The results are shown in the table I.

Table I: Age distribution of the study subjects (N=80)

Age group (years)	Preeclampsia (n=40)		Normal pregnancy (n=40)		p-value
	N	%	N	%	
<20	12	30.0	10	25.0	
21-25	7	17.5	8	37.5	
26-30	15	37.5	16	22.5	
31-35	6	15.0	6	15.0	
Mean $\pm$ SD	25.1 $\pm$ 5.2		24.9 $\pm$ 4.9		0.877ns
Range	(17-35)		(18-35)		

Unpaired t-test was performed to compare between two groups ns = not significant, Data were expressed as frequency, percentage and mean $\pm$ SD

The mean ($\pm$ SD) of 24 hours urinary protein was 0.33 $\pm$ 0.03 gm with ranged from 0.31 to 0.40 gm in preeclamptic group. In normal pregnant women the mean ($\pm$ SD) of urinary 24 hours protein level was 0.12 $\pm$ 0.13 gm with ranged from 0.04 to 0.80 gm. The mean 24hrs urinary protein difference was statistically significant ($p<0.001$) between two groups in unpaired t-test. The results are shown in the table-II.

Table II: Comparison of 24 hrs urinary protein between two groups (N=80)

Urinary protein (gm/24 hours)	Preeclampsia (n=40)	Normal pregnancy (n=40)	P value
	Mean $\pm$ SD	Mean $\pm$ SD	
Mean $\pm$ SD	0.33 $\pm$ 0.03	0.12 $\pm$ 0.13	<0.001s
Range	(0.31-0.40)	(0.04-0.80)	

Unpaired t-test was performed to compare between two groups s = significant, Data were expressed as mean $\pm$ SD and range The mean ($\pm$ SD) serum leptin level was 28.3 $\pm$ 12.52ng/ml with ranged from 11.75 to 67.7 ng/ml in preeclamptic group. In normal pregnancy, the mean ($\pm$ SD) serum leptin level was 14.24 $\pm$ 5.10ng/ml with ranged from 6.72 to 27.20 ng/ml. The mean serum leptin difference was statistically significant ($p<0.001$) between two groups in unpaired t-test. The results were shown in the table III.

Table III: Serum Leptin level of the study subjects (N=80)

Serum (ng/ml)	Leptin Preeclampsia (n=40)	Normal pregnancy (n=40)	P value
	Mean $\pm$ SD	Mean $\pm$ SD	
Mean $\pm$ SD	28.3 $\pm$ 12.52	14.24 $\pm$ 5.10	<0.001 ^s
Range	(11.75-67.70)	(6.72-27.20)	

Unpaired t-test was performed to compare between two groups s = significant, Data were expressed as mean $\pm$ SD and range 24 hours urinary protein of 40 pre-eclamptic women was measured as gm/24hrs and serum leptin level was measured in ng/ml. Negligible positive correlations were found between urinary protein and serum Leptin level. The values of Pearson's correlation coefficient was $r=+0.225$ which showed a negligible positive linear correlation between urinary protein and serum leptin level in preeclamptic group (Figure 1).

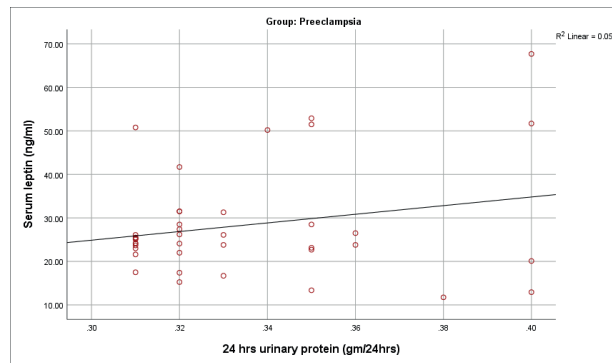


Figure-1: The scatter diagram showed positive relationship ($r=0.225$, $p>0.05$) in preeclamptic group.

In ROC curve analysis, cut off value of serum leptin was found 21 ng/ml with 80% sensitivity and 90% specificity. The area under curve (AUC) of serum leptin level was 0.904 (Figure-2).

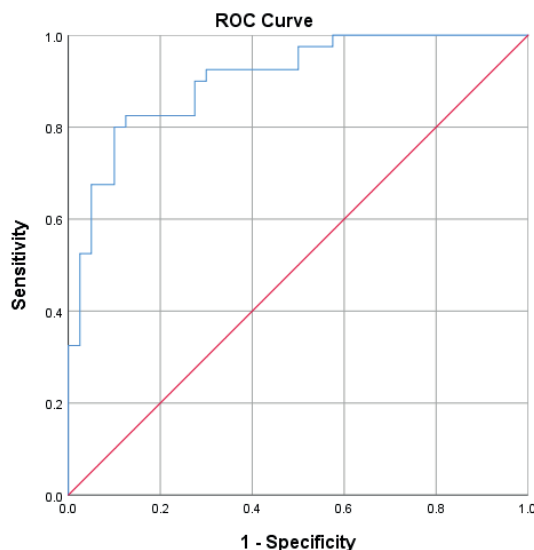


Figure-2: ROC curve analysis performed to measure the best cut off value of serum leptin for preeclampsia.

ROC curve analysis showed that a cutoff point of serum leptin 21 ng /ml can be used to diagnose preeclampsia with a sensitivity of 80%, specificity 90%, PPV 88.9%, NPV 81.8% and 85% accuracy (Table IV).

Table- IV: Diagnostic performance of serum leptin

Diagnostic validity test	Values
Sensitivity	80.0%
Specificity	90.0%
Positive Predictive Value	88.9%
Negative Predictive Value	81.8%
Accuracy	85.0%

Table V reveals that 32 preeclampsia patients had serum leptin level was ≥ 21 ng/ml which considered positive and 8 preeclampsia patients had serum leptin level was < 21 ng/ml which considered negative. In normal pregnancy, 4

women had serum leptin level was ≥ 21 ng/ml which considered positive and 36 patients had serum leptin level was < 21 ng/ml which considered negative.

Table-V: Diagnostic validity test of serum leptin with preeclampsia (N=80)

Serum leptin (ng/ml)	Group		Total (N=80)	p-value (χ^2 test)
	Preeclampsia (n=40)	Normal pregnancy (n=40)		
Positive (≥ 21)	32(80.0%)	4(10.0%)	36(45.0%)	<0.001*
Negative(< 21)	8(20.0%)	36(90.0%)	44(55.06%)	
Total	40(100.0%)	40(100.0%)	80(100.0%)	

Discussion:

The study subjects were divided into four age groups. In this study, the maximum number was found in the age group of 26-30 years in both groups. The mean ($\pm$ SD) age was 25.1 ± 5.2 years and 24.9 ± 4.9 years in Group 1 and Group 2 respectively and the difference was not statistically significant. Similarly, Ozkan S et al. (2005) study observed that mean age was 29.31 ± 5.21 years in preeclamptic and 29.11 ± 5.97 years in normal pregnant women and the difference was not statistically significant and was little higher than current study¹¹. In this present study the mean 24 hours urinary protein was found 0.33 ± 0.03 g/24 hours and 0.12 ± 0.13 g/24 hours in preeclamptic and normal pregnancy respectively and p value was 0.001. This results were nearly consistent with Aradhana et al. (2019) study where they found 24 hours urinary protein 0.50 ± 0.11 g/24 hours in preeclampsia and 0.19 ± 0.43 g/24 hours in normal pregnant women with significant p value < 0.0001 ⁶. In this study the serum leptin level was found ranged from 11.75 to 67.70 ng/ml in preeclampsia and 6.72-27.20 ng/ml in normal pregnant women. The mean serum leptin level was 28.3 ± 12.52 ng/ml and 14.24 ± 5.10 ng/ml in group-I and group-II respectively. The mean serum leptin level difference was statistically significant ($p < 0.001$) between two groups. Taylor et al. (2014) reported serum leptin level were significantly ($p = 0.011$) increased in women with preeclampsia where they found mean serum leptin level was 30.5 ng/ml in PE group compared with 20.9 ng/ml in normal group¹². The area under the receiver operator characteristic (ROC) curves for serum leptin level was depicted in present study. The area under the curve (AUC) was 0.904. This ROC curves showed that the cut off value for serum leptin was 21 ng/ml which had 80% sensitivity and 90% specificity for prediction of preeclampsia. In Rao S et al. (2021) study found that cut off value of serum leptin was 23.3 ng/ml had 90% sensitivity and 88.3% specificity. Their results were nearly consistent with our study¹³. It was observed that serum leptin level significantly increased in patient with preeclampsia than normal pregnancy. There was a positive correlation of serum leptin level with preeclampsia. AUC suggested that serum leptin level has the discriminative ability in identification of preeclampsia.

Conclusion:

Serum leptin level was increased in preeclamptic study group compared to normal pregnancy. AUC showed fair predictive performance of serum leptin to differentiate preeclamptic patients from normal pregnant women. Serum leptin level may be used as a biomarker of preeclampsia to help the clinicians for diagnosis.

Conflict of Interest: None.

Acknowledgements:

The authors are grateful to the entire staff of department of Laboratory Medicine, Fetomaternal Medicine and Obstetrics and Gynaecology, BSMMU during the study period.

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Comparison of Non-albuminuric and Microalbuminuric Diabetic Patients

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Abstract

Introduction with Objective: The aim of the present study was to compare the Non-albuminuric and microalbuminuric Diabetic Patients. **Materials and Methods:** This comparative study was conducted in the Department of Laboratory Medicine, BSMMU, Shahbagh, Dhaka. The duration of the study was from June 2022 to February 2023. Diagnosed patients with diabetes mellitus who fulfill the inclusion and exclusion criteria were selected as the study population. After data collection and processing, all statistical analysis was done by SPSS software windows version 26. **Result:** Majority of microalbuminuric subjects (n=17, 37%) were 60-69 years. Male patients were suffering from more microalbuminuria. Mean ($\pm$ SD) BMI of non-albuminuric and microalbuminuric subjects were 23.76 ± 4.18 kg/m² and 23.90 ± 3.50 kg/m² respectively. Mean ($\pm$ SD) disease duration was 6.63 ± 1.37 years in non-albuminuric and 7.41 ± 1.73 years in microalbuminuric subjects. The difference of disease duration was statistically significant between non-albuminuric & microalbuminuric subjects ($p < 0.018$). Mean value of HbA1c was 6.92 ± 1.77 in non-albuminuric and 7.27 ± 1.58 in microalbuminuric study subjects which was statistically not significant. Mean serum creatinine level in non-albuminuric and microalbuminuric subjects were 1.33 ± 0.33 and 1.45 ± 0.37 respectively and e-GFR level in non-albuminuric and microalbuminuric subjects were 57.4 ± 21.3 and 55.8 ± 24.1 respectively. Serum creatinine and e-GFR level between the non-albuminuric and microalbuminuric study subjects were statistically significant. **Conclusion:** Prevalence of microalbuminuria showed statistically significant association with age, duration of diabetes, serum creatinine and e-GFR level.

Keywords: Comparison, Non-albuminuric, Microalbuminuric Diabetic Patients.

Number of Tables: 04; Number of Figure: 01; Number of References: 08; Number of Correspondences: 03.

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Introduction:

Diabetes mellitus is the chronic disorder emerging as a major world health problem which increases the rate of morbidity and mortality. The prevalence of diabetes mellitus is growing rapidly worldwide and is reaching epidemic proportions¹. It is estimated that there are currently 422 million people with diabetes worldwide and this number is set to double in the next 20 years (World health day, 2016)². Because of the progressive nature of the disease, an evolving treatment strategy is necessary to maintain both fasting and postprandial

glycemic control. If left untreated diabetes can cause many complications. Major complications are diabetic neuropathy, diabetic kidney disease and diabetic retinopathy. Diabetic Kidney Disease (DKD) is defined as elevated urine albumin excretion or reduced glomerular filtration rate or both in diabetics³. Approximately 20% to 40% of DM patients develop DKD⁴. The presence of moderate amount of albumin in urine is known as microalbuminuria (30-300mg/dl). Clinically, microvascular damage of kidney in diabetes is diagnosed by microalbuminuria⁵. It can detect renal damage and the progression of overt diabetic nephropathy. The epidemiology of DKD shows significant regional and international variation. Only 1% of diabetic patients who have been diagnosed for 20 to 25 years but have less chance to develop DKD. After 15 years of having the condition, about one-third of diabetic patients developed microalbuminuria and less than half actually developed nephropathy⁴.

Materials & Methods:

This comparative study was conducted in the Department of Laboratory Medicine, BSMMU, Shahbagh, Dhaka. The duration of the study was from June 2022 to February 2023. If any comorbid condition present with diabetes mellitus were excluded from the study. Five ml urine was collected for the estimation of spot urinary albumin level. The collected data were entered into the computer and analyzed by using SPSS (version 26) to compare the Non-albuminuric and microalbuminuric Diabetic Patients. The study was approved by the institutional ethical committee.

Results:

Table I reveals that maximum portion of non-albuminuric subjects (n=21, 45.7%) were belonging to age group 40-49 years and majority of microalbuminuric subjects (n=17, 37%) were 60-69 years. Differences of mean age between the groups were statistically significant (p<0.001).

Table- I: Age distribution of the study subjects (N=92)

Age (Years)	Non-albuminuria (n=46)	Microalbuminuria (n=46)
20-29	03 (6.5%)	02 (4.3%)
30-39	07 (15.2%)	02 (4.3%)
40-49	21 (45.7%)	13 (28.3%)
50-59	14 (30.4%)	12 (26.1%)
60-69	01 (2.2%)	17 (37.0%)
Mean±SD	45.13±8.62	52.76±10.32

Table-II shows male were 25(54.3%) in non-albuminuric subjects and 33(71.7%) were in microalbuminuric subjects. It is also observed that females were 21(45.7%) in non-albuminuric subjects and 13(28.3%) were in microalbuminuric subjects. Male patients suffering from more microalbuminuria. The difference between the subjects were statistically not significant (p=0.780).

Table-II: Gender distribution of the study subjects (N=92)

Gender	Non-albuminuria (n=46)	Microalbuminuria (n=46)
Male	25 (54.3%)	33 (71.7%)
Female	21 (45.7%)	13 (28.3%)
Total	46 (100%)	46 (100%)

Table-III shows mean (±SD) BMI of non-albuminuric and microalbuminuric subjects were 23.76±4.18 kg/m² and 23.90±3.50 kg/m² respectively which was statistically not significant. Mean (±SD) disease duration was 6.63±1.37 years in non-albuminuric and 7.41±1.73 years in microalbuminuric subjects. The difference of disease duration was statistically significant between non-albuminuric & microalbuminuric subjects (p<0.018).

Table-III: Comparison of variable parameter among study subjects (N=92)

Parameter	Non-albuminuria (n=46) Mean±SD	Microalbuminuria (n=46) Mean±SD
Weight (kg)	59.98±11.71	60.67±10.41
Height (m)	1.59±0.08	1.59±0.08
BMI (kg/m ²)	23.76±4.18	23.90±3.50
Duration of disease (years)	6.63±1.37	7.41±1.73

Figure-1 shows mean value of HbA1c was 6.92±1.77 in non-albuminuric and 7.27±1.58 in microalbuminuric study subjects which was statistically not significant (p>0.05).

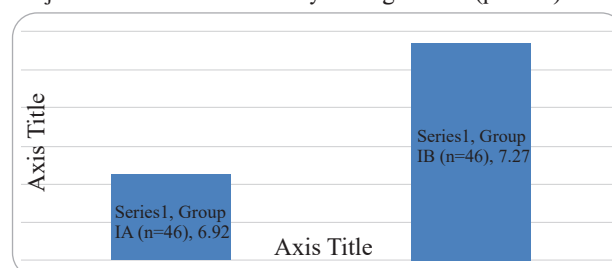


Figure-1: Comparison of HbA1c between non-albuminuria and microalbuminuria (N=92)

Table-IV shows mean serum creatinine level in non-albuminuric and microalbuminuric subjects were 1.33±0.33 and 1.45±0.37 respectively and e-GFR level in non-albuminuric and microalbuminuric subjects were 57.4±21.3 and 55.8±24.1 respectively. Serum creatinine and e-GFR level between the non-albuminuric and microalbuminuric study subjects were statistically significant (p<0.001).

Table-IV: Comparison of serum creatinine and e-GFR level in study subject (n=92)

Parameter	Non-albuminuria (n=46) Mean±SD	Microalbuminuria (n=46) Mean±SD	p-value
serum creatinine	1.33±0.33	1.45±0.37	<0.001s
e-GFR	57.4±21.3	55.8±24.1	<0.001s

Discussion:

This study observed that mean age was 45.13 ± 8.62 years in non-albuminuric and 52.76 ± 10.32 years in microalbuminuric. Differences of mean age between the groups were statistically significant ($p < 0.001$). Mahfouz et al., 2016 reported that mean age of normoalbuminuric was 55.7 ± 6.2 years, in microalbuminuric it was 53.4 ± 6.9 years and in healthy individual, it was 45.1 ± 4.8 years⁶. Our result was consistent with their study. This study showed majority of the respondents were male. It was observed that male and female were 54.3% & 45.7% in non-albuminuric subjects, 71.7% & 28.3% in microalbuminuric subjects. Kaul et al., (2018) also found that male was predominance which closely resembled with the finding of present study. They found that 22 male & 14 females were in non-albuminuric subjects; 34 male & 25 females were in microalbuminuric subjects. The difference between the subjects were statistically not significant ($p = 0.780$). Our finding was consistent with their study⁷. In present study, it was found that whose disease duration was more, those subjects were prone to develop microalbuminuria. In this study, the mean disease duration was 6.63 ± 1.37 years in non-albuminuric and 7.41 ± 1.73 years in microalbuminuric subjects ($p < 0.18$). Mahfouz et al., (2016) found that the mean disease duration in non-albuminuric subjects were 3.9 ± 1.2 years and in microalbuminuric subjects were 6.9 ± 2.14 years which was statistically significant ($p < 0.001$)⁶. In this study, the mean serum creatinine level in non-albuminuric and microalbuminuric subjects were 1.33 ± 0.33 mg/dl and 1.45 ± 0.37 mg/dl ($p < 0.001$). Bolignano et al., (2009) found that the mean serum creatinine level was 0.9 ± 0.5 mg/dl in non-albuminuric and 1.0 ± 0.4 in microalbuminuric subjects which were statistically significant ($p < 0.01$). These findings were consistent with our study⁸. Present study e-GFR was 57.4 ± 21 ml/min/ 1.73m^2 in non-albuminuric subjects and 55.8 ± 24.1 ml/min/ 1.73m^2 in microalbuminuric subjects which were statistically significant ($p < 0.001$). Kaul et al., 2018 reported that e-GFR was 95.39 ± 59.58 ml/min/ 1.73m^2 in non-albuminuric subjects and 83.36 ± 22 ml/min/ 1.73m^2 in microalbuminuric subjects respectively which were statistically significant ($p < 0.001$)⁷. The results are consistent with the current study. As per my knowledge no study was done to compare HbA1c between non-albuminuric and microalbuminuric study subjects.

Conclusion:

In our study male patients were suffering from more microalbuminuria. Prevalence of microalbuminuria showed statistically significant association with age, duration of diabetes, Serum creatinine and e-GFR level. However, no significant statistical relation was found in Gender, HbA1c level and BMI level in the present study. Larger trials with bigger sample size should be carried out to confirm this

finding from our study.

Conflict of Interest: None.

Acknowledgements:

The authors are grateful to the entire staff of department of Laboratory Medicine, BSMMU during the study period.

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Leveraging Social Media for COVID-19 Vaccine Uptake in Urban Dhaka: A Public Sector Management Perspective

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Abstract

Introduction: The COVID-19 pandemic posed unprecedented challenges for the public health system worldwide, affecting low and middle-income countries like Bangladesh severely. In Dhaka, dense urban settlements, widespread miscommunication, and fear of the vaccine hindered the success of early vaccination. Traditional media did not reach the poor, so the Directorate General of Health Services (DGHS) had to make use of social media tools to promote the use of vaccines. **Materials and Methods:** This qualitative study spans Dhaka, Bangladesh, from January 2021 to December 2022. It analyses secondary data sources, including government reports, peer-reviewed journals, and social media. The digitally engaged urban youth, middle-class homes, and digitally excluded groups like slum dwellers and the elderly population are some of the targeted populations. **Discussion:** Social networking sites, primarily Facebook, YouTube, and Twitter, were instrumental in disseminating culturally appropriate, geolocated vaccine messages. The "Tika Dibo" campaign raised awareness and pushed registration via the 'Surokkha' app, particularly among digitally literate youth. However, digital marginalization, limited monitoring of disinformation, and decentralized campaign management capped the overall effect. Strategic constraints included inadequate real-time feedback loops and no tailored communication for marginalized groups. **Conclusion:** Social media is a promising medium for low-cost and scalable public health outreach in urban LMIC settings. However, for optimal impact, online campaigns must be complemented by inclusive access strategies, timely monitoring of data, and better institutional coordination. Bangladesh's experience offers important lessons for integrating social media into mainstream, long-term public health planning beyond emergency response contexts.

Keywords: Social media and public health, Urban health governance, Vaccine hesitancy in LMICs, Public sector management, Digital health strategies, Health misinformation, Dhaka health infrastructure, Adaptive public health campaigns and Behavioural communication in pandemics.

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Introduction:

Due to socioeconomic limitations, health communication gaps, and inadequate infrastructure, low and middle-income countries like Bangladesh were disproportionately impacted by the COVID-19 pandemic, which was a serious test of public health systems worldwide (Islam et al., 2023)¹. The nation's capital and most populous city, Dhaka, quickly became a breeding ground for COVID-19 transmission due to its huge population density, vast informal slum areas, and mobility patterns that made containment challenging (Patwary et al., 2022)².

Hesitancy in vaccination presented a serious challenge to the national immunization drive launched in early 2021 and was a key obstacle to the pandemic war. Misinformation, public institution distrust, cultural miscommunication, and uneven messaging were the main factors for this reluctance, and the viral nature of online information on social media platforms accelerated the problem (Mahmud, Bin Reza and Ahmed, 2021)³. Conventional platforms like print, radio, and state television lacked the reach, agility, and interactivity necessary to influence marginalized communities and youths in Dhaka's urban poor settlements, said Chowdhury et al. (2023)⁴. Consequently, the Ministry of Health and Family Welfare's Directorate General of Health Services (DGHS) initiated a public sector effort to incorporate social media platforms, particularly Facebook, YouTube, and Twitter, into the country's COVID-19 vaccination communication plan (Hossain, 2021)⁵. Public participation in real-time, countering misinformation, encouraging vaccination registration (via the 'Surokkha' app), and sharing personalized messaging in graphics and native language were all enabled through these channels (Malik et al., 2024)⁶. Multi-stakeholder partnerships between ministries, NGOs, and digital communications experts were a part of the organisational setup. There were some major management issues, however, such as digital divide, lack of real-time analysis, and weak ability to design messaging specific to urban hard-to-reach populations (Hossain, 2021)⁵. This backdrop offers a critical lens upon which to view the operationalisation of social media-driven public health promotion in Dhaka and map out points of development.

Materials and Methods:

The study applies a qualitative case study to study the strategic application of social media on the part of the public sector to market the COVID-19 vaccines in urban Dhaka, Bangladesh. The study period is January 2021 to December 2022, which coincides with the launch and execution of the national COVID-19 vaccination campaign.

The spatial setting is Dhaka city, the capital and largest city of Bangladesh, with high population density, large informal settlements, and large digital divides. The target group is city residents segmented by digital access, i.e., (i) university students and digitally capable youth; (ii) middle-income social media consumers; and (iii) digitally excluded populations such as slum dwellers and seniors.

Sources of data for this study include secondary sources such as reports of government health communication, published journal articles, online campaign material (e.g., "Tika Dibo"), and available use analysis from online channels such as Facebook and YouTube. Theoretical foundations in public sector management and in health communication theory are also used to analyse campaign design, reach, and institutional effectiveness. This approach strategy enables a thorough insight into how digital strategies were applied in the urban LMIC environment and how far they bridged communication barriers and behavioural hurdles to vaccination.

Results & Discussion:

Social media was at the core of extending the coverage and acceptance of the vaccination campaign among digitally engaged urban populations, especially students and

middle-class young adults. Strategic messaging natively framed visual content, and integration with the 'Surokkha' vaccination registration application assisted in raising awareness of vaccines. There were still significant constraints, however, above all, the digital divide, uneven disinformation management, and the absence of real-time monitoring and responsive feedback mechanisms. These constraints reveal gaps in strategic leadership, coordination, and inclusive access planning. Observations based on organizational theories such as Kotter's change model and the McKinsey 7S Framework show there must be increased managerial capacity, decentralized decision-making, and a robust digital communications infrastructure.

Previous Efforts:

A nationwide vaccination campaign launched in February 2021, sweeping lockdowns, and preparedness of the healthcare system were the main focuses of Bangladesh's early attempts at controlling the COVID-19 pandemic. Widespread public inoculation centres spread out in major cities like Dhaka were instrumental in the early rollout of vaccines, which were aided by the Serum Institute of India. Conventional media like radio, TV, and formal press conferences constituted the bedrock of early communication campaigns (Islam et al., 2023)¹. Although this channel disseminated elementary information, it failed to address prevalent cultural scepticism as well as misinformation, especially amidst urban youths and slum residents (Chowdhury et al., 2023)⁴. The Directorate General of Health Services (DGHS) took action by taking recourse to social media platforms to launch targeted health communication interventions in collaboration with the Ministry of Health and Family Welfare and with technical assistance from organizations such as WHO and UNICEF. One such initiative was the "Tika Dibo" campaign, which promoted vaccine registration through the 'Surokkha' app, and generated confidence by releasing short films, infographics, and testimonials in Bengali on Facebook, YouTube, and Instagram (Sabbir, Taufique and Nomi, 2021)⁷. It was especially effective in reaching university students, urban youth, and middle-class neighbourhoods with internet access. According to a study carried out by Chowdhury et al. (2023)⁴, the young people who were exposed to social media campaigns recorded a palpable improvement in their vaccine knowledge and use of the 'Surokkha' portal. However, for the digitally marginalized groups, like the aged and slum dwellers who lack an internet connection and digital literacy, the reach of the strategy was not as effective (Hossain, 2021)⁵. Adaptive leadership and some aspects of entrepreneurial behaviour were evident in the management of the campaign, such as the utilization of WhatsApp groups by the local health volunteers for community-level outreach. At the national level, however, such innovations were fragmented and unorganized (Mahmud, Bin Reza and Ahmed, 2021)³. This indicates that specific managerial roles, more particularly, the liaison and disseminator roles, which could have improved vertical and horizontal communication across health sectors, have not been applied consistently (Shakeel et al., 2022)⁸.

Furthermore, the effort was hindered by limited misinformation monitoring capabilities and a shortage of

real-time feedback systems. It was challenging to measure the success of certain communications approaches or refute circulating rumours in the absence of strong monitoring and evaluation (M&E) tools (Mahmud, Bin Reza and Ahmed, 2021)³. Dysfunctional leadership and the lack of a shared framework for digital management prevented the social media efforts from realizing their full potential, though they did fill some communication gaps.

Recommendations:

A list of evidence-based, context-specific, and management-oriented recommendations is offered with the aim of improving the effectiveness and inclusiveness of COVID-19 vaccination marketing through social media in urban Dhaka. These are framed to surmount the structural inadequacies of the public health system in a low and middle-income country like Bangladesh, along with the noted shortcomings in prior initiatives.

1. Create a Centralised Unit for Digital Health Communication

DGHS must commission a specialized group of digital planners, behaviour researchers, and public health experts. Henri Fayol's concepts of coordination, specialisation, and unity of command are complementary to this. With this methodical management, Ethiopia's healthcare system underwent analogous developments (Linnander et al., 2017)⁹. A similar concept can improve public sector campaign design, delivery, and follow-up through the dissemination of timely, consistent, and culturally appropriate COVID-19 message across media if utilized in social media.

2. Maximize Digital Reach by Communicating on a Range of Platforms

Social marketing campaigns must use community radio, SMS, and IVR (interactive voice response) in addition to social media to combat digital exclusion. Dissemination of vaccine-related information to marginalised communities can be achieved through collaboration with telecommunications providers such as Grameenphone. This demonstrates an inclusive innovation strategy with a focus on equity and accessibility for marginalised communities (Hossain et al., 2021)⁵.

3. Utilise Local Micro-Influencers Influential local opinion leaders:

Youth volunteers, community health workers, and religious leaders, must be formally integrated into public sector campaigns' outreach strategies. Social Network Theory describes that people, when persuaded by their friends or other familiar persons in their social networks, are more likely to adopt new trends (Jain et al., 2022)¹⁰. This approach improves trust and relatability; two important issues identified in previous campaigns.

4. Showcase Adaptive Messaging and Real-Time Monitoring

DGHS should employ AI-driven social listening tools that track, evaluate, and respond to disinformation trends in real time to counter misinformation effectively. Coordination with platforms like Facebook and YouTube can more quickly remove harmful information and adaptive messaging (Mazumder et al., 2024)¹¹.

This is also in line with Kotter's change model, like creating the necessity for urgency and facilitating quick wins through responsive communication. Fast-paced communication systems enhance vaccination campaign results, according to prior research in international settings (Shakeel et al., 2022)⁸.

5. Leverage Training to Enhance Organisational Capacity:

DGHS communication teams and healthcare providers need to be specifically trained in digital communication, behavioural messaging, and misinformation management. According to the McKinsey 7S Framework, under the "skills" and "staff" dimensions, this facilitates skills development and internal capacity building (Bismark et al., 2018)¹². To bridge the gap between offline and online engagement, on-the-ground digital ambassadors can also be role-played by adept healthcare providers (Jain et al., 2022)¹⁰.

6. Curating a strong framework for monitoring and evaluation (M&E):

To monitor engagement metrics, message reach, sentiment trends, and actual vaccination uptake corresponding to communication bursts, a real-time observational dashboard must be established. This is in consonance with Drucker's Management by Objectives (MBO), which promotes data-driven performance measurement, monitoring, and planning (Ugwu and Ugwu, 2024)¹³.

The public sector in LMIC settings is the intended audience for these guidelines. They are informed by behaviour research, management theory, and current empirical findings. By applying these strategies, the broader digital public health communication ecosystem in Bangladesh could be rendered far more resilient and responsive, in addition to enhancing vaccine uptake (Abedin et al., 2021)¹⁴.

Conclusion:

One of the most compelling examples of adaptive public health practice in a low-resource environment is that of the Bangladeshi public sector's use of social media as a platform for social marketing to promote the COVID-19 vaccine in urban Dhaka. Misinformation, vaccine hesitancy, and mass mobilization needs were the motivations that prompted the government to shift from traditional methods of communications to social media like Facebook and YouTube (Mahmud, Bin Reza and Ahmed, 2021)³.

These approaches, despite weaknesses, demonstrated that social media can be an affordable and scalable tool to disseminate localized, culturally adapted, and real-time public health messages in urban metropolitan cities with high population density (Sada Soorapanth et al., 2023)¹⁵.

This case study highlights the importance of both technological change (use of digital platforms) and the underpinning management infrastructure. All three phases of campaign coordination, back-channel feedback from data, and engaging digitally excluded groups are missing, which are missed opportunities that could have been managed more effectively with stronger strategic leadership using tools such as Kotter's change model (Ugwu and Ugwu, 2024)¹³. Moreover, electronic communication poses a risk of worsening rather than mitigating inequalities if there are not inclusive access plans (Zhou et al., 2024)¹⁶.

The wider implication is obvious - social media must be formally recognized as a key site for public health communication rather than an ad-hoc solution during emergencies. This demands inter-sector collaboration, institutional investment in e-governance in digital health, and the incorporation of behaviour insights into public health planning at all levels (Shakeel et al., 2022)⁸. For other LMICs with similar problems, Bangladesh's experience in Dhaka has lessons. In order for public health outcomes to be equal, adaptable, and successful, future plans must embed managerial and technology innovation.

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<https://doi.org/10.2471/BLT.23.289682>

PMid:38164328 PMCID:PMC10753281

Sonographic Measurements of Portal Vein Diameter of Healthy Adult in Sylhet, North East Part Bangladesh.

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Abstract

Introduction with Objective: Portal vein diameter is important in portal hypertension. So this study was designed to see portal vein diameter among healthy adult. **Materials and Methods:** Consecutive healthy (nondiabetic, normotensive without clinical, biochemical and sonological evidence of liver disease) were enrolled. Portal vein diameter in resting, inspiratory and expiratory phases were recorded. Average of data of resting, inspiratory and expiratory diameters were calculated. And average of all three diameters of each person were taken as mean portal vein diameter. Relation of portal vein diameters with age, sex, BMI and abdominal circumference were calculated using SPSS version 20. **Result:** Total 237 (male 135; 57.0% and female 102; 43.0%, age ranging from 18 years to 93 years, mean 38.19) were enrolled. The mean portal vein diameter was 8.81 mm ranging from 6.1 mm to 13 mm for both sexes. Portal vein diameter was significantly higher among males (mean 9.06 mm vs 8.47mm; $P=0.003$). Within females portal vein diameter varied significantly with BMI. **Conclusion:** The mean portal vein diameter in our study was 8.81 mm (ranging from 5 mm to 13 mm). So higher diameter may give suspicion for raised portal vein pressure.

Key words: Portal vein diameter, normal healthy adult, portal hypertension.

Number of Tables: 03; Number of References: 15; Number of Correspondences: 04.

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Introduction:

Cirrhosis of liver, the end stage of chronic liver disease, which is characterized by generalised parenchymal necrosis, fibrosis and regenerative nodule formation with loss of normal architecture. Portal hypertension is the major cause of severe complications and death in patients with cirrhosis¹. Due to portal hypertension dilatation of portal vein, splenomegaly and porto-systemic collaterals formations at different sites are observed. Direct measurement of portal venous pressure is invasive and complicated. The indirect method of portal pressure determination i.e diameter of portal vein measurement is thus one of the preferred methods^{2,3}. In healthy people the diameter varies according to gender, age, height, weight and BMI. There is a correlation between portal vein diameter and various physical parameters like age, sex and height⁴. Physical factors like respiration, postural change, absorptive status also affects the caliber⁵. Normal portal vein diameter (PVD) can vary between 7 to 15 mm^{6,7,8}. Diameter greater than 13 mm is assumed to be the cutoff point for portal hypertension (5). Some studies set the upper limit of normality of portal vein diameter is 14.5mm⁹. But no such report regarding portal vein diameter in healthy person in Bangladesh is available. Hence, the study aimed to estimate the mean portal vein diameter and evaluate its relationship with age, gender, and body mass index (BMI) in apparently healthy people without evidence of liver disease in Sylhet, Bangladesh.

Materials and Methods:

Consecutive apparently healthy volunteer age 18 years or above were included in this study following inclusion criteria: Normotensive, Nondiabetic, Having no clinical, Biochemical or sonological evidence

of liver disease, No suffering from chronic debilitating disease, No past history of surgery, Not suffering from cardiac disease, Non-pregnant and Gave consent to take part in the study. Information of personal profile, height, weight, abdominal circumference, clinical information, recent biochemical reports were recorded in predesigned data sheet. Abdominal circumference was measured by using a measuring tape at the level of the umbilicus. Examination was done keeping the volunteer fasting at least for 6 hours. Portal vein diameter during inspiration, expiration and resting phase were measured. The examination was performed in B mode using a GE machine (Model E 10) equipped with high (5-10 MHz) and low frequency (2.5 -5 MHz) probe. Diameter of the portal vein was measured in its extrahepatic portion at the hilum of the liver just before the bifurcation into the right and left divisions lying supine and the right anterior oblique position. Measurement was taken three times for each phase and average value was taken. Then average of portal vein diameter of the three phases were calculated for each persons and was taken as mean portal vein diameter. The examination was performed same experienced radiologist to avoid inter-observer variation. This cross-sectional study was conducted in a medical imaging department of a tertiary diagnostic care centre in Sylhet, in the North East region of Bangladesh. Data were collected from December 2023 to May 2024. Statistical analysis was done using Statistical Package for Social Science (SPSS Version 20). For linear data, mean, median and SD were calculated. For categorical data percentage were calculated. Chi-square test was done to compare the variables and P value < 0.05 was taken as significant.

Results:

Total 237 participants, apparently healthy, non-diabetic, normotensive having no clinical, biochemical and sonological evidence of liver disease, were included in this study. Age of them varied from 18 years to 93 years (mean 38.19411 and SD 15.0021). Of them 135 (57.0%) and 102 (43.0%) were male and female respectively (Table I). Anthropometric data with mean portal vein diameter were given in table II. Portal vein diameter (mean) varied from 6.10 mm to 13.0 mm (mean 8.8129 and SD 1.16726) with median value 8.70 and mode 9.00. Between sexes portal vein diameter was significantly higher among males ($p=0.003$). But PV diameter showed no significant difference within age groups or abdominal circumference in both sexes (Table no. III). But among females, PV diameter significantly varied with BMI ($p=0.031$).

Table no. I:

Total number of participant		237	
Age range		18 to 93	
Mean		mean 38.1941	SD 15.0021
Male		135	57 %
Female		102	43 %
Marital status			
	single	64	27%
	Married	170	71.7%
	Others	03	1.2%

Table no. II:

	minimum cm	maximum cm	mean and SD
Height	136	180	158.2658 $\pm$ 9.72901
BMI	14.8	34.58	22.65 $\pm$ 3.88536
Abdominal circumference	49	112	81.059 $\pm$ 11.456682
Portal vein Diameter (inspiration)	0.6	1.4	9.051 $\pm$.197
Portal vein diameter (Resting)	0.5	1.3	8.84 $\pm$ 0.149
Portal vein diameter (Expiration)	0.6	1.2	8.57 $\pm$ 0.1574
Portal vein diameter (mean)	6.1	1.3	0.88129 $\pm$ 0.116727
PVD (male)	5.0	1.3	0.90679 $\pm$ 0.119983
PVD (Female)	0.61	1.13	0.84754 $\pm$ 0.1031

Table no. III:

		Portal vein size		P value
		up to 10 mm (212)	>10 mm (25)	
Age group	Up to 25 years	54 (25.47)	1 4.0	0.093
	26 – 45 years	100 47.16	17 68.0	
	46 – 60 years	41 19.39	5 20.0	
	>60 years	17 8.018	2 8.0	
Sex	Male	114 53.77	21 84.0	0.003*
	Female	98 46.226	4 16	
BMI	Under weight	27 12.735	3 12	0.385
	Normal weight	89 41.98	10 40	
	Overweight	45 21.226	6 24	
	Obesity I	43 20.28	3 12	
	Obesity II	8 3.77	3 12	
For male	Up to 25 years	32 15.09	1 4.0	0.149
	26 – 45 years	57 26.88	14 56	
	46 – 60 years	15 7.07	4 16	
	>60 years	10 4.71	2 8	
	BMI			
	Under weight	17 8.018	2 8	
	Normal weight	44 20.75	9 36	
	Overweight	31 14.62	6 24	0.656
	Obesity I	21 9.90	3 12	
	Obesity II	1 .047	1 4	
	Abd. circumference			
	up to 94 cm	103 48.58	18 72	0.375
	>94 cm	11 5.188	3 12	
For female	Age groups			0.570
	Up to 25 years	22 10.377	0	
	26 – 45 years	43 20.28	3 12	
	46 – 60 years	26 12.26	1 4	
	>60 years	7 3.30	0	
	BMI			
	Under weight	10 4.716	1 4	
	Normal weight	45 21.226	1 4	
	Overweight	14 6.037	0	0.031*
	Obesity I	22 10.377	0	
	Obesity II	7 3.30	2 8	
	Abd. circumference			
	up to 80 cm	48 22.54	2 8	0.676
	>80 cm	50 23.58	2 8	

Discussion:

In this study mean PVD diameter was 8.81 mm which was similar to report from North East Part of India¹⁰ and one Iranian report of cadaveric portal vein diameter at autopsy¹¹. But this is lower than that from Kolkata India⁷, USA¹², Nigeria¹³, and Nepal¹⁴ and higher than that of report from Addis Ababa, Ethiopia¹⁵. This variations may be due difference in study population, study design, used technique of PVD measurement and co-operation of participants. In our series PVD was highest among 26 to 45 years age group and difference was not statistically significant. Increase of PVD

with increase of age was found in reports from Kolkata⁷ and Karnataka⁴ from India, USA¹², Nigeria¹³, Addis Ababa, Ethiopia¹⁵. In our study PVD significantly varied between sexes which contradicts the report from Kolkata, India and Addis Ababa, Ethiopia. This may also be due to differences in participant and sampling method and sample size. Within female participants, PVD varied significantly with BMI. Report from Nepal¹⁴ was consistent with our study while one report from Saudi Arabia contradicted our finding. This variation may be due to difference in study population and study design.

Limitation: Sample size was small.

Conclusion:

The mean portal vein diameter of healthy adults in the Sylhet, North East part of Bangladesh on average is 8.8 mm. Portal vein diameter was significantly higher in males. Among females PVD significantly varied with BMI. Further multicentre study with large sample size is required for establishing the normal diameter among people of country.

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Correlation of TIMI Risk Score with Gensini Score in Angiographic Study in Patients with Non-ST-Elevation Myocardial Infarction

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Abstract

Introduction: Coronary artery disease (CAD) becomes a major cause of death. CAD is an atherosclerosis process, which progressively develops into plaque that will lead to stenosis of coronary artery lumen. Several studies found that Thrombolysis in Myocardial Infarction (TIMI) risk score is an significant marker of the severity of coronary artery disease. **Objectives:** To see the correlation between TIMI risk score and Gensini score in patient with Non-ST segment elevation myocardial infarction. **Materials and Methods:** This cross-sectional observational study was conducted in the Department of Cardiology, Sylhet MAG Osmani Medical College Hospital, Sylhet during the period from 1st September 2018 to 31st August 2020. Total 73 patients with NSTEMI who underwent coronary angiography (CAG) were selected. Patients were divided in two groups: Group A = TIMI score ≤ 4 and Group B = TIMI score > 4 . Coronary angiography was performed by experienced interventional cardiologist to assess severity of CAD. Angiographic severity was assessed by Gensini score. **Results:** This study was conducted on total 73 patients. Age of the patients ranged from 21 to 70 years with the mean age of 51.08 ± 11.11 years. Among them 55 (75.3%) patients were male and 18 (24.7%) patients were female. Total 45 (61.6%) patients were in group-A and 28 (38.4%) patients were in group-B. Mean TIMI risk score was 2.89 ± 1.05 in group-A and 5.71 ± 0.76 in group-B. Majorities of the patients in high TIMI risk score group had hypertension, diabetes, dyslipidaemia and history of smoking but most of them had no family history of CAD. Mean Gensini score was 20.47 ± 18.27 in group-A and 35.00 ± 25.04 in group-B, the difference was significant ($p=0.006$). There was a positive linear correlation between TIMI risk score and Gensini score ($r=0.497$; $p<0.001$). **Conclusion:** This study demonstrated that TIMI risk score has positive correlation with Gensini Score in angiographic study in patients with NSTEMI.

Key words: TIMI score, Gensini score, NSTEMI.

Number of Tables: 3, Number of Figures: 4, Number of References: 21, Number of Correspondence: 04.

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Introduction:

Cardiovascular diseases (CVDs) are a leading cause of death in the world¹. Ischaemic heart disease alone caused 7 million deaths worldwide in 2010². Coronary artery disease (CAD) may manifest clinically as either chronic stable angina or acute coronary syndrome (ACS)³. ACS encompasses unstable angina, ST-segment elevation MI (STEMI) or non-ST-segment elevation MI (NSTEMI)⁴. A number of risk scores have been developed to predict outcomes in patients with

ACS. TIMI (Thrombolysis in Myocardial Infarction) risk score can be estimated at the bedside with easy-to-obtain clinical, laboratory and ECG parameters⁵. It is well known and used and it has the best discriminatory ability to predict cardiovascular events⁶. TIMI risk score is an important short- and long-term prognostic predictor⁷. Angiography is the method of defining coronary anatomy in patients, providing an anatomic map of the site, severity and the shape and distribution of stenotic coronary lesions. In addition, the vessel size or diameter, presence of intracoronary thrombus and extent of diffuse atherosclerotic diseases can be assessed. The grading of a stenosis is most commonly reported as the percentage reduction in the diameter of the narrowed vessel site compared to the adjacent unobstructed vessel segment⁸.

Material & Methods:

It was a cross-sectional observational study, done in the department of cardiology in Sylhet MAG Osmani Medical College Hospital, Sylhet, from September 2018 to August 2020. An approval of study protocol was obtained from the Ethical Review Committee before the commencement of the study. The inclusion criteria were patients between 21-70 years of age, non-ST-elevation myocardial infarction who underwent coronary angiogram. The exclusion criteria were past history of myocardial infarction, cardiomyopathy, valvular heart disease, congenital heart disease, prior coronary revascularization (PCI or CABG). Sampling technique was purposive sampling. Sample size was calculated by using Guilford and Frucher's formula, considering 5% level of significance, 5% precision level (marginal error) and the prevalence rate of coronary artery disease in Bangladesh of 4-6%⁹. Demographic variables were age, sex, height and weight. Independent variables were risk factors for CAD such as hypertension, diabetes mellitus, dyslipidaemia, cigarette smoking and family history of coronary artery disease. Our outcome variables were TIMI risk score and Gensini score. After admission of a patient with chest pain suggestive of ACS detailed history and physical examination was performed. Resting 12 lead ECG was done. Patients were treated according to CCU protocol. Blood sample for high sensitive troponin I was drawn after admission and 6 hours after first sample. A value of > 60.4 pg/ml was considered as positive cardiac marker. Then patients were diagnosed as NSTEMI based on symptoms, ECG and troponin I. Blood sample was sent on next morning for biochemical profile such as fasting plasma glucose, fasting lipid profile and serum creatinine. Clinical demographic variables such as age, sex, BMI and major risk factors for CAD like smoking, hypertension, diabetes mellitus, dyslipidaemia and family history of CAD were recorded. Patient was asked about number of anginal episodes in last 24 hours and aspirin use in last 7 days. TIMI risk score was calculated after biochemical reports are available on second day. Calculation was made according to the simple mathematical sum of each of the following characteristics: age of ≥ 65 years; existence of ≥ 3 classical risk factors (hypertension, diabetes, smoking, low HDL cholesterol or family history of ischemic heart disease); previous significant CAD (stenosis of >50%); aspirin

consumption in the previous 7 days; at least 2 episodes of angina in previous 24 hours; elevation of cardiac necrosis markers; ST deviations of at least 0.5 mm². Those patients with TIMI risk score ≤ 4 were taken in group-A, those with TIMI risk score >4 were taken in group-B. Repeated ECG was done at 24 hours interval. If ST elevation developed, then this patient was excluded from the study. Echocardiography was done before CAG to see wall motion abnormality and ejection fraction. CAG was done during index hospitalization via the trans-femoral approach using standard techniques. CAG was analyzed by experienced interventional cardiologists. Coronary stenosis $\geq 70\%$ of the arterial luminal diameter in any view were considered significant lesions. Left main coronary lesions were counted when the luminal diameter was reduced by 50%¹⁰. Angiographic severity of CAD was assessed by Gensini score. This was intended to take into account: (1) Geometrically increasing severity of lesions (2) cumulative effect of multiple lesions (3) lesion location (4) influence of collaterals. Severity score: with each step in 25 – 50 – 75 – 90 – 99 – 100% diameter reduction, assigned values 1–2–4–8–16–32. Segment location multiplying factor: 1. Left main coronary artery (5) 2. Left anterior descending artery- proximal (2.5), mid (1.5), distal (1), first diagonal (1), second diagonal (0.5) 3. Left circumflex artery- proximal 2.5(3.5), distal (1(2)), obtuse marginal(1), posterolateral (0.5) 4. Right coronary artery- proximal(1), mid (1), distal (1), posterior descending artery (1). Gensini score: severity score X segment location multiplying factor X collateral adjustment factor¹¹. Then correlation of TIMI risk score with Gensini score was assessed. Each patient was explained about the study procedure and purpose of the study. Then informed consent was taken. Data were collected by researcher himself using pre-designed questionnaire. Data were processed and analyzed with the help of computer program SPSS (Statistical Package for Social Sciences) 25 version. Quantitative data were analyzed by mean and standard deviation; and comparison was done between two groups by unpaired t test. Qualitative data were analyzed frequency and percentage; and comparison was done by Chi-Square (χ^2) test. Pearson's correlation co-efficient test was employed to see the correlation. A probability (p) value of < 0.05 was considered statistically significant. The results were presented in tables and figures.

Results:

This study was conducted on total 73 patients. Age of the patients ranged from 21 to 70 years with the mean age of 51.08 ± 11.11 years. Among them 55 (75.3%) patients were male and 18 (24.7%) patients were female. Total 45(61.6%) patients were in group-A and 28 (38.4%) patients were in group-B. Mean TIMI risk score was 2.89 ± 1.05 in group-A and 5.71 ± 0.76 in group-B. There was history of HTN in 17 (37.8%) patients in group-A and 15 (53.6%) patients in group-B. Diabetes was present in 16 (35.6%) patients in group-A and 17 (60.7%) patients in group-B. History of smoking was present in 14 (31.1%) patients in group-A and 16 (57.1%) patients in group-B. There was family history of CAD in 7 (15.6%) patients in group-A and 9 (32.1%) patients

in group-B. Dyslipidaemia was present in 16 (35.6%) patients in group-A and 15 (53.6%) patients in group-B (Table-II). Mean TIMI risk score was 2.89 ± 1.05 in group-A and 5.71 ± 0.76 in group-B, the difference was statistically significant ($p < 0.001$) (Table-III). Mean Gensini score was 20.47 ± 18.27 in group-A and 35.00 ± 25.04 in group-B, the difference was statistically significant ($p = 0.006$) (Fig-3).

Table-I: Age distribution

Age	Number	Percentage
21-30	03	4.1%
31-40	12	16.5%
41-50	25	34.2%
51-60	16	21.9%
61-70	17	23.3%
Total	73	100%

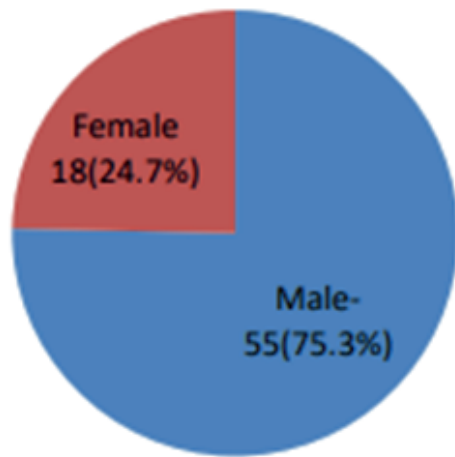


Fig-1: Sex distribution

Table-II: Baseline characteristic of study patient

Variables	Group-A (n = 45)	Group-B (n = 28)	χ^2	p-value
Sex				
Male	32	23	1.131	0.288
Female	13	5		
CAD risk factors				
Hypertension	17	15	1.749	0.186
Diabetes	16	17	4.411	0.036
Smoking	14	16	4.832	0.028
Dyslipidaemia	16	15	2.293	0.130
Family history of CAD	7	9	2.775	0.096

Table-III: TIMI risk score of the study population

TIMI risk score	Study subjects		p-value
	Group-A (n = 45)	Group-B (n = 28)	
Mean $\pm$ SD	2.89 ± 1.05	5.71 ± 0.76	<0.001
Range	0-4	5-7	

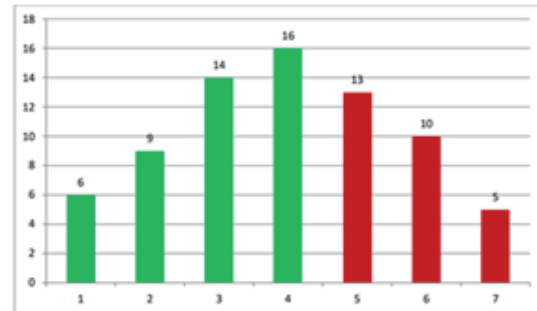


Fig-2: Distribution according to TIMI score (n=73)

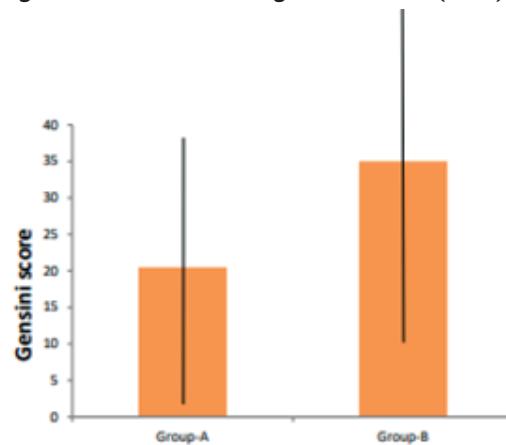


Fig-3: Gensini score of the study population

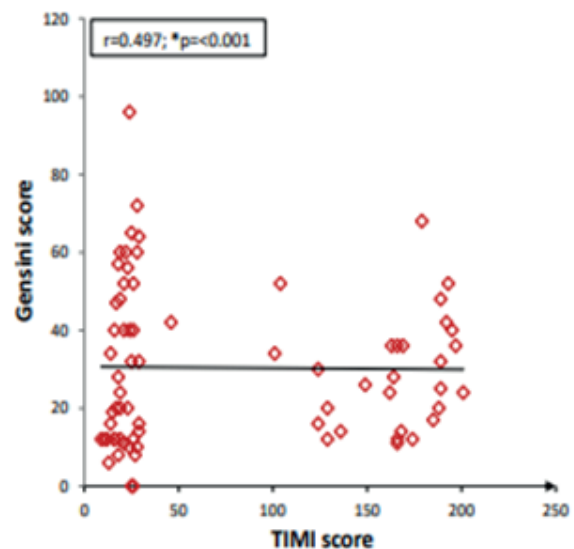


Fig-4: Correlation between TIMI risk score and Gensini score

There is positive linear correlation between TIMI risk score and Gensini score ($r=0.497$; $p<0.001$) suggesting that the higher was the TIMI risk score, the higher was the Gensini score in NSTEMI (Fig-4).

Discussion:

Due to the heterogeneous nature of the population of patients with non-ST elevation ACS, there is wide variation in terms of risk for the occurrence of death or recurrent ischemic events¹². The risk stratification is important as it has been consistently proved that early coronary intervention in high-risk patients improves clinical outcomes¹³. TIMI risk score is one of the most commonly used scores to risk-stratify for NSTEMI patients at presentation. When originally developed, the TIMI risk score was correlated with clinical end points, such as death, myocardial infarction or urgent revascularization¹⁴. In addition to predict the clinical outcome in NSTEMI, these scores have also been studied with regards to their correlation with severity of CAD on coronary angiography¹⁵. The most important advantage of the TIMI risk score is that it can be estimated at the bedside and easy-to obtain. Estimating the coronary anatomy before angiography is performed could be useful when deciding on diagnostic and therapeutic interventions. In this regard, the TIMI risk score could be used in clinical practice to predict the likelihood of a patient having coronary anatomy amenable to CABG⁷. The usefulness of TIMI score in predicting extensive CAD on angiography has been validated in several international studies^{5,16,17}. This cross sectional observational study was conducted in the department of cardiology, Sylhet MAG Osmani Medical College Hospital. Main objective was to see correlation of TIMI risk score with severity of coronary artery disease in patient with non-ST-elevation myocardial infarction. In this study age of the patients ranged from 21 to 70 years, with the mean age of 51.08 ± 11.11 years. Most of them were male. Majority of patients in high TIMI risk score group had hypertension, diabetes, dyslipidaemia and history of smoking but most of them had no family history of coronary artery disease. This result is also supported by other studies^{5,18-20}. The present study showed that mean Gensini score was significantly higher in high TIMI risk score group. There is a positive linear correlation between TIMI risk score and Gensini score suggesting the higher was the TIMI risk score, the higher was the Gensini score in NSTEMI. This result is also supported by other studies^{5,15,21}. The study had its limitations as the selection of cases for coronary angiogram was done the attending cardiologist, which could have resulted in selection bias because the selection criteria by cardiologists for sending the patients for coronary angiogram is not uniform and is subject to physician preferences. Some including only high-risk patients, while others may include low risk patients. The interpretation of the coronary angiogram and the severity estimation of coronary artery lesion was based on visual assessment of the attending cardiologist which could result in differences in the assessment of coronary lesion severity. Another limitation is that this study was conducted in single tertiary care hospital

and sample size was small.

Conclusion:

Based on the findings of present study, there is a direct and significant correlation between TIMI risk score and Gensini score in patients presenting with NSTEMI. It may be concluded that TIMI risk score correlates with angiographic severity of coronary artery disease in patients with non-ST-elevation myocardial infarction.

Conflict of Interest: None.

Acknowledgement:

We would like to express our sincere gratitude to entire staff of the department of Cardiology, Sylhet MAG Osmani Medical College Hospital, Sylhet for their support and collaboration in conducting this study. We are also grateful to the patients without the support of whom the completion of this study would not be possible.

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Clinicopathological Evaluation of Asymptomatic Bacteriuria in Diabetes Mellitus Patients

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Abstract

Introduction: Asymptomatic bacteriuria (ASB), or asymptomatic urinary infection, is isolation of a specified quantitative count of bacteria in an appropriately collected urine specimen obtained from a person without symptoms or signs referable to urinary infection. Patients with diabetes mellitus (DM) have a high frequency of ASB and urinary tract infections (UTIs). High glucose concentration in the urine of DM patients may favour the growth of uropathogens. Early detection, strict glycemic control and proper treatment prevent the burden of asymptomatic bacteriuria. **Objectives:** To observe the frequency of asymptomatic bacteriuria and common isolates among diabetic patients. **Materials & Methods:** This cross-sectional study was conducted amongst diabetic patients from March 2016 to December 2016. Sample was selected by purposive sampling technique. Patients with DM were selected for study. Sample size was 72. Mid-stream urine samples collected into sterile container for urinalysis. Cultures with colony counts ≥ 105 cfu/ml were considered as significant bacteriuria. Detail demographic data were collected from the informant and recorded in structured case report form. Clinical examination and relevant investigation were done meticulously. **Result:** Mean age of patients was 56.04 ± 18.08 yrs. Female patients were predominant, out of 72 cases 32(44%) were male and 40(56%) were female. Present study showed that ASB was present in 57(79.16%) patients and *E. coli* was the most common pathogen. Other isolates included *Klebsiella pneumoniae* 11(19.29%), *Proteus sp.* 6(10.52%) and *Enterobacter sp.* 5(8.77%). **Conclusion:** Asymptomatic bacteriuria is common in DM patients. The occurrence of ASB in the older population and females was significant in this study. ASB may lead to albuminuria and urinary tract infection, and may warrant treatment in diabetics. So it is recommend screening for detection and treatment of ASB in diabetic patients should be routinely.

Key words: Asymptomatic bacteriuria (ASB), UTI, Diabetes mellitus.

Number of Tables: 03; Number of Figures: 02; Number of References: 12; Number of Correspondences: 03.

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dysfunction. *E. coli* and *K. pneumoniae* are the most frequently isolated bacteria in these patients with ASB¹. Diabetes causes several abnormalities of the host defense system that might result in a higher risk of certain infections, including UTI. These include immunologic impairments, such as impaired migration, intracellular killing, phagocytosis, and chemotaxis of polymorphonuclear leukocytes from diabetic patients, and neuropathic complications, such as impaired bladder emptying. In addition, a higher glucose concentration in the urine may create a culture medium for pathogenic microorganisms. Diabetes has long term effects on the incidence of UTIs and has been reported to be around three to four times high in diabetic compared with non-diabetic patients. It has been suggested that presence of static pools of urine due to dysfunctional bladders contracting poorly serves as a favorable media for bacterial growth, while others suggest that hyperglycemic urine promotes rapid bacterial growth and colonization. Local secretion of cytokines and increased adherence of uropathogens to uroepithelial cells have been proposed to account for the greater prevalence of bacteriuria in diabetic persons. Various risk factors for ASB with diabetes have been suggested, including sexual intercourse, age, duration, metabolic control, and complications of diabetes. The most frequently isolated uropathogens include *Escherichia coli*, *Klebsiella pneumoniae*, *Streptococcus agalactiae*, *Enterococcus faecalis*, Coagulase negative *Staphylococcus* and *Streptococcus pyogenes*. Although *E. coli* is known to be the most

Introduction:

Urinary tract infection is a serious problem in diabetic patient, and asymptomatic bacteriuria in these patients is risk factor for pyelonephritis and renal

common uropathogen, other microorganisms are emerging with predominance in cases of ASB. Asymptomatic bacteriuria is far more common in women than in men. Also, in women, this condition is commoner in diabetics, than in those without the disease. Anatomic and physiologic factors (such as a short urethra) are responsible for the higher susceptibility of females to these infections. It is not completely clear if symptomatic UTIs are preceded by asymptomatic bacteriuria. Complications from UTI, such as bacteremia, renal abscesses and renal papillary necrosis, are seen more commonly in patients with DM than in individuals without DM^{2,3}. Diabetic subjects, especially women, show high prevalence of asymptomatic bacteriuria (ASB). The aim of the study was to evaluate the frequency of ASB in diabetic patients and to find out the antibiotic sensitivity pattern of bacterial isolates. Additionally, renal involvement even without the presence of symptoms (such as subclinical pyelonephritis) is commoner in patients with DM. So, detection of UTI in diabetics becomes very important. ASB defined as persistently and actively multiplying bacteria in significant numbers (more than 10,000 per milliliter) within the urinary tract without any obvious symptoms⁴. Asymptomatic bacteriuria is common in neonates, preschool children, pregnant women, elderly people, diabetics, catheterized patients and patients with abnormal urinary tracts or renal disease⁴. Diabetes type 2, also known as non insulin dependent diabetes (NIDDM), is one of the two major types of diabetes in which the beta cells of the pancreas produce insulin but the body is unable to use it effectively because the cells of the body are resistant to the action of insulin^{5,6,7}. Patients with diabetes have an increased risk of infections, with the urinary tract being the most prevalent infection site^{6,8}. Besides, the rates of complications of urinary tract infection (UTI) and upper tract involvement are much higher than in the general population. Though there is currently no consensus on treatment of asymptomatic bacteriuria in various population groups, it is advisable to treat asymptomatic bacteriuria in DM, as these patients may progress to symptomatic UTI or develop complications of UTI. This study attempts to estimate the frequency of asymptomatic bacteriuria among diabetic patients who have no exclusion criteria.

Materials & Methods:

This cross-sectional study was conducted from March 2016 to December 2016, amongst newly or previously diagnosed diabetic cases, aged 40 years and above, and who gave informed written consent for this study. Mid-stream urine sample was collected from these patients and subjected to culture. Urine was collected from the female subjects during their non-menstrual periods. Culture was done using the semi-quantitative calibrated loop technique. Culture plate was read after 24 hours of incubation, and number and type of colonies were estimated in plates with growth. Plates with no growth were reincubated for an additional 24 hours, and checked again for growth. The isolate was then identified using standard microbiological techniques. Isolation of the same strain of bacterium from two consecutive samples of urine with quantitative counts

greater than 105 colony forming units per millilitre in females, and growth of a single type of organism with quantitative count greater than 105 colony forming units per millilitre in males, was taken as evidence of asymptomatic bacteriuria. The data was analysed using the statistical software.

Result & Observation:

The age of participants at entry was >40years, mean age was 56.04±18.08. Participants were randomly selected on male and female subject. Female sex were significant number, sex ratio (F: M) was 1.25:1.

Table-I: Baseline characteristics of Study population (n=72)

Characteristics with Indicator	Result
Age in yr (Mean ± SD)	56.04±18.08
Sex ratio (F:M)	1.25:1
Occupation category (house wife)	29 (40.27%)
Duration of illness (yr)	>11 yr
Antiglycemic agent (injectable)	47(65.27%)
Previous history of UTI (no of episodes)	1-5 times
Major risk factors	26(36.11%)
Bacteria isolation (E.coli)	28(49.12%)

The median self-reported duration of questionnaire completion was 70 minutes (range 50–90). Baseline clinical characteristics are: Occupation category (house wife) 29 (40.27%), Duration of illness (yr) were >11 yr, injectable agent observed commonest antiglycemic drugs 47(65.27%). Among the total 72 cases of patients, previous history of UTI (no of episodes) more than 1-5 times were maximum patients, major bacteria isolation (E.coli) observed in 28(49.12%) (Table I).

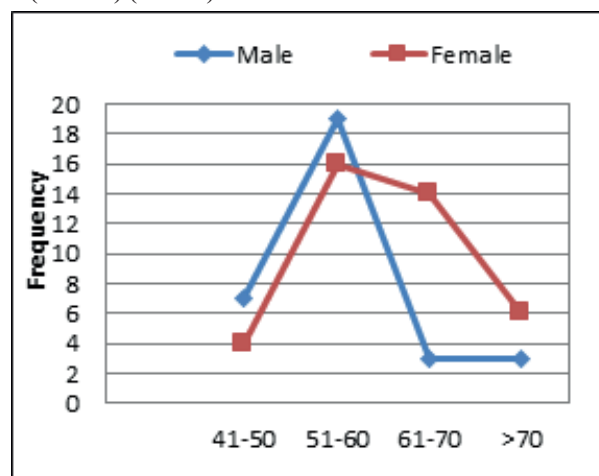


Figure- 1: Frequency of ASB in age & sex variation (n=72)

Frequency and susceptibility of asymptomatic bacteriuria in diabetes patients gradually increased with rising of age. Age ≤50 disease is insignificant. In case of female 51-70 years was highest incidence and in case of male 41 to 60 years observed peak age for asymptomatic bacteriuria (Figure-1). Diabetes treated with insulin and diabetes of longer duration were related to substantial increases in the risks of UTI and

asymptomatic bacteriuria. Higher risks of UTI and asymptomatic bacteriuria were seen the insulin-treated patients 47(65.27%) (Table II).

Table-II: Trends of Antiglycemic agent amongst the subjects (n=72)

Antiglycemic agent	Number of Patients	Percentage
Oral	25	34.72
Insulin	47	65.27

Midstream urine samples were collected from patients into sterile container for urinalysis. Cultures with colony counts $\geq 10^5$ cfu/ ml were considered as significant bacteriuria. The organisms were identified using standard cultural, morphological and biochemical techniques. We found that 57(79.16%) of urine samples had significant bacteriuria (Figure-2).

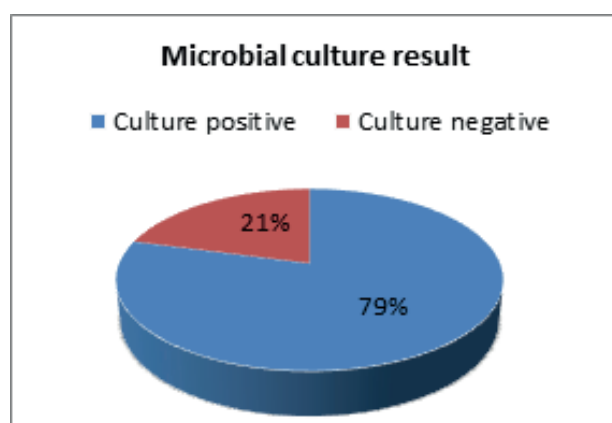


Figure- 2: Microbial culture result (n=72)

Bacteria isolated in ASB and prevalence of the organisms revealed that, *E. coli* was found most prevalent, present in 28(49.12%) of patients, followed by *Klebsiella pneumoniae* 11(19.29%), *Proteus sp.* 6(10.52%) and *Enterobacter sp.* 5(8.77%). The least prevalent organisms were *Streptococcus pyogenes*, *E. faecalis* and *S. saprophyticus* (Table III).

Table-III: Common isolated microorganism in ASB (n=57)

Organism	Frequency	Percentage
<i>Escherichia coli</i>	28	49.12
<i>Klebsiella pneumoniae</i>	11	19.29
<i>Proteus sp.</i>	6	10.52
<i>Enterobacter sp.</i>	5	8.77
<i>Enterococcus faecalis</i>	4	7.01
<i>Staphylococcus aureus</i>	2	3.50
<i>Strept. saprophyticus</i>	1	1.75

Discussion:

Present study clearly demonstrated a high occurrence of asymptomatic bacteriuria in diabetics. This is in concurrence with a meta-analysis study published in 2011, which showed a similar rate among diabetics⁹. In this series, mean age was 56.04 $\pm$ 18.08 yrs and female – male ratio was

1.25:1. Findings are consistent with other study. A hospital-based descriptive study revealed that, 42% patients with DM were found to have asymptomatic bacteriuria. Among these, 27 (64.29%) were female and 15 (35.71%) were male. Thus, the occurrence of asymptomatic bacteriuria among female diabetics was 54%, as opposed to 30% in males². Singh L et al; showed that ASB was highest in age groups 45 - 49 in males and 35 - 39 in female in their study¹⁰. So all findings support that asymptomatic bacteriuria is far more common in women than in men. Diabetes treated with insulin and diabetes of longer duration was related to substantial increases in the risks of UTI and asymptomatic bacteriuria. Patient taking insulin were mainly those at higher risk, possibly because of more severe diabetes, since the use of insulin may be a marker for disease severity. Risk of UTI was higher with increasing duration of diabetes. The present study showed that higher risks of UTI and asymptomatic bacteriuria were seen the insulin-treated patients 47(65.27%). Consistent with one other study, study in Group Health Cooperative of Puget Sound (GHC), revealed that higher risks of UTI and asymptomatic bacteriuria were seen in diabetic patients treated with medication, but statistical significance was observed only in the insulin-treated cases. Significantly higher risks of asymptomatic bacteriuria and UTI were seen among patients who had had diabetes for 10 or more years¹¹. Persistence of illness for long-term, more chance for infection. Long time suffering of diabetes causes several abnormalities of the host defense system that might result in a higher risk of infections, including UTI. These include immunologic impairments and neuropathic complications, such as impaired bladder emptying. In addition, a higher glucose concentration in the urine may create a culture medium for pathogenic microorganisms. Concomitant subsistence of any complication or risk factors plays important role for development of immunological suppression, ultimately contributes the asymptomatic illness. In this study cultures with colony counts $\geq 10^5$ cfu/ ml were considered as significant bacteriuria. The organisms were identified using standard cultural, morphological and biochemical techniques. We found that 57(79.16%) of urine samples had significant bacteriuria. Study in outpatient department of Chhattisgarh Institute of Medical sciences hospital, India showed that Mid-stream urines were collected from patients aseptically into sterile wide mouth container and examined microscopically. Significant bacteriuria was observed in forty-seven (36.15%) patients in their study, among them 34 females and 13 males¹⁰. The present study showed that asymptomatic bacteriuria (ASB) was present in 57(79.16%) out of 72 patients with diabetes mellitus. This result was higher when compared to previous studies which showed 36.15% in India¹⁰, 17.88% in Turkey¹, and 20% in Iran⁵. The population studies in these reports are comparable to the number of patients in this study. Some studies have even reported much lower values of between 5-15%. The variations in percentages of ASB have been attributed to factors such as geographical variations, ethnicity of the subjects and variation in the

screening test. *E. coli* was the most common pathogen isolated in this study 28(49.12%). This is in contrast to the report of Singh L¹⁰ et al. where *Escherichia coli* (56.9%) was the most common isolates form, followed by *Enterobacter* sp. (12.7%), *Klebsiella pneumoniae* (8.5%) and *Proteus* sp. (6.3%). In this study other bacteria isolated include *Klebsiella pneumoniae* 11(19.29%), *Proteus* sp. 6(10.52%) and *Enterobacter* sp. 5(8.77%). The result of this study is consistent with the majority of reports where *E. coli* had been reported to be the major pathogen in ASB^{1,5,10,12}. This is why in general practice most work on pathogenesis of UTI focuses on *E. coli* because of its high prevalence in UTI¹². Although diabetic persons may be more susceptible to infection by uncommon organisms, we found most of their infections to be due to typical uropathogens, which suggests that diabetes facilitates the same route of infection as that for UTI in nondiabetic persons (i.e., ascending infection from the urethra). The finding that asymptomatic bacteriuria more often involved *Klebsiella* and *Enterococcus* in diabetic person suggests that defenses against these organisms may be reduced.

Conclusions:

Acute Patients with diabetes mellitus (DM) are more prone to infection, and the urinary tract is one of the most commonly affected sites. In this study a high prevalence of ASB was established in elderly aged population and mainly female's gender. The main pathogen was *E. coli* and this organism is beginning to acquire resistance to some of the clinically used antibiotics. Study recommends improved personnel hygiene which is likely to reduce ASB that may be complicated in UTI. The use of irrational drugs, unprescribed antibiotics and their abuse is a problem and appropriate public health programmes would help resolve this issue. Facilities for prompt and adequate treatment of DM, UTI and screening should be available in all hospitals.

Conflict of Interest: None.

Acknowledgement:

We are grateful to all teachers and staffs of the Mainamoti Medical College and Hospital.

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Socio-Demographic Characteristics of Musculoskeletal Pain and Patients' Perceptions of Physical Therapy

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Abstract

Introduction: Musculoskeletal pain is a major cause of disability, affecting joints, bones, muscles, and soft tissues, with prevalence increasing with age. Socio-demographic factors such as age, gender, occupation, and income influence patients' experiences and satisfaction with physical therapy. Understanding these perceptions is essential for improving treatment outcomes and patient satisfaction. Physical therapy, which includes modalities like thermotherapy and electrotherapy, aims to alleviate pain and enhance recovery. **Objective:** To find out the patients' perception on physical therapy treatment of musculoskeletal conditions. **Material and Methods:** This cross-sectional study was conducted over a one-year period from February 1, 2018, to January 31, 2019, to assess patients' perceptions of physical therapy treatment for musculoskeletal conditions at the Department of PM&R, BSMMU, Dhaka. The study focused on patients with musculoskeletal pain who sought physical therapy, adhering to specific inclusion and exclusion criteria. **Results:** The study included 150 patients with a mean age of 40 ± 14.02 years, most of whom were aged 41-50 years. Of the patients, 68% were male and 32% female. The majority lived in Dhaka (42.7%), with 30.7% from semi-urban areas and 26.7% from nearby villages. Marital status showed 80% married and 17.3% unmarried. Most patients received thermotherapy, with 71.3% completing therapies within 10 minutes. Satisfaction levels were generally positive, with 65.3% satisfied with exercise instructions and 66.0% with facilities. **Conclusion:** This study reveals that most participants were middle-aged males, primarily from the middle-class, with a notable number being housewives. While overall satisfaction with physical therapy services, facilities, and equipment was high, complete satisfaction was less common, particularly with exercise instructions and equipment. Although a few patients deemed the treatment cost unreasonable, the majority were pleased with the environment and privacy measures. Notably, nearly all patients expressed a willingness to continue therapy at the center, reflecting a general satisfaction with the services offered, despite some opportunities for enhancement.

Key word: Patients perception, physical therapy, musculoskeletal pain, tertiary.

Number of Tables: 03; Number of Figures: 03; Number of References: 16; Number of Correspondences: 04.

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Introduction:

Musculoskeletal conditions encompass disorders that impact the joints, bones, muscles, and soft tissues. According to the World Health Organization (WHO), there are over 200 identified musculoskeletal diseases or conditions¹. While these disorders can affect individuals of any age, their prevalence tends to increase with advancing age. Common musculoskeletal conditions include back pain and other regional pain syndromes, chronic widespread pain, osteoarthritis, osteoporosis, rheumatoid arthritis, juvenile idiopathic arthritis, ankylosing spondylitis, psoriatic arthritis, and gout². Among these, osteoarthritis is the most prevalent, especially in aging populations, and is commonly linked to joint wear and tear. Fibromyalgia syndrome (FMS) affects approximately 2% of adults, with a higher prevalence in women (3.4%) compared to men (0.5%). Low back pain (LBP) stands out as the most widespread musculoskeletal pain condition^{1,2}. Musculoskeletal conditions are a leading cause of disability, particularly among women and the elderly. The pain and physical limitations associated with these conditions also negatively impact social interactions and mental well-being, further reducing the overall quality of life for affected individuals³. Therapeutic or physical modalities are tools used to produce a healing effect on tissues and are an essential component of treatment plans for musculoskeletal (MSK) disorders⁴. Key types of modalities in rehabilitation medicine include thermotherapy, hydrotherapy, electrotherapy, and light therapy. To alleviate pain, various physical therapy techniques are employed, such as cold therapy, hydrotherapy, infrared radiation, paraffin wax baths, shortwave diathermy, microwave diathermy, ultrasonic therapy, transcutaneous electrical nerve stimulation (TENS), interferential therapy, and cervical traction. Cervical traction is particularly effective for managing radicular pain^{5,6,7}. Superficial heating modalities, such as hot packs, heating pads, paraffin baths, fluidotherapy, whirlpool baths, and radiant heat, primarily raise the temperature of the skin and subcutaneous fat to a depth of 1 to 2 cm. These are typically used to manage pain, muscle spasms, and joint stiffness in subacute and chronic injuries. Deep heating modalities, including ultrasound, shortwave, and microwave diathermy, penetrate deeper, reaching 3 to 5 cm, which can enhance the flexibility of structures like joint capsules and ligaments. Heat transfer mechanisms involved in these therapies include conduction, convection, radiation, evaporation, and conversion⁸. Therapeutic exercise is often regarded as the key element of the rehabilitation program since it requires active participation by the patient along with performance of a home exercise program (HEP) to further rehabilitation and prevent recurrent musculoskeletal injuries⁹.

Patient education is the link between good intentions and actual success. Patient education ensures the proper use of home modalities, the safe performance of home exercises, and the prevention of re-injury. Patient education often needs to be addressed at each visit through verbal, visual, and written instruction to ensure safety and compliance. When utilized properly, patient education can improve the duration

of benefit and even reduce health care costs¹⁰. Even patient's intentions about treatment and the opinion of them about service provider is important to improve the treatment benefit and effectiveness of the therapy. Patients' satisfaction about musculoskeletal physical therapy treatment has been investigated in many countries, as synthesized in a recent systematic review. However, Patients' perception about physical therapy treatment has not been closely monitored and a very few studies exist in Bangladesh. The measurement of such satisfaction is essential for improving services and would add to the scarce worldwide literature on this subject. Furthermore, these kinds of studies could serve as a learning tool as it may highlight staff's training/development needs. This study was conducted to evaluate the socio-demographic characteristics of musculoskeletal pain and patients' perceptions of physical therapy.

Materials and Methods:

This cross-sectional study was carried from 1st February 2018 to 31st January 2019 for one year duration to find out the patients' perception on physical therapy treatment in musculoskeletal conditions attending in the department of PM&R, BSMMU, Dhaka. Patients with musculoskeletal pain attended for physical therapy treatment to the Department of PM&R, BSMMU according to the inclusion and exclusion criteria was the population of this study. Whatever drug treatment regime was received by the participants (Non-steroidal anti-inflammatory drugs, analgesics or steroid) for their musculoskeletal pain, those who attended for physical therapy and had fulfilled the inclusion criteria was selected for this study. On fulfillment on inclusion and exclusion criteria and after taking informed written consent, all information was recorded in the data collection sheet. Interviewer-administered structured questionnaire was used in this study. With closed ended questions, participants were answered according to focused and pertinent to the objectives. Structured questionnaire was developed to know the perceptions. It was an interpretive approach that enables gain an understanding of individual patient's opinions, feelings, attitudes, beliefs and behavior of musculoskeletal pain patients about physical therapy treatment. The data was collected by using a closed ended questionnaire form and different codes was applied; finally, the coded data were checked, verified for consistency and edited followed by analyzed and was presented as qualitative analysis. Coded data was directly be entered to the computer by using SPSS (Statistical Package for the Social Sciences) software (SPSS Inc., Chicago, IL, USA) version 25. Descriptive statistics was analyzed to calculate the frequency, percentage, mean and standard deviation of observed data.

Results:

The mean age of the patients in study was 40 $\pm$ 14.02 years. Out of 150 patients in the study, most of the patients were at the age group of 41-50 years. (Fig. 1). 102 (68%) subjects were male and rest 48 (32%) were female in a ratio of 2.12:1. Regarding occupation of the patients, most of the patients were housewives (HW, 28 %), then the second highest were the service holder (22%) and then Businessman (13.3%). Maximum patients of the study subjects were in the

middle-class group (50 %); their monthly income was in between 10000 to 20000 takas. Some patients were poor (38.7 %), their monthly income was less than 10,000 taka and a very few patients were rich (11.3 %), their monthly income was more than 20,000 taka found in our study. Most of our study subjects lived in Dhaka metropolitan city 64(42.7%), 46(30.7%) were from semi urban and only 40(26.7%) came from the villages nearby the Dhaka district. Most of the patients were educated. Of them 30% had passed primary level and 34.7% of them were completed secondary education. 31.4% persons are found who had completed either graduate level or higher studies. Some were illiterate and some had post graduate degree. Regarding marital status, maximum participants 120 (80%) were married and 17.30 % were unmarried (Table I). Almost all the patients were treated with thermotherapy off them 72(48%) received SWD, 35 (23.3%) treated with UST and 18 (12%) were treated with MWD. Most of the patients, 107 (71.3%) preferred or used to complete the therapies within 10 minutes as prescribed by the physician and 14% received the therapies for a duration of 20 minutes (Table II). Majority of patients were generally satisfied with the instructions and demonstrations of exercises provided by the physiotherapist (65.3%), as well as the facilities and equipment used during treatment (66.0%). However, fewer patients reported being fully satisfied with both the exercise instructions (8.0%) and the facilities (8.7%), indicating a notable gap in achieving complete satisfaction. A smaller proportion (26.7% for exercises and 24.7% for facilities) were only partially satisfied, while just 0.7% of patients expressed dissatisfaction with the facilities and equipment (Table III). Most of the patients were with chronic illness as 100 patients (66.7%) had symptoms with a duration of more than 3 months and rest of them had 1-3 months (32%) and (07%) for less than one month. Most of the patients who received physical therapies were suffering from low back pathology 48.7% followed by neck pathology which was 15.3% and shoulder pathology 8.7%. Others had Knee (6%), Thigh (4.7%), Wrist and hand (3.3%), and Upper back and Arm pathology were 2.7% each (Fig. 1). Among the patients, 149 (99.3%) patients were happy with the existing environment and only 07% were unhappy with this issue. Maximum (99.3%) of the patients were happy with the measures of maintaining privacy. Comparing the available centers, 100(66.3%) patients agreed that the cost of the physical therapy treatment was reasonable but other 50(33.3%) thought this cost was not reasonable. Despite of all issues, 148 (98.3 %) of the patients were eager to continue therapies from this center except 2 (1.3%) (Fig 2). Maximum patients were positive 144 (96%), only 2 (2.7%) respondents strongly agreed with overall complete satisfaction (Fig .3).

Table I: Demographic characteristics of the study subject (n=150)

Characteristics	Frequency	Percentage (%)
Age in years		
<20	10	6.7
21-30	35	23.3
31-40	36	24.0
41-50	38	25.3

Characteristics	Frequency	Percentage (%)
51-60	21	14.0
>60	10	6.7
Sex		
Male	102	68
Female	48	32
Occupation		
House wife	42	28
Service	33	22
Farmer	6	4.0
Businessman	20	13.3
Laborer	5	3.3
Student	15	10.0
Unemployed	17	11.3
Others	12	8.0
Socio-economic status		
Poor class (less than 10,000 Tk)	75	50.0
Middle class (10000 to 20000 Tk)	58	38.7
Rich (more than 20,000 Tk.)	17	11.3
Resident		
Urban	64	42.7
Semi-urban	46	30.7
Rural	40	26.7
Education		
Illiterate	21	14.0
Primary	30	20.0
Secondary	52	34.7
Higher secondary	24	16.0
Graduate	19	12.7
Postgraduate	4	2.7
Marital status		
Married	120	80.0
Unmarried	26	17.3
Divorced	3	2.0
Widow	1	0.7

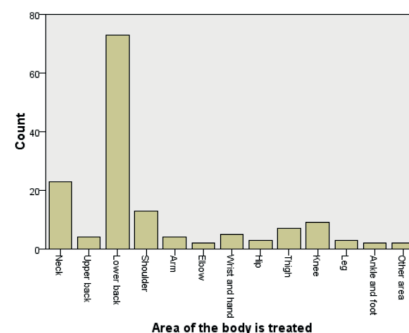


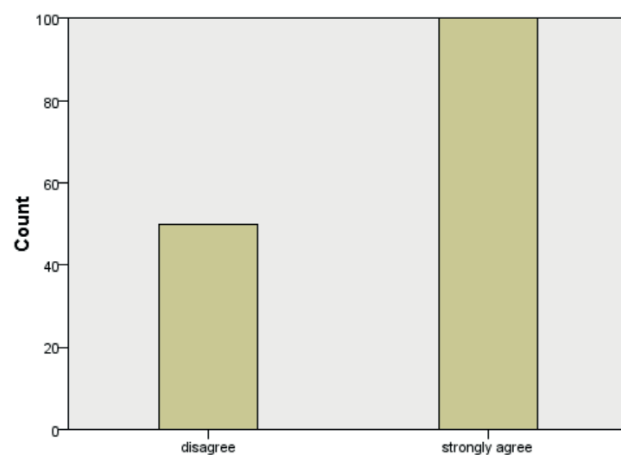
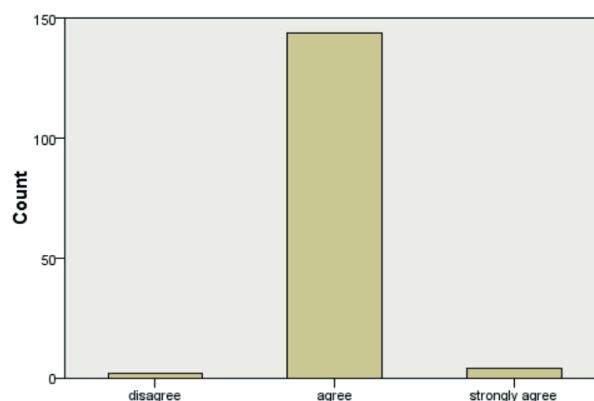
Fig. 1: Distribution of the area of body treated by physiotherapy (n=150).

Table II: Distribution of physical modality used by the subjects (n=150).

Physical modality used	Frequency	Percentage (%)
Treated with thermotherapy		
SWD	72	48.0
MWD	35	23.3
UST	18	12.0
Therapeutic exercise	10	6.7
IRR	11	7.3
Phonophoresis	1	0.7
Paraffin-wax bath	1	0.7
IFT	2	1.3
Duration of therapy received		
10 minute	107	71.1
20 minute	24	16.0
30 minute	19	12.7

Table III: Perception about instructions and demonstration of exercises, facilities and the equipment used in therapies

Perception about instructions	Frequency	Percentage (%)
Exercises given by the physiotherapist		
Satisfied	98	65.3
Partially satisfied	40	26.7
Fully satisfied	12	8.0
Facilities and the instrument used during treatment		
Satisfied	99	66.0
Partially satisfied	37	24.7
Fully satisfied	13	8.7
Unsatisfied	1	0.7

**Fig. 2: Distribution of satisfaction over the therapy costs (n=150).****Fig. 3: Satisfaction level after the treatment (n=150).**

Discussion:

This study included a total of 150 patients with various musculoskeletal conditions. Among them, 102 (68%) were male and 48 (32%) were female, resulting in a male-to-female ratio of 2.12:1. A similar study on osteoarthritis of the knee in Chittagong, Bangladesh, found that 61% of the patients were male and 39% were female¹¹. The higher proportion of males in this study could be attributed to greater male attendance at the hospital, as female patients often hesitate to participate and share their opinions. In our study, mean age of the patients in study were 40 ± 14.02 years. Out of 150 patients in the study, most of the patients were at the age group of 41 to 50 years. Thirty-eight (25.3%) patients were in this group. And then 24 % patients were at the age group of 31-40 years. In a study, it was found that maximum patients were in the age group of 30-39 years¹². This is to some extent same as the result found in the present series. Most of the patients were house wives (HW, 28%) found in our study and then the second highest were the service holder (22 %) and then Businessman (13.3%). There were some patients of different occupation in our findings; they were Student (10%), Farmer (4%), Laborer (3.3%) and also Unemployed (11.3%). In a study at Barisal, it was found that most of the patients of LBP were students (23.97%), then HW (16.96%), labors (10.82%), businessman (9.95%) and some other occupations were also found in some cases¹². This is to much extent same in some occupations but they found student in the highest position because they included all patients of different ages and we included patients of age ≥ 30 years and below ≤ 70 years. So, in our study HW was found more in respect to occupation. In the present study, Maximum patients of the study subjects were in the middle class group (50% %); their monthly income was in between 10,000 to 20,000 taka. Some patients were poor their monthly income was less than 10,000. In some studies, it was found that middle class people were attended more in their study. This is as same as found in the present study. This may be due to the poverty situation of the country. Some rich people usually take treatment from the private clinic and private doctors. So,

they are less in the study. On the other hand, poor people are illiterate and have no enough money to expense to reach the tertiary level hospital like BSMMU Hospital. So, they are also less in number. Most of the patients were educated. Of them 30% had passed primary level and 34.7% of them were completed secondary education. 31.4% persons are found who had completed either graduate level or higher studies. Most of the patients were married 120 (80%). Among the rest, 17.3% were unmarried and 2% were widowed. Study supported the hypothesis that physicians' perceptions of patients were influenced by patients' socio-demographic characteristics¹³. Using meta-analysis on a database of 221 studies, Hall and Dornan found greater satisfaction associated with being older, having less education, having higher social status, and being married. The authors could not account for the opposite trends for education and social status because these usually are positively related variables¹⁴. Perception about instructions and demonstration of exercises, facilities and the equipment used in therapies. The instructions and demonstration of exercises given by the physiotherapist made 65.3% satisfied but 26.7% were partially satisfied. There were no unsatisfied individuals. Regarding the facilities and the equipment used during treatment, 99(66%) were satisfied but 37(24.7%) were partially satisfied. Only 1 person was found unsatisfied. Low levels of adherence have also been linked to negative beliefs about the value of the exercises. Adherence to physiotherapy exercise programmes was found to be significantly greater when physiotherapists gave patients positive feedback, asked them for feedback about their progress and treatment, regularly monitored their exercise performance and frequently motivated them to do their home exercises.

Perception about the effects of the provided treatment. Among the patients, 99 (66%) had experienced good improvement since started the physiotherapy program, 43 (28.7%) felt better but 7(4.7%) though that still there was no visible improvement from the treatments. Level of improvement was more in Females patients (6.3%) than the male (3.9%) which is similar to all level of education group. Among them, 131(87.3%) of the patients thought the treatment is beneficial for them while 14 (9.3%) though that treatment was make any significant changes in sufferings. Female patients (14.6%) predominantly recommended the treatments were useful than the male groups (6.9%). 148 (98.7%) patients wished to continue exercises as advised and 1.3% felt to discontinue the exercise therapy. Self-motivation has been consistently positively associated with adherence to sport injury rehabilitation programmes, of which physiotherapy is integral¹⁵. Among the patients, 149 (99.3%) were satisfied with the current environment, while only 0.7% expressed dissatisfaction. Nearly all patients (99.3%) were pleased with the privacy measures, with 100% of female patients satisfied, though one male patient raised a concern. The clinic's service environment has been recognized as important, with patients showing better adherence when they perceive the atmosphere as comfortable^{13,16}. When comparing

different centers, 100 patients found the cost of physical therapy reasonable, while 50 (33.3%) felt it was not. A higher percentage of female patients (41.7%) considered the treatment costs to be unfavorable compared to male patients (29.4%), likely because many female patients are housewives, depending on their male partners for financial support. In terms of overall satisfaction with the physical therapy services received from the Department of Physical Medicine and Rehabilitation at Bangabandhu Sheikh Mujib Medical University, the majority of patients (96%) responded positively. Male patients reported a higher level of satisfaction (100%) compared to female patients (95.8%). Patient and family satisfaction play a crucial role in the success of rehabilitation, as active patient involvement is vital for physical progress and acquiring new skills. Proper education on managing chronic conditions after discharge requires the full engagement of both the patient and their family. Since treatment duration is often lengthy, sustained cooperation is essential.

Conclusions:

In conclusion, the study highlights the majority of the participants were middle-aged males, predominantly from the middle-class income group, with a significant portion being housewives. While most patients expressed satisfaction with the physical therapy services, including the facilities and equipment, full satisfaction levels were low, especially regarding exercise instructions and equipment. Although a small percentage of patients found the cost of treatment unreasonable, a vast majority were content with the overall environment and privacy measures. Importantly, nearly all patients were willing to continue therapy at the center, demonstrating general satisfaction with the services provided, despite some areas for improvement.

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Socio-Demographic Characteristics of Breast Cancer Patients in Bangladesh: A Single Centre Study

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Abstract

Introduction: Breast cancer is a significant public health concern worldwide and has a significant impact on individuals, families, and society. While progress has been made in the diagnosis, treatment, and prevention of breast cancer, there is still much to be learned about the disease and its impact on patients. The objective of the study was to find out the socio-demographic characteristics of breast cancer among women in a selected cancer specialized hospital in Dhaka city.

Materials and Methods: This cross-sectional Study was carried out among 108 patients attending at the department of Oncology at Delta Medical College Hospital; Dhaka for the treatment of breast cancer within the defined period from January 2022 to December 2022. All the data were compiled and sorted properly and the quantitative data was analyzed statistically by using Statistical Package for Social Science. **Result:** Majority of the breast cancer patients (32.41%) were within the age range of 50-59 and 40-49 years. The most common weight for the breast cancer patients was in the range of 40-50 kg with frequency of 43(39.81%). Most of the respondents have come from urban areas with a frequency of 63 (58.33%). Most of the breast cancer patients were housewives (n=61, 56.48%) followed by service holders (n= 30, 27.78%). Most of the patients (n=94, 87%) were married. Most of the women were Muslim (87%). Family history was positive for 61 patients (56.48%). Out of 108 patients, 63 of the respondents had diabetes (58.3%). Out of the 108 respondents having breast cancers, 61 (56.5%) reported not using contraceptive pills, whereas 47 (43.5%) used contraceptive pills. Only 22.22% breast cancer patients used hormone replacement therapy. Out of 108 breast cancer patients, having exposure to X-ray was with frequency 44 (40.74%) and having no X-ray exposure was with frequency 64 (59.26%). Most of the breast cancer patients (n=70, 64.81%) were prone to betel-nut chewing habit. The highest frequency was 58 (53.7%) who were having daily 2 cups of tea which was followed by 3 cups of tea 25 (23.15%). Most of the respondents (n= 67, 62.04%) were prone to taking added salt consumption. 48 (44.44%) of the respondents had red meat for more than one time in a week. For the breast cancer patients, having no alcohol consumption was the higher number (n=61, 56.48%), whereas the alcohol consumption number was 47 (43.52%). **Conclusion:** In our study breast carcinoma was more common within the age range of 50-59 and 40-49 years. Regular screening of this age group through mammography will helps to early detection of breast carcinoma.

Keywords: Breast cancer, Socio-demographic character.

Number of Tables: 03; Number of References: 11; Number of Correspondences: 03.

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Introduction:

Cancer is one of the main causes of mortality worldwide¹. In 2008, 8 million deaths were recorded as a result of malignant diseases, and this figure is estimated to reach 11 million by 2030². Breast cancer is a prevalent disease that affects millions of women worldwide, with significant physical, psychological, and social consequences. It is a complex and heterogeneous disease that affects women of different ages, races, and ethnicities. Early detection and prevention are crucial for reducing the incidence and mortality of breast cancer³. According to the World Health Organization, breast cancer is the most common cancer among women globally, with an estimated 2.3 million new cases diagnosed in 2020 alone⁴. Breast cancer is the second most common cancer in the world and the most common cancer among women. Lifetime risk of developing breast cancer in every woman in the United States is 12.4% or one in eight women⁵. In 2012, 1.67 million new cases of breast cancer were identified worldwide, accounting for 25% of all cancers⁷. It is estimated that breast cancer accounts for about 25% of all cancers among women in Bangladesh, and the incidence of the disease is on the rise⁶. There are several factors that contribute to the high incidence of breast cancer in Bangladesh, including a lack of awareness about breast cancer and its risk factors is one of the major factors contributing to the high incidence of the disease in Bangladesh⁷. Many women in the country are not properly informed about the early signs and symptoms of breast cancer, which can lead to a delayed diagnosis. This is particularly true in rural areas, where access to healthcare and health education is limited. This lack of awareness and education can also result in women not seeking regular breast cancer screenings, which can have a significant impact on the prognosis and outcome of the disease.

Materials & Methods:

This cross-sectional Study was carried out among 108 patients attending at the department of oncology at Delta Medical College Hospital; Dhaka for the treatment breast cancer within the defined period from January 2022 to December 2022. Ethical clearance was obtained from the appropriate authority to get permission to collect data. Purposive sampling was done according to availability of the patients. The collected data were entered into the computer and analyzed by using SPSS (version 20.1) to assess the socio-demographic characteristics of breast cancer among women in a selected cancer specialized hospital in Dhaka city.

Results:

Majority of the breast cancer patients (32.41%) were within the age range of 50-59 and 40-49 years. The most common weight for the breast cancer patients was in the range of 40-50 kg with frequency of 43(39.81%), followed by weight range of 50-60 Kg with a frequency of 41 (37.96%). Most of the respondents have come from urban areas with a frequency of 63 (58.33%) followed by rural area residents with frequency 34 (31.48%) and Semi urban dwellers 11 (10.19%). Most of the breast cancer patients were housewives (n=61, 56.48%) followed by service holders (n=30, 27.78%). Most of the patients (n=94, 87%) were Muslim.

Most of the women were married (87%). Family history was positive for 61 patients (56.48%) (Table I).

Table I: Demographic characteristics of the study patients (n=108)

Parameter	Frequencies	Percentage
Age (years)		
20-29	3	2.78%
30-39	16	14.81%
40-49	35	32.41%
50-59	35	32.41%
60-69	15	13.89%
70-79	3	2.78%
80-89	1	0.93%
Weight (Kg)		
30-40	4	3.70%
40-50	43	39.81%
50-60	41	37.96%
60-70	4	3.70%
70-80	10	9.26%
80-90	5	4.63%
90-100	1	0.93%
Residence		
Urban	63	58.33%
Semi Urban	11	10.19%
Rural	34	31.48%
Occupation		
Service Holder	30	27.78%
Business	9	8.33%
Housewife	61	56.48%
Others	8	7.41%
Marital Status		
Yes	94	87%
No	14	12.96%
Religion		
Muslim	94	87%
Others	14	13%
Family history		
Yes	61	56.48%
No	47	43.52%

Out of 108 patients, 63 of the respondents had diabetes (58.3%), whereas 45 respondents (41.67%) did not have diabetes. Out of the 108 respondents having breast cancers, 61 (56.5%) reported not using contraceptive pills, whereas 47 (43.5%) used contraceptive pills. Only 22.22% breast cancer patients used hormone replacement therapy. Out of 108 breast cancer patients, having exposure to X-ray was with frequency 44 (40.74%) and having no X-ray exposure was with frequency 64 (59.26%) (Table II).

Table II: Distribution of breast cancer patients with different clinical condition (n=108)

Parameter	Number	Percentage
Diabetes mellitus		
Yes	63	58.33%
No	45	41.67%
Previous operation history		
Yes	84	77.78%
No	24	22.22%
X-ray Exposure		
Yes	44	40.74%
No	64	59.26%
Contraceptive Pill Usage		
Yes	47	43.50%
No	61	56.50%
Hormone Replacement Therapy		
Yes	24	22.22%
No	84	77.78%

Most of the breast cancer patients (n=70, 64.81%) were prone to betel-nut chewing habit. The highest frequency was 58 (53.7%) who were having daily 2 cups of tea which was followed by 3 cups of tea 25 (23.15%) and 1 cup of tea 16 (14.81%). Most of the respondents (n= 67, 62.04%) were prone to taking added salt consumption. 48 (44.44%) of the respondents had red meat for more than one time in a week. The second highest was with frequency of 40 (37.04%) which had only one time intake of red meat in a week. For the breast cancer patients, having no alcohol consumption was the higher number (n=61, 56.48%), whereas the alcohol consumption number was 47 (43.52%) (Table III).

Table III: Distribution of breast cancer patients according to food habit (n=108)

Parameter	Number	Percentage
Betel Nut Chewing Habit		
Yes	70	64.81%
No	38	35.19%
Daily Tea Consumption		
1 Cup	16	14.81%
2 Cups	58	53.70%
3 Cups	25	23.15%
More than 3 Cups	9	8.33%
Salt Consumption		
Yes	67	62.04%
No	41	37.96%
Consumption of Red Meat		
One time	40	37.04%
More than one time	48	44.44%
Everyday	5	4.63%

Parameter	Number	Percentage
Do not take	15	13.89%
Alcohol Consumption		
Yes	47	43.52%
No	61	56.48%

Discussion:

It is observed that majority of the breast cancer patients is under the age range 50-59 and 40-49 years in the current study. The risk of breast cancer begins to increase after age 40 and becomes more significant as women get older. In fact, about two-thirds of all invasive breast cancers are found in women age 55 or older which is found in similar studies⁸. In our study most of the patients were housewives (n=61, 56.48%). Similar results were obtained in the study conducted by Chowdhury et al. (2023) study. In their study 70% breast cancer patients were housewives⁹. In our study most of the breast cancer patients were married (87%). Near to similar results were obtained in the study conducted by sarkar et al (2020) study¹⁰. They reported most of the breast carcinoma patients were married (58.33%). The most of the breast carcinoma was reported in the urban people which were 58.33%. Similar results were obtained in the study conducted by Chowdhury et al. (2023) study⁹. In our study family history was positive for 56.48% breast carcinoma patients. A positive family history of breast cancer can increase an individual's risk of developing breast cancer. The risk is higher if a first-degree relative (such as a mother, sister, or daughter) has been diagnosed with the disease, particularly if they were diagnosed before the age of 50. The same has been found in the present study. In Alwan, N.A.S., (2010) study 16.2% breast carcinoma patients had the positive family history¹¹. In our study 43.50% breast carcinoma patients used contraceptive pill. In Alwan, N.A.S., (2010) study 29.0% breast carcinoma patients used contraceptive pill¹¹.

Conclusion:

In conclusion, breast cancer is a significant health issue in Bangladesh, and it is important to take steps to address this problem. By increasing awareness, education, and access to early detection and treatment services, it is possible to reduce the incidence and impact of breast cancer on women in Bangladesh.

Conflict of Interest: None.

Acknowledgements:

The authors are grateful to the entire staff of department of oncology at Delta Medical College Hospital, Dhaka during the study period.

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Comparative Analysis of Oral Cavity Carcinoma in Smokers vs. Non-Smokers

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Abstract

Introduction: Oral cavity carcinoma (OCC) is a significant health concern, with smoking being a major risk factor. It involves malignancies affecting intraoral structures like the tongue, lips, and gums. Tobacco smoke contains carcinogenic compounds that contribute to DNA damage and oncogenic transformations. This study compares OCC in smokers and non-smokers, focusing on prevalence, progression, and prognosis, to highlight the differences in clinical presentation, histopathology, and outcomes. **Objectives:** To compare clinical features, tumor sites, staging, histopathology, and treatment outcomes of oral cavity carcinoma in smokers and non-smokers. **Method and Materials:** This comparative cross-sectional study was conducted at BSMMU from July 2016 to June 2018, involving 120 patients diagnosed with oral cavity carcinoma. Participants were divided into two groups: smokers (60) and non-smokers (60). Data on clinical presentation, tumor staging, and treatment outcomes were collected. Statistical analysis was performed using SPSS, with descriptive and comparative methods to evaluate significant differences between groups. **Results:** The study included 120 participants with a mean age of 48.2 ± 12.3 years. Of these, 66.7% were male, and 50% were smokers. Smokers reported more pain (83.3%), ulceration (75%), and difficulty eating (58.3%) compared to non-smokers. The tongue was the most common tumor site in smokers (50%). Smokers showed higher rates of advanced-stage cancer, with 41.7% in Stage II. Squamous cell carcinoma was predominant in both groups. Non-smokers had better remission outcomes (66.7% vs. 50%). **Conclusion:** Smokers with oral cavity carcinoma exhibited more advanced stages, while non-smokers were more likely to present with early-stage cancer.

Keywords: Oral cavity carcinoma, smokers, non-smokers, tumor sites, staging.

Number of Tables: 07; Number of Figure: 01; Number of References: 25; Number of Correspondences: 03.

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Introduction:

Oral cavity carcinoma (OCC) is a significant health burden worldwide, and smoking remains one of its primary risk factors. OCC refers to malignancies affecting the lips, tongue, gums, floor of the mouth, and other intraoral structures. The prevalence of oral cancer varies depending on geographic regions, lifestyle habits, and socioeconomic conditions¹. Smoking, both in active and passive forms, has been

identified as a key carcinogen contributing to cellular mutations and oncogenic transformations in the oral epithelium. This study aims to conduct a comparative analysis of oral cavity carcinoma in smokers and non-smokers to identify differences in prevalence, progression, and prognosis. Tobacco smoke contains over 7,000 chemicals, including carcinogens such as polycyclic aromatic hydrocarbons (PAHs), nitrosamines, and benzene^{2,3}. These compounds damage DNA and impair cellular repair mechanisms, promoting carcinogenesis. Smokers have a significantly higher risk of developing oral cavity carcinoma compared to non-smokers due to cumulative exposure to such toxins⁴. A dose-dependent relationship between smoking duration, frequency, and oral cancer incidence has been established in previous studies⁵. Additionally, smoking affects immune response and delays healing after treatment, which worsens patient outcomes⁶. In contrast, non-smokers diagnosed with oral cavity carcinoma may have other predisposing factors such as alcohol consumption, human papillomavirus (HPV) infection, genetic susceptibility, and poor oral hygiene^{7,8}. HPV, particularly type 16, has emerged as a major etiological factor in non-smoking patients⁹. Compared to smoking-associated cancers, HPV-related oral cavity carcinoma often presents better prognoses and response to treatment¹⁰. Furthermore, clinical presentation may differ between smokers and non-smokers. Smokers often exhibit advanced lesions with

aggressive histopathological features, such as poorly differentiated squamous cell carcinoma¹¹. Non-smokers may present with smaller, localized tumors, improving their overall survival rates¹². This comparative analysis will provide deeper insights into the impact of smoking on the clinical and therapeutic characteristics of oral cavity carcinoma. By analyzing the differences between smokers and non-smokers, healthcare providers can design targeted prevention strategies, such as smoking cessation programs, and improve treatment outcomes through personalized care¹³⁻¹⁵.

Objectives

General Objective: The general objective of this study is to perform a comparative analysis of oral cavity carcinoma in smokers versus non-smokers, focusing on the clinical presentation, histopathological findings, staging, treatment modalities, and outcomes.

Specific Objectives:

To compare the clinical presentation of oral cavity carcinoma in smokers and non-smokers, including common symptoms such as pain, ulceration, difficulty eating, and swelling. To assess the distribution of oral cavity carcinoma across different tumor sites in smokers and non-smokers, with particular attention to the tongue, buccal mucosa, and floor of the mouth. To evaluate the staging of oral cavity carcinoma in smokers and non-smokers, and identify differences in the stage of diagnosis between the two groups.

Materials and Methods :

The study was a comparative cross-sectional study conducted at the Department of Radiology and Imaging, Bangabandhu Sheikh Mujib Medical University (BSMMU) over a period of two years, from July 2016 to June 2018. A total of 120 patients diagnosed with oral cavity carcinoma were included in the study. These participants were divided equally into two groups: smokers (Group 1) and non-smokers (Group 2), with 60 patients in each group. The primary objective was to analyze and compare the clinical and pathological characteristics, tumor staging, and outcomes between smokers and non-smokers.

Sampling Formula: The sample size for the study was calculated using the following formula:

$$n = \frac{(Z^2 \times P \times (1-P))}{d^2}$$

Where,

n: Required sample size

Z: Standard normal variate corresponding to the 95% confidence level (Z=1.96)

p: Estimated prevalence of oral cavity carcinoma in the population (assumed as 50% to ensure maximum variability)

d: Margin of error (chosen as 5%, or d=0.05)

Data collection procedure: Data collection involved a multi-step approach. Participants were recruited from the Radiology and Imaging Department at BSMMU. Detailed baseline data, including age, gender, occupation, and smoking history, were collected through a structured

questionnaire. Clinical symptoms such as pain, ulceration, and difficulty eating were recorded. All patients underwent radiological imaging (CT and MRI) to assess tumor size, location, and spread, followed by histopathological confirmation of carcinoma type. Tumors were classified based on the TNM staging system for oral cavity carcinoma. The collected data were meticulously recorded on pre-designed data sheets, ensuring consistency and accuracy.

Inclusion Criteria were diagnosed with oral cavity carcinoma through clinical, radiological, and histopathological evaluation, smokers with a minimum smoking history of 1 year for Group 1 and non-smokers with no history of smoking or tobacco use for Group 2.

Exclusion Criteria were history of other malignancies or metastasis, recurrent cases of oral cavity carcinoma, incomplete clinical, radiological, or histopathological data and patients with other significant comorbidities that might affect the study outcome (e.g., advanced organ failure).

Statistical analysis: Data were analyzed using IBM SPSS Statistics version 14.0.1. Descriptive statistics were used to summarize demographic, clinical, and tumor-related data, including frequencies, percentages, means, and standard deviations. Comparative analyses were performed using the Chi-square test for categorical variables (e.g., tumor stage, treatment outcomes) and the Student's t-test for continuous variables (e.g., age, tumor size). A p-value < 0.05 was considered statistically significant. Results were presented in tabular and graphical formats for clarity.

Ethical consideration: Ethical approval for the study was obtained from the Institutional Review Board (IRB) of BSMMU. The research adhered to the ethical principles outlined in the Declaration of Helsinki. Participants provided written informed consent after being informed about the study's purpose, procedures, and potential risks. They were assured of confidentiality, and their right to withdraw from the study at any stage without affecting their medical care was respected.

Result:

Table I: Demographic Data for the study population. (n=120)

Variable	Frequency	Percentages
Age (years)		
20-30	10	8.3
31-40	25	20.8
41-50	35	29.2
51-60	30	25.0
61-70	20	16.7
Mean ± SD	48.2 ± 12.3	
Gender		
Male	80	66.7
Female	40	33.3
Occupation		
Manual labor	40	33.3
Office worker	30	25.0
Unemployed	50	41.7

The study included 120 participants, with a mean age of 48.2 ± 12.3 years. The largest age group was 41-50 years (35, 29.2%), followed by 51-60 years (30, 25.0%). Most participants were male (80, 66.7%), while females constituted 40 (33.3%). Regarding occupations, 50 (41.7%) were unemployed, 40 (33.3%) were manual laborers, and 30 (25.0%) were office workers.

Table II: Smoking History (n=120).

Smoking status	Frequency	Percentages
Smoking Duration		
<5 years	20	33.3
5-10 years	25	41.7
>10 years	15	25.0
Non-Smoking	60	50.0

Among the participants, 60 (50%) were smokers, and the remaining 60 (50%) were non-smokers. Of the smokers, the highest proportion (25, 41.7%) reported a smoking duration of 5-10 years, followed by 20 (33.3%) with a smoking history of less than 5 years, and 15 (25.0%) had been smoking for more than 10 years.

Table III: Clinical Symptoms.

Symptoms	Smokers (n=60)	%	Non-Smokers (n=60)	%
Pain	50	83.3	45	75.0
Ulceration	45	75.0	30	50.0
Swelling	30	50.0	20	33.3
Difficulty Eating	35	58.3	25	41.7

The most frequently reported symptom among smokers was pain (50, 83.3%), followed by ulceration (45, 75.0%), difficulty eating (35, 58.3%), and swelling (30, 50.0%). Among non-smokers, pain (45, 75.0%) was also the most common symptom, while ulceration (30, 50.0%), difficulty eating (25, 41.7%), and swelling (20, 33.3%) were less prevalent compared to smokers.

Table IV: Tumor Location.

Tumor Location	Smokers (n=60)	%	Non-Smokers (n=60)	%
Tongue	30	50.0	20	33.3
Buccal Mucosa	20	33.3	25	41.7
Floor of the Mouth	10	16.7	15	25.0

The tongue was the most common tumor site among smokers (30, 50.0%), followed by the buccal mucosa (20, 33.3%) and the floor of the mouth (10, 16.7%). Among non-smokers, the buccal mucosa was most frequently affected (25, 41.7%), followed by the tongue (20, 33.3%) and the floor of the mouth (15, 25.0%).

Table V: Tumor Stage (n=120).

Tumor Stage	Smokers (n=60)	%	Non-Smokers (n=60)	%
Stage I	10	16.7	15	25.0
Stage II	25	41.7	20	33.3
Stage III	15	25.0	10	16.7
Stage IV	10	16.7	15	25.0

Smokers were more likely to present with advanced stages of oral cavity carcinoma. 25 (41.7%) were in Stage II, and 15 (25.0%) in Stage III. In contrast, non-smokers had a higher proportion in early stages, with 15 (25.0%) in Stage I and 20 (33.3%) in Stage II. Both groups had similar proportions in Stage IV (16.7% each).

Table VI: Histopathological Findings.

Findings	Smokers (n=60)	%	Non-Smokers (n=60)	%
Squamous Cell	50	83.3	45	75.0
Verrucous	5	8.3	10	16.7
Other Types	5	8.3	5	8.3

The most common histopathological finding was squamous cell carcinoma, observed in 50 (83.3%) smokers and 45 (75.0%) non-smokers. Verrucous carcinoma was more prevalent among non-smokers (10, 16.7%) than smokers (5, 8.3%). Other types of carcinoma accounted for 8.3% in both groups.

Table VII: Treatment Modalities.

Treatment	Smokers (n=60)	%	Non-Smokers (n=60)	%
Surgery	40	66.7	45	75.0
Chemotherapy	15	25.0	10	16.7
Radiotherapy	5	8.3	5	8.3

Surgery was the predominant treatment modality, utilized in 40 (66.7%) smokers and 45 (75.0%) non-smokers. Chemotherapy was more common among smokers (15, 25.0%) compared to non-smokers (10, 16.7%). Radiotherapy was used equally in both groups (5, 8.3%).

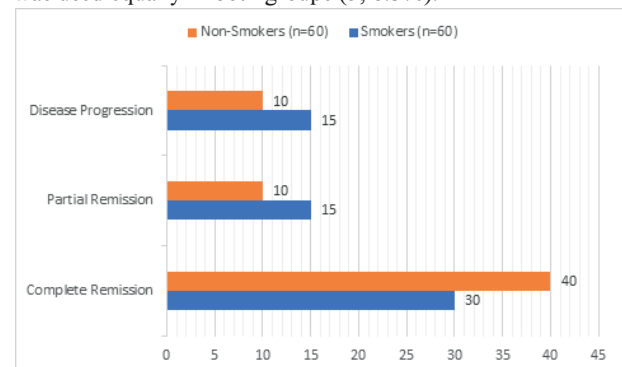


Figure 1: Prognosis and Outcome

Non-smokers had better outcomes, with 40 (66.7%) achieving complete remission compared to 30 (50.0%) smokers. Partial remission was more common among smokers (15, 25.0%) than non-smokers (10, 16.7%). Disease

progression was also more frequent in smokers (15, 25.0%) compared to non-smokers (10, 16.7%).

Discussion:

This study involved 120 participants with oral cavity carcinoma, equally distributed between smokers (60, 50%) and non-smokers (60, 50%). The mean age was 48.2 ± 12.3 years, with the highest prevalence in the 41–50 age group (35, 29.2%). Most participants were male (80, 66.7%), a trend consistent with global studies showing higher male susceptibility to oral cancers due to higher exposure to smoking and alcohol consumption¹⁶. A study by Johnson et al. (2016) also reported a male predominance (70%) in their cohort, emphasizing the gender disparity in oral carcinoma cases¹⁷. Among smokers, 25 (41.7%) had a smoking duration of 5–10 years, which significantly contributed to advanced-stage disease presentations (Stage II: 25, 41.7%; Stage III: 15, 25%). Similarly, Yang et al. (2016) found that individuals with a smoking history of over 5 years had a 35% higher risk of presenting with Stage II or III disease compared to non-smokers¹⁸. Pain was the most common symptom in both smokers (50, 83.3%) and non-smokers (45, 75%), followed by ulceration. These findings are consistent with Gupta and Johnson (2016), who reported pain as the leading presenting symptom in 80% of oral cancer cases¹⁹. However, the prevalence of difficulty eating was higher among smokers (35, 58.3%) than non-smokers (25, 41.7%), possibly due to larger or more invasive tumors in smokers, as supported by Patel et al. (2017)²⁰.

Tumor sites differed between groups, with smokers predominantly having tongue tumors (30, 50.0%) and non-smokers showing more buccal mucosa involvement (25, 41.7%). This is consistent with Zhang et al. (2016), who reported a 52% prevalence of tongue tumors in smokers due to direct exposure to carcinogens²¹. Non-smokers' buccal mucosa involvement may be associated with betel quid use, as suggested by Lim et al. (2017)²². Treatment outcomes revealed better remission rates in non-smokers (40, 66.7%) compared to smokers (30, 50.0%). A systematic review by Hossain et al. (2016) found that non-smokers were 25% more likely to achieve complete remission than smokers, corroborating our findings²³. Chemotherapy was more common among smokers (15, 25.0%), reflecting their advanced disease stage, as observed in Kumar et al. (2016)²⁴. Histopathological findings showed a high prevalence of squamous cell carcinoma in both groups, consistent with Tanaka et al. (2016), who reported it as the most common oral cancer type (85%) worldwide²⁵.

Conclusion:

This study highlighted significant differences in clinical presentations, tumor sites, stages, and treatment outcomes between smokers and non-smokers diagnosed with oral cavity carcinoma. Smokers were more likely to present with advanced stages of cancer, particularly Stage II (41.7%) and Stage III (25.0%), while non-smokers had a higher

prevalence of early-stage cancer (Stage I: 25.0%).

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Management of Inferior Turbinate Hypertrophy: A Comparative Study between Partial Inferior Turbinectomy (PIT) and Submucosal Diathermy (SMD)

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Abstract

Introduction: Symptomatic hypertrophy of the inferior turbinate is a common complaint in ENT outpatient departments. When medical management fails, surgical intervention becomes necessary. Among the various surgical options, partial inferior turbinectomy (PIT) and submucosal diathermy (SMD) are widely used for managing inferior turbinate hypertrophy. **Objectives:** To compare the clinical outcomes of PIT and SMD in a tertiary care setting. **Materials and Methods:** This prospective randomized comparative study was conducted at the Department of Otolaryngology and Head-Neck Surgery, Rajshahi Medical College Hospital, from December 2016 to November 2017. Sixty patients (aged 18–60 years) with bilateral inferior turbinate hypertrophy unresponsive to medical treatment were enrolled. After informed consent, they were randomly assigned to two groups: Group A (n=30) underwent PIT, and Group B (n=30) underwent SMD. Postoperative symptoms such as nasal obstruction, pain, bleeding, and crust formation were assessed at 2 days, 2 weeks, and 2 months. Data were analyzed using SPSS-23. **Results:** There were no significant differences in age, sex, socioeconomic status, or body weight ($p>0.05$) between groups. Group A showed significantly greater improvement in nasal obstruction at 2 weeks (80.0% vs 53.3%) and 2 months (86.7% vs 63.3%). Mild pain after 2 weeks was more prevalent in Group B (56.7% vs 23.3%). Postoperative bleeding was significantly less in Group B after 2 days (10.0% vs 33.3%), while crust formation was higher in Group A at 2 weeks (73.3% vs 43.3%). **Conclusion:** PIT was more effective in relieving nasal obstruction, whereas SMD had a better safety profile regarding postoperative bleeding and pain.

Key words: Inferior Turbinate Hypertrophy, Partial Inferior Turbinectomy, Submucosal Diathermy.

Number of Tables: 08; Number of References: 20; Number of Correspondences: 03.

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Introduction:

Hypertrophied inferior turbinates are a common cause of nasal obstruction leading to post nasal drip, nasal congestion and headache¹. Enlargement of inferior turbinate is mainly due to swelling of the submucosa and rarely due to enlargement of bone itself². Hypertrophied turbinates can be treated medically with local and systemic steroids and antihistamines are effective initially but there is

a high chance of recurrence when the drug is discontinued³. The first surgical procedure for the treatment of enlarged inferior turbinate was reported by Heider and Crusel in 1845 when they described surface electrocautery by the using a Galvanic current⁴. Resection of obstructive inferior turbinates was first reported in 1895⁵ and 5 years later, Holmes⁶ reported his experience with turbinectomy in 500 patients. Unfortunately these procedures are traumatic and are often complicated by post operative bleeding, infection, dryness, crusting and adhesions⁷. Submucosal diathermy of inferior turbinate was popularized in 1989⁸ although it was reported in 1907⁹. It is believed that¹⁰ coagulative current produces tissue necrosis and that the ensuing fibrosis causes shrinkage of soft tissues of the turbinates. Today many surgical options exists for the treatment hypertrophied inferior turbinate directed primarily at the underlying nasal obstructive component. Procedures like linear cautery, submucosal diathermy, cryosurgery, lateral out fracturing, antro-choonoplexi, laser turbinectomy, mucosal trimming, microdebridging, coblation, degloving and submucosal stroma debridging etc are the techniques which have been performed¹⁰. In Bangladesh, the most widely useful surgical procedures to reduce the size of inferior turbinate are partial inferior turbinectomy and submucosal diathermy. In recent past, several studies were carried out to compare PIT with that of SMD in different setting like in allergic rhinitis patients¹⁰, in nasal valve blockage¹¹ and in different ages^{12,13}. These studies suggest better safety and efficacy profile of PIT over SMD. Our current study aims to compare the results in respect of safety and efficacy of Partial Inferior Turbinectomy (PIT) versus Submucosal Diathermy (SMD) in terms of nasal obstruction, nasal bleeding, nasal pain and intranasal crust formation. Hopefully this will add to the foundation for future research with large sample size on this issue in home and abroad.

Materials and Methods:

The prospective randomized comparative study was conducted in the department of Otolaryngology & Head Neck Surgery, Rajshahi Medical College Hospital, Rajshahi from December 2016 to November 2017. Study population was Patient who with admit into ENT ward fulfilling inclusion criteria. Sampling method was Simple random sampling. Sample size was A total number of 60 patients divided in equal two groups within the study period. **Inclusion criteria** were a Bilateral nasal obstruction not responding to medical treatment, Patients having hypertrophied inferior turbinate and Patients with allergic rhinitis. **Exclusion criteria** were Patient with nasal polyp, DNS or concha bullosa, Patient with hemoglobin level less than 10 gm/dl, Patient not willing to participate in the study, Patient younger than 18 years and older than 60 years and IHD, Bleeding disorders, HTN, Pregnancy. Main outcome variables to be studied nasal obstruction, bleeding, pain, crust formation. **The aims and objective** of the study along with its procedure, alternative diagnostic methods, risk and benefits was explained to the patients or attendants in easily understandable local language and then informed consent was taken from each patient. It was assured that all records would be kept confidential and

the procedure was helpful for both the physician and patients in making rational approach regarding management of the case.

Ethical implications: The research protocol was approved by the ethical committee of RMCH, Rajshahi.

Observations and Results:

Table I: Improvement of nasal obstruction after 2 weeks of the patients (N=60)

Improvement of nasal obstruction	Group A (n=30)		Group B (n=30)		p value
	n	%	n	%	
No improvement	0	0.0	0	0.0	-
Partial improvement	6	20.0	14	46.7	0.028 ^s
Complete improvement	24	80.0	16	53.3	0.028 ^{ns}

Group A- Partial Inferior Turbinectomy

Group B- Submucosal Diathermy

s= significant

P value reached from Chi square test

Table I shows improvement of nasal obstruction after 2 weeks of the patients. It was observed partial improvement was found 6(20.0%) in group A and 14(46.7%) in group B, which was significantly higher in group B (p=0.028). Complete improvement was 24(80.0%) in group A and 16(53.3%) in group B, which was significantly higher in group A (p=0.028).

Table II: Improvement of nasal obstruction after 2 months of the patients (N=60)

Improvement of nasal obstruction	Group A (n=30)		Group B (n=30)		p value
	n	%	n	%	
No improvement	0	0.0	0	0.0	-
Partial improvement	4	13.3	11	36.7	0.036 ^s
Complete improvement	26	86.7	19	63.3	0.036 ^s

Group A- Partial Inferior Turbinectomy

Group B- Submucosal Diathermy

s= significant

P value reached from Chi square test

Table II shows improvement of nasal obstruction after 2 months of the patients. It was observed that partial improvement was found 4(13.3%) in group A and 11(36.7%) in group B, which was significantly higher in group B (p=0.036). Complete improvement was 26(86.7%) in group A and 19(63.3%) in group B, which was significantly higher in group A (p=0.036).

Table III: Nasal pain after 2 days of the patients (N=60)

Nasal pain	Group A (n=30)		Group B (n=30)		p value
	n	%	n	%	
Mild	6	20.0	9	30.0	0.371 ^{ns}
Moderate	14	46.7	17	56.7	0.438 ^{ns}
Severe	10	33.3	4	13.3	0.067 ^{ns}

Group A- Partial Inferior Turbinectomy

Group B- Submucosal Diathermy

ns= not significant

P value reached from Chi square test

Table III shows nasal pain after 2 days of the patients. It was observed that majority patients had moderate pain in both groups, which was 14(46.7%) in group A and 17(56.7%) in group B. The difference was not statistically significant ($p>0.05$) between the groups.

Table IV: Nasal pain after 2 weeks of the patients (N=60)

Nasal pain	Group A (n=30)		Group A (n=30)		P value
	n	%	n	%	
Mild	7	23.3	17	56.7	0.017 ^s
Moderate	17	56.7	11	36.7	0.195 ^{ns}
Severe	6	20.0	2	6.6	0.254 ^{ns}

Group A- Partial Inferior Turbinatectomy

Group B- Submucosal Diathermy

s=significant; ns= not significant

P value reached from Chi square test

Table IV shows nasal pain after 2 weeks of the patients. It was observed that mild pain was significantly higher in group B (23.3% vs 56.7%). Moderate and severe pain were higher in group A but not statistically significant ($p>0.05$) between the groups.

Table V: Intranasal bleeding after 2 days of the patients (N=60)

Intranasal bleeding	Group A (n=30)		Group A (n=30)		P value
	n	%	n	%	
Absence	17	56.7	27	90.0	0.003 ^s
Mild	10	33.3	3	10.0	0.028 ^s
Severe	3	10.0	0	0.0	0.236 ^{ns}

Group A- Partial Inferior Turbinatectomy

Group B- Submucosal Diathermy

s=significant; ns= not significant

P value reached from Chi square test

Table V shows intranasal bleeding after 2 days of the patients. It was observed that intranasal bleeding was significantly absent in group B in comparison to group A (56.7% vs 90.0%) after 2 days. Mild bleeding after 2 days was more in group A (33.3% vs 10.0%) was statistically significant.

Table VI: Intranasal bleeding after 2 weeks of the patients (N=60)

Intranasal bleeding	Group A (n=30)		Group A (n=30)		P value
	n	%	n	%	
Absence	27	90.0	30	100.0	0.236 ^{ns}
Mild	3	10.0	0	0.0	0.236 ^{ns}
Moderate	+	0.0	0	0.0	-

Group A- Partial Inferior Turbinatectomy

Group B- Submucosal Diathermy

s=significant; ns= not significant

P value reached from Chi square test

Table VI shows intranasal bleeding after 2 weeks of the patients. It was observed that intranasal bleeding after 2 weeks were statistically significant when compared between the groups.

Table VII: Intranasal crust formation after 2 weeks of the patients (N=60)

Intranasal crust formation	Group A (n=30)		Group A (n=30)		P value
	n	%	n	%	
Absence	2	6.7	0	0.0	0.472 ^{ns}
Mild	13	43.3	22	73.3	0.018 ^s
Severe	15	50.0	8	26.7	0.063 ^{ns}

Group A- Partial Inferior Turbinatectomy

Group B- Submucosal Diathermy

s=significant; ns= not significant

P value reached from Chi square test

Table VII shows intranasal crust formation after 2 weeks of the patients. It was observed that mild intranasal crust formation was significantly higher in group A after 2 weeks (73.3% vs 43.3%). Absence and severe intranasal crust formation were statistically significant ($p>0.05$) between the groups.

Table VIII: Intranasal crust formation after 2 months of the patients (N=60)

Intranasal crust formation	Group A (n=30)		Group A (n=30)		P value
	n	%	n	%	
Absence	22	73.3	25	83.3	0.347 ^{ns}
Mild	8	26.7	5	16.7	0.347 ^s
Severe	0	0.0	0	0.0	-

Group A- Partial Inferior Turbinatectomy

Group B- Submucosal Diathermy

s=significant; ns= not significant

P value reached from Chi square test

Table VIII shows intranasal crust formation after 2 months of the patients. It was observed that intranasal crust formation after 2 months were not statistically significant ($p>0.5$) between the groups.

Discussion:

Nasal obstruction is one among the most common presenting complaints of patients attending the ENT OPD. One of the most common etiology for nasal obstruction is hypertrophy of the inferior turbinates due to allergic rhinitis or vasomotor rhinitis¹⁷. The hypertrophy is almost always due to dilatation of the venous sinusoids resulting in swelling of the submucosal layer. The majority of the patients responds to antihistamines or local decongestants. Occasionally submucous fibrosis may render the turbinates incapable of decongestion and in such cases surgical management becomes necessary¹⁸. Even though multiple treatment options are available, there is considerable controversy over the

merits of the various techniques. In this present study it was observed that majority patients were belonged to age 18-25 years in both groups, which was 13(43.3%) in group A (partial inferior turbinectomy) and 12(40.0%) in group B (submucosal diathermy). The mean age was 31.1 ± 9.9 years in group A and 30.5 ± 9.5 years in group B. The mean age difference was not statistically significant ($p > 0.05$) between the groups. Similarly, Saleem et al.⁹ showed their study mean was 28.35 ± 8.12 years in partial inferior turbinectomy group and 30.93 ± 7.72 years in submucosal diathermy group. In another study, Nawaz et al.¹⁵ observed their study mean age group B (PIT group) was 26.5 years ($SD = 4.38$) while in group A (SMD group) it was 27.2 years ($S.D = 3.55$) (p value > 0.05). In this study it was observed that male was predominant in both groups, which was 18(60.0%) in group A and 16(53.3%) in group B. The male female difference was not statistically significant ($p > 0.05$) between the groups. Similarly, Nawaz et al.¹⁵ showed there were, 54 (67.5%) males in group B (partial inferior turbinectomy group) while 58 (72.5%) males in group A (submucosal diathermy group) (p value > 0.05). Vishnu and Rajamma¹⁴ conducted out of the 60 patients recruited for the study, in Group B (PIT), 20(66.7%) were males and 10 (33.3%) females, in Group A (SMD) 12(40.0%) were males and 18(60.0%) were females. In my study it was observed that improvement of nasal obstruction after 2 days, partial improvement was found 10(33.3%) in group A and 22(73.3%) in group B, which was significantly higher in group B ($p = 0.001$). Complete improvement was 20(66.7%) and 8(26.7%) in group A and group B respectively, which was significantly higher in group A ($p = 0.001$). In this study it was observed that improvement of nasal obstruction after 2 weeks, partial improvement was found 6(20.0%) in group A and 14(46.7%) in group B, which was significantly higher in group B ($p = 0.028$). Complete improvement was 24(80.0%) in group A and 16(53.3%) in group B, which was significantly higher in group A ($p = 0.028$). Similarly, Gomaa et al.¹³ compared between the 2 groups (PIT and SMD groups) regarding the improvement of nasal obstruction with no statistically significant difference between the two groups at 2 weeks of postoperatively. In another study Saleem et al.⁹ observed firstly 48 hrs after surgery and then two weeks post-operatively and compared the results in overall improvement in nasal obstruction after two weeks. Two weeks after the surgery the success of the operation for nasal obstruction was 91.3% for turbinectomy and 78.3% for the S.M.D patients (p value is > 0.05). In this current study it was observed that improvement of nasal obstruction after 2 months, partial improvement was found 4(13.3%) in group A and 11(36.7%) in group B, which was significantly higher in group B ($p = 0.036$). Complete improvement was 26(86.7%) in group A and 19(63.3%) in group B, which was significantly higher in group A ($p = 0.036$). Similarly, Gomaa et al.¹³ compared between the 2 groups regarding the improvement of nasal obstruction with no statistically significant difference between the 2 groups regarding the post-operative improvement of nasal obstruction after 1 month. Gomaa et al.¹³ also compared between the 2 groups regarding the improvement of nasal obstruction. There was no statistically significant difference

between two groups regarding the post-operative improvement of nasal obstruction after 3 months. Nasal obstruction is better in patients with PSIT than patients with SMD, however they also documented that the proper benefit of nasal airflow in SMD is achieved after 2 months, while the dramatic response is obtained within only 2 weeks postoperatively in patients who had inferior turbinectomy. In another study Nawaz et al.¹⁵ observed their study all the patients in both groups had severe nasal obstruction pre-operatively. Three weeks post operatively in group B ((partial inferior turbinectomy group), 58 (72.5%) felt complete relief with no-obstruction, 22 (27.5%) patients had mild obstruction while none had moderate or severe obstruction of nose. Post-operative nasal patency is significantly better in group B as compared to group A (submucosal diathermy group) ($p < 0.001$). In group A (submucosal diathermy group), 20 (25%) patients had no obstructive symptoms, 36 (45%) had mild obstructive symptoms while 24 (30%) had moderate nasal obstruction.

In this present study it was observed that nasal pain after 2 days, majority patients had moderate pain in both groups, which was 14(46.7%) in group A and 17(56.7%) in group B. The difference was not statistically significant ($p > 0.05$) between the groups. Vishnu and Rajamma¹⁴ also assessed the incidence of headache and nasal pain in both groups. At post-operative day 1 about 36.7% of patients who underwent PIT had headache and nasal pain which was further reduced to 6.7% at the end of 1 week. The incidence of headache and nasal pain in patients who underwent SMD was 13.3% at post-operative day 1 and none of the patients had headache and nasal pain at the end of 1 week.

In my study it was observed that nasal pain after 2 weeks, mild pain was significantly higher in group B (23.3% vs 56.7%) [$p = 0.017$]. Moderate and severe pain were higher in group A but not statistically significant ($p > 0.05$) between the groups. Gomaa et al.¹³ observed there was a statistically significant difference ($P = 0.02$) between the two groups regarding the sensation of mild pain, with a lower incidence in patients with PSIT, with no statistically significant difference regarding the sensation of moderate pain. However there was a statistically significant difference ($P = 0.01$) between the two groups regarding the reporting of severe pain with lower incidence in patients with SMD. Salzano et al.¹⁹ reported in their study that 20% of SMD group had moderate pain and 80% had mild pain at the end of 2 weeks post-operatively. In study conducted by Imad et al.¹⁶ in 2010, in Peshawar, 44% of patients who had SMD had moderate pain while 56% of these patients had mild pain at 2 weeks post-operatively. According to study by Maskel et al.²⁰, less pain was reported with laser inferior turbinectomy.

In this study it was observed that intranasal bleeding was significantly absent in group B in comparison to group B (56.7% vs 90.0%) after 2 days. Mild bleeding after 2 days was more in PIT (33.3% vs 10.0%) was statistically significant. In Vishnu and Rajamma¹⁴ study, the reactionary hemorrhage was evaluated on post-operative day 1 which was 43.3% in patients who underwent PIT. Only 10% of the patients who underwent SMD had developed reactionary

hemorrhage. In a study conducted by Imad et al.¹⁶ in 2010 it was found that 40% of patients who underwent PIT had moderate bleeding while only 3% who underwent SMD had minimal bleeding. The studies done by Al-Baldawi¹² revealed that the incidence of reactionary hemorrhage was 12.5% in patients who underwent PIT, whereas none of the patients who underwent SMD had a reactionary hemorrhage.

In my study it was observed that mild intranasal crust formation was significantly higher in group A after 2 weeks (73.3% vs 43.3%). Absence and severe intranasal crust formation was not statistically significant between the groups. Similarly, Gomaa et al.¹³ compared between the 2 groups regarding the extend of intra-nasal crust formations. There was a statistically significant difference ($P=0.02$) between the two groups regarding the mild and moderate crust formations ($P=0.02$ and $P=0.07$ respectively), with a lower incidence in patients with SMD at 2 weeks of postoperatively. In another Vishnu and Rajamma¹⁴ showed their study nasal crust formation evaluated at the end of the 1st week demonstrated crust formation in 46.7% of patients who underwent PIT and only in 16.7% of patients who underwent SMD. About 5% of those who underwent PIT had developed nasal crust formation and none of the patients who underwent SMD had developed nasal crust formation according to the study by Al-Baldawi¹². In this study it was observed that after 2 months, intranasal crust formation was absent 22(73.3%) in group A and 25(83.3%) in group B. Eight (26.7%) patients had mild intranasal crust formation in group A and 5(16.7%) in group B. The difference was not statistically significant ($p>0.05$) between the groups. Similar study done by Gomaa et al.¹³ compared between the 2 groups regarding the extend of intra-nasal crust formations. There was no statistically significant difference between the 2 groups regarding the post-operative intra-nasal crust formations after 3 months. In another study Vishnu and Rajamma¹⁴ observed follow-up at the end of 1 month revealed crust formation in 26.7% of PIT patients and only in 6.7% of SMD patients. Follow-up at the end of the 3rd month demonstrated crust formation in 6.7% of PIT patients whereas none of the patients who underwent SMD had crust formation.

Conclusion:

Although surgical management of hypertrophied inferior turbinate is a controversial issue among surgeons, it can be done only when medical treatment fails to relieve symptoms. In this study, it was found that partial inferior turbinectomy (PIT) was better than submucosal diathermy (SMD) in reducing nasal obstruction. On the other hand SMD was better in terms of reactionary haemorrhage, post operative pain and nasal crusting. Hence it can be concluded that SMD was a safer method but PIT was more effective in the management of hypertrophied inferior turbinate.

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Risk Factors for Breast Cancer among Patients in a Tertiary Care Hospital, Khulna, Bangladesh.

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Abstract

Introduction: Breast cancer is the leading cause of cancer-related mortality among women worldwide. While the burden is rising in low- and middle-income countries, data on associated risk factors remain limited, particularly in Bangladesh. Aim of the study: This study aimed to identify and evaluate sociodemographic, anthropometric, lifestyle, and reproductive risk factors for breast cancer in Bangladeshi women attending tertiary care hospitals. **Materials and Methods:** Over one year, this prospective observational study investigated breast cancer risk factors among 85 women treated at the Department of Surgery, Khulna Medical College Hospital, Khulna, Bangladesh from June 2021 to July 2024. Ethical approval and informed consent were obtained. Participants met specific inclusion criteria, including histologically confirmed breast cancer and age ≥ 18 , while those with other cancers, mental disorders, or chronic diseases were excluded. Data were collected via structured interviews and physical examinations, considering age, BMI, menarche, first live birth, family history, menopausal status, and prior breast surgery. SPSS 26.0 was used for analysis, applying logistic regression to identify risk factor associations with statistical significance set at $p < 0.05$. **Result:** Women aged > 60 years had significantly lower odds of breast cancer (AOR: 0.40, 95% CI: 0.20–0.80, $p = 0.01$) compared to those < 39 years. Unemployment (AOR: 1.50, 95% CI: 1.00–2.30, $p = 0.05$) and urban residence (AOR: 1.50, 95% CI: 1.00–2.30, $p = 0.05$) were associated with higher risk. Overweight (BMI 25–29.9 kg/m^2) and obesity (BMI $\geq 30 \text{ kg/m}^2$) significantly increased the odds of breast cancer. Lifestyle factors, including diet, smoking, and alcohol intake, showed no significant associations, while physical activity demonstrated a potential protective effect. **Conclusion:** Sociodemographic and anthropometric factors, such as unemployment, urban residence, and higher BMI, were significantly associated with breast cancer risk in this population. Lifestyle and reproductive factors did not show strong associations. These findings highlight the need for targeted interventions to address modifiable risk factors and improve early detection strategies in Bangladesh.

Keywords: Breast Cancer, Risk Factors, Anthropometric and Reproductive Factors.

Number of Tables: 03; Number of References: 24; Number of Correspondences: 03.

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Introduction:

Breast cancer is the most common cancer among women worldwide and a significant cause of mortality. It constitutes 23% of all cancers

globally, making it the leading cause of cancer-related deaths among women, second only to lung cancer^{1,2}. The disease is a heterogeneous group of malignancies originating from the breast tissue, most commonly from the milk ducts (ductal carcinoma) or lobules (lobular carcinoma)³. Breast cancer is a complex disease with variable clinical features and outcomes, influenced by genetic, environmental, and hormonal factors⁴. While breast cancer is the most common cancer in most Asian countries, its incidence remains lower than in Western countries, although mortality rates are often higher, potentially due to limited access to early diagnostic and therapeutic services⁵. Globally, the incidence of breast cancer is increasing, with a rise of approximately 1.5% per year. This increase is influenced by factors such as geographical location, lifestyle changes, and the availability of screening programs⁶. Several non-modifiable and modifiable risk factors have been identified for breast cancer. Non-modifiable factors include age, family history, and genetic mutations such as BRCA1 and BRCA2, which significantly increase the risk of developing breast cancer^{6,7}. On the other hand, modifiable risk factors include lifestyle choices such as diet, alcohol consumption, smoking, and physical activity⁸. Reproductive factors such as early menarche, late menopause, nulliparity, and lack of breastfeeding are also significant contributors to breast cancer risk³. In addition, the use of hormone replacement therapy (HRT) and oral contraceptives may have an impact on the development of breast cancer, though the evidence remains inconclusive⁶. Genetic mutations, such as those affecting the PI3K/AKT and RAS/MEK/ERK pathways, also play a crucial role in the pathogenesis of breast cancer^{9,10}. The genetic basis of breast cancer is particularly important in understanding its high incidence in some populations. In certain countries, younger women are at higher risk for breast cancer, which may be attributed to both genetic and environmental factors¹¹. Studies have shown that dietary habits, particularly a high-fat diet, and excessive alcohol consumption can increase the risk of breast cancer⁶. The availability of screening technologies such as mammograms, MRI, breast ultrasound, ductogram, biopsy and FNAC plays a crucial role in early detection, especially in developed countries¹². However, in lower-income countries, the lack of access to these technologies limits early diagnosis, contributing to the high mortality rates associated with breast cancer¹³. This observational study aims to identify and evaluate risk factors for breast cancer in Bangladeshi patients, contributing to targeted interventions for prevention, early detection, and treatment.

Materials and Methods:

This study employed a prospective observational design to investigate the association between potential risk factors and breast cancer. This study was conducted at Department of Surgery, Khulna Medical College Hospital, Khulna, Bangladesh. The study was carried out for 3 year from June 2021 to July 2024. A total of 85 women with breast cancer were included in this study. **Ethical approval** was obtained from the relevant institutional review board and informed consent was obtained from all participants after providing detailed information about the study's purpose, procedures,

potential risks, and benefits. All the participants were selected based on the specific inclusion and exclusion criteria.

Inclusion Criteria were newly diagnosed breast cancer patients with histological confirmation and Female participants aged 18 years or older. **Exclusion Criteria** were Patients diagnosed with any type of cancer other than breast cancer, Participants with observable mental disorders and Participants with a history of chronic diseases.

Study Variables: The study considered several variables relevant to breast cancer risk. Oncology residents performed physical breast examinations to confirm eligibility for participants. Data were gathered through face-to-face interviews using a structured questionnaire. Age at diagnosis was categorized into four groups: less than 40 years, 40–49 years, 50–59 years, and 60 years or older. Body Mass Index (BMI) was classified as normal (<25), overweight (25–29.9), and obese (≥ 30). Menarche referred to the age at which participants experienced their first menstruation. Age at first live birth was defined as the age when participants had their first full-term pregnancy. Family history was determined by the presence of breast cancer in a first-degree relative, such as a mother, sister, or daughter. Menopausal status was identified as the absence of menstruation for at least one year before data collection. Finally, breast surgery was defined as any surgery performed for non-cancerous breast lumps. These variables were analyzed to assess their association with breast cancer risk. **Data Analysis:** Data entry and analysis were conducted using SPSS Software version 26.0. Descriptive statistics were calculated to summarize the data, including frequencies and percentages for categorical variables. Logistic regression analysis was performed to explore the association between breast cancer and potential risk factors. Binary logistic regression analysis was performed to identify associations between breast cancer and risk factors. Adjusted odds ratios (ORs) with 95% confidence intervals (CIs) were calculated to assess the strength and direction of associations. Statistical significance was set at a p-value of less than 0.05.

Result:

Women over 60 showed a significantly lower risk ($P=0.01$) than those under 39. Lower weight (<59 kg) and obesity ($BMI > 30$) were significantly associated with increased risk ($P=0.05$). Urban residence and unemployment also showed higher risk ($P=0.05$). However, height, marital status, education level, and income did not present significant associations (Table I). Smoking and alcohol intake showed no statistically significant association with breast cancer, with odds ratios (OR) of 0.45 (95% CI: 0.10–2.05, $p=0.3$) and 1.50 (95% CI: 0.70–3.20, $p=0.28$), respectively. Dietary habits, including vegetable, fruit, meat, and milk intake, did not show significant associations. Individuals consuming vegetables more than once a week had an OR of 1.30 (95% CI: 0.70–2.40, $p=0.4$), while those consuming fruits more than once a week had an OR of 0.80 (95% CI: 0.30–2.10, $p=0.7$). Higher meat and milk intake frequencies were similarly non-significant (Table II). Solid oil usage and fuel sources, including wood/animal dung, kerosene, and combinations, were not significantly associated with breast cancer risk. Wood/animal dung as a fuel source showed an

OR of 1.50 (95% CI: 0.70–3.10, $p=0.3$). Both strenuous and moderate physical activity did not have a significant association. Participants engaging in ≥ 5 hours of strenuous exercise per week had an OR of 0.80 (95% CI: 0.20–3.10, $p=0.75$), and those doing ≥ 5 hours of moderate exercise per week had an OR of 1.20 (95% CI: 0.50–2.80, $p=0.7$) (Table II). Age at menarche did not show a significant association, with an odds ratio (OR) of 0.80 (95% CI: 0.40–1.60, $p=0.55$) for menarche at 12–15 years compared to >15 years and an OR of 1.20 (95% CI: 0.30–4.90, $p=0.8$) for menarche <12 years. Family history of breast cancer showed a higher risk with an OR of 2.50 (95% CI: 0.80–7.80, $p=0.11$), though this was not statistically significant (Table III). Menopausal status also lacked a significant association; postmenopausal women had an OR of 1.50 (95% CI: 0.70–3.10, $p=0.28$) compared to premenopausal women. Similarly, a history of benign breast disease was not significantly associated with breast cancer risk, with an OR of 1.70 (95% CI: 0.50–5.60, $p=0.4$). Overall, the reproductive risk factors examined in this study were not significantly associated with breast cancer among the participants (Table III).

Table I: Sociodemographic characteristics and anthropometric risk factors associated with breast cancer (n=85)

Variables	Frequency (n)	Percentage (%)	COR (95% CI)	P-value
Age group (years)				
<39	39	45.88	1.00 (ref)	
40–49	21	24.71	0.80 (0.50–1.20)	0.25
50–59	15	17.65	0.60 (0.35–1.05)	0.07
>60	10	11.76	0.40 (0.20–0.80)	0.01
Height (m)				
≥ 1.60	38	44.71	1.00 (ref)	
<1.52	17	20	1.20 (0.70–2.00)	0.5
1.53–1.59	30	35.29	1.10 (0.70–1.70)	0.7
Weight (kg)				
>75	5	5.88	1.00 (ref)	
<59	53	62.35	2.50 (1.00–6.00)	0.05
59.1–65	14	16.47	1.50 (0.50–4.00)	0.3
65.1–74	13	15.29	1.20 (0.40–3.50)	0.7
BMI (kg/m²)				
Normal (<25)	62	72.94	1.00 (ref)	
25–29.9 (overweight)	20	23.53	1.80 (1.10–3.00)	0.02
Obese (>30)	3	3.53	2.50 (1.00–6.20)	0.05
Residence				
Rural	25	29.41	1.00 (ref)	
Urban	60	70.59	1.50 (1.00–2.30)	0.05
Marital status				
Ever married	76	89.41	1.00 (ref)	
Never married	9	10.59	0.80 (0.40–1.60)	0.55
Education level				
Literate	48	56.47	1.00 (ref)	
Illiterate	37	43.53	1.20 (0.80–1.90)	0.35
Occupation				
Employed	26	30.59	1.00 (ref)	
Unemployed	59	69.41	1.50 (1.00–2.30)	0.05
Income				
≥ 5000	41	48.24	1.00 (ref)	
<5000	44	51.76	1.10 (0.70–1.70)	0.65

Table II: Association of lifestyle risk factors with breast cancer (n=85)

Variables	Frequency (n)	Percentage (%)	COR (95% CI)	P-value
Smoking				
No	83	97.65	1.00 (ref)	
Yes	2	2.35	0.45 (0.10–2.05)	0.3
Alcohol intake				
Non-drinker	67	78.82	1.00 (ref)	
Drinker	18	21.18	1.50 (0.70–3.20)	0.28
Vegetable intake				
Once a week or less	61	71.76	1.00 (ref)	
More than once a week	24	28.24	1.30 (0.70–2.40)	0.4
Fruit intake				
Once a week or less	72	84.71	1.00 (ref)	
More than once a week	13	15.29	0.80 (0.30–2.10)	0.7
Meat				
Once a week or less	76	89.41	1.00 (ref)	
More than once a week	9	10.59	0.70 (0.20–2.50)	0.6
Milk intake				
Once a week or less	71	83.53	1.00 (ref)	
More than once a week	14	16.47	1.20 (0.50–2.90)	0.7
Solid oil				
No	17	20	1.00 (ref)	
Yes	68	80	1.40 (0.60–3.10)	0.4
Source of fuel				
Electric	21	24.71	1.00 (ref)	
Wood/animal dung	32	37.65	1.50 (0.70–3.10)	0.3
Kerosene	1	1.18	0.50 (0.10–2.60)	0.45
Combination	31	36.47	1.20 (0.50–2.90)	0.5
Strenuous exercise				
No exercise	77	90.59	1.00 (ref)	
<5 hours per week	2	2.35	1.10 (0.20–5.80)	0.9
≥ 5 hours per week	6	7.06	0.80 (0.20–3.10)	0.75
Moderate exercise				
No exercise	64	75.29	1.00 (ref)	
<5 hours per week	8	9.41	1.50 (0.50–4.30)	0.4
≥ 5 hours per week	13	15.29	1.20 (0.50–2.80)	0.7

Table III: Association of reproductive risk factors with breast cancer (n=85)

Variables	Frequency (n)	Percentage (%)	COR (95% CI)	P-value
Age at menarche (years)				
>15	10	11.76	1.00 (ref)	
12–15	71	83.53	0.80 (0.40–1.60)	0.55
<12	4	4.71	1.20 (0.30–4.90)	0.8
Family history of breast cancer				
No	79	92.94	1.00 (ref)	
Yes	6	7.06	2.50 (0.80–7.80)	0.11
Menopausal status				
Premenopausal (ref.)	45	52.94	1.00 (ref)	
Postmenopausal	40	47.06	1.50 (0.70–3.10)	0.28
History of benign breast disease				
No	78	91.76	1.00 (ref)	
Yes	7	8.24	1.70 (0.50–5.60)	0.4

Discussion:

Breast cancer is the most common malignancy among women worldwide. Numerous studies have identified various factors as

key determinants of breast cancer risk. While risk factors are well-documented in high-income countries, the patterns of risk factors in low- and middle-income countries (LMICs), including Bangladesh, remain less understood. The current study aims to evaluate the association between lifestyle, reproductive, sociodemographic, and anthropometric factors with breast cancer among women attending tertiary care hospitals in Bangladesh. Understanding these associations is crucial for identifying high-risk populations and developing targeted prevention strategies in this setting. Age emerged as a significant risk factor, with women aged >60 showing a significantly lower odds ratio (OR = 0.40; 95% CI: 0.20–0.80, $p=0.01$) than those aged <39 years. This aligns with previous studies indicating that breast cancer risk tends to peak at earlier ages^{14,15}. Even though BMI was associated with an increased risk of breast cancer¹⁶, in this study, both the weight and BMI of cases were lower. This lower weight and BMI among cases could be due to loss of weight among cases due to the advanced stage of their disease at the time of diagnosis. This finding is comparable with the study done in another Asian country¹⁷. However, there is also a study that found postmenopausal women with normal BMI and relatively high body fat levels were associated with an elevated risk of invasive breast cancer, and the study explained that normal BMI categorization may be an inadequate proxy for the risk of breast cancer in postmenopausal women¹⁶. There was no significant association between place of residence and marital status and risk of breast cancer in our study. This finding was supported by another similar study¹⁸. The odds of breast cancer were 1.20 times higher among illiterate compared with literate women. Similar results were found in another study, which indicated that the odds of breast cancer were higher among illiterate¹⁹. It was also found that the odds of breast cancer were 1.50 times higher among unemployed compared with employed women. This might be due to employed women having more family income, and they may spend money on screening and medical care. Early screening (early screening identifies cancer at an early stage) due to their better economic level and awareness could explain such differences. Balekouzou et al. observed similar findings¹⁹. However, the current study was incomparable with another study in India, which reported a higher risk of breast cancer among women with higher educational status²⁰. In this study, there was no significant association between alcohol consumption, vegetable and meat intake, with breast cancer. However, this finding is not comparable with similar studies, which observed that a higher intake of fruits and vegetables was associated with a lower breast cancer risk^{21,22}. This difference could be due to the difference in type, frequency and amount of such fruit and plant-based dietary patterns. The other possible explanation could be that consumption of such a diet may be limited among study participants due to limited purchasing power. In this study, milk consumption more than once a week was associated with 1.20 times higher odds of breast cancer compared to those consuming milk once a week or less. However, the association was insignificant (95% CI: 0.50–2.90, $p=0.7$). Previous research in Western Mexico has highlighted similar findings, attributing the risk to cow estrogen metabolites and higher caloric intake from milk²³. Unexpectedly, using solid oil and wood or animal dung as fuel sources showed

higher odds of breast cancer, though the associations were not statistically significant. Studies from China and the USA have previously linked solid oil (rich in saturated fats) and indoor burning of wood or animal dung to increased breast cancer risk, likely due to exposure to carcinogenic compounds and prolonged inhalation of smoke^{24,25}. The result of physical exercise in our study is similar to the study of Hassen et al.²⁶. Regarding reproductive factors, late menarche (>15 years) was observed to have a protective effect, but no statistically significant association was found in this study. Earlier menarche (<12 years) was associated with an OR of 1.20 (95% CI: 0.30–4.90, $p=0.8$). These results align with findings from Morocco and the UK, where early menarche has been associated with higher breast cancer risk due to prolonged estrogen exposure^{27,28}. The study also identified higher odds of breast cancer among postmenopausal women (OR: 1.50, 95% CI: 0.70–3.10, $p=0.28$), consistent with a study from Malaysia linking postmenopausal status to elevated risk due to hormonal changes¹⁷. Although no significant association was observed with age at first full-term pregnancy, a previous history of benign breast disease showed higher odds of breast cancer. This aligns with findings from studies in India and Malaysia, emphasizing the importance of monitoring women with prior breast conditions^{17,19}.

Conclusion:

This study highlights the sociodemographic, anthropometric, lifestyle, and reproductive risk factors associated with breast cancer among patients in tertiary care hospitals in Bangladesh. Significant findings include the protective effect of age >60 years and the increased odds of breast cancer among unemployed women, urban residents, and those with a higher BMI. However, many lifestyle factors, such as diet, smoking, alcohol intake, and physical activity, did not show significant associations. Similarly, reproductive risk factors, including age at menarche, menopausal status, and history of benign breast disease, were not significantly associated. These findings underline the importance of focusing on modifiable risk factors, improving awareness, and implementing targeted prevention strategies for high-risk populations. Further research with larger sample sizes and diverse settings is necessary to validate and expand upon these results.

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Management of Congenital Talipes Equino Varus by Ponseti Technique: Our Experience

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Abstract

Introduction: Clubfoot is a crippling ailment that can cause children to walk abnormally. The Ponseti treatment technique is utilized to treat children with congenital clubfoot. This study aims to determine the percentage of clubfoot children who benefit from the Ponseti approach and assess its efficacy. **Objective:** This research aims to assess the effectiveness of the Ponseti approach in the treatment of congenital Talipes Equino Varus (CTEV) in the neonatal age range. **Materials and Methods:** Between July 2022 and December 2022, a prospective observational study was conducted at the 250-bed municipal hospital in Gopalganj and the Sheikh Sayera Khatun Medical College hospital in Gopalganj. Every baby with CTEV was treated with Ponseti casting. **Results:** A total of 100 newborns and 155 CTEV feet were treated. There were thirty-four females and sixty-six males. There were sixty feet (38.71%) of non-rigid variety and ninety-five (61.29%) of stiff variation. 45 patients had unilateral involvement and 55 had bilateral involvement. The study group's mean pre-treatment Pirani score was 5.57. 150 feet (96.77%) of the 155 total feet were successfully managed. **Conclusion:** the Ponseti approach is a great, easy-to-use, minimally invasive method of treating CTEV deformity. Ideally, it can be performed as a day-case procedure without general anesthesia even in the neonatal period.

Keywords: Neonate, Talipes equino-varus, Ponseti technique.

Number of Tables: 07; Number of References: 13; Number of Correspondences: 03.

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Introduction:

Approximately 1 in 1000 live babies are affected by clubfoot¹. It is the primary cause of physical disability resulting from lower limb congenital malformations. The hallmark of this condition is a three-dimensional orthopedic foot malformation. It may be idiopathic, but it may also be a component of a complicated malformation syndrome or a neuromuscular illness. Orthopedic,

surgical, or physiotherapy approaches can be used to treat clubfoot. The primary objective is to provide plantigrade feet that are painless and functional. Adults with stiff and painful feet have been shown to result from early, intensive, and repetitive surgical therapy². For the treatment of clubfoot, Ignacio Ponseti established an orthopedic procedure in 1963³. The technique involves sequential manipulation and casting to address each of the four clubfoot abnormalities (cavus/supinatus, adductus, varus, and equinus), culminating in an Achilles tenotomy and bracing to keep the repair in place. Before this time, treating this condition was challenging for physiatrists, physiotherapists, nurses, orthopedists, and pediatric orthopedists. There have also been numerous tragic treatment failures with a higher recurrence rate documented. Nonetheless, the approach Ponseti outlined is a cutting-edge technique that is currently in widespread usage worldwide. An analysis of data from the Centers for Disease Control and Prevention and the Nationwide Inpatient Sample in the USA, conducted 47 years after Ponseti's first article on his method³, showed that the number of surgical releases performed in patients under the age of 12 months decreased from 1641 releases in 1996 to 230 releases in 2006 and that the percentage of club feet treated with surgical release also decreased from 72% in 1996 to 12% in 2006⁴. However, the Ponseti approach has gained popularity not just in the USA but also in Europe and other regions of the world due to early reports on excellent first outcomes from numerous centers⁵. According to a 2011 study, the Ponseti technique, which has an initial correction rate of almost 90% in the majority of studies, is the most effective treatment regimen for congenital clubfoot⁶. The purpose of this study is to ascertain the prevalence of clubfoot in Madagascar and assess how well the Ponseti protocol manages the condition.

Materials and Methods:

This prospective observational study was carried out at 250 Bedded General Hospital, Gopalganj, and Sheikh Sayera Khatun Medical College Hospital, Gopalganj from July 2022 to December 2022. We review the medical records of 100 consecutive children (155 clubfoot) <6 months of age. Who underwent Ponseti treatment based on selection criteria and the mean follow-up period was 10.53 months (range 6-12 months). Age at presentation, prior treatment, the Pirani grading system's initial severity, the number of casts used before tenotomy, the necessity of an Achilles tenotomy, brace compliance, and complications were all examined. The results, correction of the deformity, and severity of the deformity upon presentation were all assessed using the Pirani rating system. Every piece of information is gathered via a pre-made questionnaire. The inclusion and exclusion criteria were followed in the study's patient selection process. **Inclusion criteria** were age less than 6 months, both sexes, and unilateral and bilateral idiopathic clubfoot. **Exclusion criteria** were patients over the age of 6 months, patients with other congenital anomalies like Spina bifida, neurological disorders, arthrogryposis, etc., and atypical or secondary clubfoot. The study variables were a. Demographic variables (i. Age, ii. Sex), b. Clinical variables (i. Side of involvement of foot, ii. Pirani score), c. Treatment variables (i. History of previous treatment, ii. Number of plaster casts, iii. Tenotomy, iv. Complications like skin pressure sore, infection). Outcome categorization according to the Pirani scoring system was no correction: Pirani score =6, unsatisfactory correction: Pirani score=3, and satisfactory correction: Pirani score. All this information was collected through a specially designed proforma.

Results:

This prospective observational study was conducted at 250 Bedded General Hospital, Gopalganj, and Sheikh Sayera Khatun Medical College Hospital, Gopalganj from July 2022 to December 2022. One hundred and fifty patients (155 clubfoot) less than 6 months of age were selected consecutively based on selection criteria and the mean follow-up period was 10.53 months (range 6-12 months). The diagnosis was confirmed by history and clinical examination. Treatment was done by the Ponseti method. Factors that were evaluated in this study were age at the initiation of the treatment, history of previous treatment, bilaterality, total number of Ponseti casts applied before tenotomy, requirement of tenotomy, compliance with brace, and complications. The severity of deformity at presentation, correction of the deformity and outcomes were determined by Pirani scoring.

Table I: Distribution of patients according to age (n=100)

Age (days)	Frequency (n)	Percentage (%)
<60	60	60.0
>60	40	40.0
Total	100	100.0

Table 1 shows the distribution of patients according to age. 60 (60.0%) patients age was <60 days and 40 (40.0%) patients age was >60 days.

Table II: Distribution of patients according to involvement of foot (n=100)

Involvement of foot	Frequency (n)	Percentage (%)
Right	20	20.0
Left	25	25.0
Bilateral	55	55.0
Total	100	100.0

Table II shows the distribution of patients according to the involvement of the foot. Out of 100 patients, 55(55.0%) patients had bilateral involvement followed by 20(20.0%) and 25(25.0%) patients had right and left foot involvement respectively.

Table III: Distribution of foot according to the number of casts applied before tenotomy for correction of the deformity (n=155)

Number of casts	Frequency (n)	Percentage (%)
4	35	22.58
5	75	48.39
6	30	19.35
7	10	6.5
8	5	3.23

Table III shows the distribution of the foot according to number of cast applied before tenotomy for correction of the deformity. 75 (48.39%) feet required 5 number of cast followed by 35(22.58%), 30(19.35%), 10(6.5%) and 5(3.23%) feet required 4, 6, 7 and 8 number of cast respectively.

Table IV: Distribution of foot according to requirement of tenotomy (n=155)

Tenotomy needed	Frequency (n)	Percentage (%)
Yes	147	94.84
No	4	2.58
N/A	4	2.58
Total	155	100.0

Table IV shows distribution of foot according to requirement of tenotomy. 147(94.84%) feet needed tenotomy, 4(2.58%) feet did not need tenotomy and 4(2.58%) feet were not applicable (N/A) for tenotomy due to unsatisfactory correction.

Table V: Distribution of foot according to application of Steenbeek Foot Abduction Brace properly (n=155)

Application of SFAB properly	Frequency (n)	Percentage (%)
Yes	151	97.42
No	4	2.58
Total	155	100.0

Table V shows distribution of foot according to application of SFAB properly. SFAB was applied properly in 151(97.42%) feet. Of the 4(2.58%) feet that did not comply with the bracing protocol.

Table-VI: Distribution of foot according to Pirani score before and at different stages of treatment

Wilcoxon Signed Ranks test was done to measure the level of significance.

	Mean±SD	Min-Max	p-value
Before treatment	5.35±0.76	4 – 6	
Before tenotomy	1.74±0.77	1 – 4	<0.001
After tenotomy	0.83±0.60	0 – 3	<0.001
Before application of SFAB	0.50±0.69	0 – 3	<0.001
After 2 weeks of SFAB	0.34±0.69	0 – 3	<0.001
At final follow up	0.33±0.89	0 – 4	<0.001

Table VI shows Pirani score before and at different stages of treatment. Pirani score significantly reduced before tenotomy, after tenotomy, before application of SFAB, after 2 weeks of SFAB, and at final follow up comparing with before treatment.

Table VII: Distribution of foot according to outcome (n=155)

Outcome	Frequency (n)	Percentage (%)
Unsatisfactory correction	5	3.23
Satisfactory correction	150	96.77
Total	155	100.0

Table-VII shows distribution of foot according to complications. Two patients (3.23% of the total) experienced skin problems, such as allergies, itching, and skin rashes. All it took to heal this was to keep the casting off. In total, the two feet's skin healed in seven days. The child's parents were instructed to manually stretch their child's foot for seven days, but no cast or corrective manipulation was placed until the child's skin condition returned to normal. Following that, the casting was resumed where it had been stopped.

Discussion:

The most prevalent congenital foot abnormality in the pediatric age range is called CTEV. In spite of this, its management is still unclear⁷. Clubfoot, also known as congenital talipes equine varus, is a complex foot deformity that must be corrected with much care and attention by the

treating physician as well as the patient's parents. Getting a plantigrade foot with high mobility and no discomfort is the major goal of treatment for congenital clubfoot⁸. Most people feel that non-surgical treatment is the best course of action for congenital clubfoot⁹. The Ponseti regimen is being used by the current management to transition from an operative to a more conservative course of care¹⁰. The pathoanatomy of clubfoot gives a solid foundation for the Ponseti approach⁷. As soon as possible, ideally in the first week of life, treatment should begin. If the right gentle manipulations and plaster casts are used, most clubfoot cases can be rectified in 4-6 weeks, culminating in an Achilles tenotomy. But mastery of the technique needs much training, experience, and repetition¹¹. The Ponseti method of serial manipulation and casting is widely used in CTEV treatment facilities. Numerous writers have written on their experiences¹². From July 2022 to December 2022, a prospective observational study was conducted in the orthopedic surgery departments of the 250-bed general hospital in Gopalganj and the Sheikh Sayera Khatun Medical College hospital in Gopalganj. The study included 100 patients (155 clubfeet) of both sexes who had been diagnosed with congenital idiopathic clubfoot and were older than 6 months. The clinical examination and history confirmed the diagnosis. Treatment was administered using the Ponseti technique, and SFAB was used to maintain the correction. Using the Pirani scoring method, the severity, degree of deformity repair, and ultimate result were evaluated. In a different study, Singh et al. (2011)¹⁴ discovered that the patients' ages ranged from 3 to 48 weeks, with the majority of them showing up within three months of giving birth. There was no prior treatment for either the patient or the foot. Out of the 146 feet in their study, 48 feet had received partial treatment somewhere else, and the remaining 98 feet were given to Mootha et al. (2011)¹¹ first. Singh et al. (2011)¹⁴ discovered in another study that eight patients had previously undergone two to three manipulations and plastering at another facility. Likewise, Abbas et al. (2008)⁷ discovered that the involvement of the foot was 56% bilateral, 29% right, and 15% left sided. Porecha et al. (2011)¹² discovered in another study that 36.73% of participants had bilateral involvement, 54.84% had involvement in the right foot, and 45.16% had participation in the left foot. Four to eight casts were required. Similar to this study, Mootha et al. (2011)¹¹ discovered in their investigation that the necessary number of casts was 4–13. In their investigation, Porecha et al. (2011)¹² discovered that the average number of casts was 6–8. In a different study, Singh et al. (2011)¹⁴ discovered that the range of casts applied was 5-9.

94.84% of the feet needed a tenotomy. Similar to this study, Singh et al., (2011)¹⁴ reported that 81.31% of feet received percutaneous tenotomy. Ninety percent of the patients in the Mootha et al., (2011)¹¹ study needed a tendon Achilles tenotomy. Since there were no objective ways to monitor compliance with the Steenbeek Foot Abduction Brace

(SFAB), verbal reports from parents regarding their use of the brace served as the main way to gauge compliance. In this study, SFAB was applied correctly in 97.42% of the feet, while 2.58% of the feet were non-compliant. Despite having informed the parents of the significance of routine long-term splinting, noncompliance nevertheless happened. Poor brace compliance was a big problem, particularly for kids from lower socioeconomic backgrounds and for parents who had low educational attainment. According to Mootha et al. (2011)¹¹, a significant proportion of their patients—21.8%—had poor brace compliance. A further study by Porecha et al. (2011)¹² found that 28.57% of the relapsed cases had impaired splint compliance. The follow-up period lasted between six and twelve months. Time constraints resulted in a shorter follow-up period than other research in the literature. The follow-up period for Singh et al. (2011)¹⁴ was 6–24 months. The patients in a different study by Mootha et al., (2011)¹¹ were followed for two to seven years. The average follow-up duration in another study by Porecha et al., (2011)¹², was five years. The mean Pirani score at presentation was 5.35 ± 0.76 and at final follow-up was 0.33 ± 0.89 . The reduction in the Pirani score before treatment and at final follow-up was statistically significant ($p < 0.001$). Mootha et al., (2011)¹¹ found the mean initial Pirani score for the responsive patients to be 4.5 and at follow-up for those patients to be 0.5. In another study by Abbas et al., (2008)⁷, the mean precorrection Pirani score was 4.26 and the postcorrection mean score was 1.3, the difference between the two was statistically significant. Few complications were encountered. 5 patients developed skin complications like skin rash, allergy and itching. All it took to heal this was to keep the casting off. Two individuals out of the 49 in the Porecha et al., (2011)¹² study had a plaster sore on the lateral aspect of the skin covering the talar head. That merely required local dressing to heal. The sore took seven days to heal on average. The corrective cast and manipulation were not applied until the wound had healed.

5 (3.23%) of the 150 feet had an inadequate correction, whereas 96.77% of the feet had a successful correction and reacted to the Ponseti treatment. Comparable outcomes were observed in the research carried out by Mootha et al. (2011)¹¹, wherein of the 146 feet, 87.7% showed response to the first treatment, while 12.3% of the feet required posteromedial medial soft tissue release, 8 of the feet were atypical at presentation, and 5 of the feet were resistant to the first treatment. After first success, 15.6% of foot relapsed. The most frequent reason for the deformity to recur in all of the relapsing feet in their study was poor compliance with the Dennis Browne splint. Using the functional Ponseti Scoring System, Porecha et al. (2011)¹² obtained good to excellent results in 86.56% of feet at mean follow-up after five years. They completed the first adjustment in all 100 feet by using the Ponseti method. 28.35% of the feet experienced relapse at different ages; of these, 52.63% were repaired using the Ponseti casting procedure, and 47.37% were not amenable to

it. It was believed that the primary reason for those patients' failure with the Denis Browne splint was poor compliance. With a mean follow-up period of 15 months, 90.65% of feet responded to initial casting in a different study conducted by Sing et al. (2011)¹³. After 10 feet did not improve with the first course of treatment, considerable softtissue release was necessary. After an initial period of effectiveness, 32.71% experienced recurrences; 19 of these cases were effectively managed with repeat casting, tenotomy, and/or casting. The remaining 16 required extensive soft tissue release and external fixator application. The primary reason for the patients' failure with the foot-abduction orthoses (Denis Browne splint) was believed to be poor compliance. With anecdotal or detailed follow-up spanning more than 30 years, Ponseti reported a success rate of over 90% with the casting technique he invented.

Conclusion:

It is concluded that the Ponseti casting technique is an effective means of treating CTEV deformity, with good outcomes and negligible morbidity. Even in the neonatal stage, this approach is easy to use, affordable, low-invasive, and uncomplicated. It is best carried out in an outpatient facility without the need for general anesthesia.

Conflict of Interest: None.

Acknowledgement:

I would like to acknowledge the contributions of all co-authors of this article.

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Morphology and Treatment of Tibial Fracture in Adult Patients at Teaching and Referral Hospital

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Abstract

Introduction with Objective: Tibia fractures are the most common long bone fractures in adult. The aim of the present study was to assess the morphology and treatment of tibial fracture in adult patients at a tertiary hospital. **Materials and Methods:** This Prospective Study was carried out among 48 patients attending at the department of Orthopedics Surgery at Chittagong Medical College Hospital, Chittagong for the treatment tibial fracture within the defined period from May 2022 to April 2023. Total 4 patients were dropped out in the middle of follow up. So follow up was done among 44 patients. All the data were compiled and sorted properly and the quantitative data was analyzed statistically by using Statistical Package for Social Science. **Result:** Out of 48 patients, the mean $\pm$ SD age of the patients was 36.98 ± 8.240 years. Most of the patients (83.33%) were male. According to type of fracture, 45.8% patients had both 42A (1, 2, 3) and 42B (2, 3) type and 8.3% patients had 42C (3) type of fracture. Regarding location of fracture, 52.1% patients had proximal 1/3 of shaft fracture and 47.9% patients had middle 1/3 of shaft fracture of Tibia. Average mean $\pm$ SD duration of operation was 83.25 ± 10.903 minutes (range: 60-110 minutes). Average mean $\pm$ SD fluoroscopy time was 110.48 ± 10.078 seconds (range: 90-134 seconds). Average mean $\pm$ SD radiological union time was 3.44 ± 0.841 months (range: 3-5 month). Average mean $\pm$ SD range of motion (ROM) was 110.00 ± 2.753 o (range: 105-115o) after 1 month, 120.66 ± 5.048 o (range: 113-128o) after 3 months, 124.11 ± 4.260 o (range: 118-130o) after 5 months and 128.11 ± 3.294 o (range: 123-133o) after 6 months. Average mean $\pm$ SD range of Lysholm knee score was 57.55 ± 2.256 (range: 55-62) after 1 month, 67.00 ± 3.941 (range: 60-73) after 3 months, 77.50 ± 5.364 (range: 70-86) after 5 months and 86.64 ± 5.545 (range: 72-95) after 6 months. After operation with intramedullary nail approach most of the patients (79.5%) functional outcome after six month was excellent. **Conclusion:** Treatment of tibial fracture was mainly surgical using locked intramedullary nail.

Keywords: Tibial fracture, Morphology and treatment.

Number of Tables: 06; Number of References: 12; Number of Correspondences: 04.

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Introduction:

Tibial shaft fractures are the most prevalent type of tibia fracture¹. The most frequent long bone fracture, accounting for 2% of all fractures in adults, is a tibial shaft fracture². A large-scale study of

tibial shaft fractures from a trauma databank found an incidence of 16.9/100,000 population with a bimodal distribution of peaks at ages 20 and 50³. The risk is somewhat higher in males (males 21.5/100,000 and females 12.3/100,000 incidence per year). The mechanism of injury among older adults primarily is fall, while motor vehicle collisions are the primary cause in younger age groups⁴. In comparison to other long bones, diaphyseal tibia fractures have one of the highest rates of non-union and malunion. Low-energy spiral fractures are more common in people over 50, while high-energy transverse and comminuted fractures are more common in patients under 30. Low-energy tibial fractures are more frequently caused by sports injuries and falls from standing height, whereas high-energy tibial diaphyseal fractures are most frequently caused by vehicle trauma⁵. The treatment of choice for operative fixation is the insertion of an intramedullary nail (IMN) with interlocking screws⁶. IMN has long been the standard procedure for surgical treatment of tibial shaft fracture, allowing for minimally invasive, dynamic fracture fixation and preservation of the extraosseous blood supply by adhering to the concept of biological osteosynthesis. And it has the advantages of early mobilization, high union rates, and few wound complications^{7,8}.

Materials & Methods:

This Prospective study was carried out among 48 patients attending at the department of Orthopaedic Surgery at Chittagong Medical College Hospital; Chittagong for the treatment tibial fracture within the defined period from May 2022 to April 2023. Ethical clearance was obtained from the Institutional Review Board (IRB) of CMCH. Purposive sampling was done according to availability of the patients. The collected data were entered into the computer and analyzed by using SPSS (version 20.1) to assess the morphology and treatment of tibial fracture in adult patients. All fractures were treated with a reamed intra medullary nailing in a non-dynamized mode. Total 4 patients were dropped out in the middle of follow up. So follow up was done among 44 patients.

Results:

Out of 48 patients, the mean $\pm$ SD age of the patients was 36.98 ± 8.240 years. The youngest and the oldest patient were 20 and 53 years. About 40 patients (83.33%) were male and 08 (16.66%) were female (Table I).

Table I: Age and Gender Distribution of the study patients (n=48)

Parameter	Mean $\pm$ SD	Range
Age (years)	36.98 ± 8.240	20-53
Gender Distribution	Number	Percentage
Male	40	83.33
Female	08	16.66

Data was expressed as frequency (%) or mean $\pm$ SD (range)

Table represents that, among 48 patients, according to type of fracture, 45.8% patients had both 42A (1, 2, 3) and 42B (2, 3) type and 8.3% patients had 42C (3) type of fracture. Regarding location of fracture, 52.1% patients had proximal 1/3 of shaft fracture and 47.9% patients had middle 1/3 of shaft fracture of Tibia (Table II).

Table II: Fracture profile of the study population (n=48)

Parameter	Number	Percentage
Type of fracture		
42A (1,2,3)	22	45.8 %
42B (2,3)	22	45.8 %
42C (3)	04	8.3%
Location of fracture		
Proximal	25	52.1
Middle	23	47.9

Table III shows that, average mean $\pm$ SD duration of operation was 83.25 ± 10.903 minutes (range: 60-110 minutes). Average mean $\pm$ SD fluoroscopy time was 110.48 ± 10.078 seconds (range: 90-134 seconds). Average mean $\pm$ SD radiological union time was 3.44 ± 0.841 months (range: 3-5 month) (Table III).

Table III: Distribution of the patients according to duration of operation, fluoroscopy time and radiological union time with approach of intramedullary nailing (n=44)

Parameter	Number
Duration of operation (minutes)	
Mean $\pm$ SD	83.25 ± 10.903
Range	60-110
Fluoroscopy time (seconds)	
Mean $\pm$ SD	110.48 ± 10.078
Range	90-134
Radiological union time (month)	
Mean $\pm$ SD	3.44 ± 0.841
Range	3-5

Table IV shows that, average mean $\pm$ SD range of motion (ROM) was $110.00 \pm 2.753^\circ$ (range: $105-115^\circ$) after 1 month, $120.66 \pm 5.048^\circ$ (range: $113-128^\circ$) after 3 months, $124.11 \pm 4.260^\circ$ (range: $118-130^\circ$) after 5 months and $128.11 \pm 3.294^\circ$ (range: $123-133^\circ$) after 6 months.

Table IV: Range of motion (ROM) of the patients after 1 month, 3 months, 5 months and 6 months (n=44)

ROM (o)	Number
After 1 month	
Mean $\pm$ SD	110.04 ± 2.753
Range	105-115
After 3 months	
Mean $\pm$ SD	120.66 ± 5.048
Range	113-128
After 5 months	
Mean $\pm$ SD	124.11 ± 4.260
Range	118-130
After 6 months	
Mean $\pm$ SD	128.11 ± 3.284
Range	123-133

Table V shows that, average mean $\pm$ SD range of Lysholm knee score was 57.55 ± 2.256 (range: 55-62) after 1 month,

67.00 $\pm$ 3.941 (range: 60-73) after 3 months, 77.50 $\pm$ 5.364 (range: 70-86) after 5 months and 86.64 $\pm$ 5.545 (range: 72-95) after 6 months.

Table V: Functional assessment by Lysholm knee score of the patients after 1 month, 3 months, 5 months and 6 months (n=44)

Lysholm knee score	Number
After 1 month	
Mean $\pm$ SD	57.55 $\pm$ 2.256
Range	55-62
After 3 months	
Mean $\pm$ SD	67.00 $\pm$ 3.941
Range	60-73
After 5 months	
Mean $\pm$ SD	77.50 $\pm$ 5.364
Range	70-86
After 6 months	
Mean $\pm$ SD	86.64 $\pm$ 5.545
Range	72-95

Table VI shows that, after operation with intramedullary nail approach most of the patients (79.5%) functional outcome after six month was excellent.

Table VI: Distribution of the patients according to functional outcome after 6 months with IMN approach (n=44)

Functional outcome	Number	Percentage
Poor	4	9.1
Satisfactory	5	11.4
Excellent	35	79.5

Discussion:

In this study the mean $\pm$ SD age of the patients was 36.98 $\pm$ 8.240 years. About 40 patients (83.33%) were male and 08 (16.66%) were female. In Shugie, Y., Kebede, S. et. al (2025) study mean age of the patients was 36.3 $\pm$ 13.9 years and most of the patients were male (76.3%)⁹. In our study, among 48 patients, according to type of fracture, 45.8% patients had both 42A (1, 2, 3) and 42B (2, 3) type and 8.3% patients had 42C (3) type of fracture. 52.1% patients had proximal 1/3 of shaft fracture and 47.9% patients had middle 1/3 of shaft fracture of Tibia. In Wanjema, S. et. al (2020) study, Middle 1/3 tibia shaft was the commonest site (52.7%) of fracture and type A fractures were the most common comprising 47.3%¹⁰. After operation with intramedullary nail approach most of the patients (79.5%) functional outcome after six month was excellent. These findings are compared with some studies as they recommend that based on the clinical outcomes of suprapatellar and infrapatellar tibial intra medullary nail insertion, the suprapatellar and infrapatellar approaches can get similar knee functional outcomes in the treatment of tibial shaft fracture (Al-Azzawi et al., 2021; Ringenberg et al., 2022)^{11,12}.

Conclusion:

Tibial fracture was commonly occur at proximal 1/3 level of shaft. Tibial shaft fractures are typically treated using intramedullary nailing (IMN), which is a traditional method. After operation with intramedullary nail approach functional outcome of the patients after six month was excellent.

Conflict of Interest: None.

Acknowledgements:

The authors are grateful to the entire staff of department of Orthopaedic Surgery at Chittagong Medical College Hospital, Chittagong during the study period.

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Generalized Anxiety Disorder and Sleep Quality of Day Laborers during COVID-19 Pandemic

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Abstract

Introduction: Since December 2019, Coronavirus Disease (COVID-19) has had a significant impact on the world. It had severe economic repercussions in Bangladesh. The lockdown had interfered with the production, availability, and supply of enough food. As a result, food prices have increased, making it harder for low-income individuals, such as day laborers, to survive. **Aims and objectives:** The purpose of the study was to determine the level of generalized anxiety disorder (GAD) and evaluate the association between sleep quality and GAD among day laborers during the COVID-19 pandemic. **Materials and Methods:** This cross-sectional study was conducted among 227 construction workers, rickshaw pullers, van pullers, and other day laborers from the Faridpur district. Participants were conveniently selected and interviewed in person using a semi-structured questionnaire, with data collection taking place at their convenience from January to December 2020. **Results:** The majority of respondents reported minimal anxiety (75.3%), followed by mild anxiety (14.5%), moderate anxiety (9.7%), and severe anxiety (0.4%). most respondents had good sleep quality (74.4%), while 25.6% experienced poor sleep quality. A strong positive correlation was observed between GAD scores and sleep quality scores ($p < 0.05$). A significant association was found between anxiety and sleep quality, with higher levels of anxiety linked to poorer sleep quality. Factors such as age, marital status, smoking, and years of work experience were significantly associated with sleep quality ($p < 0.05$). Unmarried participants were more likely to report poor sleep, potentially due to fewer family-related responsibilities compared to their married counterparts. **Conclusion:** This study revealed that day laborers during the COVID-19 pandemic had a significant mental health charges. It should be widespread procedure to continuously monitor and assess the psychological effects of the day workers during this period.

Keywords: Generalized anxiety disorder, sleep quality, day laborers, COVID-19 pandemic.

Number of Tables: 08; Number of Figure: 01; Number of References: 23; Number of Correspondences: 03.

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Introduction:

COVID-19 has a dangerous effect on the mental health of the general population¹. The pandemic has a devastating impact on both the physical and mental health of individuals. However, differences in education and occupation lead to varying levels of threat perception, causing people to experience different degrees of anxiety and insomnia severity^{2,3}. The nationwide lockdown resulted in significant challenges for the migrant workforce and day laborers, as many lost their jobs and

were forced to leave their places of employment to return to their villages due to a lack of income³. The economic damage has led to unemployment, loss of income, and economic uncertainty, disproportionately affecting informal workers, day laborers, and blue-collar workers⁴. Economic inequality has been exacerbated, particularly among ethnic minorities, small-scale farmers, migrant workers, and women, who face heightened vulnerability to economic hardship^{5,6}. Mental stress significantly impacts the poorest segments of the population⁷. During the lockdown in India, thousands of migrant workers crowded railway and bus stations in desperate attempts to return to their villages, often disregarding lockdown rules⁸. This situation created a vicious cycle of susceptibility to infection, quarantine, stress, insomnia, and violation of preventive measures^{9,10}. The heightened anxiety among these workers forced many to travel thousands of miles on foot without provisions for food or shelter. Migrant workers also faced psychosocial issues, including high levels of stress and fears related to COVID-19, compounded by predisposing factors like occupational hazards and chronic malnutrition. Additionally, the lack of family support and feelings of loneliness made them vulnerable to mental health problems, such as depression and anxiety¹¹. A case study in Bangladesh documented numerous suicide cases between April 6 and April 24, 2020¹². Most of the victims belonged to low-income groups, including day laborers, auto-rickshaw drivers, garment workers, and small business owners, highlighting the precarious psychosocial condition of Bangladesh's low-income population. This evidence suggests that the pandemic adversely affected the mental health of the general public, particularly the poorest segments^{12,13}. The COVID-19 pandemic has also contributed to an economic crisis among Bangladesh's poorest populations, including day laborers. Many day laborers lost their jobs during the nationwide lockdown, while small and medium-sized businesses faced severe disruptions, with some going bankrupt. Consequently, this study aims to assess the mental health burden among Bangladeshi day laborers during the time.

Materials and Methods:

This cross-sectional study aimed to assess the status and association between generalized anxiety disorders (GAD) and sleep quality among day laborers during the COVID-19 pandemic. Data were collected in Faridpur Sadar, Modhukhali, Boalmari, Saltha, and Nagarkanda Upazila in the Faridpur district of the Dhaka division, Bangladesh. The study population included conveniently selected 227 construction workers, rickshaw pullers, van pullers, along with day laborers employed in the Faridpur district. Participants who fulfilled the following criteria were eligible for inclusion: presently working in day labour-intensive jobs like construction, rickshaw, or van pulling; at least 18 years old; worked as a day laborer over 6 months prior or more. Data were collected through face-to-face interviews using a semi-structured questionnaire at the participants' convenience from January to December 2020. The questionnaire included

Generalized Anxiety Disorder-7 (GAD-7) scale for anxiety assessment, Pittsburgh Sleep Quality Index (PSQI) scale for sleep quality evaluation, and questions on socio-demographics, behavior, and mental health. Collected data were reviewed for consistency, relevancy, and quality. They were then compiled, coded, and analyzed using IBM SPSS Statistics Version 25 (Armonk, NY, USA). Missing data were identified through frequency analysis. Descriptive statistics, including numbers and percentages, were used to summarize socio-demographic, occupational, behavioral, anxiety, and sleep-related variables. Inferential analyses, such as Chi-square tests and logistic regression, were performed to evaluate associations between variables.

Ethical considerations

Ethical clearance was obtained following the Declaration of Helsinki protocols. Verbal informed consent was sought from participants using a translated Bengali consent form. Participants were informed about the study's objectives, confidentiality measures, and their right to refuse or withdraw at any stage. No invasive procedures or interventions were involved, and participation was entirely voluntary. Ethical approval was obtained from the Institutional Review Board (IRB) of the National Institute of Preventive and Social Medicine (NIPSOM), Dhaka 1212, Bangladesh. (Reference: NIPSOM/IRB/2020/1225)

Results:

The respondents' ages ranged from 18 to 65 years, with a mean of 32.46 ± 12.01 years. The majority of respondents were male (96.9%), with females comprising 3.1%. Islam was the predominant religion, practiced by 98.2% of participants. Most respondents were married (72.7%), while the remaining 27.3% were unmarried. Regarding education, 51.5% had completed classes 1–5, 23.8% had completed classes 6–8, 9.3% were illiterate, 8.4% had completed classes 9–10, and 7.0% had achieved S.S.C. level or higher. In terms of family size, 74.0% of respondents belonged to families with 1–5 members, 25.6% to families with 6–10 members, and 0.4% to families with 16–20 members (Table I).

Table II shows that over half of the respondents were construction workers (51.5%), followed by rickshaw pullers (34.4%) and van pullers (14.1%). The daily income of respondents ranged from 200 to 800 taka, with a mean of 449.07 ± 104.55 taka. Income distribution revealed that 47.1% of participants earned 400–499 taka, 22.0% earned 500–599 taka, 15.9% earned 300–399 taka, 8.4% earned 600–699 taka, 3.1% earned 200–299 taka, 2.2% earned 800–899 taka, and 1.3% earned 700–799 taka. The daily working hours of respondents ranged from 5 to 12 hours, with a mean of 7.98 ± 0.731 hours. Among them, 88.1% worked 8 hours or less daily, while 11.9% worked 9–12 hours per day. The duration of current occupation ranged from 8 months to 40 years, with a mean of 9.88 ± 9.07 years. In terms of occupational duration, 55.1% had been engaged in their current occupation for 6 months to 9 years, 26.9% for 10–19 years, 12.3% for 20–29 years, 4.0% for 30–39 years, and 1.8% for 40–49 years.

Regarding the number of working family members, 49.3% of respondents had one working family member, 39.6% had two, 7.9% had three, 1.8% had four, 0.9% had five, and 0.4% had eight working family members.

Table III shows the leisure activities and behavioral characteristics of the respondents. Among them, 64.3% spent their leisure time gossiping, 32.2% watching TV, and 3.5% playing games. Regarding smoking habits, 47.1% were current smokers, 40.1% had never smoked, and 12.8% were past smokers. Among current smokers, 43.0% had been smoking for 1–5 years, 25.2% for 6–10 years, 10.3% for 11–15 years, 8.4% for 16–20 years, 5.6% for 26–30 years, 3.7% for 21–25 years, 1.9% for 31–35 years, and 1.9% for 36–40 years. The number of cigarettes smoked daily varied: 43.0% smoked 1–5 sticks, 37.4% smoked 6–10 sticks, 10.3% smoked 11–15 sticks, 7.5% smoked 16–20 sticks, and 0.9% each smoked 21–25 or 26–30 sticks. Alcohol consumption was minimal among respondents, with the majority (99.6%) never having consumed alcohol and only 0.4% being past alcohol consumers.

Table IV demonstrates that the majority of respondents experienced minimal anxiety (75.3%), followed by mild anxiety (14.5%), moderate anxiety (9.7%), and severe anxiety (0.4%). Regarding sleep quality, most respondents had good sleep quality (74.4%), while 25.6% reported poor sleep quality.

Figure 1 shows that the Pearson correlation analysis revealed a strong positive correlation between the GAD score and the sleep quality scores ($r=+0.894$, $p<0.001$).

The majority of respondents were aged 21–30. Chi-square analysis showed a significant association between age and sleep quality ($p<0.05$). Most respondents were married, and marital status also showed a significant association with sleep quality ($p<0.05$). The majority had been in their current occupation for 0–9 years, with a significant association between occupation duration and sleep quality ($p<0.05$). Most respondents were current smokers, and smoking status was significantly associated with sleep quality ($p<0.05$). Additionally, the majority had smoked for 1–5 years, with a significant association between smoking duration and sleep quality ($p<0.05$) (Table VI).

Table I: Socio-demographic characteristics of the respondents (n=227)

Characteristics	Frequency (n)	Percent (%)
Age group (year)		
≤ 20	37	16.3
21–30	86	37.9
31–40	58	25.6
41–50	22	9.7
51–60	20	8.8
61–70	4	1.8
Sex		
Male	220	96.9
Female	7	3.1
Religion		
Islam	223	98.2

Hindu	4	1.8
Marital status		
Married	165	72.7
Unmarried	62	27.3
Educational status		
Illiterate	21	9.3
Class 1 – 5	117	51.5
Class 6 – 8	54	23.8
Class 9 – 10	19	8.4
S.S.C. and above	16	7.0
Number of family members		
1 - 5	168	74.0
6 - 10	58	25.6
11 - 20	1	0.4

Table II: Occupation-related characteristics of the study population (n=227)

Characteristics	Frequency (n)	Percent (%)
Occupation		
Rickshaw puller	78	34.4
Van puller	32	14.1
Construction worker	117	51.5
Daily income (in taka)		
200 - 299	7	3.1
300 - 399	36	15.9
400 - 499	107	47.1
500 - 599	50	22.0
600 - 699	19	8.4
700 - 799	3	1.3
800 - 899	5	2.2
Daily working hours (in hours)		
≤8	200	88.1
9–12	27	11.9
Duration of current occupation (in years)		
Month 6 to 9 years	125	55.1
10 - 19	61	26.9
20 - 29	28	12.3
30 - 39	9	4.0
40 - 49	4	1.8
Number of working family members		
1	112	49.3
2	90	39.6
3	18	7.9
4	4	1.8
5	2	0.9
8	1	0.4

Table III: Behavior-related characteristics of the study population (n=227)

Characteristics	Frequency (n)	Percent (%)
Activities in leisure time		
Gossiping	146	64.3
Watching TV	73	32.2
Playing game	8	3.5
Smoking status of day laborers		
Current smoker	107	47.1
Past smoker	29	12.8
Never smoked	91	40.1

Duration of smoking of current smoker (n=107)		
1 - 5	46	43.0
6 - 10	27	25.2
11 - 15	11	10.3
16 - 20	9	8.4
21 - 25	4	3.7
26 - 30	6	5.6
31 - 35	2	1.9
36 - 40	2	1.9
Number of sticks taken (n=107)		
1 - 5	46	43.0
6 - 10	40	37.4
11 - 15	11	10.3
16 - 20	8	7.5
21 - 25	1	0.9
26 - 30	1	0.9
Alcohol consumption status		
Current alcohol consumer	0	0
Past alcohol consumer	1	0.4
Never consumed	226	99.6

Table IV: GAD and sleep quality status of the study population (n=227)

GAD and sleep quality status	Frequency (n)	Percent (%)
Level of anxiety		
Minimal	171	75.3
Mild	33	14.5
Moderate	22	9.7
Severe	1	0.4
Level of sleep quality		
Good	169	74.4
Poor	58	25.6

Table V: Association between generalized anxiety disorder and sleep quality (n=227)

Level of anxiety	Level of sleep quality		χ^2 value	p-value
	Good	Poor		
	n (%)	n (%)		
Minimal	168 (74.0)	3 (1.3)	206.408	0.000
Mild	1 (0.4)	32 (14.1)		
Moderate	0 (0.0)	22 (9.7)		
Severe	0 (0.0)	1 (0.4)		

p<0.05 considered as statistically significant value

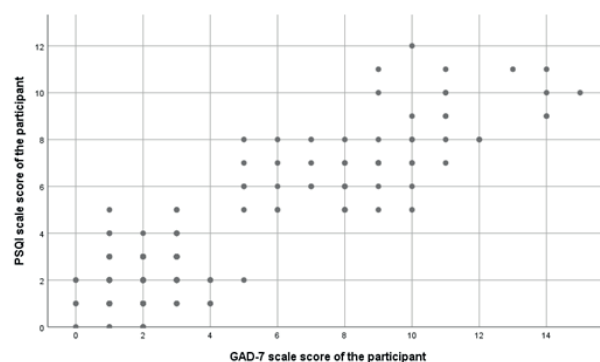


Figure 1: Correlation Coefficient between GAD and sleep quality (n=227)

In the Univariate logistic regression analysis, several factors were found to be significantly associated with poor sleep quality. Participants over the age of 30 were 2.43 times more likely to report poor sleep quality compared to those under 30 (OR= 2.430, 95% CI: 1.317-4.487). Married participants had a 4.30 times higher likelihood of poor sleep quality compared to unmarried participants (OR= 4.295, 95% CI: 1.740-10.603). Smokers were 2.26 times more likely to experience poor sleep quality compared to non-smokers (OR= 2.259, 95% CI: 1.225-4.165). Participants with more than 10 years of smoking duration were 3.21 times more likely to have poor sleep quality than those with less than 10 years of smoking (OR= 3.214, 95% CI: 1.642-6.289). Additionally, participants with over 10 years of occupation duration had a 2.10 times higher likelihood of poor sleep quality compared to those with less than 10 years of occupational experience (OR= 2.104, 95% CI: 1.148-3.858). All associations were statistically significant (Table VII).

In the multivariate logistic regression models, the strength of the associations weakened, but some factors remained significant. Married participants were 2.78 times more likely to experience poor sleep quality compared to unmarried participants (OR= 2.779, 95% CI: 1.007-7.674) (Table VIII).

Table VI: Association between different variables and sleep quality (n=227)

Variables	Level of sleep quality		χ^2 value	p-value
	Good	Poor		
	n (%)	n (%)		
Age (in years)	35 (15.4)	2 (0.9)	12.988	0.023
≤ 20	66 (29.1)	20 (8.8)		
21-30	37 (16.3)	21 (9.3)		
31-40	15 (6.6)	7 (3.1)		
41-50	13 (5.7)	7 (3.1)		
51-60	3 (1.3)	1 (0.4)		
61-70				
Marital status			11.298	0.001
Married	113 (49.8)	52 (22.9)		
Unmarried	56 (24.7)	6 (9.7)		
Duration of current occupation (in years)				
0-9	101 (44.5)	24 (10.6)	10.370	0.035
10-19	42 (18.5)	19 (8.4)		
20-29	18 (7.9)	10 (4.4)		
30-39	7 (3.1)	2 (0.9)		
40-49	1 (0.4)	6 (1.3)		
Smoking status				
Current smoker	71 (31.3)	36 (15.9)	6.995	0.030
Past smoker	24 (10.6)	5 (2.2)		
Never smoked	74 (32.6)	17 (7.5)		
Duration of smoking (in years)				
1-5	35 (32.7)	11 (10.3)	16.717	0.019
6-10	16 (15.0)	11 (10.3)		
11-15	7 (6.5)	4 (3.7)		
16-20	8 (7.5)	1 (0.9)		
21-25	0 (0.0)	4 (3.7)		
26-30	2 (1.9)	4 (3.7)		
31-35	2 (1.9)	0 (0.0)		
36-40	1 (0.9)	1 (0.9)		

p<0.05 considered as statistically significant value

Table VII: Univariate logistic regression of different variables associated with poor sleep quality (n=227)

Poor sleep quality				
Variables	OR	p-value	95% CI for OR lower	95% CI for OR higher
Age				
18-30 years	1.00	0.005	1.317	4.487
31-65 years	2.430			
Marital status				
Married	4.295	0.002	1.740	10.603
Unmarried	1.00			
Smoking history				
Smoker	2.259	0.009	1.225	4.165
Non-smoker	1.00			
Year of smoking				
0-9 years	1.00	0.001	1.642	6.289
10-40 years	3.214			
Duration of occupation				
0-9 years	1.00	0.016	1.148	3.858
10-40 years	2.104			

p<0.05 considered as statistically significant value

Table VIII: Multivariate logistic regression of different variables associated with poor sleep quality (n=227)

Variables	AOR	p-value	95% CI for OR lower	95% CI for OR higher
Age			0.511	2.898
18-30 years	1.00	0.657		
31-65 years	1.217			
Marital status				
Married	2.779	0.049	1.007	7.674
Unmarried	1.00			
Smoking history				
Smoker	1.676	0.212	0.745	3.772
Non-smoker	1.00			
Year of smoking				
0-9 years	1.00	0.422	0.566	3.886
10-40 years	1.484			

p<0.05 considered as statistically significant value

Discussion:

The study aimed to investigate the impact of socio-demographic and socio-economic factors on anxiety and sleep quality among day laborers in Bangladesh during the COVID-19 pandemic. These workers, primarily male (96.9%), were from Faridpur district, with an age range of 18-65 years (mean age 32.46 ± 12.01). The findings highlight notable socio-demographic differences compared to other countries^{3,6}, such as China, where a study found a more balanced gender distribution (45.4% male and 54.6% female)². This gender disparity may stem from conservative cultural norms in Bangladesh, which restrict women from working as day laborers. The educational level of Bangladeshi day laborers was also lower, with 51.5% having only completed primary education, whereas Chinese participants had higher educational qualifications². The study also observed differences in marital status, with 72.7% of Bangladeshi participants being married, which contrasts with the 54% observed in a similar Chinese study¹⁴. The family structure in Bangladesh appeared more nuclear, with 74.4%

of respondents living in families of 1-5 members. The daily income of participants ranged from 200 to 800 taka, with 47.1% earning between <500 taka^{12,15}. Despite working predominantly 8 hours or less daily, the study identified violations of labor laws, with many laborers working beyond the regulated hours due to economic instability¹⁶. Among the participants, 64.3% spent their leisure time gossiping, while 32.2% watched TV, and 3.5% played games. Regarding smoking habits, 47.1% were current smokers, 40.1% had never smoked, and 12.8% were past smokers. In a similar study found that 46.7% of participants were smokers and 53.3% were nonsmokers¹⁷. These findings are consistent with other studies that report higher rates of current smoking among day laborers. In terms of mental health, the study revealed that 75.3% of participants had minimal anxiety, and 25.6% reported poor sleep quality. The studies indicated that the general population experienced an increase in anxiety-related symptoms and sleep disorders during the occurrence of a major infectious disease^{10,18}. A significant association was found between anxiety and sleep quality, with higher anxiety correlating to poorer sleep^{9,19}. Factors such as age, marital status, smoking, and years of work experience were significantly associated with sleep quality (p<0.05), which were almost similar to these studies^{20,21}. Specifically, unmarried participants were more likely to experience poor sleep, potentially due to fewer family-related responsibilities compared to their married counterparts²². These results were consistent with similar studies conducted in other regions, such as China²⁰ and Latin America²³, which observed high levels of anxiety and poor sleep quality among day laborers. The study emphasizes the psychological toll the COVID-19 pandemic has had on vulnerable populations, particularly day laborers. It also underscores the need for policies to address the socio-economic disparities and mental health challenges faced by these workers.

Conclusion:

The countries faced multiple challenges as a result of the global spread of COVID-19 and associated morbidity and mortality. The mental health problems of day laborers are one such underappreciated and neglected topic. Day laborers' sleep problems and generalized anxiety disorder have been associated to economic crisis, unemployment, and poverty. These factors are also related to various co-morbidities that may harm day laborers' physical and mental health.

Recommendations:

To discourse mental health concerns and provide psychological support to day laborers, health authorities need to think about establishing multidisciplinary mental health teams at the local, regional, and national levels. In order to help people deal with economic uncertainty and lack of financial security, we need maintain socioeconomic stability during this crisis. We need to make sure that day

workers have enough leisure time and economic diversity. To provide day workers with timely, high-quality, crisis-oriented psychological assistance, the government, non-governmental organizations, and local authorities should work together to address these problems.

Conflict of Interests: None.

Acknowledgments:

We are thankful to the participants' for their substantial participation in the study.

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Clinical Profile and Etiology of Children Presenting with Prolonged Fever in a Tertiary Care Hospital

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Abstract

Introduction: Prolonged fever in children, defined as fever persisting for ≥ 10 days without an initially identifiable cause, is a common yet diagnostically challenging clinical presentation, especially in resource-limited settings. **Aim of the study:** To determine the common causes of prolonged fever and its clinical presentation and outcome which may guide to narrow the diagnostic approach. **Materials and Methods:** A prospective observational study was conducted on 86 children aged 1 year to 12 years admitted with prolonged fever. Detailed history, clinical examination, and a stepwise diagnostic protocol—including baseline and targeted investigations—were used to determine underlying causes. **Result:** The majority were aged between 5 to 10 years (43.02%), followed by 1–5 years (33.72%) and 10–12 years (23.25%). In terms of gender males are predominate (56.97%). The common identifiable causes were Rickettsial fever (31.40%), Leukemia & lymphoma (11.63%), Enteric Fever (10.46%) and Bronchopneumonia (10.46%). In 6.97% of cases, the cause of prolonged fever remained undiagnosed. The most common associated clinical features included chills or rigors (43.02%), Pallor (36.05%), hepatomegaly (26.74%), cough (23.25) and vomiting (20.93%). Categorization of the diseases showed infectious cause predominant (73.25%) then malignancy (13.95%) and connective tissue /autoimmune disease (5.81%). Most hospital stays ranged from 8 to 14 days (50.00%), during which 86.04% recovered, 11.62% were referred, and one death occurred. **Conclusion:** Infectious diseases remain the predominant cause of prolonged fever in children in low-resource settings. However, a notable proportion had non-infectious or undiagnosed etiologies, highlighting the need for a structured, multi-tiered diagnostic approach. Early recognition and context-specific management strategies are essential to improve outcomes.

Keywords: Prolonged fever, pediatric, etiology, tuberculosis, Rickettsial fever, malignancy, undiagnosed fever.

Number of Tables: 05; Number of References: 28; Number of Correspondences: 03.

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clinical entity that accounts for a significant proportion of pediatric hospital visits and admissions globally¹. It is estimated that 4% of all pediatric hospitalizations worldwide are due to fevers persisting beyond one to two weeks, reflecting a notable clinical and economic burden². Prolonged fever—commonly defined as a body temperature $\geq 38^{\circ}\text{C}$ (100.4°F), at least once a day lasting more than 7 to 10 days in the absence of an identifiable source despite initial clinical evaluation. Prolong fever may have a wide spectrum of underlying causes, including both common self-limiting infections and more serious, potentially life-threatening systemic diseases^{3,4}. Prolong fever causes anxiety to parents, on other hand it causes confusion for the physician, leading to unnecessary laboratory tests and medications including multiple antibiotics. Four etiological categories of diseases should be considered: infectious, /autoimmune, malignancy and miscellaneous. The Infectious diseases remain the most prevalent cause, particularly in low- and middle-income countries, where diseases such as tuberculosis, malaria, enteric fever, and a growing burden of arboviral and rickettsial infections continue to dominate⁵⁻⁸. However, with the widespread implementation of vaccination programs, significant improvements in hygiene and sanitation practices, and evolving environmental and socioeconomic conditions, the relative contribution of non-infectious etiologies to prolonged fever has become increasingly evident. These include autoimmune diseases, connective tissue disorders, malignancies such as Acute leukemia, and lymphoma, as well as various inflammatory

Introduction:

Fever is the most common reason for a child to seek medical care. Prolonged fever in children is a frequently encountered yet diagnostically challenging

syndromes like Kawasaki disease, systemic juvenile idiopathic arthritis, and periodic fever syndromes, all of which are now recognized more frequently in clinical practice^{1,9,10}. Moreover, the emergence of atypical infections, changing antimicrobial resistance patterns have further expanded the diagnostic spectrum¹¹. The clinical approach to prolonged fever involves a meticulous and often staged diagnostic process, which begins with comprehensive history-taking and physical examination, followed by targeted investigations such as complete blood counts, inflammatory markers, cultures, and imaging studies¹². In tertiary care like autoimmune panels, bone marrow studies, and imaging modalities such as CT or MRI can facilitate early diagnosis¹. However, in resource-constrained environments, the lack of diagnostic infrastructure often leads to empiric treatment based on clinical suspicion, contributing to overuse of antimicrobials and potential delays in identifying non-infectious causes¹³. Importantly, certain cases remain undiagnosed despite extensive evaluation and may eventually resolve spontaneously, though some may harbor insidious pathologies that carry risks of progression or recurrence¹⁴. The clinical profile of children with prolonged fever varies by age, geographic location, immune status, nutritional state, and local endemic disease patterns—necessitating region-specific data to guide clinicians¹⁵. Understanding the evolving etiological profile and for diagnostic accuracy, optimizing antibiotics use and improving patient outcomes. On this background, the present study was designed to investigate the clinical profile and underlying causes of prolonged fever in pediatric patients, with the goal of contributing to evidence-based diagnostic and treatment strategies that are both effective and appropriate.

Materials and Methods:

This prospective observational study was conducted at the Department of Pediatrics, Khulna Medical College Hospital, Khulna, over a one year period from January 2024 to December 2024. A total of 86 children who presented with prolonged fever were enrolled based on predefined inclusion and exclusion criteria. Prolonged fever was defined as fever lasting at least 10 days at the time of presentation, as reported by the caregivers and verified by healthcare staff through serial axillary and/or oral temperature measurements. Inclusion Criteria were children aged 1 year to 12 years, fever persisting for at least 10 days at presentation and admitted to the pediatric ward during the study period. Exclusion Criteria were children with known immunocompromised conditions at presentation (undergoing chemotherapy, Steroid therapy for >14 days, diagnosed case of aplastic anemia and thalassemia), Children who left against medical advice before diagnosis or treatment completion.

Ethical Considerations:

Prior to enrollment, parents or legal guardians were informed about the purpose and nature of the study, and written informed consent was obtained. The study was conducted in

accordance with ethical principles, and ethical clearance was obtained from the Institutional Ethics Committee.

Data Collection:

After obtaining informed consent from parents or legal guardians, data were collected using a structured questionnaire. Samples were taken as consecutive manner. Information gathered included demographic details (age and gender), clinical features, and relevant epidemiological history such as travel, contacts, parasite exposure, family history and prior medication.

Thorough clinical examination was done on admission and serial temperature charting and daily systemic assessments were recorded throughout hospitalization.

Diagnostic Workup:

All enrolled patients underwent a series of baseline investigations to determine the underlying etiology of prolonged fever. These included complete blood count (CBC), peripheral blood film (PBF), C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), urine routine and microscopy & culture, chest X-ray, blood cultures and tripple antigen test. Based on the presence of clinical suspicion or diagnostic clues, a set of targeted investigations were performed selectively. These included Mantoux test, gastric lavage and stool for Gene Xpert, Ultrasonogram, cerebrospinal fluid (CSF) study, echocardiography, and serological tests for HIV, ICT for Malaria, autoimmune/rheumatological markers like ANA, anti-dsDNA. Where necessary, advanced imaging techniques such as CT scan, MRI, and biopsy were done to establish a definitive diagnosis.

Statistical Analysis:

All data collected from the structured questionnaire were first checked for completeness and accuracy. Data were then analyzed accordingly. Categorical variables were summarized as frequencies (n) and percentages (%). No inferential statistics (e.g., chi-square test, t-test, or regression analysis) were applied, as the primary aim of the study was to describe the clinical spectrum and not to establish causal associations or risk factors.

Result:

The majority were aged between 5 to 10 years (43.02%), followed by 1–5 years (33.72%) and 10-12 years (23.25%). In terms of gender distribution males are predominate (56.97%) (Table I). The common identifiable causes were Rickettsial fever (31.40%), Leukemia& lymphoma (11.63%), Enteric Fever (10.46%) and Bronchopneumonia(10.46%). A small number of patients were diagnosed with serious conditions such as Infective Endocarditis, Empyema Thoracis, complicated Meningoencephalitis, Liver abscess (each 1.16%). In 6.97% of cases, the cause of prolonged fever remained undiagnosed (Table II). The most common associated clinical features included chills or rigors (43.02%), Pallor (36.05%), hepatomegaly (26.74%),cough (23.25) and vomiting (20.93%), (Table III). Categorization of the diseases showed infectious cause predominant (73.25%) then

malignancy (13.95%) and connective tissue /autoimmune disease (5.81%) (Table IV). Most hospital stays ranged from 8 to 14 days (50.00%), among them 86.04% recovered, 11.62% were referred and death occurred 4.65% of total cases (Table V).

Table I: Demographic characteristics of the study population (n=86)

Demographic data	Frequency (n)	Percentage (%)
Age group		
1-5 year	29	33.72
5-10 year	37	43.02
10-12 year	20	23.25
Gender		
Males	49	56.97
Females	37	43.02

Table II: Etiologies of prolonged fever among patients (n=86)

Etiology	Frequency (n)	Percentage (%)
Rickettsial fever	27	31.40
Leukemia/lymphoma	10	11.63
Enteric fever	9	10.46
Bronchopneumonia	9	10.46
Lobar Pneumonia	5	5.81
UTI	4	4.65
SOJIA	3	3.48
SLE	2	2.33
Septic Arthritis	2	2.33
Tuberculosis	2	2.33
Aplastic anaemia	2	2.33
Infective endocarditis	1	1.16
Empyema Thoracis	1	1.16
Meningoencephalitis with subdural effusion	1	1.16
Dengue with complications	1	1.16
Liver abscess	1	1.16
Undiagnosed	6	6.97

Table III: Clinical features (According to system involved) of participants (n=86)

System Involved	Clinical features	Frequency (n)	Percentage (%)
General	Marked Anorexia	29	33.72
	Myalgia	6	6.97
	Loss of weight	10	11.62
	Chills/rigors	37	43.02
Gastrointestinal	Abdominal pain	5	5.81
	Vomiting	18	20.93
	Loose stools	5	5.81
	Dehydration	4	4.65
Respiratory	Rhinorrhoea	16	18.60
	Cough	20	23.25
	Dyspnea	15	17.44
	Added respiratory sounds	15	17.44
Hematological	Pallor	31	36.05
	Jaundice	1	1.16
	Petechiae/Purpura	3	3.48
	Gum bleed/other mucosal bleeding	3	3.48
	Lymph node enlargement	6	6.97
	Hepatomegaly	23	26.74
	Splenomegaly	13	15.11

Renal	Dysuria	4	4.65
	Oliguria	9	10.46
	Edema	2	2.32
Cardiac	Hypotension	4	4.65
	Cardiac murmur	2	2.32
Central Nervous System	Headache	16	18.60
	Conjunctival congestion	3	3.48
	Convulsions	1	1.16
	Altered sensorium	4	4.65
Locomotor	Joint pain & swelling	3	3.48

Table IV: Categorization of the diseases according to final diagnosis

Disease category	Number of cases (n=86)	Percentages (%)
Infections	63	73.25
Malignancy	12	13.95
Autoimmune / Connective tissue disease	5	5.81
Miscellaneous	2	2.32
Undiagnosed	6	6.97

Table V: Duration of hospital stay and outcome of study population (n=86)

Duration of stay	No. of cases (%)	Recovered cases (%)	Referred cases (%)	Death (%)
1-7 days	29 (33.72%)	24 (82.75)	3 (10.34)	2 (6.89)
8-14 days	43 (50%)	37 (86.04)	5 (11.62)	1 (2.32)
>14 days	13 (15.11%)	11 (84.61)	1 (7.69)	1 (7.69)
Total	86	73 (84.88)	9 (10.46)	4 (4.65)

Discussion:

Children presenting with prolonged fever can exhibit diverse clinical profiles, reflecting a wide spectrum of etiological categories including infectious, connective tissue disease/inflammatory, malignancy, and miscellaneous causes¹. This prospective study evaluated the clinical spectrum, etiologies, and outcomes of children presenting with prolonged fever in a tertiary care setting. Prolonged fever in pediatric populations remains a diagnostic challenge, particularly in low- and middle-income countries, where infections and non-infectious etiologies coexist in varying proportions. In our study cohort (n=86), children aged 5- 10 years comprised the largest age group (43.02%), followed by the 1-5 years (33.72%) and 10 - 12 years (23.25%) age groups. This age distribution aligns with findings from studies by Sumathisri et al. who observed a higher prevalence of prolonged fever presentations in school-aged children¹⁶. Males constituted 56.97% of our cohort, indicating a mild male preponderance. This male predominance is echoed in studies by Lim et al. and Shoman et al., which reported similar gender distributions^{17,18}. Infectious causes dominated the etiology, accounting for 73.25% of cases. Rickettsial Fever was the leading cause (31.40%) consistent with observations from Southeast Asian studies, where these vector-borne illnesses are prevalent^{19,20}. Leukemia/lymphoma was the most frequent non-infectious etiology (11.63%), followed by rare cases such as systemic-onset juvenile idiopathic arthritis (SOJIA) and this findings are in line with study by Shoman et al., which

underscore the importance of malignancies and autoimmune disorders in the differential diagnosis of fever of unknown origin (FUO)¹⁸. Unfortunately, 6.97% of the patients remained undiagnosed despite extensive workup. A comparable proportion of undiagnosed fever cases, approximately 12%, was reported by both Avinash et al. and Joshi et al. In contrast, Sumathisri et al. documented a lower rate, with only 4% of patients remaining without a definitive diagnosis^{16,21,22}.

The clinical features were diverse. The most common symptoms included chills or rigors (43.02%), cough (23.25%) and vomiting (20.93%), Pallor (36.05%), Hepatomegaly (26.74%), respiratory added sound (17.44%) and splenomegaly (15.11%) were significant examination findings. These features suggest a predominance of systemic infections, and are supported by studies from Agrawal et al. and Anand et al., which noted similar clinical profiles in pediatric fever cohorts^{23,24}. Regarding patient outcomes, most recovered with supportive and specific therapy. Only 4 patients (4.65%) died, indicating favorable outcomes with timely diagnosis and treatment. Similar low mortality rates have been reported in previous study²⁵. The duration of hospital stay was 8 - 14 days in 50% of cases, A small number of patients required referral for specialized care, particularly those with complex or non-infectious causes. This trend is supported by findings in previous studies that associate delayed diagnosis or referral with prolonged hospitalization^{26,27}. Undiagnosed causes are the most challenging cases worldwide. In our study undiagnosed causes accounted for 6.97%. This result comparable with another study which showed 18.84%²⁸.

Conclusion:

Prolonged fever in children presents a wide diagnostic spectrum, predominantly led by infectious causes in our center. Among them Rickettsial fever is most common. However, hematological malignancies were found as an emerging causes. A systematic, protocol-based approach combining clinical evaluation with relevant investigations can improve diagnostic yield and patients outcome. Further large-scale, multi-center studies are recommended to validate findings and guide policy-making in pediatric febrile illness management.

Conflict of Interest: None.

Ethical approval: The study was approved by the Institutional Ethics Committee.

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Physical Examination Findings of Painful Shoulder

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Abstract

Introduction with Objective: Shoulder pain and weakness are common complaints among patients, which can lead to disability and affect a person's ability to perform daily activities. The aim of this study was to identify the physical examination findings of painful shoulder. **Materials and Methods:** This Prospective Observational Study was carried out among 101 patients attending at the Department of Physical Medicine and Rehabilitation, Dhaka Medical College and Hospital (DMCH), Dhaka within the defined period from July 2021 to December 2021. Ethical clearance was obtained from the Institutional Review Board (IRB) of Dhaka Medical College Hospital. Purposive sampling was done according to availability of the patients. Statistical analyses of the results were obtained by using window based computer software devised with Statistical Packages for Social Sciences (SPSS-20.1). **Results:** Majority of the patients (59.4%) were in 41-50 years age group where the mean age of the patients was 50.3 ± 7.9 years and 51 (50.5%) patients were male. Majority of the patients (59.4%) had shoulder pain on right shoulder. In case of active movement, the mean external rotation (in abduction) of the patients was 69.1 ± 17.5 and the mean forward flexion was 153.9 ± 17.2 . On the other hand, in case of passive movement, the mean external rotation (in abduction) of the patients was 73.6 ± 15.2 and the mean forward flexion was 160.7 ± 13.7 . On physical examination, 76 (75.2%) patients were Neer tests positive, 62 (61.4%) were Jobe's test for supraspinatus positive and 37 (36.6%) were Yegerson's test for the long head of the biceps brachii positive. Most of the patients (93.1%) were Patte's test for infraspinatus negative. **Conclusion:** Appropriate physical examination of the shoulder is important for making an accurate diagnosis and distinguishing certain pathologies of the shoulder.

Keywords: Physical examination, Painful shoulder.

Number of Tables: 04; Number of References: 10; Number of Correspondences: 05.

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Introduction:

The shoulder is a complex structure that affords great mobility at the expense of stability. Its stability can be divided into static and dynamic components. Statically, the bony glenoid, cartilaginous labrum, glenohumeral ligaments, and joint capsule provide moderate stability¹. Shoulder pain is the most common and incapacitating upper limb

overuse injury and can be caused by bicipital tendonitis, rotator cuff impingement syndrome, subacromial bursitis, capsulitis, and osteoarthritis². As shoulder disorders can develop into chronic conditions,³ it is essential to identify the exact pathology to select the most appropriate treatment⁴. Identifying a specific shoulder pathology may be challenging, considering the numerous structures examination, which involves inspection, palpation, assessment of range of motion, strength, and neurovascular integrity. In addition, specific tests are used to reproduce symptoms and signs that would help physicians identify the pathology of the shoulder problem⁵. The aim of this study was to describe the specific tests used to evaluate common shoulder conditions to facilitate accurate diagnosis and guide proper treatment of these conditions.

Materials & Methods:

This Prospective observational Study was carried out among 101 patients attending at the Department of Physical Medicine and Rehabilitation, Dhaka Medical College and Hospital (DMCH), Dhaka within the defined period from July 2021 to December 2021. Ethical clearance was obtained from the Institutional Review Board (IRB) of Dhaka Medical College Hospital. Purposive sampling was done according to availability of the patients. Physical examination Neer's test for shoulder impingement syndrome, Jobe's test for supraspinatus, Patte's test for infraspinatus, Gerber's lift-off test for subscapularis, Yegarson's test for the long head of the biceps brachii was also performed. The collected data were entered into the computer and analyzed by using SPSS (version 20.1).

Results:

Majority of the patients (59.4%) were in 41-50 years age group where the mean age of the patients was 50.3 ± 7.9 years and 51 (50.5%) patients were male (Table I).

Table I: Socio-demographic Characteristics of the study population (n=101)

Parameter	Number	percentage
Gender		
Male	51	50.5%
Female	50	49.5%
Age in years		
41-50	60	59.4
51-60	31	30.7
61-70	10	9.9
Mean $\pm$ SD (min-max)	50.3 ± 7.9 (41-70)	

Majority of the patients (59.4%) had shoulder pain on right shoulder (Table II).

Table II: Distribution of patients by side of pain involvement (n=101)

Side of pain	Frequency (n)	Percentage (%)
Right shoulder	60	59.4
Left shoulder	41	40.6

In case of active movement, the mean external rotation (in abduction) of the patients was 69.1 ± 17.5 and the mean

forward flexion was 153.9 ± 17.2 . On the other hand, in case of passive movement, the mean external rotation (in abduction) of the patients was 73.6 ± 15.2 and the mean forward flexion was 160.7 ± 13.7 (Table III).

Table III: Distribution of patients by measurement of range of motion of shoulder joint (n=101)

Movements	Mean $\pm$ SD (in degree)	Range(min-max)
Active		
External rotation (in abduction)	69.1 ± 17.5	10-80
Forward flexion	153.9 ± 17.2	100-165
Extension	52.1 ± 10.9	20-60
Abduction	140.9 ± 37.7	15-170
Passive		
External rotation (in abduction)	73.6 ± 15.2	10-80
Forward flexion	160.7 ± 13.7	100-165
Extension	56.4 ± 8.6	20-60
Abduction	159.6 ± 22.6	85-170

On physical examination, 76 (75.2%) patients were Neer tests positive, 62 (61.4%) were Jobe's test for supraspinatus positive and 37 (36.6%) were Yegarson's test for the long head of the biceps brachii positive. Most of the patients (93.1%) were Patte's test for infraspinatus negative (Table IV).

Table IV: Distribution of patients by physical examination (n=101)

Physical examination	positive	Negative
Neer tests for shoulder impingement syndrome	76 (75.2%)	25 (24.8%)
Jobe's test for supraspinatus	62 (61.4%)	39 (38.6%)
Patte's test for infraspinatus	7 (6.9%)	94 (93.1%)
Gerber's lift-off test for subscapularis	17 (16.8%)	84 (83.2%)
Yegarson's test for the long head of the biceps brachii	37 (36.6%)	64 (63.4%)

Discussion:

The mean age of the patients in this study was 50.3 ± 7.9 years which was comparable to the study of Khan et al. (2019)⁶ and Choi & Kim (2020)⁷. In the study of Khan et al. (2019)⁶ the mean age of the patients was 52 years while in the study of Choi & Kim (2020)⁷ the mean age of the patients was 51 years. Though other studies conducted by Kim HA et al. (2007)⁸ and Cheng X et al. (2017)⁹ found predominant female patients with shoulder pain, male to female proportion was almost equal in this study. Majority of the patients (59.4%) had shoulder pain on right shoulder which was in consistent with other studies conducted by Deshpande SV et al. (2018)¹⁰. In case of active movement, the mean external rotation (in abduction) of the patients was 69.1 ± 17.5 and the mean forward flexion was 153.9 ± 17.2 . On the other hand, in case of passive movement, the mean external rotation (in abduction) of the patients was 73.6 ± 15.2 and the mean forward flexion was 160.7 ± 13.7 . This restricted shoulder movement of patients was due to pain and tenderness, this restriction of movement was less comparative to the study of

Choi & Kim (2020)⁷. On physical examination, 75.2% patients were Neer tests positive, 61.4% were Jobe's test for supraspinatus positive and 36.6% were Yegerson's test for the long head of the biceps brachii positive. Most of the patients (93.1%) were Patte's test for infraspinatus negative. Similar finding was reported by Khan et. al (2019)⁶ in their study. However, Kim et. al (2007)⁸ found less positivity of these patients regarding physical examination.

Conclusion:

In our study, most of the patients Neer tests for shoulder impingement syndrome was positive followed by Jobe's test for supraspinatus. The clinician should rather focus on choosing the best test, based on the patient's history, to confirm a suspected diagnosis.

Conflict of Interest: None.

Acknowledgements:

The authors are grateful to the entire staff of Physical Medicine and Rehabilitation department of the Dhaka Medical College and Hospital for their cooperation and support during the study period.

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The Outcome of Percutaneous Nephrolithotomy (PCNL) in the Management of Large Upper Ureteric Stone

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Abstract

Introduction with objective: Urolithiasis, a prevalent urologic condition affecting 10-15% of the population, poses significant challenges, particularly in impoverished nations where complications such as urosepsis and renal failure contribute to elevated morbidity rates. The surgical management of stone disease has evolved from traditional open procedures to include non-invasive and minimally invasive techniques, driven by factors such as stone location and size. Percutaneous nephrolithotomy (PCNL) introduced in 1955, revolutionized the approach to kidney stones, and its popularity has grown, especially for larger kidney stones and upper ureteric stones. The aim of this study was to observe and assess the outcomes of percutaneous nephrolithotomy in managing large upper ureteric stones. **Materials and Methods:** This prospective observational study was carried out among 35 patients attending at the department of Urology at Sir Salimullah Medical College Mitford Hospital, Dhaka for the treatment of upper ureteric stone within the defined period from January 2019 to December 2020. All the data were compiled and sorted properly and the quantitative data was analyzed statistically by using Statistical Package for Social Science. **Result:** The clinical features of patients who underwent PCNL were analyzed, revealing a mean stone size of 20.05 mm, an operative time of 90.17 minutes, and a postoperative hospital stay of 1.80 days. The distribution of stones on the right and left ureters was 51.40% and 48.60%, respectively, with a stone clearance rate of 97.1% and a 2.9% incidence of residual stones. The study further assessed postoperative complications, reporting per-operative complications in 28.6% of cases, including bleeding, pleural and renal pelvis injuries, and post-operative complications in 31.4%, such as fever, blood transfusion, and urinary leakage. **Conclusion:** Mean operative time, hospital stay was less. Comparative analysis revealed PCNL as a less morbid procedure, aligning with its established efficacy for stone clearance. The study contributes valuable insights into the clinical outcomes and complications associated with PCNL, offering considerations for its application in managing large upper ureteric stones.

Keywords: Percutaneous Nephrolithotomy (PCNL), Urolithiasis, Upper Ureteric Stones.

Number of Tables: 04; Number of References: 11; Number of Correspondences: 04.

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Introduction:

Urolithiasis, a benign urologic condition, with a frequency of 10-15% (Lopez and Hoppe, 2010). In impoverished nations, patients often have complications such as urosepsis and renal failure, leading to a large

increase in morbidity rates. Stone disease is a significant proportion of the surgical effort for urologists in this region¹. Stone disease may be treated using many types of surgical techniques, including non-invasive, minimally invasive, and open surgeries. The choice of method depends on the location and size of the stone². The percutaneous method for accessing the kidney was first documented in 1955 by Goodwin and colleagues. The method used included the insertion of a nephrostomy tube to facilitate the drainage of a blocked renal unit. This instance prompted the realization that the same entry point may also serve as a functional pathway for the percutaneous extraction of the kidney stone. The age of percutaneous renal surgery started with the work of Deane and Clayman in 2007. Operative therapy of proximal ureteric stones is a significant challenge³. Proximal dilatation in ureteroscopic lithotripsy increases the likelihood of unintentional push back. In the past, urologists had limited surgical choices for treating bigger kidney stones, which mostly included open surgical procedures like pyelolithotomy and nephrolithotomy. However, these methods had their own drawbacks. With the growing use and refinement of these novel procedures, there has been a significant decrease in illness and death caused by renal urolithiasis. Percutaneous nephrolithotomy is increasingly being preferred for larger kidney stones, and there is also growing interest in using this surgery for upper ureteric stones as well⁴. PCNL, or percutaneous nephrolithotomy, is now being used and gaining popularity in several medical facilities around our nation.

Materials and Methods:

This prospective observational study was carried out among 35 patients attending at the department of Urology at Sir Salimullah Medical College Mitford Hospital, Dhaka for the treatment of upper ureteric stone within the defined period from January 2019 to December 2020. All patients admitted with ureteric stones were screened and those meeting the inclusion criteria were enrolled using a purposive sampling method. All the data were compiled and sorted properly and the quantitative data was analyzed statistically by using Statistical Package for Social Science. This study investigated the outcomes of percutaneous nephrolithotomy in the management of large upper ureteric stone by comparing independent variables such as patient age, sex, and stone size with dependent variables including operative time, stone clearance rate, complications (per-operative and post-operative), hospital stay duration, and recovery time. Inclusion criteria: Age 15-70 years, Single, upper ureteric stone and Stone size > 1.5 cm. Exclusion criteria: Uncorrectable coagulopathy, End-stage renal disease (serum creatinine > 8 mg/dL), Pregnancy, Distal obstruction and Radiolucent stone.

Results:

Most of respondents (28.57%) were aged between 35 - 44 years. Mean age of the patients were 44.91 ± 13.92 (SD) years (Table I).

Table I: Age distribution of the respondents (n=35)

Age (in year)	n=35(%)
15-24	04 (11.43%)
25-34	05 (14.29%)
35-44	10 (28.57%)
45-54	08 (22.85%)
55-64	07 (20.00%)
65-70	01 (02.86%)
Total	35 (100)
mean $\pm$ SD	44.91 $\pm$ 13.92

Most of the respondents (51.40%) were male (Table II).

Table II: Gender distribution of the respondents (n = 35)

Sex	Frequency n=35(%)
Male	18 (51.40)
Female	17 (48.60)
Total	35 (100)

The mean stone size was 20.05 mm, with a standard deviation of 1.34 mm, providing insight into the average dimension of stones treated. The average operative time for the PCNL procedure was 90.17 minutes, with a standard deviation of 8.27 minutes, indicating the typical duration of the surgical intervention. Postoperative recovery metrics were also elucidated, with patients staying in the hospital for an average of 1.80 days and taking approximately 1.98 weeks to return to normal activities, as reflected by mean values and standard deviations of 0.75 days and 0.91 weeks, respectively. Furthermore, the distribution of stones on different sides is presented, revealing that 51.40% of stones were located on the right ureter, while 48.60% were on the left ureter. Notably, the stone clearance rate after PCNL was high, with 97.1% of patients experiencing successful removal of stones. However, a small proportion, 2.9%, had residual stones post-procedure (Table III).

Table III: Distribution of clinical features of patients underwent PCNL (percutaneous nephrolithotomy)

Characteristics	Mean $\pm$ SD
Stone Size (mm)	20.05 $\pm$ 1.34
Operative Time (min)	90.17 $\pm$ 8.27
Postoperative hospital stay (days)	1.80 $\pm$ 0.75
Time required to return normal activity (weeks)	1.98 $\pm$ 0.91
Stone Side	N (%)
Right Ureter	18 (51.40)
Left Ureter	17 (48.60)
Stone Clearance rate	34 (97.1)
Residual Stone	1 (2.9)

Per operative complications were observed in 28.6% of cases

(10 out of 35), encompassed instances of bleeding (14.3%) and renal pelvis injury (14.3%). Postoperative complications, affecting 31.4% of cases (11 out of 35), were diverse in nature. Fever emerged as the most prevalent postoperative issue, affecting 20% of patients. Additionally 11.4% patients required blood transfusions. No wound infections were documented in postoperative cases (Table IV).

Table IV: Distribution of patients according to preoperative and post-operative complications. (n=35)

	Per operative complications n=35(%)
With Complication	10 (28.6)
Bleeding	5 (14.3)
Pleural injury	0
Renal pelvis injury	5 (14.3)
	Post operative complications n=35(%)
With Complication	11 (31.4)
Fever	7 (20)
Urinary leakage	0
Blood transfusion	4 (11.4)
Wound infection	0

Discussion:

Percutaneous nephrolithotomy is generally accepted as a safe procedure. The overall morbidity ranges from 7.5% to 18% depending upon the sample size and the presence of complicated renal stones⁵. According to the American Urological Association (AUA) guideline panel 2004 report, PCNL should be first line treatment for most patients with stag horn/large stones. Stone free rate of 78% (74 - 83%) which was equivalent to open surgery and superior to both shockwave lithotripsy (SWL) monotherapy (54%) and combination therapy SWL plus PCNL (66%). A success rate of 98.3% had been reported from Mayo Clinic in a series of 1000 patients for the small symptomatic calculi of upper ureter and renal pelvis⁶. In the present study, stone clearance rate by PCNL as mono-therapy was 97.1%. Only 2.9% of the patients in the present study have reported residual stone. In this study maximum patient were in 35 - 44 age group. A study done by Paryani et al., (2012) PCNL for proximal upper ureteric stone where maximum patient were aged 31-40 years⁷. Mean age of the patients was 44.91±13.92 years. Besides, 51.4% of the patients were male in the current study. In the present study the mean operative time was 90.17 ± 8.27min which as per Clinical Research Office of the Endourological Society (CROES) study comes under long time group⁸. Longer operative time increases anesthesia risks and respiratory complications, increased blood loss, and the need for transfusions^{9,10}. The factors which affect the operative time are stone load and stone type, complexity of collecting system, obesity, and expertise of the surgeon¹¹. Pulmonary complications, such as hydrothorax and pneumothorax are usually related to percutaneous renal access. Infracostal approach should be used when possible because complication

rates of supra costal approach are three-fold greater, ranging from 23% to 100% for supra eleventh rib and 1 - 13% for supra twelfth rib. No such pulmonary complication was noted in this study but complications such as fever and blood transfusion were found in 20% and 11.4% of the patients respectively.

Conclusions:

Although percutaneous nephrolithotomy (PCNL) is a safe procedure for the treatment of upper ureteric calculus, it sometimes results in some complications. Bleeding after PCNL is generally self-limited and can be treated conservatively. However, it is important to determine the time for emergent intervention. The mean operative time was less in percutaneous nephrolithotomy and it is an effective and safe procedure with a high stone-free rate.

Conflict of Interest: None.

Acknowledgement:

The authors are grateful to the entire staff of urology department of the Sir Salimullah Medical College Mitford Hospital for their cooperation and support during the study period.

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Effect of Ramadan Fasting on Cognitive Function of Physicians

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Abstract

Introduction: Effect of fasting on human cognition has been a topic of recent research. The results of those studies are contradictory at best. Moreover, fasting as a religious ritual for an entire holy month of Ramadan has many denominators that differs from other pattern of fasting. Data on cognitive functions of physicians during Ramadan is scarce. We had investigated the effect of Ramadan fasting on physicians who are actively engaged in treating patients.

Materials and Methods: This was a cross-sectional study conducted on 53 doctors working in a teaching hospital. Basic and task specific data were collected 1 week before and during Ramadan. On each occasion, cognition of each participant was tested using Trail making Test (TMT) part A and B, Simple reaction time (SRT) and Stroop test. Independent and paired t-test and multiple regression analysis were used for statistical analysis of Data in SPSS with significance level set at 0.05 or lower. **Result:** Overall, Ramadan fasting had no significant impact on cognitive capabilities of the physicians. Female participants (67.9%) performed better in TMT A and B and increased age was related to poorer results in SRT, TMT A and B. Higher diastolic blood pressure was associated with higher TMT B score. Neither sleep nor the blood glucose had any significant impact on cognition during Ramadan. **Conclusion:** In our study we had found no impairment of cognitive functions of treating physicians from different age group and specialties due the religious fasting on the holy month of Ramadan.

Key-words: Physicians, Fasting, Cognition, reaction time, trail making test.

Number of Tables: 01; Number of Figure: 01; Number of References: 19; Number of Correspondences: 04.

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affects every human endeavor and the process of cognition can get affected by different factors. Some common examples of that can be hunger¹, thirst², sleep deprivation³, any disease that can cause cognitive decline like stroke, dementia etc. Professions that demand sound cognitive ability includes physician. As physicians deals with the complexities of disease process, anything that negatively affect their cognition may have the potential to impart detrimental effect on patients' healthcare. Muslims restrain themselves from eating and drinking from dawn to dusk for a whole month of Ramadan as their religious obligation. Staying awake late at night for rituals is a common practice too. Moreover, to have the pre-fast meal known as "Sahur", normal sleep-wake cycle is disrupted⁴ which can also affect cognitive performance⁵. Studies on fasting for reasons other than Ramadan had shown to have a negative impact on cognition⁶. Fasting during Ramadan has many features that set it apart from other types of calorie restricted diets in practice like the complete abstinence from food as well as drink, variable time frame, disrupted circadian rhythm and pre-dawn meal. Research on effect of Ramadan fasting on cognition had revealed mixed results. Some studies had shown that, some aspects of cognitive function like working memory, visual learning, reaction time etc. may remain relatively preserved⁷ while rapid reaction, detection and identification of elements may get affected⁸. Another interesting finding was a decline in reaction time among male athletes at the beginning of Ramadan which gradually improved in the later days of fasting⁹. The previous studies were conducted on healthy subjects of different age and group, especially athletes, female, school going kids and medical students. To the best of our knowledge, no study was ever conducted in Bangladesh to investigate the possible effect of Ramadan fasting on the cognition of physicians who are directly involved in treating patients. Our study aimed to explore whether any such relationship between fasting and cognition exist or not among physicians.

Introduction:

Cognition is a key component of the supremacy of human being as it enables us to learn and adopt. It is the process of acquiring, processing, organizing, planning and executing of the information. A more tangible way of thinking about cognition is to define it in terms of learning, memory and functioning. Without this incredible process, we would not have achieved our fit in the hierarchy of life on this planet. Cognition

Materials and Methods:

This was a cross-sectional study. The study was conducted between February to April 2025 at Ad-din Sakina Women's Medical College Hospital, a tertiary level teaching hospital in southern Bangladesh. 56 participants were enrolled in the study based on non-probability sampling but later on 3 participants opted out of the study due their health issue at the time of data collection during Ramadan. Inclusion criteria were 1) Doctors who are involved in direct patient care 2) Muslim doctors who fast during Ramadan. Exclusion criteria were: 1) Any chronic background illness likely to impair cognition 2) Those who were not consistent in their fasting. Cognition was defined as the mental process of acquisition, storage, processing and retrieval of information. Ramadan fasting was defined as voluntary abstinence from eating and drinking as a religious act during the month of Ramadan from dawn to dusk. A structured questionnaire was designed for this study containing some background information of the participants, physical parameters like blood pressure and blood sugar at the time of data collection. To assess different aspects of cognitive process, trail making test (TMT) part A and B, simple reaction time (SRT) and Stroop test were used. The participants were given clear instruction about the tests. The time taken for trail making in part A which consist only of numbers and part B which consist of both number and letter was recorded in seconds. Three attempts of simple reaction time were recorded in milliseconds and the average number was finally taken. Every participant was given a single chance to take a Stroop test. They had to choose the right color written in an incongruent ink making it a challenge. Choosing a wrong color signaled the termination of the test and the number of successful choices taken by participants was counted. Every data of study subjects was recorded 1 week before Ramadan (BR) and between week 3 and 4 during Ramadan (DR). Data was analyzed using Statistical Package for Social Science (SPSS) version 30. Results were expressed as mean $\pm$ SD. Independent and paired t-test, multiple regression analysis and Pearson's correlation were used as statistical tool. Significance level was set at 0.05 or lower.

Result:

Our study participants (N=53) were overwhelmingly female (67.9%) and most were graduate physician (73.2%). Specialist doctors (n=15) were mostly male (66.6%). Age range of the study population spanned from 24 years to 69 years (32.82 $\pm$ 11.32).

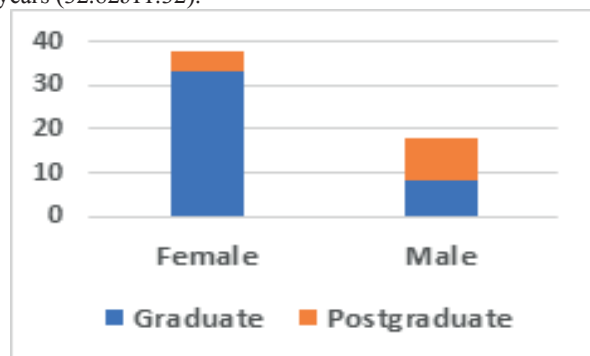


Figure 1: Gender and education level of participants

Regression analysis was performed to evaluate the confounding effect of parameters like age, duration of last meal taken, random blood sugar immediately before the test, duration of sleep of the preceding night, systolic blood pressure and diastolic blood pressure on the outcome variables (SRT, ST, TMT A and TMT B). Age was found to be significantly prolonging the SRT ($P<0.001$), TMT A ($P=0.001$) and TMT B ($P=0.006$). Increment of diastolic blood pressure was associated with poorer TMT B score ($P=0.045$) but the reverse was the case with systolic blood pressure ($P=0.041$). Independent sample t-test had shown no significant differences in cognitive tests among graduate versus postgraduate doctors but female participants were significantly faster in TMT A ($P=0.022$) and TMT B ($P=0.038$) compared to the male. Paired t test of the SRT, ST, TMT A and B has shown that, with the exception of ST, all other test time in fact decreased during Ramadan. However, neither the improvements in SRT, TMT-A, TMT-B nor the decline in ST were found to be statistically significant.

Table I: Observed value of study parameters before and during Ramadan

Parameters	Before Ramadan (Mean $\pm$ SD)	During Ramadan (Mean $\pm$ SD)	P value
SRT	473.11 $\pm$ 128.95	447 $\pm$ 122.7	0.082
ST	14.89 $\pm$ 9.74	16.53 $\pm$ 10.96	0.354
TMT-A	32.89 $\pm$ 15.07	31.3 $\pm$ 14.8	0.420
TMT-B	59.74 $\pm$ 21.14	57.45 $\pm$ 20.51	0.358
RBS	5.19 $\pm$ 2.17	4.98 $\pm$ 0.68	0.466
SBP	110.94 $\pm$ 12.13	106.79 $\pm$ 11.39	<0.001
DBP	75.38 $\pm$ 8.48	74.81 $\pm$ 7.59	0.655

On the other hand, random blood sugar and diastolic blood pressure both decreased to some extent during Ramadan but the change was insignificant. Systolic blood pressure had dropped significantly during Ramadan ($P<0.001$).

Discussion:

Our study aimed to explore the effect of Ramadan fasting on the cognitive functions of physicians actively involved in patient care. The study is novel in a sense that, no article on such matter had published in Bangladesh until the writing of this manuscript. The results indicates that, the null hypothesis of no effect prevails. Our baseline premise was: cognition is likely to be affected if there is lack of hydration, nutrition and sleep. We were particularly keen to see the effect of blood glucose and the cognitive performance. Blood glucose had not changed significantly from the baseline pre-Ramadan reading among the participants and it had no negative impact on the physician's cognition. This finding is in alignment of the previous studies that also had revealed steady cognitive capability despite intermittent calorie restriction^{9,10,11}. The seemingly counterintuitive phenomena can be explained by glucose load prior the day

long fasting in the form of Sahur meal, compensatory gluconeogenesis and increased alertness of the fasting individual to counteract the “perceived” lack of brain fuel^{5,12}. Some notable research on the same issue had also noted that, the circadian variance of blood glucose that leans towards upper limit of normalcy can in fact cause a slower cognition¹³. They argued that, the prescribed hours of fasting during Ramadan effectively prevents these troughs and valley and maintains a somewhat stable blood glucose that can boost cognitive functions. From physiological stand point, it was noted that unless the blood glucose drops down to below 3.6 mmol/l, it is unlikely to suffer from brain fog¹⁴. Under normal circumstances, the blood glucose is unlikely to fall down below this mark for the reasons explained before. Moreover, it must be remembered that, all of our participants were otherwise healthy. So, the effect of blood glucose on cognition in cases where wide fluctuation is a possibility remains uncertain. Another point to be noted is the timing of the data collection. We had deliberately chosen week two and three for our “during Ramadan” data gathering as some earlier studies have shown that, cognitive performance may remain unstable in the earlier days of Ramadan but becomes stable as the days progresses¹⁵. Our finding contradicts to those researchers who had findings suggestive of cognitive slowness in response to “fasting”, many of which was defined outside the scope of Ramadan and was not done on physicians^{16,17}. So, we think, the seemingly incongruent results can be secondary to the vastly different study population and fasting method. As for the hydration, the current study had not investigated the objective evidences of dehydration and its association of cognition but earlier works indicates that, human brain adopts pretty well to slowly developed water deprivation¹⁸. This anecdotal inference was also indirectly reflected in our study as cognition was not seen to suffer even after long hours of no drinking for prolonged periods. Sleep duration of each participant was calculated and tested as a possible confounder to influence the outcome variables. The duration of sleep and its quality and continuity inevitably changes during the holy month of Ramadan for several factors like night prayers, pre-dawn meal and late bed time to compensate for morning tasks. Although it may sound obvious that this sleep deprivation should have a negative impact on the cognitive skills of our brain but our data shows no significant differences compared to pre-Ramadan days. We acknowledge the fact that, some earlier studies had shown meaningful negative influence of sleep deduction on cognitive processes¹⁹. Once again, the definite study population of fasting adults who fast for an entire month with the religious mindset need to be considered to put things in perspective. The study was weakened by the non-random sampling method and lack of a control group. Although our intention was to collect during Ramadan data towards the end of the day and closer to breaking of

fast to maximize the abstinent hours, it was not possible for all cases. Moreover, the battery of tests that were used to estimate the cognitive function were not comprehensive. We hope that a multicentric study with a more diverse sample will shed more light on this emerging issue in near future.

Conclusion:

It can be inferred from our study that, Ramadan fasting does not negatively impact the cognitive functions of treating physicians.

Conflict of Interest: None.

Acknowledgement:

We are grateful for the support and participations of our esteemed colleagues of ASWMC. We also are thankful for the encouragement and aid that we had received from the director's office to conduct this study.

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Time of Apyrexia after Azithromycin Therapy in Uncomplicated Childhood Typhoid Fever

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Abstract

Introduction with Objective: The aim of the present study was to assess the time of apyrexia after Azithromycin therapy in uncomplicated childhood Typhoid Fever. **Materials and Methods:** A cross sectional study was conducted in the Department of pediatrics, Dhaka National Medical College, Dhaka from July 2024 to October 2024. According to selection criteria one hundred subjects were selected with the age ranging from 1-12 years of either sex who was diagnosed as typhoid fever. Widal test positive was included for the study & specific antibiotic Azithromycin was started. Statistical analyses of the results were obtained by using window based computer software devised with Statistical Packages for Social Sciences (SPSS-20.1). **Results:** Most of the patients (n=51) belong to 6-8 years age group. Young male patients (52%) were more than the young female patients (48%). Majority of the patients (n=39) time of apyrexia after taking antibiotic was 4 days. Almost three fourth patients (75.0%) had nausea after taking antibiotic. **Conclusion:** Azithromycin is effective in the treatment of childhood typhoid fever. Majority of the patient's time of apyrexia after taking antibiotic was 4 days.

Keywords: Azithromycin, Uncomplicated Typhoid Fever, Salmonella typhi/paratyphi.

Number of Tables: 03; Number of Figure: 01; Number of References: 10; Number of Correspondences; 04.

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Introduction:

Typhoid and paratyphoid fever, also known as enteric fever, is a potentially fatal multi-system illness caused by Salmonella typhi or Salmonella paratyphi. It occurs throughout the world where water supply and sanitation are substandard. Typhoid fever is highly endemic in developing countries like Bangladesh with documented high prevalence among children. Every year there are at least 13–17 million cases of typhoid fever worldwide resulting in 600,000 deaths; 80% of these cases occur in Asia alone¹. In 12 to 32 percent of patients, the two most feared complications intestinal hemorrhage and bowel perforation were the cause of death. Typhoid fever consequences have decreased to 2% or fewer since the development of efficient treatment. The mainstay of typhoid fever treatment is still antimicrobial therapy. Various antibiotics including chloramphenicol, cotrimoxazole, amoxicillin and flouroquinolones have been used in typhoid fever with variable success rate². The emergence of different drug resistance stains in this disease, which is either multidrug resistance or extensively drug resistant typhoid fever, is a consequence of prolonged nonselective usage of antibiotics, which is alarming for health services as well as worldwide health authorities³. Widespread emergence of multi-drug resistant S. typhi has necessitated the search for other therapeutic options for typhoid fever. Azithromycin, the first drug of this class and studies comparing the efficacy of azithromycin with cefixime in adults and children with typhoid fever have reported it to be safe and efficacious⁴.

Azithromycin, a member of the macrolide class of antibiotics, possesses many characteristics for effective and convenient treatment of typhoid fever, including in vitro activity against many enteric pathogens, excellent penetration into most tissues, and achievement of concentrations in macrophages and neutrophils that are 1100-fold higher than concentrations in serum. Previous studies have demonstrated that a 7-day treatment course of azithromycin was highly effective against uncomplicated typhoid fever in adults and children⁵.

Materials & Methods:

This cross sectional study was carried out on children age belonged to 1 – 12 years presenting with symptoms, signs and laboratory investigations diagnostic of typhoid fever in IPD and OPD of Pediatrics department, Dhaka National Medical College Hospital, Dhaka, Bangladesh during the period from July 2024 to October 2024. The diagnosis of typhoid fever was based on fever for more than 7 days; positive Widal test and exclusion of other febrile illnesses were enrolled in this study. Typhoid fever associated with other disease and patient who were already receiving antibiotics were excluded from the study. The collected data were entered into the computer and analyzed by using SPSS (version 20.1). The study was approved by the institutional ethical committee.

Result:

The table shows that the age structures of those patients have been categorized in years into four groups. Overall, 15 patients were ≤ 5 years old while 51 patients were in 6-8 years old. 26 patients belong to 9-11 years age group while 8 patients were in >11 years old (Table I).

Table I: Demographic characteristics of the study population (n=100).

Parameters	Number	Percentage
Age of the patients		
≤ 5 years	15	15%
6-8 years	51	51%
9-11 years	26	26%
>11	8	8%

Total numbers of patients both young male and young female were 100. Young male patients (52%) were more than the young female patients (48%) (Figure 1).

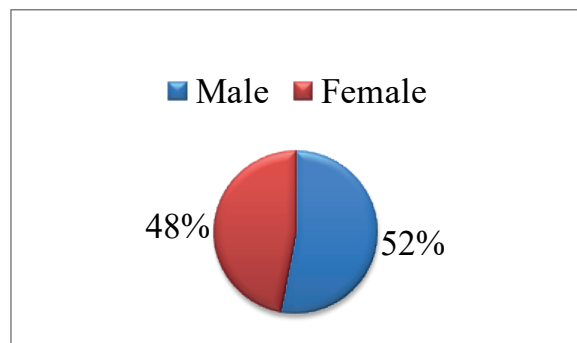


Figure 1: Pie Chart Showing Sex of the Patients

Majority of the patients (n=39) time of apyrexia after taking antibiotic was 4 days (Table II).

Table II: Distribution of the patients by time of apyrexia after taking antibiotic (n=100)

Time of apyrexia after taking antibiotic	Number	Percentage
3 days	6	6%
4 days	39	39%
5 days	20	20%
6 days	35	35%

Almost three fourth patients (75.0%) had nausea after taking antibiotic. Vomiting was found in 7% patients. Diarrhea was found in 8% patients. Abdominal discomfort was found in 21% patients. Skin rash was found in 6% patients (Table III).

Table III: Distribution of the study patients by side effects of antibiotic (n=100)

Side effects	Number	Percentage
Nausea	75	75%
Vomiting	7	7%
Diarrhea	8	8%
Abdominal discomfort	21	21%
Skin rash	6	6%

*Patients may suffer more than one side effect

Discussion:

In this series it was observed that typhoid fever is predominant in young male subjects (52%). Rokonzaman et al. (2011) showed significant number of the patients was male 67.0%, and the rest 33.0% of them were female, which is consistent with the current study⁶. In this study, majority patients (51%) belonged to 6-8 years which is similar to the Devaranavadi et al. (2017) study⁷. In this current study it was observed that time of afebrile after taking antibiotic 4 days in 39.0% patients. This finding is consistent to the finding of Frenk et al. (2000) who observed the mean afebrile period was 4.1 ± 1.1 days in case of Azithromycin⁸. Our study finding is consistent to the finding of Islam et al. (2003) study who observed the mean afebrile period was 3.82 ± 1.49 days in case of Azithromycin¹. Azithromycin are generally well tolerated. Side effects include nausea, vomiting, dyspepsia, abdominal pain, diarrhoea, abdominal discomfort and skin rash. In our study we observed that 75% of the patients had nausea. Vomiting was found in 7 patients, Diarrhoea was found in 8 and abdominal discomfort was found in 21 patients. Sheng (2010) mentioned in his study that Gastrointestinal symptoms (nausea, vomiting, diarrhea, abdominal pain etc.) observed 60.53%, respiratory symptoms (cough, sore throat, etc.) 31.58% and headache 26.32%⁹. Adverse effects noted by Nelwan et al. (2006) where the authors found nausea in 4 patients, vomiting in one and meteorism in another one, which were all difficult to distinguish from the enteric infection¹⁰.

Conclusion:

Azithromycin is effective in the treatment of childhood typhoid fever. Majority of the patient's time of afebrile after taking antibiotic was 4 days. Nausea and abdominal discomfort were the more common side effect.

Conflict of Interest: None.

Acknowledgements:

The authors are grateful to the entire staff of Pediatrics department of the Dhaka National Medical College and Hospital for their cooperation and support during the study period.

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Incidence of Overweight in Plantar Fasciitis Patients

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Abstract

Introduction with Objective: Plantar fasciitis is a common condition causing heel and arch pain and has been related with degenerative changes in the plantar fascia resulting in tissue thickening. The aim of this study was to assess the incidence of overweight in plantar fasciitis patients. **Materials and Methods:** This cross-sectional study was conducted in the Department of Physical Medicine & Rehabilitation, Dhaka Medical College Hospital, Dhaka during February 2023 to March 2024. A total of 51 patients with plantar fasciitis were included in the study. Ethical clearance was obtained from the Ethical Review Committee of Dhaka Medical College Hospital. Statistical analyses of the results were obtained by using window based computer software devised with Statistical Packages for Social Sciences (SPSS-20.1). **Results:** The mean age of the patients was 46.6 ± 4.3 years where majority of the patients (51.0%) were in 41-45 years age group and 27 (52.9%) patients were male. Among the 51 patients, 21 (41.2%) patients were homemakers whereas others were service holder (35.3%, $n=18$), businessmen (11.8%, $n=6$), and (11.8%, $n=6$) were involved in other professions. The mean BMI of the patients was 26.8 ± 2.6 kg/m² where 38 (74.5%) patients were overweight, while 5 (9.8%) were obese. **Conclusion:** Overweight is considered a significant risk factor for plantar fasciitis.

Keywords: Overweight, plantar fasciitis, incidence.

Number of Tables: 04; Number of Figure: 01; Number of References: 13; Number of Correspondences: 03.

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Introduction:

The plantar fascia (PF) is a thick fibrous aponeurosis that begins from the medial calcaneal tubercle and supports the arch of the foot¹. The most frequent cause of sub-calcaneal pain, plantar fasciitis (PFs), was initially identified in 1812 as a painful sensation in the calcaneus caused by plantar fascia deterioration. Plantar fasciitis is a chronic, self-limiting, painful, and disabling ailment that affects the inferomedial part of the heel and usually extends to the metatarsophalangeal joints. There is considerable evidence for a link between Achilles tendon (AT) loading and plantar aponeurosis (PA) tension². It is the most common cause of chronic pain beneath the heel in adults as 10% population suffer from it over a lifetime³. The diagnosis of plantar fasciitis can usually be made on the basis of history and physical examination alone. Patients experience severe pain with the first steps on arising in the morning or following

inactivity during the day. The pain usually lessens with weight-bearing activity during the day, only to worsen with continued activity. Pain is made worse on walking barefoot or upstairs⁴. Tenderness and pain may be increased by passive dorsiflexion of the toes or by having the patient stand on the tips of the toes. Tightness of calf muscles, limited dorsiflexion of ankle and tightness of plantar fascia that restricts extension of toes are other observations in the physical examination⁵. A biomechanical malfunction that creates tension along the plantar fascia is the cause of certain documented cases. Due to the enormous stresses that runners place on the plantar fascia, is a typical problem. Nevertheless, it is also important to discuss other risk factors, such as elevated plantiflexion and a high body mass index⁶.

Materials & Methods:

This cross-sectional study was conducted in the Department of Physical Medicine & Rehabilitation, Dhaka Medical College Hospital, Dhaka during February 2023 to March 2024. A total of 51 patients with plantar fasciitis were included in the study. Ethical clearance was obtained from the Ethical Review Committee of Dhaka Medical College Hospital. Purposive sampling technique was applied for this study. Body mass index was calculated by the formula. BMI = weight in kg / (Height x Height) in the meter. Normal BMI 18.5–24.9 Kg/m², Overweight BMI 25–29.9 Kg/m², Obese BMI 30 Kg/m² and above. Plantar fasciitis was confirmed by ultrasound assessment and considered present when the plantar fascia was 4.0 mm or greater at the calcaneal origin. Plantar fascia thickness was measured at a standard location, where the fascia crosses the anterior aspect of the inferior calcaneal border. Statistical analyses of the results were obtained by using window based computer software devised with Statistical Packages for Social Sciences (SPSS-20.1).

Results:

The majority of patients (51.0%) were in 41-45 years age group. The mean age of the patients was 46.6 ±4.3 years (Table I).

Table I: Distribution of patients by age (n=51)

Age group (in years)	Frequency (percentage)
41-45	26 (51.0%)
46-50	12 (23.5%)
51-55	13 (25.5%)
Mean ±SD	46.6 ±4.3

Among the 51 patients, 24 (47.1%) patients were female and 27(52.9%) patients were male. (Figure I)

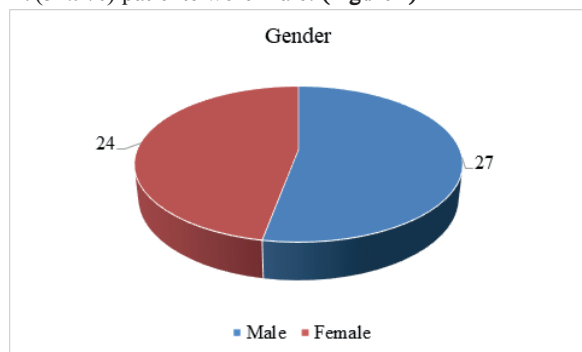


Figure I: Distribution of patients by gender (n=51)

Among the 51 patients, 21 (41.2%) patients were home makers whereas others were service holder (35.3%, n=18) and businessmen (11.8%, n=6) (Table II).

Table II: Distribution of patients by occupational status (n=51)

Occupational status	Frequency (percentage)
Homemaker	21 (41.2%)
Service holder	18 (35.3%)
Businessman	6 (11.8%)
Others	6 (11.8%)

Majority of the patients (74.5%) were overweight while 5 (9.8%) were obese. The mean BMI of the patient's was 26.8 ±2.6 kg/m² (Table III).

Table III: Distribution of patients by body mass index (BMI) (n=51)

BMI	Frequency (percentage)
Healthy weight (18.5-24.9)	8 (15.7%)
Overweight (25.0-29.9)	38 (74.5%)
Obese (30.0 and above)	5 (9.8%)
Mean ±SD (in kg/m ²)	26.8 ±2.6

Among the 51 patients, 26 (51.0%) patients had plantar fasciitis in right foot whereas others had in left foot (49.0%, n=25) (Table IV).

Table IV: Distribution of patients by side involvement (n=51)

Side involvement	Frequency (percentage)
Right	26 (51.0%)
Left	25 (49.0%)

Discussion:

Although plantar fascia (PF) occurs at all ages, the highest risk of occurrence of plantar fasciitis is 40 to 60 years of age⁴. The mean age of the patients of this study was 46.6 ±4.3 years where majority of the patients (51.0%) were in 41-45 years age group. Akfirat et al. (2003) examined the PF through ultrasonography and found the mean age of the patients with unilateral plantar fasciitis (PFs) was 47.5 (±11.7) years⁷. PFs affects both male and female equally⁸. Among the 51 patients of the current study, majority (52.9%) patients were male. Several studies found female predominance (Akfirat et al., 2003; Karabay et al., 2007; Ozdemir et al., 2005)^{7,9,10} while other studies observed equal number of male and female patients (McMillan et al., 2013; Aggarwal et al., 2020)^{11,12}. In Bangladesh, men are more likely to avail health service than women because of their strong socioeconomic position which might be the reason of higher proportion of male patients than female¹³. Increased BMI causes increase plantar fascia thickness and heel pad stiffness. Increased body mass may alter the mechanical characteristics of heel pad and plantar fascia. In this study

majority of the patients (74.5%) were overweight while 5 (9.8%) were obese. The mean BMI of the patients was $26.8 \pm 2.6 \text{ kg/m}^2$. This finding was supported by other studies (Akfirat et al., 2003; Karabay et al., 2007; Ozdemir et al., 2005; McMillan et al., 2013; Aggarwal et al., 2020)^{7,9,10,11,12}.

Conclusion:

In our study, most of the plantar fasciitis patients were overweight. Overweight is considered a significant risk factor for plantar fasciitis because of the increased stress on the plantar fascia in feet.

Conflict of Interest: None.

Acknowledgement:

The authors are grateful to the entire staff of Physical Medicine and Rehabilitation department of the Dhaka Medical College and Hospital for their cooperation and support during the study period.

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Platelet Indices among Women with Pre-eclampsia attending at a Tertiary Care Hospital – A Case Control Study

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Abstract

Introduction: Pre-eclampsia (PE) is a pregnancy-specific hypertensive disorder characterized by endothelial dysfunction, increased systemic vascular resistance, platelet activation, and coagulation abnormalities. These changes can lead to serious complications for both mother and fetus. Platelets play a key role in vascular repair and primary hemostasis, and platelet indices—including plateletcrit (PCT), mean platelet volume (MPV), platelet distribution width (PDW), and platelet-large cell ratio (P-LCR)—reflect changes in platelet morphology and activity. Alterations in these indices have been increasingly studied as potential early markers of pre-eclampsia. Typically, platelet count decreases while MPV and PDW increase, with more pronounced changes in PE than in normotensive pregnancies. These variations can appear 2–8 weeks before the clinical onset of PE. **Aim:** To compare platelet indices among women with pre-eclampsia and normotensive pregnant women to evaluate their potential as early indicators for the diagnosis of pre-eclampsia. **Materials and Methods:** This case-control study was conducted over 12 months (June 2023 to May 2024) in the Department of Gynecology & Obstetrics at the Institute of Child and Mother Health, following ethical approval. A total of 62 pregnant women were enrolled, including 31 women with pre-eclampsia (Group A) and 31 normotensive pregnant women (Group B) as controls. After informed consent, clinical data and laboratory values were collected using structured case-record forms and analyzed with SPSS version 26. **Results:** Most participants were aged 21–30 years (67.7% in cases vs. 58.1% in controls, $p=0.632$). Systolic and diastolic pressures were significantly higher in cases. Platelet indices showed significant differences: MPV (10.58 ± 1.48 vs. 8.42 ± 1.09 fl), PDW (12.84 ± 1.53 vs. 11.19 ± 1.38 fl), P-LCR ($25.97 \pm 4.00\%$ vs. $22.19 \pm 2.89\%$), and PCT ($0.2485 \pm 0.0360\%$ vs. $0.2175 \pm 0.0279\%$) were all elevated in pre-eclamptic women ($p<0.05$). **Conclusion:** Platelet indices—especially MPV, PDW, P-LCR, and PCT—were significantly elevated in women with pre-eclampsia compared to normotensive pregnant women. These markers may serve as early, cost-effective indicators for the prediction and monitoring of pre-eclampsia. Larger prospective studies are needed to validate these findings.

Key words: Pre-eclampsia, Platelet indices, Mean platelet volume (MPV), Platelet distribution width (PDW), Platelet crit (PCT), Platelet-large cell ratio (P-LCR), Hypertensive disorders.

Number of Tables: 06; Number of References: 18; Number of Correspondences: 03.

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Introduction:

Pre-eclampsia (PE) is a pregnancy-specific multisystem disorder characterized by new-onset hypertension and proteinuria after 20 weeks of gestation. It is a major contributor to maternal and perinatal morbidity and mortality worldwide, complicating 2–8% of all pregnancies^{1,2}. Despite improvements in prenatal care in developed countries, PE remains a significant challenge in low- and middle-income regions, where it contributes disproportionately to maternal and neonatal deaths. Globally, it is estimated to cause over 76,000 maternal and 500,000 perinatal deaths annually^{3,4}.

The pathophysiology of PE is complex and not entirely understood. It is believed to originate from abnormal placental development due to defective trophoblastic invasion and inadequate remodeling of spiral arteries. This leads to placental ischemia, oxidative stress, and widespread endothelial dysfunction⁵. The resulting inflammatory response increases vascular permeability and systemic vasoconstriction, triggering a cascade of events involving platelet activation, coagulation system dysregulation, and multi-organ involvement⁶.

Among the hematological changes observed in PE, thrombocytopenia is the most common and clinically significant. The disease is associated with increased platelet activation, turnover, and consumption due to endothelial injury^{7,8}. Platelets play a central role in maintaining vascular integrity and initiating coagulation. When activated, they undergo morphological changes that can be measured as part of routine complete blood count testing.

Platelet indices—such as platelet count (PC), mean platelet volume (MPV), platelet distribution width (PDW), plateletcrit (PCT), and platelet-large cell ratio (P-LCR)—reflect platelet function, size variability, and activation status. These indices are cost-effective, easily accessible, and increasingly recognized as potential early markers of PE^{5,9}. Studies have shown that while platelet count tends to decrease in PE, MPV, PDW, and P-LCR tend to increase. These alterations may precede the clinical manifestations of PE by several weeks and correlate with disease severity¹⁰.

Advanced biochemical markers, such as the sFlt-1/PlGF ratio and soluble endoglin (sEng), have been studied for early detection and severity assessment of PE. However, their high cost and limited availability make them impractical for routine use in low-resource settings^{11,12}. In contrast, platelet indices are part of standard hematology panels and can serve as practical alternatives for early screening and monitoring of high-risk pregnancies.

Given the rising burden of PE and the limitations in current diagnostic tools, there is a need to explore affordable, accessible, and reliable markers. This study aims to compare platelet indices in women with pre-eclampsia and normotensive pregnant women to assess their clinical utility in predicting and evaluating pre-eclampsia.

Materials and Method:

This case-control study was conducted over a 12-month

period (June 2023 to May 2024) in the Department of Gynecology & Obstetrics at the Institute of Child and Mother Health, Matuail, Dhaka. A total of 62 pregnant women were recruited using purposive sampling, with 31 pre-eclamptic women assigned to the case group and 31 normotensive pregnant women to the control group. Inclusion criteria for cases included age >16 years, gestational age >20 weeks, blood pressure $\geq 140/90$ mmHg, and clinical signs of pre-eclampsia including proteinuria, organ dysfunction, or fetal growth restriction. Controls were healthy pregnant women >16 years of age with gestational age ≥ 20 weeks and normal blood pressure. Exclusion criteria included multiple gestations, chronic hypertension, diabetes, cardiovascular or liver diseases, steroid use, and autoimmune or inflammatory disorders. After obtaining informed written consent, clinical examinations and interviews were conducted using a structured questionnaire. Blood pressure was measured using a mercury sphygmomanometer under standardized conditions. Venous blood samples were collected aseptically from the left antecubital vein, and platelet indices—including platelet count, mean platelet volume (MPV), plateletcrit (PCT), platelet distribution width (PDW), and platelet large cell ratio (P-LCR)—were analyzed within one hour using the SYSMEX XN-550 automated hematology analyzer. Midstream urine samples were collected in sterile test tubes and tested for proteinuria using the heat coagulation method. All data were collected by the principal investigator using a checklist to ensure accuracy and consistency, with participants informed of their right to withdraw at any stage.

Statistical Analysis:

Data were entered, cleaned, and analyzed using SPSS version 26 (IBM Corp., Armonk, NY). Descriptive statistics were used to summarize the variables: frequencies and percentages for categorical data, and mean $\pm$ standard deviation for continuous data. The independent samples t-test was applied to compare normally distributed continuous variables between groups, while Chi-square or Fisher's exact test was used for categorical variables. A p-value <0.05 was considered statistically significant. Results were presented in tables and figures to illustrate key findings effectively.

Results:

Table-I: Socio-demographic and obstetric characteristics of study participants in Group A and Group B (n=62)

Variables	Group A (n=31) n (%)	Group B (n=31) n (%)	p-value
Age distribution			
18-20	6 (19.4)	10 (32.3)	0.632
21-25	13 (41.9)	14 (45.2)	
26-30	8 (25.8)	4 (12.9)	
31-35	3 (9.7)	2 (6.5)	
36-40	1 (3.2)	1 (3.2)	
Education			
Primary	5(16.1)	5(16.1)	0.921
Secondary	22(71)	23(74.2)	
Graduate or above	4(12.9)	3(9.7)	

Income			
<10000	1(3.2)	2(6.5)	0.894
10000-20000	5(16.1)	4(12.9)	
20000-40000	21(67.7)	22(71)	
>40000	4(12.9)	3(9.7)	

Group A: Pregnant mother with pre-eclampsia

Group B: Normotensive Pregnant mother

* Chi-squared Test (χ^2) was performed.

Table-II: Gravidia of the study participants (n=62)

Gravidia	Group A (n=31) n (%)	Group B (n=31) n (%)	p-value*
Primigravida	14 (45.2)	11 (35.5)	0.437
Multigravida	17(54.8)	20(64.5)	

Group A: Pregnant mother with pre-eclampsia

Group B: Normotensive Pregnant mother.

* Chi-squared Test (χ^2) was performed.

The participants of group A and B were multigravida (54.8% vs 64.5%) followed by primigravida (45.2% vs 35.5%). There was no significant difference between groups ($p>0.05$).

Table-III: Symptoms of the study participants (n=62)

Gravidia	Group A (n=31) n (%)	Group B (n=31) n (%)	p-value*
Symptoms	14(45.2)	9(29)	0.189
Leg edema	13(41.9)	9(29)	0.288
Headache	10(32.3)	7(22.6)	0.393
Vomiting	7(22.6)	6(19.4)	0.755
Blurring of vision	7(22.6)	5(16.1)	0.520

Group A: Pregnant mother with pre-eclampsia

Group B: Normotensive Pregnant mother.

* Chi-squared Test (χ^2) was performed.

Majority of the study participants complaints off leg edema (45.2% vs 29%), followed by headache (41.9% vs 29%), vomiting (32.3% vs 22.9%), blurring of vision (22.6% vs 19.4%), and epigastric pain (22.6% vs 16.1%). There was no significant difference between groups ($p>0.05$).

Table-IV: Comparison of blood pressure in study groups (n=62)

Blood pressure	Group A (n=21) Mean±SD	Group B (n=21) Mean±SD	p-value*
Systolic pressure (mm/Hg)	153.06±5.43	111.94±6.15	<0.001
Diastolic pressure (mm/Hg)	95.48±3.73	74.51±4.35	<0.001

Group A: Pregnant mother with pre-eclampsia

Group B: Normotensive Pregnant mother.

*p-value was determined by independent t-test

The mean of systolic blood pressure of group A was 153.06±5.43mmHg and group B was 111.94±6.15 mmHg.

The mean diastolic pressure was 95.48±3.73 mmHg and 74.51±4.35mmHg in group A and group B. Blood pressure had statistically significance difference between groups ($p<0.05$).

Table- V: Comparison of platelet indices in study groups (n=62)

Platelet Indices	Group A (n=21) Mean±SD	Group B (n=21) Mean±SD	p-value*
Platelet count $\times 10^9/L$	235.06 ± 11.20	258.48 ± 6.03	<0.001
MPV/fl	10.58 ± 1.48	8.42 ± 1.09	<0.001
PDW/fl	12.84 ± 1.53	11.19 ± 1.38	<0.001
P-LCR%	25.97 ± 4.00	22.19 ± 2.89	<0.001
PCT%	0.2485 ± 0.0360	0.2175 ± 0.0279	<0.001

Group A: Pregnant mother with pre-eclampsia

Group B: Normotensive Pregnant mother.

*p-value was determined by independent t-test

(MPV- mean platelet volume, PDW- platelet distribution width, P-LCR- platelet large cell ratio, PCT- platelet-crit.)

It was observed that the mean total platelet count was 235.06 ± 11.20 $\times 10^9/L$ in case group and 258.48±6.03 $\times 10^9/L$ in control group. The mean of MPV was 10.58 ± 1.48 fl in case group and 8.42±1.09 fl in control group. The mean of PDW was 12.84± 1.53 fl in case group and 11.19±1.38 fl in control group. The mean P-LCR was 25.97±4.00% in case group and 22.19 ± 2.89% in control group. The mean PCT was 0.2485 ± 0.0360 % in case group and 0.2175 ± 0.0279 % in control group. The difference of platelet indices were statistically significant ($p<0.05$) between two groups.

Table VI: presence of protein-uria in the study participants (n=62)

Proteinuria	Group A (n=31) n (%)	Group B (n=31) n (%)	p-value*
Positive	31(100)	0(0)	<0.001
Negative	0(0)	31(100)	

Group A: Pregnant mother with pre-eclampsia

Group B: Normotensive Pregnant mother

* Chi-squared Test (χ^2) was performed.

All participants of preeclampsia group had positive proteinuria while all participants of group B had negative proteinuria, and it was statistically significant ($p<0.001$)

Discussion:

Pre-eclampsia (PE) is a multisystem disorder characterized by endothelial dysfunction, platelet activation, and hemostatic abnormalities, leading to serious maternal and fetal complications. It is associated with abnormal placental vascular response, increased systemic vascular resistance, and activation of the coagulation cascade. These changes are driven by inflammatory responses that induce vasoconstriction and platelet aggregation, playing a central

role in the disease's pathophysiology⁵.

Platelet indices—including plateletcrit (PCT), mean platelet volume (MPV), platelet distribution width (PDW), and platelet-large cell ratio (P-LCR)—reflect changes in platelet morphology and production kinetics. These parameters have gained attention for their potential utility in the early detection and monitoring of hypertensive disorders in pregnancy. In PE, platelet count tends to decrease while MPV and PDW increase, often preceding clinical onset by 2–8 weeks and progressing with disease severity⁵.

In the current study, the majority of participants across both groups were aged 21–25 years, followed by those aged 18–20 years, with no statistically significant difference in age distribution. This demographic pattern is consistent with findings from Gogoi et al.¹³, who reported similar mean ages among pre-eclamptic and normotensive groups.

Gravidity distribution showed a higher proportion of multigravida women in both groups, though the difference was not statistically significant. This contrasts with studies by Kamath and Gomathy¹⁴ and Hassan et al.¹⁵, which observed a higher prevalence of primigravida women among PE cases. Such differences may reflect demographic variations or regional obstetric patterns.

Common symptoms such as leg edema, headache, vomiting, blurred vision, and epigastric pain were more frequently observed in the PE group. However, these differences were not statistically significant, suggesting limited diagnostic specificity for these clinical features in distinguishing PE from normotensive pregnancy.

Significant differences were noted in systolic and diastolic blood pressure between the two groups. Mean systolic and diastolic pressures were substantially higher in the PE group (153.06±5.43 mmHg and 95.48±3.73 mmHg) compared to the normotensive group (111.94±6.15 mmHg and 74.51±4.35 mmHg), which aligns with findings reported by Edwin Obiorah et al.¹⁶.

Regarding hematologic parameters, total platelet count was significantly lower in PE patients, while MPV, PDW, P-LCR, and PCT values were significantly elevated. These results are in agreement with studies conducted by Dadhich et al.⁷, Piazzese et al.¹⁷, and Mondal et al.¹⁸, which highlight increased platelet activation and consumption in PE due to endothelial injury and systemic inflammation. Moreover, all PE participants exhibited positive proteinuria, in contrast to the control group, where no proteinuria was detected ($p < 0.001$). This finding supports the clinical diagnosis and reinforces proteinuria as a key diagnostic criterion for PE. Overall, the study supports the relevance of platelet indices as accessible and cost-effective markers for early detection and monitoring of pre-eclampsia, especially in resource-limited settings.

Conclusion:

This study evaluated platelet indices in women with pre-eclampsia and compared them with those of normotensive pregnant women. The findings demonstrated

significantly elevated levels of mean platelet volume (MPV), platelet distribution width (PDW), platelet-large cell ratio (P-LCR), and plateletcrit (PCT) among women with pre-eclampsia. These results suggest that platelet indices, which are readily available through routine complete blood counts, may serve as simple, cost-effective tools for early detection and monitoring of pre-eclampsia during antenatal care. However, to validate these findings and establish clinical utility, further multicenter, longitudinal studies with larger sample sizes and extended follow-up periods are recommended.

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Over-the-Counter Medication Use without Prescription Trends in Dhaka City: A Cross-Sectional Survey

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Abstract

Introduction: Self-medication with over-the-counter (OTC) drugs is rising in urban Bangladesh, raising concerns over misdiagnosis, side effects, and antibiotic resistance. Data on such practices among diverse adult populations in Dhaka City remain limited. **Objectives:** To estimate the prevalence of OTC medication, use without prescription, identify motivations, characterize ailments and drug categories, and examine demographic predictors. **Methods:** A cross-sectional survey was conducted from March to May 2025 among 400 adults in Dhaka using multistage cluster sampling. A semi-structured questionnaire captured demographic data, self-medication practices, types of ailments, drug classes, sources, motivations, and knowledge. Data were analyzed using descriptive statistics, chi-square tests, and logistic regression. **Results:** Of 400 participants (mean age 26.5 ± 8.3 years; 52% female), 83.0% reported self-medication in the past three months. Major reasons included quick relief (40.0%), lack of time (27.5%), minor illness perception (21.3%), and high consultation cost (16.8%). Common ailments were fever/headache (24.8%), gastric issues (22.3%), and respiratory symptoms (14.0%). Frequently used OTC drugs included NSAIDs (33.0%), antacids (20.5%), antibiotics (17.5%), and antipyretics (13.0%). Pharmacies were the main source (78.3%), with influences from peers (45.1%) and old prescriptions (42.2%). Male gender, higher education, and student status were significant predictors ($p < 0.05$). **Conclusions:** OTC self-medication is highly prevalent in Dhaka, driven by convenience and accessibility. Misuse of NSAIDs and antibiotics signals urgent need for regulatory control, public education, and affordable healthcare options.

Keywords: Self-medication, Over the counter, Antibiotics, Dhaka, Bangladesh, Public health.

Number of Tables: 05; Number of References: 20; Number of Correspondences: 03.

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Introduction:

Self-medication, defined as the use of drugs to treat self-diagnosed disorders or symptoms without consulting a physician, is a global phenomenon with profound public health implications^{1,2}. The World Health Organization (WHO) acknowledges that responsible self-medication can be a positive component of self-care, empowering individuals to manage minor ailments promptly and efficiently³. This practice can offer significant benefits, including increased access to medicines, greater independence for patients in managing their health, and a reduction in the burden on overstretched healthcare systems by saving scarce medical resources for more serious conditions^{1,2}. However, this convenience is shadowed by considerable risks, especially when practiced irrationally or without adequate knowledge. Potential dangers include misdiagnosis, incorrect dosage, prolonged duration of use, adverse drug reactions, dangerous drug-drug interactions, the masking of severe underlying diseases, and, critically, the exacerbation of antimicrobial resistance (AMR) due to the misuse of antibiotics^{1,2,4}.

To mitigate these risks, modern health systems globally rely on a fundamental regulatory distinction between two classes of medicines: over-the-counter (OTC) drugs and prescription-only medicines (POMs)^{5,6}. OTC medicines are those that regulatory bodies have deemed safe and effective for consumers to use for self-diagnosed conditions without the direct supervision of a healthcare professional^{5,7}. In contrast, POMs, or legend drugs, can only be dispensed with a valid prescription from a licensed practitioner. This restriction is applied to medications that may be habit-forming, potentially harmful if used without oversight, or require a professional medical diagnosis to be used appropriately⁷. This two-tiered system serves as a critical public safety framework, designed to balance accessibility for minor conditions with necessary control over potent therapeutic agents.

The context of pharmaceutical regulation and access in Bangladesh presents a compelling paradox. On one hand, the country's landmark National Drug Policy (NDP) of 1982 is celebrated as a major public health success. By prioritizing local production of essential medicines and eliminating thousands of harmful or irrational products, the policy successfully cultivated a thriving, self-reliant domestic pharmaceutical industry, making drugs widely available and affordable for its population^{8,9}. On the other hand, this remarkable achievement in manufacturing and supply has not been matched by commensurate strength in retail-level regulation and enforcement. Consequently, a significant gap exists between policy on paper and practice on the ground. While national policies explicitly prohibit the sale of POMs like antibiotics without a prescription, the practice is widespread and deeply entrenched in communities across the country^{10,11}.

This dissonance is particularly acute in Dhaka, the nation's

capital. As a rapidly expanding megacity, Dhaka is characterized by high population density, significant socio-economic stratification, and a formal healthcare system that is often strained and difficult for many residents to access³. These urban dynamics create a fertile environment for self-medication, where community pharmacies and informal drug shops often serve as the primary, and sometimes only, point of healthcare contact. Previous studies conducted in urban settings in Bangladesh have documented alarmingly high rates of self-medication, with prevalence reported to range from 16% to as high as 81% depending on the specific population surveyed^{3,12,13}. These figures underscore the scale of the issue and highlight the urgent need for a focused investigation within the country's largest urban center.

The central problem this study addresses is the pervasive and often irrational practice of obtaining and using medications without professional medical consultation in Dhaka City. This behavior carries substantial public health risks that extend from the individual to the global community. For the individual, it can lead to delayed diagnosis of serious illnesses, treatment failures, and adverse health outcomes. For the community and the world, the most ominous consequence is the acceleration of AMR, a global health crisis fueled directly by the inappropriate and widespread use of antibiotics for self-treated conditions^{1,14}. While the high prevalence of self-medication in Bangladesh is acknowledged, there remains a need for a detailed, contemporary cross-sectional analysis that systematically maps the specific trends, determinants, and knowledge-practice gaps among the general adult population in Dhaka.

Therefore, the primary objective of this study is to assess the prevalence, patterns, and associated factors of medication use without a prescription, encompassing both true OTC products and illicitly obtained POMs among adult residents of Dhaka City. This report posits that the trend of non-prescription medication use in Dhaka is not merely a reflection of individual choice but is a complex, systemic issue. It is hypothesized that this practice is driven by a confluence of factors, including the paradoxical outcomes of a national drug policy focused on supply over rational use, critical gaps in regulatory enforcement, significant cost and access barriers within the formal healthcare system, and powerful socio-economic determinants that compel residents to seek expedient care from informal and often unqualified sources.

Methods:**Study Design and Setting**

A cross-sectional survey was conducted in Dhaka City, encompassing both North and South City Corporations, over a three-month period (March–May 2025).

Participants and Sampling Strategy

- Eligibility: Adults aged ≥ 18 years, residents of

Dhaka for at least six months.

- **Exclusions:** Healthcare professionals and individuals unable to provide informed consent.

- **Sample Size Determination:** Using the prevalence estimation formula $n = Z^2 \cdot p(1-p)/d^2$ assuming $p \approx 0.74$ (Bangladesh self-medication prevalence) and desired margin of error $\pm 5\%$, at 95% confidence level, the minimum sample size was calculated as ~ 300 . To enhance precision and allow stratified subgroup analyses, the survey targeted $n = 400$ respondents.

- **Sampling Method:** Multistage cluster sampling across six wards. Within each ward, households were approached systematically every third residence until sample quotas were met. At each household, one eligible participant was systematically invited to participate.

Data Collection Instrument and Procedure

A semi-structured interviewer-administered questionnaire was developed, informed by validated instruments used in Bangladesh. The questionnaire was drafted in English and translated into Bengali, then back-translated to ensure semantic accuracy. It consisted of:

- **Section I:** Socio-demographics (age, sex, education, occupation, monthly income, household characteristics).

- **Section II:** Self-medication and OTC behavior—history of use within the past 3 months, specific ailments treated, medicine classes, motivations, sources, knowledge, and prior experience.

Prior to deployment, the questionnaire was pre-tested on 10 participants from a similar population to refine wording and flow. Data collectors—local research assistants fluent in Bengali—were trained intensively on study aims, ethical procedures, and standardized interviewing techniques.

Data Management and Analysis

Data were double-entered and checked in IBM SPSS version 28. Descriptive statistics (mean $\pm$ SD for continuous variables; frequencies and percentages for categorical data) were generated for key variables.

- **Bivariate analysis:** Chi-square tests assessed associations between self medication and demographic variables (sex, education, occupation). Statistical significance was set at $p \leq 0.05$.

- **Multivariate analysis:** Logistic regression (unadjusted and adjusted odds ratios with 95% confidence intervals) identified independent predictors of self medication. Model validity was evaluated using Hosmer–Lemeshow goodness-of-fit test.

- **Quality Control:** Multicollinearity among independent variables was assessed (variance inflation factors < 2.5 deemed acceptable). Sensitivity analyses excluded incomplete responses.

Results:

A total of 400 participants (aged ≥ 18 years) from various

wards of Dhaka City completed the survey. The sample mean age was 26.5 years (SD ± 8.3 ; range 18–60); 52% were female, and respondents included students (58%), service workers (18%), housewives (12%), and others (12%) (Table-I).

Table I: Demographic Characteristics of Study Participants (n = 400)

Characteristic	Category	n	%
Age group	18–24 years	212	53.0
	25–34 years	132	33.0
	≥ 35 years	56	14.0
Sex	Male	192	48.0
	Female	208	52.0
Education level	$\leq$ High school	98	24.5
	College/Intermediate	172	43.0
	$\geq$ Bachelor's degree	130	32.5
Occupation	Student	232	58.0
	Service holder	72	18.0
	Housewife	48	12.0
	Others	48	12.0

Table II presents the number and percentage of respondents who reported using at least one OTC medication without a prescription within the prior three months. Among the 332 self-medicating participants (83.0%), the most frequently cited reasons were “quick symptom relief” (40.0%), “lack of time for medical consultation” (27.5%), “perceived minor illness” (21.3%), and “high cost of physician consultation” (16.8%). Multiple responses were permitted, so percentages for motivations exceed 100% when summed.

Table II: Prevalence of OTC Medication Use and Motivations (Past 3 Months)

Parameter	n	%
Used any over the counter medicine	332	83.0
Top reasons (multiple responses allowed)		
• Quick symptom relief	160	40.0
• Lack of time for medical consultation	110	27.5
• Perceived minor illness	85	21.3
• High cost of physician consultation	67	16.8

Table III delineates the primary health complaints for which participants self-medicated and the corresponding categories of over the counter (OTC) medicines employed. Among the 332 respondents who used at least one OTC medicine without a prescription in the past three months, the most frequently addressed ailments were fever/headache (24.8%), gastric disturbances (e.g., acidity or upset stomach; 22.3%), general or muscle pain (15.0%), cough/cold/allergy symptoms (14.0%), and diarrhea (7.0%). The predominant medication classes used over the same period were NSAIDs, such as ibuprofen, utilized by 33.0% of users, followed by antacids/H₂-receptor blockers (20.5%), antibiotics (17.5%), antipyretics like paracetamol

(13.0%), and vitamins/antihistamines (11.2%). These findings closely align with previous Dhaka-based surveys reporting NSAIDs use at ~28%, antacids ~21%, and antibiotics ~17% among self-medicating individuals.

Table III: Ailments Treated and Classes of OTC Medicines Used

Ailment/Cause	n	%	Medicine Class	n	%
Fever/headache	99	24.8	NSAIDs (e.g., ibuprofen)	132	33.0
Gastric complaints (acidity, upset)	90	22.3	Antacids/H ₂ blockers	82	20.5
General/muscle pain	60	15.0	Antibiotics (e.g., azithromycin)	70	17.5
Cough/cold/allergy	56	14.0	Antipyretics (e.g., paracetamol)	52	13.0
Diarrhea	28	7.0	Vitamins/antihistamines	44	11.2

Table IV summarizes the principal sources through which participants obtained OTC medicines without a prescription, as well as the influences shaping their self-medication choices. The data show that a majority (78.3%) procured medicines directly from pharmacies or drug shops, highlighting the critical role of informal retail outlets in facilitating access to prescription-only drugs.

Table IV: Sources of Medicines and Influencing Factors

Source/Influence	n	%
Purchased from pharmacy/drug shop	260	78.3
Influenced by old prescriptions	140	42.2
Peer/family advice	150	45.1
Based on previous experience/symptom match	120	36.1

Table V presents the percentage of participants engaging in self-medication (SM) across demographic groups and reports chi-square (χ^2) test results for associations. Male respondents exhibited a significantly higher prevalence of SM compared to females (88.5% vs. 77.9%; $\chi^2 = 7.6$, $p = 0.006$). Educational attainment was also significantly associated, with individuals holding a bachelor's degree or higher reporting greater self-medication than those with a high school education or less (89.2% vs. 72.4%; $\chi^2 = 10.2$, $p = 0.001$). Occupational differences were observed: students were more likely to self-medicate than housewives (85.3% vs. 69.1%; $\chi^2 = 4.9$, $p = 0.027$). All associations reached statistical significance ($p < 0.05$), indicating that gender, education level, and occupation are important determinants of self-medication behaviour findings that align with other Bangladeshi studies reporting higher SM prevalence among males and more educated individuals.

Table V: Associations between Self-Medication and Demographics

Variable	Group	% Practiced SM*	χ^2 (p value)
Sex	Male	88.5	$\chi^2 = 7.6$ ($p = 0.006$)
	Female	77.9	
Education Level	≤ High school	72.4	$\chi^2 = 10.2$ ($p = 0.001$)
	≥ Bachelor's degree	89.2	
Occupation	Students	85.3	$\chi^2 = 4.9$ ($p = 0.027$)
	Housewives	69.1	

*Self medication (SM) = use of any medicine without physician

prescription.

Discussion:

This study reveals an exceptionally high prevalence of self-medication (83.0%) among the adult population in Dhaka City, a figure that sits at the uppermost end of the 16% to 81% range previously reported in urban Bangladesh^{3,12,13}. This finding underscores that obtaining medicine without a prescription is not a fringe activity but a dominant health-seeking behavior in the nation's capital. The primary motivations cited by participants, the need for quick symptom relief, lack of time for consultations, and the high cost of physician visits are consistent with research from other developing countries and within Bangladesh, pointing to significant systemic barriers within the formal healthcare system^{15,16}. These factors compel individuals to seek more immediate and affordable alternatives, positioning community pharmacies as de facto primary care providers.

The pattern of ailments treated, primarily fever, headache, gastric issues, and pain, aligns with common minor health complaints globally. Correspondingly, the heavy reliance on NSAIDs (33.0%) and antacids (20.5%) is an expected outcome. However, the finding that antibiotics are the third most commonly self-prescribed medication class, used by 17.5% of participants, is a major public health concern. This figure confirms that the rampant misuse of antibiotics, a key driver of antimicrobial resistance (AMR), is deeply embedded in the community's self-care practices^{1,14}. This irrational use of critically important medicines represents a direct threat to both individual and global health, stemming from a system where prescription-only drugs are dispensed with alarming ease. Other studies in Bangladesh have reported similarly troubling rates of antibiotic self-medication, ranging from 26.7% to as high as 78% among university students^{14,17}.

The overwhelming majority of participants (78.3%) obtained these medicines directly from pharmacies or drug shops, highlighting a critical disconnect between national policy and on-the-ground enforcement. While Bangladesh's National Drug Policy explicitly prohibits the sale of antibiotics and other prescription drugs without a valid prescription, this study confirms that these regulations are largely ineffective at the retail level¹¹. Furthermore, the significant influence of peer/family advice (45.1%) and old prescriptions (42.2%) on medication choice illustrates that health decisions are often made within informal social networks, bypassing professional medical guidance entirely. This reliance on unqualified sources is a well-documented phenomenon in settings where access to formal healthcare is constrained^{10,15}.

The demographic analysis presented several significant associations. The finding that males self-medicated more than females (88.5% vs. 77.9%) is noteworthy and aligns with some Bangladeshi studies¹⁶. More striking was the positive correlation between higher education and

self-medication. Individuals with a bachelor's degree or higher were significantly more likely to self-medicate than those with less education (89.2% vs. 72.4%). This finding, while contrasting with some local studies that identify illiteracy as a risk factor¹⁵, aligns with international research suggesting that higher education may foster a sense of confidence or perceived knowledge that encourages self-diagnosis and treatment¹⁸. Similarly, the high prevalence among students (85.3%) is consistent with studies that identify them as a high-risk group, possibly due to academic stress and time pressures¹⁴.

This research paints a stark picture of self-medication in Dhaka as a systemic issue rooted in the shortcomings of the formal healthcare system and a failure of regulatory oversight. The practice is not merely a matter of individual choice but a widespread, rationalized response to cost, time, and access barriers. The high rate of non-prescription antibiotic use is particularly alarming and demands immediate action. A multi-pronged strategy is essential, combining stricter enforcement of existing drug laws at the pharmacy level with public health campaigns designed to educate all segments of the population, especially educated males and students, about the profound risks of irrational medication use. Empowering pharmacists to move beyond a vendor role to become integral healthcare providers could also improve the safety of self-care practices^{19,20}. Ultimately, addressing the underlying drivers by improving the accessibility and affordability of professional healthcare is fundamental to curbing this dangerous trend and preserving the efficacy of essential medicines for future generations.

Limitation of Study:

Its cross-sectional design precludes the establishment of causal relationships, and the reliance on self-reported data is subject to recall and social desirability biases. As the survey was conducted only in Dhaka, the findings may not be generalizable to rural populations, where healthcare access and self-medication patterns may differ.

Conclusion:

This study confirms that self-medication is not merely a common practice in Dhaka City but a deeply entrenched, systemic issue, with a prevalence of 83.0%. The findings paint a clear picture of a health-seeking behavior driven not by convenience alone, but by necessity, as residents navigate the significant time and cost barriers of the formal healthcare system. While the treatment of minor ailments like headaches and gastric issues with appropriate over-the-counter drugs is a recognized component of self-care, the irrational use of prescription-only medicines is rampant and poses a grave public health threat.

The most alarming finding is the widespread self-medication with antibiotics, reported by 17.5% of participants. This practice, facilitated by the unrestricted availability of these drugs in community pharmacies, directly fuels the global crisis of antimicrobial resistance. The data reveal a critical paradox: a national drug policy successful in ensuring

medicine availability has failed to enforce regulations at the point of sale, effectively turning pharmacies into the primary and often unqualified source of healthcare for a large segment of the population. The significant association of self-medication with higher education levels and male gender highlights the complexity of the problem, indicating that awareness of risks does not necessarily translate to safer practices.

Therefore, addressing this challenge requires a robust, multi-pronged strategy. First, regulatory bodies must enforce existing laws prohibiting the non-prescription sale of antibiotics and other potent medicines. Second, targeted public health campaigns are essential to educate all demographic groups, particularly educated individuals and students, about the specific dangers of irrational drug use and the societal threat of AMR. Finally, and most importantly, long-term solutions must address the root causes by improving the accessibility and affordability of professional healthcare services. Empowering pharmacists through training and integration into the primary healthcare framework could also transform them from simple vendors into trusted advisors for responsible self-care. Without these concerted efforts, the dangerous trend of self-medication will continue to undermine both individual health and the efficacy of essential medicines for the global community.

Conflict of Interest: None.

Acknowledgement:

We sincerely thank the residents of Dhaka City, both North and South City Corporations, who participated in the survey and the field team for their valuable contributions.

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Risk Factors & In-Hospital Outcome of Acute ST Segment Elevation Myocardial Infarction among Young (<40 Years) versus Older (>40 Years) Patients: A Comparative Study

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Abstract:

Introduction: Acute coronary syndrome (ACS) is a global health issue that causes premature death, disability, and rising healthcare costs. Younger people are now experiencing acute myocardial infarction (AMI), which is usually seen in older adults. Unfortunately, public awareness of AMI, its risk factors, and complications is low. Youthful coronary artery disease (CAD) prevalence and outcomes are also unknown. This study compares risk factors and in-hospital outcomes of acute ST-segment elevation myocardial infarction (STEMI) in younger (≤ 40 years) and older (> 40 years) patients. **Material and Methods:** An observational, hospital-based study was conducted at the Department of Medicine, Khulna Medical College Hospital. The study included 100 consecutive patients, with 50 patients aged 40 years or younger and 50 patients older than 40 years, all diagnosed with acute STEMI. Clinical characteristics, echocardiographic findings, and in-hospital outcomes were evaluated and compared between the two age groups. Data analysis was carried out using SPSS (Statistical Package for Social Science), with statistical significance determined at a p -value ≤ 0.05 , applying the Chi-square test for analysis. **Results:** The majority of patients in both age groups were male (74% in the younger group vs. 80% in the older group). The younger cohort demonstrated a significantly higher prevalence of smoking (70% vs. 54%), a positive family history of ischemic heart disease (52% vs. 32%), dyslipidemia (48% vs. 36%), and a higher body mass index (BMI). Conversely, conditions such as hypertension (14% in the younger group vs. 80% in the older group), diabetes (20% vs. 46%), and a history of angina (16% vs. 28%) were more common among older participants. Notably, the left ventricular ejection fraction (LVEF) was significantly better in the younger group ($p = 0.005$). Complications such as heart failure (32% vs. 16%), arrhythmias (24% vs. 8%), cardiogenic shock (18% vs. 2%), post-MI angina (12% vs. 6%), and in-hospital mortality (14% vs. 6%) were more frequent in older patients, though these differences did not reach statistical significance. **Conclusion:** Young patients with AMI exhibit distinct risk profiles and generally have better in-hospital outcomes compared to their older counterparts. This study underscores the importance of early intervention and control of modifiable risk factors, such as smoking, poor diet, obesity, and dyslipidemia, to mitigate the incidence of AMI in younger populations.

Key words: Acute coronary syndrome (ACS), Young, Older adults, Risk factors, In-hospital outcome.

Number of Tables: 02; Number of Figures: 03; Number of References: 21; Number of Correspondences: 03.

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Introduction:

Coronary artery disease (CAD) is an increasingly significant global health concern, with various risk factors contributing to its rising prevalence across different age groups. Common contributing factors include hypertension, diabetes mellitus, smoking, and dyslipidemia. Among younger individuals, hypertension is the predominant risk factor, while in older patients, diabetes becomes more prevalent, driven by age-related changes in beta cell function and insulin resistance^{1,2}. Over the past few decades, numerous epidemiological

studies such as the WHO's MONICA study, INTERHEART, Euroheart SES studies, and the India Heart Watch study (2012), along with various randomized control trials, have highlighted that certain risk factors, including family history, obesity, dyslipidemia, and tobacco use, are stronger predictors of outcomes in younger individuals compared to older ones³. The etiology of CAD is multifactorial, with many contributing risk factors influenced by lifestyle. The rapid shift in dietary habits and reduced physical activity, often linked to urbanization, may partially explain the increased prevalence of CAD⁴. Bangladesh is currently undergoing an epidemiological shift, marked by rapid urbanization. This shift has led to economic growth but also an increase in fast food consumption, tobacco use, and reduced physical activity. Consequently, the disease spectrum has shifted from communicable to non-communicable diseases, particularly CAD and diabetes⁵.

A study by Morillas et al on patients under 45 years old admitted to 17 hospitals in Spain found that these younger patients exhibited distinct clinical characteristics and better short-term prognoses compared to older patients⁶. Similar observations have been reported in studies from other countries⁷⁻¹⁰. However, data on the Bangladeshi population in this context remains limited. Gaining better insights into the characteristics and outcomes of AMI in the Bangladeshi population could help clinicians develop more effective age-specific treatment strategies. Thus, this study aimed to analyze the characteristics and in-hospital outcomes of AMI patients across two age groups admitted to Khulna Medical College Hospital.

Materials and Methods:

From June 2016 until November 2016, this hospital-based observational study was conducted at the Department of Medicine at Khulna Medical College Hospital, which is located in Khulna, Bangladesh. This study aimed to evaluate the clinical characteristics of patients who had been diagnosed with acute ST-elevation myocardial infarction (STEMI) as well as the outcomes that occurred while they were in the hospital. A total of one hundred patients were enrolled, with fifty patients belonging to the younger age group (those under the age of forty) and fifty patients belonging to the older age group (those over the age of forty). Patients with acute ST-elevation myocardial infarction who presented with one or more risk factors, such as diabetes, hypertension, dyslipidemia, smoking, obesity, a family history of coronary artery disease, or a previous history of myocardial infarction, were eligible for inclusion in the study. All patients who were diagnosed with valvular heart disease, congenital heart disease, cardiomyopathy, severe renal impairment, cancers, or any other major systemic disorders were not allowed to participate in the study. Following the acquisition of informed consent from the patients or their legal guardians, a comprehensive clinical history was gathered, and a physical examination was carried out, with a particular

emphasis placed on the cardiovascular system. In order to diagnose the participants, diagnostic tests such as electrocardiograms, serum cardiac enzyme analyses, and fasting lipid profiles were carried out on each individual. Information was gathered through the use of structured case record forms, and the selection of participants who fulfilled the inclusion criteria was accomplished through the use of non-randomized purposive sampling. The primary outcomes that were of interest were heart failure, arrhythmias, mechanical complications, re-infarction, cardiogenic shock, and mortality while the patient was in the hospital. The data that was collected was analyzed using SPSS, which stands for Statistical Package for the Social Sciences. The Chi-square test was utilized to evaluate the statistical significance of the data, with a significance level of p (less than or equal to 0.05). In accordance with the principles outlined in the Declaration of Helsinki, ethical considerations were adhered to in a stringent manner. This included ensuring that all participants were provided with comprehensive information regarding the objectives and procedures of the study, as well as the right to withdraw from the study at any time. Before enrollment, written informed consent was obtained from each and every participant in the study, or more specifically, from their legally recognized guardians.

Statistical analysis: All data were analyzed using SPSS software (version 22.0).

Results:

A total of 100 patients with ST-segment elevation myocardial infarction (STEMI) who met the inclusion and exclusion criteria were included in the study. These patients were admitted to the Medicine ward of Khulna Medical College Hospital. Data were collected by the investigator using a structured questionnaire for each patient. The Chi-square test was applied to analyze the data, with a significance level set at $p \leq 0.05$.

The study found that 50% of the patients with STEMI were in the younger age group (≤ 40 years), while the other 50% were in the older age group (> 40 years). A majority of the patients were male, with 74% of younger patients and 80% of older patients being male. Occupational categorization revealed that the most common occupation in both age groups was service holder (Figure 1). Additionally, most patients were engaged in sedentary occupational activities, with 74% of younger patients and 80% of older patients in sedentary roles, which could be attributed to the mechanization of agriculture and the heavy reliance on migrant labor in both agriculture and other sectors (Figure 2).

Table I shows that the younger age group had a significantly higher proportion of smokers (70% vs. 54%), a family history of ischemic heart disease (IHD) (52% vs. 32%), dyslipidemia (48% vs. 36%), and higher BMI. In contrast, the older age group had significantly higher rates of hypertension (80% vs. 14%), diabetes (46% vs. 20%), and a

history of angina (28% vs. 16%). Left ventricular ejection fraction (LVEF) was also significantly higher in the younger group ($p = 0.005$) compared to the older group (Figure 3).

In terms of clinical outcomes, a higher proportion of older patients developed heart failure (32% vs. 16%), arrhythmias (24% vs. 8%), cardiogenic shock (18% vs. 2%), post-MI angina (12% vs. 6%), and death (14% vs. 6%) compared to the younger group, although these differences were statistically not significant (Table II).

Figure-1: In this study the occupational categorization had been done according to service holder, business, farmer, house wife and others. Among 100 patients with ST segment elevated groups.

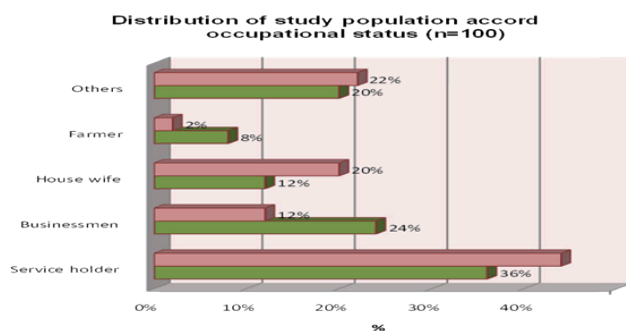


Figure-1: Distribution of study population according to occupational status (n=100).

Figure-2: Column chart showed, majority of patients were in sedentary occupational activities (young 74 % vs. old 80 %) due to mechanization of agriculture and also due to extreme dependence on migrant labor in both agriculture and other occupational activities.

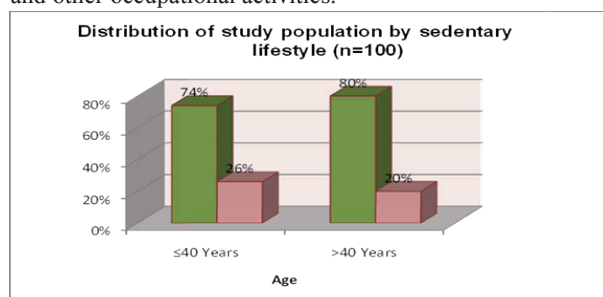


Figure-2: Distribution of study population by sedentary life style (n=100).

Figure-3: In this study, left ventricular ejection fraction (LVEF) was in the younger group ($p = 0.005$) than older.

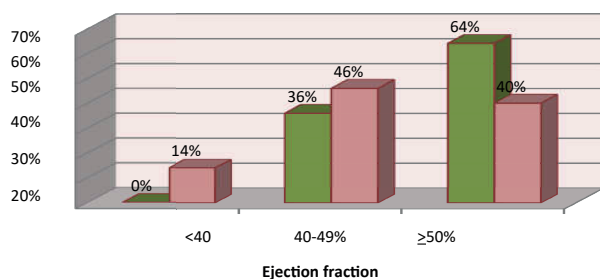


Figure-3: Distribution of study population according to Echocardiographic findings (n=100).

Table-I showed younger group had a significantly higher proportion of smoking (70 % vs 54 %), family history of IHD (52 % vs 32 %), dyslipidemia (48 % vs 36%), and higher BMI. In contrast, hypertension (14 % vs 80 %), diabetes (20 % vs 46 %) and history of angina (16 % vs 28 %) were significantly higher among participants of the older group.

Table-I: Distribution of study population according to risk factors (n=100).

Risk factors	≤40 Years	>40 Years	p-value
Hypertension	07(14%)	40 (80%)	<.001 ^s
Diabetes mellitus	10(20%)	23 (46%)	<.001 ^s
Dyslipidemia	24(48%)	18(36%)	<.001 ^s
Obesity			
• Normal	22(44%)	30(60%)	
• Obese	12(24%)	08(16%)	<.001 ^s
• Overweight	16(32%)	12(24%)	<.001 ^s
Previous history of Angina or acute MI	08(16%)	14(28%)	<.001 ^s
Family early history of IHD	26(52%)	16(32%)	<.001 ^s
Smoking	35(70%)	27(54%)	<.001 ^s
History of taking alcohol	08(16%)	04(8%)	

n= study population, S= significant.

Table II showed the in-hospital outcome of the study participants. In this study older patients had developed heart failure (16% vs 32%), arrhythmia (8% vs 24%), cardiogenic shock (2% vs 18%), post MI angina (6% vs 12%) and death (6% vs 14%) than the younger group, which was statistically not significant.

Table-II: Distribution of study population according to in-hospital outcome (n=100).

In-Hospital outcome	≤40 Years	>40 Years	p-value
Heart failure	08(16%)	16(32%)	
• Class I	00(00%)	00(00%)	
• Class II	04(08%)	03(06%)	0.10NS
• Class III	03(06%)	04(08%)	
• Class IV	01(02%)	9(18%)	
Post MI angina	03(06%)	06 (12%)	1.00NS
Re-infarction	01(02%)	03(06%)	1.00NS
Significant			
Arrhythmia			
• Ventricular tachycardia/Ventricular fibrillation	02(04%)	04(08%)	0.43NS
• Atrial fibrillation	00(00%)	03(06%)	
• Complete heart block	02(04%)	05(10%)	
Cardiogenic shock	01(02%)	09(18%)	1.00NS
Mechanical complications (MR)	01(02%)	02(04%)	1.00NS
Death	03(06%)	07(14%)	1.00NS

n= study population, NS= not significant.

Discussion:

This observational study was conducted on patients with ST-segment elevation myocardial infarction (STEMI) admitted to the Department of Medicine at Khulna Medical College Hospital, Khulna. The results showed that the majority of patients were male (74% in the younger group vs. 80% in the older group), which aligns with previous studies in Bangladesh where the percentage of male STEMI patients ranged from 80% to 92%^{11,12}. Among the 100 patients with STEMI, the most common occupation in both age groups was being a service holder. Additionally, the majority of patients were engaged in sedentary occupational activities (74% in the younger group vs. 80% in the older group), likely due to the mechanization of agriculture and a heavy dependence on migrant labor in both agriculture and other sectors. A previous study found that 84% of subjects were involved in sedentary occupations, while 16% were moderately active¹³. In terms of risk factors, the younger age group had a significantly higher proportion of smokers (70% vs. 54%), a family history of ischemic heart disease (IHD) (52% vs. 32%), dyslipidemia (48% vs. 36%), and a higher body mass index (BMI). In contrast, the older age group had significantly higher rates of hypertension (80% vs. 14%), diabetes (46% vs. 20%), and a history of angina (28% vs. 16%). A study by Khan et al. on young patients with acute myocardial infarction (AMI) reported high rates of smoking (84.4%), hypertension (46.9%), dyslipidemia (56.3%), diabetes (12.5%), and family history (34.4%), with higher triglyceride levels and lower HDL 14. These findings are consistent with other studies¹⁴⁻¹⁶. Another study in Bangladesh found that AMI in young patients is most commonly seen in males, with smoking being the most frequent risk factor¹⁷. In this study, left ventricular ejection fraction (LVEF) was significantly higher in the younger group ($p = 0.005$) compared to the older group. A majority of the older patients developed heart failure (32% vs. 16%), arrhythmias (24% vs. 8%), cardiogenic shock (18% vs. 2%), post-MI angina (12% vs. 6%), and death (14% vs. 6%) compared to the younger group, although these differences were statistically not significant. These findings are consistent with previous studies^{17,18}.

Our results indicate that ST-elevation MI was associated with significantly higher mortality and cardiovascular events in the elderly compared to the young, a finding that is in agreement with an Indian study. In a study by Chowdhury and Marsh, the in-hospital mortality rate among young MI patients ranged from 1% to 6%, while it ranged from 8% to 22% in older patients. Screening for risk factors in the young population could improve prognosis and help prevent AMI in younger individuals¹⁹⁻²¹. The better clinical outcomes observed among younger patients in this study are consistent with previous reports. However, studies in other countries have suggested that although young AMI patients experience better in-hospital outcomes due to less severe coronary vessel involvement, they are at higher long-term risk for complications, including previous MI,

peripheral vascular disease, and low ejection fraction, all of which contribute to higher mortality.

Limitation of Study:

The study was conducted for academic and clinical purposes within a short timeframe and with a small sample size and limited resources. As it was carried out in a single hospital, the findings may not be generalizable to the broader population. The purposive sampling method used could introduce bias, potentially affecting the results. A larger sample size would have provided more robust findings.

Conclusion:

Younger patients with acute myocardial infarction (AMI) exhibit a distinct risk profile and generally experience more favorable in-hospital outcomes compared to older patients. The predominant risk factors in the younger cohort included male gender, a family history of ischemic heart disease (IHD), smoking, overweight, and dyslipidemia. Early intervention aimed at controlling modifiable risk factors, such as smoking, obesity, and dyslipidemia, is crucial to reducing the incidence of AMI in this population.

Conflict of Interest: None.

Acknowledgement:

We are grateful to Department of Medicine, Khulna Medical College, Khulna, Bangladesh and all patients who participate in this study.

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Microbial Infections in Patients Suffering from Burn Injuries: A Systematic Review

Raisa Enayet Badhan^{*1}, Md. Jahangir Alam²

Abstract

Polymicrobial infections are common in patients suffering from burn injuries. Hospitalized patients are at a heightened risk of contracting hospital-acquired infections and extended hospital stays raise the possibility of infection with resistant organisms. Pseudomonas aeruginosa, Proteus mirabilis, Acinetobacter baumannii, and Klebsiella pneumoniae are the most often found multidrug-resistant (MDR) Gram-negative bacteria in burn wound infections (BWIs). BWIs caused by Gram positive organism like Staphylococcus and Streptococcus are also prevalent. Fungi-like Candida species appear to occur also. Nonetheless, opportunistic pathogen infection is highly prevalent in burn victims. Variations in geographic location and infection control practices result in variations in the causal agents of BWIs. All things considered, increased serum cytokine levels, systemic immune response and immunosuppression are indicative of burn injuries. Therefore, prompt identification and intervention can quicken the healing of wounds and lower the chance of developing new infections at the site of injury. A multidisciplinary approach from infectious disease experts and burn surgeons is also required to effectively track antibiotic resistance in BWI pathogens, prevent the super-spread of MDR infections and enhance treatment results.

Keywords: Burn wound infections; Biofilm; Hospital acquired infection; Multidrug resistant; Opportunistic infection.

Number of Tables: 01; Number of References: 49; Number of Correspondences: 04.

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Introduction:

Being the largest anatomical organ in humans, the skin is engaged in several physiological processes including proprioception, thermoregulation, homeostasis maintenance, and defense against environmental threats¹. Man's physical defense against disease invasion is his skin. Thus, conditions that result in the loss of skin integrity have a number of grave repercussions¹. A serious global public health concern is burn injuries. The epidermal barrier is damaged, which results in the downregulation of the immune system on both a local and systemic level¹. Burn wounds thus become the perfect environment for bacteria to grow^{1,2}. Burn wound

exudates (BWEs), a biological fluid that predominates in the wound, serve as an excellent microenvironment that is optimal for the growth of pathogens³. First-degree (superficial) burns damage only the epidermal layer, so they heal rather quickly without scarring². Second-degree (partial-thickness) burns involve the deeper layers of the epidermis and dermis and heal slowly². Third-degree (full-thickness) burns fully destroy the epidermal and dermal layers of the skin and can also cause significant damage to the underlying tissues and bones as well². One extremely prevalent and severe type of trauma is burn. With a crude fatality rate of 5%, it is ranked eighth among all traumatic injuries by the World Health Organization⁴. An estimated 2.65 lakh people die from burn injuries each year worldwide. These situations are more common in undeveloped and underdeveloped nations, where burns that cover more than 40% of the body's surface area have a 100% patient mortality risk^{3,5}. Eighty percent of burns happen at home⁶. Children and teenagers are more likely to get burn injuries from domestic sources^{6,7}. Southeast Asia leads the globe in deliberate burn injuries, followed by Africa⁸. Asia has the greatest rate of burn injuries worldwide. India is the Asian nation with the greatest number of reported cases of burning self-harm, followed by Bangladesh, Pakistan, and Bhutan. With a burn injury fatality rate of 23.5% annually, Africa has the highest rate⁸. Due to domestic abuse or self-immolation, young women make almost 65% of burn casualties in India⁹. Conversely, children are the most common victims of burn injuries in Africa. Asia and Africa have high population densities, low income rates, low levels of education, and inadequate surveillance systems, all of which contribute to the high incidence of burn injuries⁹. Continents like Europe, North America, South America, and Australia have notably less reported cases of burn injuries⁸. Intentional burning self-harm victims are more common among men in the 40–50 age

range in Europe⁹. Australia is the country with the greatest annual hospital admissions of burn patients, followed by Asia. When it comes to burn injuries, these developed continents are in a far better position than the underdeveloped and developing nations. Seventy-five percent of burn deaths are the result of polymicrobial infections².

Pathogens of Burn Wound Infections:

Microorganisms colonize and grow quickly at the site of injury due to the loss of the skin barrier following burn. The skin barrier otherwise serves as the first line of immune defense for any individual^{10,11,12}. Any breach in the skin allows for easy entry and access of the infecting microbe to the inner tissues of the body, thus complicating the etiology^{10,11,12}. Hence, it has been observed that microbial infections, especially those caused by multidrug-resistant (MDR)-bacteria, including *Pseudomonas* and *Acinetobacter*, are the main cause of increased morbidity and mortality in burn patients^{10,11,12}. According to the 2016 National Burn Repository Report, polymicrobial burn wound infections (BWIs) account for seven out of ten of the most common complications in burn patients. UTIs, cellulitis, and pneumonia are the most common BWIs, while respiratory tract infections are the most common¹¹. The length of hospital stay following a burn injury is directly correlated with the kinds of bacteria that infect the patients; *Staphylococcus aureus* is the main cause of infection¹³. Skin and soft tissue infections predominate during the first week of hospitalization, while bloodstream infections, pneumonia, and urinary tract infections typically develop later in the stay¹³.

Gram-Positive Bacteria: The most commonly found Gram-positive bacteria in BWI include *Staphylococcus* species (spp.), *Enterococcus* spp., and β -hemolytic group A *Streptococci* (GAS)¹⁰. Specifically, vancomycin-resistant *Enterococci* (VRE) and methicillin-resistant *Staphylococcus aureus* (MRSA) are the pathogens of high concern in patients with severe burns^{10,11}. Over recent decades and with the uncontrolled over-the-counter availability of broad-spectrum antibiotics, MRSA has become the most predominant pathogen in the intensive care unit of burn patients¹². Colonization with any of these bacteria may also lead to biofilm infections, resulting in severe illness and death¹².

Table I. Bacterial pathogens isolated from burn wound infections¹³

Bacterial pathogens	Percentage of occurrence (%)
<i>Staphylococcus aureus</i>	33.85
<i>Pseudomonas aeruginosa</i>	15.38
<i>Acinetobacter baumannii</i>	15.38
<i>Klebsiella pneumoniae</i>	13.85
<i>Escherichia coli</i>	8.46
<i>Proteus mirabilis</i>	4.62
<i>Staphylococcus epidermis</i>	3.85
<i>Pseudomonas putida</i>	3.08
<i>Proteus morgani</i>	0.77
<i>Citrobacter freundii</i>	0.77

One of the most popular therapies for reducing MRSA infection has been vancomycin. However, new antibiotic-resistant strains, such as Vancomycin-intermediate *Staphylococcus aureus*, have been emerging over the last few years¹⁴. Novel antimicrobials as daptomycin, tigecycline, quinupristin-dalfopristin, dalbavancin, and linezolid (an oxazolidinone) may offer some relief from this issue¹². Despite being a Gram-positive bacterium of concern, *Enterococcus* was luckily not known to be lethal until the advent of VRE¹⁶. These days, combination therapy is utilized to treat VRE infections, which includes ampicillin and an aminoglycoside¹⁶. The most common cause of graft failure in burn patients is group B streptococci (*Streptococcus agalactiae*), which is followed by GAS (*Streptococcus pyogenes*)¹⁵. The penicillin class of medicines is effective in eliminating these streptococci¹⁷.

Gram-Negative Bacteria: *P. aeruginosa* prefers moist conditions, it is not only the primary bacterium that is commonly found in invasive burn wounds¹⁸. Additionally, sepsis caused by these bacteria results in burn-related death¹⁸. Infections caused by *pseudomonas*, especially *P. aeruginosa*, typically begin as a small, superficial lesion with a characteristic yellow or green color and an unpleasant fruity odor. These infections can progress to an invasive infection known as "ecthyma gangrenosum," which results in blue-purplish "punched-out" lesions in the skin¹⁹. Sepsis can then be quickly brought on by *P. aeruginosa*'s fast spread into deeper tissues²⁰. *P. aeruginosa* is showing signs of developing drug resistance, hence combination therapy using piperacillin and tazobactam is used. An alternative treatment for MDR-*P. aeruginosa* is azatreonam²⁰. Another Gram-negative bacterium in the list of high-concern microbes in burn patients is *A. baumannii*. Survivability in both wet and dry conditions, also on both inanimate and animate objects, helps them to achieve this²¹. As a last resort for treating pan-resistant *Acinetobacter* spp., colisin has been developed²¹. The development of a biofilm in the burn wound microenvironment of a patient is the primary cause of burn treatment regimen failure, and in many complex situations, this can result in mortality²². Importantly, the bacterial community enclosed in a polysaccharide matrix biofilm is more tolerant to antibiotics and more resilient to host immune system stresses and disinfection²⁰. **MDR Bacteria:** The Centers for Disease Control and Prevention and the European Centre for Disease Prevention and Control state that there are two types of drug-resistant (DR) bacteria: pan-drug resistant strains, which are resistant to all agents under all antimicrobial categories, and extensively drug-resistant strains, which are resistant to at least one agent in all antimicrobial categories except a few^{23,24}. The length of the patient's hospital stay and the intensity and scope of the burn are the two main variables that influence MDR-pathogen attacks²⁵. Extended hospital stays elevate the risk of multidrug resistant infections, primarily caused by Gram-negative bacteria (GNB)^{25,26}. The use of invasive medical devices such urinary catheters

and prior antibiotic exposure may be the cause of future increases in these BWIs²⁵. A research conducted at the Canadian Burn Center, with 125 patients, provided support for this²⁷. After 28 days in the hospital, 44% of the bacterial isolates were MDR, up from 6% during the first 7 days²⁷. Thus, a significant treatment issue arises from the rise in the prevalence of MDR-GNB during extended hospital stays for burn patients²⁸. *A. baumannii*, *P. aeruginosa*, *Stenotrophomonas maltophilia*, and carbapenem-resistant Enterobacteriaceae strains are a few of the MDR-GNB pathogens that are of particular concern. These are thought to be the most prevalent MDR-GNB in BWIs, along with *Escherichia coli*, *Proteus mirabilis*, and *Klebsiella pneumoniae*^{28,29}. MRSA and GAS were shown to be prevalent in a study carried out in a burn unit at a tertiary care referral center in North India. MRSA strains were found to be resistant to erythromycin, ciprofloxacin, netilmicin, gentamicin, and cefotaxime³⁰. Ninety percent of the bacteria cultivated from the infected burn wounds there showed resistance to amikacin and ceftazidime, making MDR *P. aeruginosa* one of the most common microbes³⁰. These multidrug-resistant bacteria are first identified by examining their physical morphology, Gram-staining features, and biochemical traits³¹. In addition, to look for the zone of growth inhibition, antimicrobial susceptibility tests are performed using a variety of antibiotics, including ceftazidime, ciprofloxacin, gentamicin, trimethoprim-sulfamethoxazole, and others³¹. Here, multi-drug resistance is defined if a pathogen shows resistance to at least one agent in 3 or more antimicrobial classes³². Fungal Infections: The second most common microorganism that causes BWI is fungus³³. Fungi-induced BWIs can be a component of opportunistic infections, rare severe soft tissue infections, fungemia, and mono- or polymicrobial infections³⁴. Due to the similarity of these infections' symptoms to those of bacterial infections and the lack of an appropriate mycology laboratory, these infections are frequently misdiagnosed³⁵. Only when there is early detection and treatment may an infection become nonfatal due to the extremely high mortality risk of these fungal infections^{35,36}. Between 6.3 and 44% of all fungal infections that occur have been reported from various burn hospitals worldwide^{35,37-39}. 42% of the BWI infections from a case study involving 220 burn victims were found to be *Candida* spp.^{35,37-39}. One of the main factors contributing to burn victims' morbidity and mortality is invasive *Candida* infections³⁷. Changes in the treatment responses and prevalence of these fungal infections have been noted as a result of the introduction of novel antifungals⁴⁰⁻⁴³. It has been observed that common anti-mycotic drugs are no longer effective against non-albicans *Candida*⁴⁰⁻⁴⁴. After the second week of their thermal injury, burn victims are typically exposed to these fungal infections⁴⁵. The existence of fungemia, numerous positive cultures, and a deep-seated invasion of healthy skin are the causes of the high death rate⁴⁶. Fungal infections in burn patients are made worse by the patient's age, the extent of

the burns, the body surface area (30–60%), full-thickness burns, prolonged hospital stays, prolonged artificial ventilation, inhalational injuries, late surgical excision, artificial dermis, central venous catheters, fungal wound colonization, open dressing, antibiotics (like imipenem, vancomycin, and aminoglycosides), steroid treatment, hyperglycemic episodes, and immunosuppressive disorders^{32,40-43,45}. The diagnosis techniques used to identify mycoses at the burn site are traditional and primarily organism-specific⁴⁰. In certain situations, a direct tissue biopsy is carried out⁴⁰. However, because fungal cultures grow so quickly, there are instances when it is too late to begin an effective anti-mycotic medication⁴⁰. Samples from burn wounds are taken at appropriate intervals to aid in the detection of fungal infections in the lab⁴⁷. After seven, fourteen, twenty-one, and twenty-eight days, the burned tissue needs to be removed⁴⁶. The purpose of tissue biopsy is to demonstrate fungal wound infections. The following formula is used to analyze tissue-specific biopsy cultures semi-quantitatively:

$(CFUs \times \log \text{ reciprocal} \times 2 = \text{colony count}) / \text{Tissue weight (g)}^{46}$

Yeast identity in cultures is assessed using the following methods: tetrazolium reduction test, carbon and nitrogen assimilation tests, characteristic growth on cornmeal agar, and cultural features on HiCrome agar⁴⁶. Lactophenol cotton blue (LPCB) wet mount preparation for conidiogenesis, pattern, and organization is used to identify molds⁴⁶. Slide cultures using potato dextrose agar are used to identify non-sporulating molds⁴⁶. The assays to determine the antifungal susceptibility of yeasts are e-strip or broth micro-dilution utilizing antifungals such as amphotericin B, fluconazole, itraconazole, voriconazole, and caspofungin⁴⁷. Molds' susceptibility to antifungals is determined using an E-strip test employing amphotericin B⁴⁷. Compared to other *Candida* species, if *Candida albicans* is isolated, a lower quantity of nystatin is required for local treatment^{43,45,48}. The likelihood of developing fungal infections rises as burn wounds heal longer⁴⁴. Thus, improvements in topical antifungal therapy, the creation of pharmaceutical products to speed up wound healing, and the application of suitable systemic antifungal regimens based on antifungal susceptibility testing all contribute to better treatment outcomes for burn patients who are severely injured and prone to fungal infections⁴⁵.

Viral Infections: Burn patients are very susceptible to viral infections⁴⁹. The immunosuppressed state of the patient after an injury triggers the reactivation of latent infection. This becomes the most common cause of viral infection post-injury⁴⁹. Administration of acyclovir for a minimum of 10 days is the most commonly used antiviral therapy to treat viral infection⁴⁹.

Conclusions:

The prevention of burn injuries should be given top priority right now because it is currently a global public health emergency, particularly in developing and impoverished nations. During their hospital stay for treatment, patients

with burn injuries are more vulnerable to a variety of infections, including many multidrug-resistant bacteria, fungi, and viruses. Their weakened immune system responses, improper vascular arrangement in the burn-injured area, and worsening of severe oxidative stress are the main causes of this. Burn patients' vulnerability to deadly virus infections and MDR bacteria is influenced by immunosuppression, length of hospital stay, and geographic location. Reducing microbial transmission and infestation in burn wounds is necessary to increase burn patients' chances of survival. An efficient infection control policy is necessary for this at every level of the healthcare system. The misuse of antibiotics, the provision of a sterile environment, and the use of efficient medical equipment for the effective and critical treatment of patients may all be controlled by burn surgeons and burn care units working together to address the otherwise dire state of burn care worldwide.

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The Capital Investment Structure of the Medicine Sector in Bangladesh

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Abstract:

The capital investment structure of the medicine sector in Bangladesh plays a pivotal role in determining the industry's financial resilience, research capabilities, and global competitiveness. This study applies a mixed-methods research design to comprehensively analyze the capital composition, financing strategies, and investment challenges facing pharmaceutical companies operating in Bangladesh. Quantitative analysis is conducted on panel data of 10 leading firms from 2014 to 2023, focusing on debt-equity ratios, return on assets (ROA), return on equity (ROE), and long-term capital trends. Qualitative data from interviews with industry experts and financial officers provide insights into decision-making processes, risk management, and investor behavior. Findings reveal a significant preference for equity over debt, with many companies leveraging internal funding and public equity rather than bank loans or venture capital. Institutional barriers, high interest rates, and policy inconsistencies have discouraged debt financing and foreign direct investment (FDI). Additionally, regulatory constraints and a weak capital market infrastructure limit the expansion of investment opportunities in research and development (R&D). The study concludes with strategic recommendations including development of sector-specific credit instruments, enhancement of IPO mechanisms, incentivization of private equity and venture capital, and the creation of favorable regulatory frameworks. By aligning capital investment strategies with global best practices, Bangladesh's medicine sector can achieve long-term financial sustainability and innovation-driven growth.

Keywords: Capital Investment Structure, Pharmaceutical Industry, Bangladesh Medicine Sector, Debt-Equity Ratio, Return on Assets (ROA), Return on Equity (ROE), Long-Term Debt, Retained Earnings, Pharmaceutical Financing, Equity Financing, Capital Market, Foreign Direct Investment (FDI), Financial Management, Research and Development (R&D), Investment Strategies, Pharmaceutical Companies, Dhaka Stock Exchange (DSE), Regulatory Framework, Institutional Barriers.

Number of Tables: 02; Number of Figures: 05; Number of References: 8; Number of Correspondences; 04.

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Introduction:

The medicine sector, particularly the pharmaceutical industry, has emerged as one of the most strategically important and fastest-growing sectors of the Bangladeshi economy. According to the Bangladesh Association of Pharmaceutical Industries (BAPI, 2023)¹, the sector supplies approximately 98% of the country's domestic demand and exports to over 150 countries. As of 2022, it contributed nearly 1.83% to the country's gross domestic product (GDP), with projections indicating continued growth driven by urbanization, healthcare awareness, and an expanding middle-income population (Rahman & Hossain, 2022)². Bangladesh's pharmaceutical sector has benefited from favorable WTO³ Trade-Related Aspects of Intellectual Property Rights (TRIPS) exemptions, which allow it to produce patented drugs without license until 2033. This has opened opportunities for investment in research, manufacturing capacity, and global expansion. However, realizing the full potential of these opportunities depends on effective capital investment strategies, sound financial management, and a conducive policy environment. Despite its success, the capital investment structure of the pharmaceutical sector remains under-investigated in academic literature. Investment decisions in this sector are crucial not only for expansion and modernization but also for research and innovation—core to competing in global markets. However, anecdotal evidence and limited research suggest that firms in Bangladesh rely heavily on equity financing, retained earnings, and limited public offerings while avoiding long-term debt or foreign direct investment (FDI) due to structural and regulatory challenges (Uddin & Zaman, 2021)⁴. This imbalance potentially limits scalability, hinders innovation, and poses long-term financial sustainability issues. The lack of a comprehensive analysis of how capital is structured and invested in this high-potential industry creates a gap in both policy and business decision-making.

Methods:

To comprehensively assess the capital investment structure in Bangladesh's medicine sector, this study adopts a mixed-methods research design that integrates both quantitative and qualitative approaches. This enables triangulation of findings and captures both the financial patterns and the contextual understanding of decision-makers in the industry. **Research Design Overview:** The mixed-methods approach consists of: Quantitative analysis of secondary data from 10 leading pharmaceutical companies listed on the Dhaka Stock Exchange (DSE) between 2014 and 2023⁵. Qualitative analysis through in-depth, semi-structured interviews with financial officers, regulatory officials, and sectoral analysts. This design allows the study to meet its dual objectives: (a) identify trends and relationships among capital structure variables, and (b) interpret the reasoning, constraints, and institutional barriers shaping those trends.

Quantitative Methodology

A purposive sampling strategy was used to select 10 of the top-performing publicly listed pharmaceutical companies in Bangladesh, based on market capitalization and availability of consistent financial data. These include: Square Pharmaceuticals Ltd., Beximco Pharmaceuticals Ltd., Biopharma Ltd., ACI Ltd., Incepta Pharmaceuticals, Orion Pharma Ltd., Beacon Pharmaceuticals Ltd., Acme Laboratories Ltd., Ibn Sina Pharmaceuticals and Pharma Aids Ltd. These companies collectively represent over 75% of market share in the Bangladeshi pharmaceutical industry and are considered suitable for generalizing findings.

Data Collection

Secondary financial data were collected from: Annual reports and audited financial statements (2014–2023) and Bangladesh Bank bulletins⁶. The 10-year panel (2014–2023) allows the capture of structural changes before and after major macroeconomic events, including COVID-19 and interest rate reforms.

Time Frame: The process to write and publish the paper on Bangladesh's pharmaceutical sector took around 8 weeks. In the first week, we gathered data and reviewed existing research, then outlined the main points for the paper. By the second week, we started writing the Introduction, Macroeconomic Overview, and Pharmaceutical Industry Overview sections, explaining the sector's importance and growth. In the third week, we covered the Investment Landscape and Sub-sectors sections, discussing where investments were going and looking at key areas like drug manufacturing, medical devices, and digital health. In Week 4, we wrote about Government Policies, Challenges, and the Future Outlook for the industry. Week 5 was spent finalizing the paper, adding tables, and creating visuals like charts and graphs. In Week 6, we focused on editing and proofreading to make sure everything was clear and error-free. In Week 7, we put the paper into a PDF format, reviewed it one last time, and made any final changes. The final week (Week 8) was spent submitting the paper to a journal and making any necessary revisions based on feedback.

Variables and Measurements

Dependent Variables (Firm Performance): Return on Assets (ROA), Return on Equity (ROE), Net Investment Margin (NIM).

Independent Variables (Capital Structure): Debt-to-Equity Ratio (DER), Equity Capital (EQ), Long-Term Debt (LTD), Retained Earnings (RE), Firm Size (log of total assets)

Model Specification: The study employs a panel data regression model, using both Fixed Effects (FE) and Random Effects (RE) estimators. The basic model is:

$$\text{Performance}_{it} = \beta_0 + \beta_1 \text{DER}_{it} + \beta_2 \text{EQ}_{it} + \beta_3 \text{LTD}_{it} + \beta_4 \text{RE}_{it} + \beta_5 \text{SIZE}_{it} + \epsilon_{it}$$

- Performance_{it} : Dependent variable representing the performance of the firm i in year t .
- DER_{it} : Debt-to-equity ratio for firm i in year t .

- EQitit: Equity ratio for firm i in year t.
- LTDTit: Long-term debt ratio for firm i in year t.
- REitit: Retained earnings ratio for firm i in year t.
- SIZEitit: Size of the firm (possibly measured by total assets or revenue) for firm i in year t.

Qualitative Methodology

Sampling and Participants: A total of 12 participants were interviewed using purposive sampling to ensure representation across the capital investment landscape. The sample includes:

- 5 Chief Financial Officers (CFOs) or Finance Directors from pharmaceutical firms
- 2 Senior Investment Analysts from merchant banks
- 2 Officials from Bangladesh Securities and Exchange Commission (BSEC)
- 2 Policy advisors from the Ministry of Industries
- 1 Pharmaceutical Industry Analyst from a research institute

This multi-stakeholder representation provides a balanced perspective across corporate, regulatory, and financial sectors.

Results and Analysis:

Quantitative Analysis:

The quantitative analysis was performed on secondary financial data collected from 10 leading pharmaceutical companies from 2014 to 2023. The key variables examined include the debt-equity ratio (DER), return on assets (ROA), return on equity (ROE), long-term debt ratio (LTD), and retained earnings (RE).

Table-I: The data is summarized below with approximate values^{7,8}:

Firm	DER	ROA	ROE	LTD	RE	Size (log of assets)
Square Pharmaceuticals Ltd.	0.8	12%	18%	25%	40%	8.5
Beximco Pharmaceuticals Ltd.	0.9	10%	15%	30%	35%	8.8
Biopharma Ltd.	0.5	14%	20%	22%	42%	7.9
ACI Ltd.	1.1	8%	12%	28%	38%	8.2
Incepta Pharmaceuticals	0.7	13%	17%	26%	41%	8.4
Orion Pharma Ltd.	1.0	9%	14%	32%	36%	8.6
Beacon Pharmaceuticals Ltd.	0.6	11%	16%	24%	39%	8.0
Acme Laboratories Ltd.	0.9	10%	15%	27%	37%	8.3
Ibn Sina Pharmaceuticals	0.7	12%	18%	23%	40%	8.1
Pharma Aids Ltd.	0.8	11%	16%	29%	38%	7.7

Findings from Quantitative Analysis:

Debt-Equity Ratio (DER): The average debt-equity ratio (DER) across firms is approximately 0.8, which indicates a moderate reliance on debt financing. However, some companies, like ACI Ltd. and Orion Pharma Ltd., show

higher levels of debt, suggesting their higher leverage compared to firms like Biopharma Ltd., which has a relatively low DER.

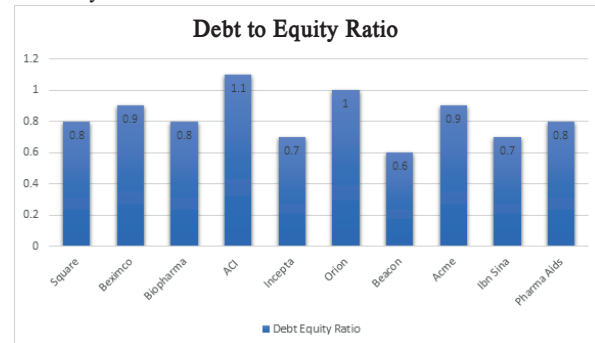


Figure-1: Debt to Equity Ratio of Different Companies.

Return on Assets (ROA) and Return on Equity (ROE): Companies like Biopharma Ltd. and Square Pharmaceuticals Ltd. show strong performance with high ROA and ROE values (around 14% and 18%, respectively), indicating effective asset utilization and strong returns on equity. However, companies like ACI Ltd. and Orion Pharma Ltd. show weaker performance with lower ROA and ROE values (8-9%).

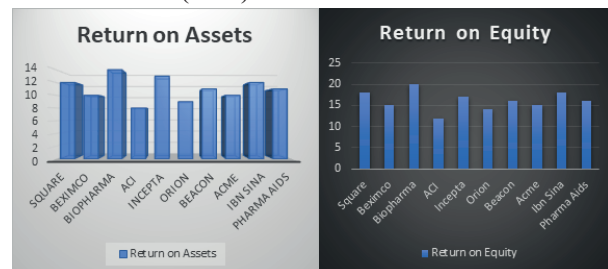


Figure-2: Return on Asset of Different Companies.

Figure-3: Return on Equity of Different Companies.

- **Long-Term Debt (LTD):** Long-term debt levels are distributed across firms, with companies such as Beximco Pharmaceuticals Ltd. and Orion Pharma Ltd. holding higher long-term debt ratios (above 30%), indicating higher financial risk and potential constraints on future investments in R&D or expansion.

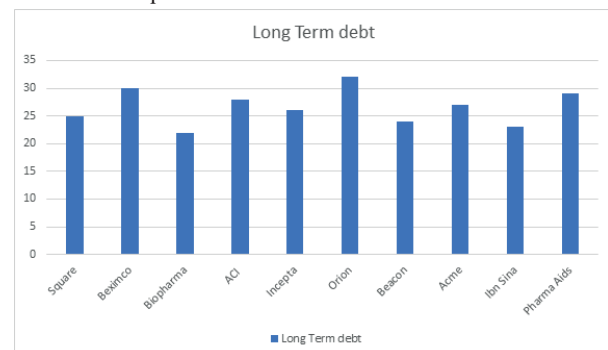


Figure-4: Long Term Debt of Different Companies.

Retained Earnings (RE): The retained earnings across the firms range from 35% to 42%, suggesting that most companies rely on internally generated funds for financing. This is consistent with the study's finding that equity and

retained earnings are the preferred fina



Figure-5: Retained Earnings of Different Companies

Qualitative Insights: Interviews were conducted with industry experts, financial officers, and regulatory analysts. Here are some key findings from these qualitative insights:

- **Preference for Equity Financing:** Industry experts emphasized that many pharmaceutical firms prefer equity financing and internal retained earnings because they offer flexibility and reduce the burden of debt repayment. However, this approach limits scalability and innovation potential in the long term.

- **Regulatory Constraints:** Several interviewees highlighted the challenges posed by the regulatory environment, including inconsistent

policies regarding foreign direct investment (FDI) and high interest rates, which discourage the use of debt financing. There is also concern over the inefficiencies of the capital market and the absence of sector-specific credit instruments.

- **Risk Aversion:** Financial officers noted that risk aversion is prevalent in the sector, as firms are reluctant to engage in high-risk ventures or long-term debt financing. This is due to the volatile market

conditions and fear of non-compliance with strict government regulations.

Regression Analysis

Regression Output:

- **Dependent Variable:** ROA (Return on Assets)
- **R-squared:** 0.921, which indicates that 92.1% of the variability in ROA can be explained by the model.
- **Adjusted R-squared:** 0.858, which is adjusted for the number of predictors.
- **F-statistic:** 14.59, with a p-value of 0.00578, which suggests the model is statistically significant.

Table-II: Coefficients:

Variable	Coefficient	Std. Error	t-value	p-value
Intercept (const)	-0.1595	0.133	-1.196	0.285
DER (Debt-to-Equity Ratio)	-0.0815	0.021	-3.789	0.013
LTD (Long-Term Debt)	0.1755	0.156	1.127	0.311
RE (Retained Earnings)	0.4884	0.204	2.392	0.062
SIZE (Firm Size)	0.0120	0.008	1.501	0.194

Debt-to-Equity Ratio (DER): The coefficient for DER is -0.0815 with a p-value of 0.013, suggesting that a higher debt-to-equity ratio negatively impacts ROA. As DER increases, ROA tends to decrease. This result is statistically significant.

Long-Term Debt (LTD): The coefficient for LTD is 0.1755 with a p-value of 0.311, which is not statistically significant. This suggests that long-term debt does not have a significant effect on ROA in this dataset.

Retained Earnings (RE): The coefficient for RE is 0.4884 with a p-value of 0.062, indicating that retained earnings have a positive effect on ROA, though it is not statistically significant at the 0.05 level (but close). This suggests that companies with higher retained earnings tend to have better performance.

Firm Size (SIZE): The coefficient for SIZE is 0.0120 with a p-value of 0.194, which is not statistically significant. This implies that firm size does not have a substantial effect on ROA in this dataset.

Discussion:

The quantitative and qualitative analysis of the capital investment structure in Bangladesh's pharmaceutical sector reveals several important insights. The average Debt-Equity Ratio (DER) across the 10 firms is approximately 0.8, indicating a moderate reliance on debt financing. Companies such as ACI Ltd. and Orion Pharma Ltd. exhibit higher levels of debt, while firms like Biopharma Ltd. have a relatively lower DER. The regression analysis confirms that a higher DER negatively impacts Return on Assets (ROA), suggesting that higher debt financing can lead to reduced profitability from assets, likely due to the financial strain of servicing debt. On the other hand, Long-Term Debt (LTD) does not show a significant effect on ROA, indicating that long-term debt might not pose the same immediate financial pressure as short-term debt.

When examining Return on Assets (ROA) and Return on Equity (ROE), firms like Biopharma Ltd. and Square Pharmaceuticals Ltd. perform well with higher ROA and ROE values, suggesting efficient use of assets and strong returns on equity. In contrast, companies like ACI Ltd. and Orion Pharma Ltd. show weaker performance, which may be influenced by their higher reliance on debt or other operational inefficiencies.

The analysis also highlights the role of Retained Earnings (RE), which ranged from 35% to 42% across firms, indicating that most companies prefer using internal funding for reinvestment rather than relying on external debt or equity. The regression results show a positive, though not statistically significant, relationship between retained earnings and ROA, suggesting that firms with higher retained earnings tend to perform better, as they have more resources for reinvestment into growth and innovation.

Furthermore, Firm Size (SIZE), as measured by the log of assets, did not have a significant effect on ROA, implying that larger firms do not necessarily outperform smaller ones.

in terms of asset utilization efficiency.

The qualitative insights from interviews with industry experts and financial officers revealed that many pharmaceutical firms in Bangladesh prefer equity financing and retained earnings due to the flexibility it offers and the avoidance of debt repayment pressures. However, this strategy limits scalability and innovation potential, as firms are more reliant on their internal funds. Regulatory constraints, such as inconsistent policies on foreign direct investment (FDI) and high interest rates, also hinder the ability to utilize debt financing effectively. Additionally, there is a strong sense of risk aversion within the sector, as firms tend to avoid high-risk ventures or long-term debt financing due to the volatile market conditions and stringent regulatory environment.

In conclusion, the findings from both the quantitative analysis and the qualitative insights suggest that pharmaceutical companies in Bangladesh should strike a better balance between debt and equity financing. While equity and retained earnings provide flexibility, they may also limit growth potential. Addressing regulatory inefficiencies and adopting more balanced financing strategies could support sustainable growth in the sector, enhancing its global competitiveness and long-term profitability.

Recommendations for Sustainable Growth:

Based on the findings of this study, several strategies can be implemented to optimize capital investment in the medicine sector:

- **Development of Sector-Specific Credit Instruments:** Introducing specialized credit instruments tailored for pharmaceutical companies could help reduce reliance on costly bank loans and provide firms with more flexible financing options.
- **Enhancement of IPO Mechanisms:** Improving the initial public offering (IPO) process and making it more accessible for smaller pharmaceutical companies could help them raise capital for expansion and innovation.
- **Encouraging Private Equity and Venture Capital:** Policymakers should create a more favorable regulatory environment for venture capital and private equity investments, which would allow firms to secure funds for R&D and long-term projects.
- **Favorable Regulatory Framework:** The creation of consistent and transparent policies for FDI and the reduction of bureaucratic hurdles will encourage foreign investments, which could improve capital flows and enhance global competitiveness.

Conclusion:

This study has provided a comprehensive analysis of the capital investment structure in Bangladesh's pharmaceutical

sector. It has shown that while equity financing remains the dominant form of capital, there are significant opportunities for improving access to debt financing and foreign investment. By implementing strategic reforms and aligning investment strategies with global best practices, Bangladesh's medicine sector can strengthen its financial resilience, foster innovation, and enhance its competitiveness in the global market.

Conflict of Interest: None.

Acknowledgement:

We would like to express our sincere gratitude to everyone who contributed to the completion of this research. Our heartfelt thanks go to our advisor for their constant guidance, encouragement, and support throughout the study. We also wish to acknowledge the industry experts, financial officers, and regulatory officials who took part in the interviews and shared their valuable insights, which were crucial to the qualitative aspects of this research. We are grateful to the pharmaceutical companies and Bangladesh Bank for providing access to the necessary data, which made the quantitative analysis possible. Lastly, we would like to extend our appreciation to our families for their patience and support during the course of this research.

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Challenges and Strategies to Strengthen Diabetes Prevention Programmes in Bangladesh

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Abstract

Accelerated urbanization, changing lifestyle, and growing health inequality have all contributed towards Bangladesh's diabetes burden unfolding as a serious public health emergency. Structural, social, and policy-level impediments to the effective prevention and control of diabetes in the country are critically examined in this research. Despite the recognition of the threat of non-communicable disease (NCD) and of diabetes at the national programs and policy levels, implementation has been patchy and disproportionately concentrated in urban areas. Inequities are compounded by an un-integrated healthcare system, lack of funding, substandard primary care centers, and a severe shortage of trained staff.

This paper highlights the intricacies of these barriers, various social determinants of health through to policy intransigence and digital divides, and the need for a multisectoral, equity-oriented, and integrated response. The potential of public-private partnerships, digital health innovations, and community interventions is examined in the context of Sustainable Development Goal 3 (SDG 3). Drawing from a close integration of policy briefs, epidemiological data, and the subject literature, this paper proffers strategic recommendations to augment the agenda for diabetes prevention in Bangladesh. It recommends scaling up primary prevention, capacity development, and reorientation of the health system towards chronic disease management to reduce morbidity, mortality, and socioeconomic consequences of diabetes.

Keywords: Diabetes Prevention, Non-Communicable Diseases (NCDs), Bangladesh Health Policy, Primary Healthcare, Health Systems Strengthening, Social Determinants of Health, mHealth and Digital Interventions, Public-Private Partnerships, SDG 3, Chronic Disease Management.

Number of References: 09; Number of Correspondences: 04.

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Introduction and Background:

In Bangladesh, the prevalence of diabetes is escalating quickly, posing a public health concern nationwide. Rapid urbanization, coupled with changing dietary habits, sedentary lifestyles, and increasing rates of obesity, has placed an increasing burden on the healthcare system. The rise in diabetic prevalence creates an urgent need to improve preventive techniques, particularly in the marginalized and underprivileged population. The increasing prevalence of diabetes is particularly concerning in a country like Bangladesh, where the healthcare infrastructure is not sufficiently equipped to manage the long-term medical needs of people diagnosed with diabetes. It is imperative to understand the urgency of addressing this concern, given its substantial health and economic impacts.

More specifically, SDG 3, which has the aim to "ensure healthy lives and promote well-being for all at all ages (Martin, n.d.) falls in line with the UN's Sustainable Development Goals. To countries like Bangladesh, which is in the lower-middle-income group of nations, the increasing prevalence of non-communicable diseases, such as diabetes, poses a serious issue. This is in addition to a combination of poverty, lack of high-quality available health care, and the increased burden of chronic diseases. The most recent estimates are proven to suggest that diabetes affects 8.4% of adults in Bangladesh, which will increase substantially over the coming decades (Saleh et al., 2014)¹.

Untreated or improperly managed diabetes can result in serious side effects that impair quality of life, including blindness, renal failure, stroke, and cardiovascular disorders. Diabetes also has a significant financial impact on households and the country's healthcare system. Bangladesh will not be an exception to the International Diabetes Federation's (IDF) prediction that the expense of managing diabetes, and its consequences will increase internationally (Hasan et al., 2019)². Furthermore, the epidemiological transition that Bangladesh is undergoing is impacting health infrastructures and services, which have been built for fighting infectious diseases, thus making responding appropriately to people's needs caused by chronic illnesses such as diabetes increasingly difficult (Aziz et al., 2021)³. These facts therefore evidently indicate that strengthening existing diabetes preventive programs as well as implementing newer concepts are of utmost importance.

This paper will discuss the challenges Bangladesh faces in fighting diabetes, critically review the current initiatives and regulations taken by the government, and propose ways in which diabetes prevention initiatives can be improved. This, by extension, will pinpoint the weaknesses of the current initiatives and provide remedies to enhance access, coverage, quality, and equity for diabetes care, especially in light of achieving Sustainable Development Goals-3 (SDG-3).

Materials and Methods:

In order to explore the current barriers and strategic opportunities for diabetes prevention in Bangladesh, a narrative and qualitative review method was used in this research. For the purpose of identifying trends, gaps, and interventions in diabetes prevention, a search of peer-reviewed journal articles, national policy documents, WHO and IDF reports, and grey literature published between 2010 and 2024 was conducted. Using keywords like "diabetes prevention," "non-communicable diseases," "Bangladesh," "policy response," and "primary healthcare," sources were retrieved from databases (PubMed, Google Scholar, and Bangladesh Ministry of Health archives).

Discussion:

Government Policies and Responses

Recognizing the emerging burden of diabetes, along with other non-communicable diseases, the current Bangladeshi government has taken several context-appropriate or relevant initiatives through various programs and policy frameworks to prevent a nationwide health crisis, particularly in peripheral locations. The National Health Policy adopted in 2011, recognizing Non-Communicable Diseases, including diabetes, as a major public health concern, forms a very important part of Bangladesh's strategy for improving public health (Murshid and Haque, 2020)⁴. The policy fervently indicates that, as the prevalence of Non-Communicable Diseases is increasing and requires a more strategic and integrated approach regarding health promotion, prevention, and care, the focus of the healthcare system should gradually be shifted from communicable diseases.

Bangladesh has framed a National Non-Communicable Disease Strategy for 2018 to 2025 considering the growing burden of chronic diseases like diabetes. The overall goals of the strategy for prevention and control of diabetes include:

1. **Primary Prevention:** This essentially involves the reduction of risk factors, such as obesity, bad nutrition, and lack of physical activity that are associated with diabetes.
2. **Improved Screening and Early Detection:** Screening for Diabetes is quite imperative; this should especially be done on the high-risk populations. It needs to be taken with equal attention in the peripheral areas as it is in metropolitan cities like Dhaka.
3. **Health Care Delivery System Strengthening:** It ensures access to quality diabetes care, integrates services at the Primary Health Care (PHC) level and assures access to the essential drugs and diagnostic tools. Strengthening these delivery systems will provide a valid ground for future management of the disease burden as well.
4. **Public awareness campaigns:** Increased knowledge of diabetes and its risk factors to support early detection and lifestyle changes.

These policies do exist; however, their implementation has been inconsistent, and very slow. Among the major impediments to preventing diabetes in Bangladesh is the lack of an integrated effort by the national government, local governments, and the private sector. Most of the suggested policies have not seen effective implementation, especially in neglected and distal peripheral areas.

The MOHFW initiated the illustrious National Program for Prevention and Control of Diabetes, Cardiovascular Disease, and Stroke in 2007 to develop diabetes education, screening, and care in Bangladesh. Resource allocation, a deficiency of appropriate healthcare

facilities, and a shortage of adequately trained personnel pose challenges that must be faced by this program (Saleh et al., 2014)¹.

Moreover, most of these activities have been hindered by inadequate funding and sufficient infrastructural support, even though the National Strategy for Health Sector Development has outlined measures relating to the treatment of Non-Communicable Diseases, including diabetes, for the period 2017-2030. As a matter of fact, diabetes care and prevention continue to be provided principally and exclusively in metropolitan areas, thereby denying the rural population access to this important category of medical services. This unfortunate discrepancy represents a significant barrier to the provision of diabetes care to all citizens.

The lack of medical practitioners who have been trained in the management of diabetes also contributes to the way these guidelines are implemented. The continued lack of training in chronic disease management among the primary healthcare workforce perpetuates ineffective prevention and treatment of diabetes in rural and poor communities (Hossain et al., 2022)⁵. This gap further worsens as the number of people affected by diabetes keeps increasing, hence increasing demand for specialized care.

The multi-year Health, Nutrition, and Population Sector Program supports the overall objectives of Bangladesh for the growth of the health sector. Strengthening health systems to address diabetes by increasing the ability of healthcare professionals at the local level is one of the main focal points of the program. The training of CHWs and other frontline health professionals to conduct early detection of diabetes, along with brief counselling on lifestyle modifications, is included in this multimodal approach. This service has also been integrated into the wide network of community clinics, aiming to reach the poor, especially those in rural areas where specialists are scarce (Afroz et al., 2020)⁶. However, the implementation of such programs has been marred by various challenges in the form of inadequate budgets, lack of comprehensive monitoring systems, and challenges in scaling the intervention effectively across the entire population.

A review of the body of research indicates several important shortcomings and difficulties in Bangladesh's diabetes prevention program implementation. While the government has tried to develop methods and regulations to fight the diabetes epidemic, empirical research shows that such efforts have not achieved much success.

Identified Gaps

1. Understanding and Education: The general lack of understanding among the public about diabetes is one of the primary barriers to its treatment in Bangladesh. A study conducted by Hasan et al. (2019)² also indicated that most of the population was still ignorant about the risk factors for diabetes, which include obesity and a lack

of activity. This results in inappropriate management of the disease, including delayed diagnosis, hence adverse health outcomes. Besides, the studies show that most of the diabetic patients were diagnosed at a very advanced stage when complications have already set in, hence worsening their prognosis.

2. Access to Health Care: Lack of access to quality health care within the country is one of the major impediments to Bangladesh's successful management of diabetes. According to Islam et al. (2014)⁷, access to diabetes care is highly challenging for people living in rural and remote areas. These challenges include a lack of medical practitioners trained in the management of diabetes, limited access to essential drugs on prescription, and diagnostic equipment. Most people cannot afford the high out-of-pocket costs of private healthcare services, which aggravates this issue (Saleh et al., 2014)¹.

3. Social Determinants of Health: It is well documented that social determinants of health such as income, education, and urbanization play a role in preventing diabetes. Because of sedentary lifestyles, poor diets, and elevated stress levels, diabetes is more common in metropolitan settings. On the other hand, rural communities are less likely to obtain preventative treatment or early diagnosis since they frequently lack access to basic health services (Aziz et al., 2021)³. The burden of diabetes is increased by this social difference, underscoring the necessity of focused interventions in both urban and rural settings.

4. Systemic Health Care Challenges: The health system of Bangladesh remains burdened by communicable diseases; as such, there has been a minimum level of focus and funding devoted to NCDs like diabetes. Generally, the health system remains fragmented and views diabetes prevention as a separate concern rather than a part of a systemic response within the greater health system. Indeed, according to Hasan et al. (2019)², integrating diabetes care into the larger primary health system would improve both access and effectiveness.

5. Policy Gaps: Although Bangladesh has developed a few frameworks and policies regarding NCDs, including diabetes, the implementation of those has been spasmodic and episodic. Rather than being proactive, the policy response has been reactive, often until the burden of the diabetes epidemic has worsened. Such a late policy response leads to missed opportunities for early intervention, increasing healthcare costs and burdens associated with diabetes, according to Chowdhury et al. (2015)⁸.

Case Study Examples

Teleconsultation, SMS reminders, and health education through mobile apps are some examples of mobile health treatments that may significantly improve diabetes self-management and medication adherence, according to studies by Chowdhury et al. (2015)⁸. A study by Islam et

al. (2014)⁷ found that mobile health solutions that allowed for remote consultations with specialists in diabetes management, nutritional advice, and exercise suggestions benefited rural communities that often face barriers to accessing health care. Even as these technologies hold promise for increasing access to care, lower-income populations face barriers in the areas of digital literacy, internet connectivity, and device affordability, and thus these solutions must be tailored to the local environment. This means that even though mobile health treatments can help bridge some gaps in care, they must be employed in addition to other diabetes care strategies.

Barriers to Success

A critical analysis of the barriers to successful implementation of diabetes preventive and management initiatives identifies the following:

1. **Economic Constraints:** Bangladesh being a lower-middle-income country with very tight budgetary allocations, certainly has some significant economic restrictions as a nation. While diabetes is a non-communicable disease that attracts relatively less attention, as the health budget is typically prioritized for communicable disease emergencies. Inadequate resources in the healthcare budget impede the development of programs on diabetes screening, provision of essential drugs, and training of health professionals (Chowdhury et al., 2015)⁸.

2. **Healthcare Infrastructure:** The health infrastructure in rural Bangladesh remains one of the major barriers in the management of diabetes. Effective diabetes preventive initiatives are difficult to undertake due to a shortage of well-equipped healthcare facilities in most areas, particularly in rural areas. This is further compounded by the lack of qualified specialists in diabetes care in these areas as well (Islam et al., 2014)⁷.

3. **Workforce Shortages:** The shortage of medical professionals trained in the management of chronic diseases is a significant barrier to diabetes prevention. Diabetes control measures are less effective in rural areas where health workers are not trained to a sufficient level. Training of healthcare workers in rural areas remains insufficient, which limits their ability to provide effective treatment for diabetic patients (Saleh et al., 2014)¹.

4. **Social Inequalities:** Urbanization, income, and education are some of the major social determinants of health that have a strong impact on the risk of diabetes and access to care. Two major unhealthy behaviours that are more prevalent among urban populations and increase the risk of diabetes include poor diet and a sedentary lifestyle. However, access to healthcare is challenging for rural populations, and they often get diagnosed later in the course of illness (Hasan et al., 2019)². It therefore calls for policies to be formulated that address urban and rural settings in terms of the socio-economic factors influencing the risk of diabetes.

5. **Enhancing Public-Private Partnerships:** One way to overcome these challenges is the development of public-private partnerships in the management of diabetes. Access to diabetes care services can be improved, especially in disadvantaged areas, by partnering with private sector healthcare providers. The approach of PPPs could also offer a more sustainable approach to diabetes prevention and reduce the economic costs of diabetes care to the government (Chowdhury et al., 2015)⁸.

6. **Technology and Innovation:** Care and prevention of diabetes can be further facilitated by leveraging technology in the form of mobile health (mHealth) technologies. mHealth treatments have the capability to monitor blood sugar levels, actively remind patients when to take their medication, facilitate lifestyle changes, and generally raise awareness. Individuals with diabetes can employ these technologies to manage their disease remotely, which is especially useful in resource-poor settings (Chowdhury et al., 2015)⁸.

The lack of inter-sectoral collaboration within the sectors of health, education, agriculture, and urban planning is one of the main reasons for Bangladesh not being able to successfully implement diabetes preventive programs. Prevention of diabetes requires a multidimensional approach beyond medical care. In Bangladesh, these various sectors often work in isolation, which diminishes the effectiveness of efforts to prevent diabetes. As noted by Ahmed et al. (2022)⁹, what is evidently needed is a more integrated approach that unites policy, education, and health sectors in providing a common environment for healthy lifestyle promotion at every level of society. Partnerships such as these will have to be further strengthened in their efforts to tackle diabetes from different perspectives and enhance the general effectiveness of health promotion and disease prevention efforts.

Recommendations:

The following recommendations are advanced to enhance diabetes prevention programs in Bangladesh:

1. **Diabetes Screening:** Increased and expanded diabetes screening at the primary healthcare level, with particular emphasis on high-risk groups in both urban and rural areas.

2. **Diabetic Care in Primary Health Services:** Strengthen the capacity of primary healthcare facilities to provide diabetic care, including training of medical personnel in the management of chronic diseases.

3. **Expand Access to Drugs and Diagnostics:** Ensure access to essential diabetes drugs and diagnostic equipment at an affordable price, particularly in the most remote areas.

4. **Encourage Public-Private Partnerships:** Engage public-private partnerships to reduce costs and increase access to services for diabetes care.

5. **Technology for Diabetes Care:** Promote the use of 'mHealth' and other technologies, especially in rural

areas, to improve diabetes care, create awareness, and monitor the disease.

6. Address Social Determinants of Health: Implement policies to address the social determinants of diabetes risk, including unhealthy urban lifestyles, poverty, and education.

By addressing these gaps and improving the implementation of diabetes prevention programs, Bangladesh can reduce the burden of diabetes, improve health outcomes, and move closer to achieving SDG 3.

Conclusion:

Investment in data collection and surveillance systems is crucial to track the prevalence of diabetes and monitor the outcome of treatments, which is an integral part of enhancing diabetes prevention and care in Bangladesh. With a robust surveillance system, the policymakers would be able to make necessary adjustments in their plans and make well-informed decisions based on real-time data. This will include integrating diabetes indicators into routine health surveys and the improvement of local data collection capacity via community health workers.

Additionally, expanded EHRs will facilitate the coordination of care, particularly for individuals with diabetes requiring ongoing care. Current data infrastructure is still weak to appropriately monitor trends and assess the impact of interventions despite the government's efforts to collect data on NCDs, including diabetes (Aziz et al., 2021)³. Investments in more comprehensive data systems will enable Bangladesh to monitor progress toward SDG 3 and ensure that diabetes preventive and treatment plans are evidence-based and flexible enough to meet the country's evolving medical needs. **"A unified, equity-focused approach—combining digital innovation, policy reform, and community engagement—will be critical to reversing the diabetes epidemic and achieving SDG 3 in Bangladesh".**

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Unusual Presentation of Kala Azar: A Case Series from Rajshahi Medical College Hospital, Bangladesh.

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Abstract

Kala Azar, or visceral leishmaniasis, often manifests with a typical triad of fever of long duration, wt loss, and splenomegaly. Unusual manifestations can sometimes make the diagnosis and management difficult. This case series was conducted in the Department of Hematology, Rajshahi Medical College Hospital, Rajshahi, Bangladesh. This case presented unusual occurrences of a typical disease, Kala Azar, which were encountered. The clinical challenges of diagnosis and management highlight different therapeutic interventions and responses. All 4 cases of Kala Azar, with unusual presentations, were retrospectively analyzed. Clinical examination, history, laboratory investigations, results, diagnosis, and treatment responses were retrieved, and in-depth analyses were conducted. Present 4 cases of unusual diseases. One patient had a fever and cough, and pancytopenia was not described as a common manifestation of Kala Azar. His initial blood tests described non-reactive malarial slides, whereas the final bone marrow report described pancytopenia due to Kala Azar. The patient improved with amphotericin-B courses. The presentation of Kala Azar was unusual in some cases, which is why its clinical evaluation must be kept in mind in endemic areas. Conducting a profound evaluation and early management is essential.

Keywords: Kala Azar, Visceral Leishmaniasis, Diagnostic Challenges.

Number of Figures:02; Number of References:30; Number of Correspondences: 03.

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Introduction:

The cases under consideration in this report remarkably combine the most crucial aspect of understanding Kala Azar^{1,2}. They underscore the need to appreciate the varied clinical presentations of the disease within the confines of RMCH. Kala Azar, otherwise known as visceral leishmaniasis, still results in significant concern in low-resource settings, and it is imperative that the varied aspects of its clinical phenotypes be appreciated and understood to facilitate timely care^{3,4}. Because of its insidious onset, non-specific symptoms, and varied manifestations, the diagnosis of Kala Azar is often delayed, presenting significant therapeutic challenges for the healthcare provider. In this sense, the report goes to significant lengths to unravel the many conundrums and intricacies of the various atypical presentations of Kala Azar and provide valuable insights into the intrinsic nuances of its diagnosis and many therapeutic

implications. One of the gravest challenges to public health systems globally, especially in countries where Kala Azar is endemic, such as Bangladesh, bloodstream? hemorrhagic-yes *Leishmania donovani*, a protozoan parasite transmitted through the bite of infected sand flies, its consequence disease Kala-azar, became one the most pertinent public health problems worldwide Kala Azar is an entity with diverse clinical presentations, some of which viz^{5,6}. Irregular fever, anorexia, weight loss, abdominal discomfort, pantaloons strangely with many other infectious and non-infectious diseases, which can create diagnosing dilemmas in the face of diagnostic limitations^{7,8}. Adding to this complexity, the disease can present with varied clinical phenotypes, from classical visceral involvement to atypical extra-intestinal presentations, requiring a multidimensional approach to diagnosis^{9,10}.

Case Presentation:

Case 01

Case report A 62-year-old male patient, Mr. Md Ayub Ali, non-diabetic, non-hypertensive, non-smoker hails from Noshratpur, Adom Dighi, Bogura, presented with a history of high-grade continuous fever for 4 months associated with anorexia, abdominal discomfort, and weight loss of about 15 kg. The investigations included pancytopenia with peripheral blood film (PBF) and minimal splenomegaly on ultrasonography. One was Negative IgM for Kala Azar, but positive IgG. Other tests carried out as part of the investigations, such as malarial, Widal, and Weil Felix, were negative. On exam, he had left-sided pleural effusion on chest X-ray, and urine analysis demonstrated numerous red blood cells. On March 24, 2024, referred to RMCH, a bone marrow examination revealed the diagnosis of Kala Azar in the intracellular and extracellular form, demonstrating intracellular and extracellular organisms (LD bodies). The administration of a single dose of Amphotericin B improved significantly in the clinic symptomatically and followed 15 days later with the type of hematologic symptoms resolved.

Case 02

He was a 35-year-old businessman hailing from Chat mohar of Pabna with a background history of irregular high-grade continuous fever, anorexia, weight loss, and left-sided abdominal discomfort along with a progressively increasing mass over 20 days. Pancytopenia and hepatosplenomegaly were findings in investigations carried out initially. Despite a negative Combs test and multiple myeloma panel, serum protein electrophoresis confirmed monoclonal gammopathy. He received a cycle of CTD chemotherapy with no response and was referred to Rajshahi Medical College Hospital. A bone marrow examination showed LD body infiltration, which was diagnosed as Kala Azar. The patient was started on Amphotericin B, and there was a symptomatic improvement, and hematological parameters improved on follow-up. Conclusion: This case emphasizes the importance of keeping kala-azar in the differential diagnosis of prolonged fevers without specific clinical clues, especially in endemic areas like Pabna.

Case 03

Mrs. Kismot Ara, 36, an old housewife from Tanore,

Rajshahi, presented with 24-month history of irregular high-grade fever with on-and-off anorexia, mild weight loss, and joint pains over the last 20 days. The patient was then hospitalized at Rajshahi Medical College Hospital, where investigations confirmed pancytopenia, splenomegaly, left-sided pleural effusion, mild ascites, and radiologic signs of intestinal obstruction from ultrasound of the abdomen. The most remarkable laboratory findings were characteristics of renal dysfunction, urinary tract infection, and autoimmune work up close to active vasculitis syndromes. The patient eventually expired elsewhere before definitive therapy could be initiated in southern India, despite a positive ICT for Kala Azar and thought-provoking bone marrow invasion by LDs (Case C). The case highlights the difficulties of diagnosing and treating kala-azar (VL) in areas of endemicity in the presence of multiple medical conditions and the need for prompt diagnosis and intervention in such areas as Rajshahi, where it is endemic for improving the prognosis.

Case 04

A 40-year-old lady, Fulmoti of Vangura, Pabna, was admitted with a one-month history of fever, two weeks of cough, anorexia, and vomiting last week in RMCH. Initial hematologic Investigations showed pancytopenia on CBC (Hb 6.3 g/dl, TLC 2400/cumm, Plt count 60000/cumm). Her ESR was also bad: 100 mm in the first hour. Although the blood culture, CSF study, and Gene Xpert for sputum showed negative results, the ICT for Kala Azar returned positive results. The bone marrow study was repeated, which also showed intracellular LD bodies; yes, extracellular LD bodies were found in some fields. Following the national guidelines, the treatment was started without any delay. Fulmoti's case emphasizes that Kala Azar must be considered a differential in patients presenting with fever and cytopenia, more so in endemic regions like Pabna so that timely diagnosis and management can be initiated to prevent complications and improve prognosis.

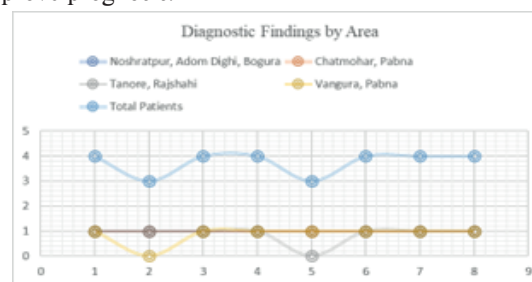


Figure 1: Diagnostic Findings and Outcomes by Area

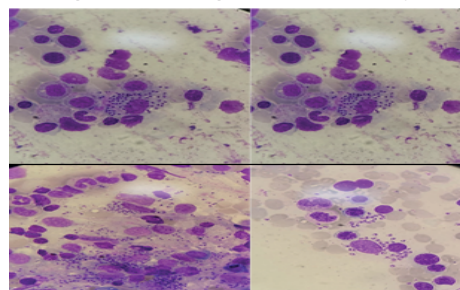


Figure 2: Histopathological Image of Intracellular LD Bodies in Kala Azar Diagnosis

The (Figure 1) reveals clinical and diagnostic findings for four Kala Azar patients from different areas, highlighting consistent and variable results. Notably, bone marrow examinations and the presence of intracellular LD bodies showed 100% positivity (P -value < 0.01) across all patients, underscoring their diagnostic reliability. Negative tests for Malaria, Widal, and Weil Felix were consistently found in all cases (100%, P -value < 0.01), effectively ruling out other infections. However, the Positive ICT for Kala Azar was present in 75% of patients (P -value = 0.05), indicating some variability. Similarly, extracellular LD bodies were observed in 75% of cases (P -value = 0.05). These findings emphasize the diagnostic challenges and the necessity for a comprehensive approach in endemic areas, considering the consistent results in bone marrow examinations and intracellular LD bodies, contrasted with the variability in ICT and extracellular LD bodies (Figure 2).

Diagnosis:

The presentation of Kala Azar or Visceral Leishmaniasis in the reported cases is supported by a careful analysis of clinical and diagnostic tests associated with the corresponding epidemiological data. Suppose there is a persistent high fever off and on for several months, which is of irregular type with anorexia, weight loss, abdominal discomfort, and splenomegaly. In that case, the possibility of Kala Azar is very high. In addition, the diagnostic hypothesis is based on hematological disorders, especially pancytopenia in the peripheral blood film (PBF) survey. Among various diagnostic tests, immunochromatographic tests (ICT) play a crucial diagnostic role in Kala Azar; for Kala Azar IgM, the ICT may not give positive results, though positive IgG antibodies are helpful for the serological diagnosis indicating that the patient has been exposed to the *Leishmania* parasites. A thorough examination of bone marrow, demonstrating marrow infiltration with intracellular and extracellular LD bodies, which are pathognomonic for Kala-azar, will confirm the diagnosis. Similarly, radiological imaging like abdominal ultrasonography (USG) showing splenomegaly and chest X-ray (CXR) revealing left-sided pleural effusion help in the diagnosis. ICT for Malaria, Widal test, and Well Felix test negative results also helped to exclude other diagnoses. It is also supported by epidemiological criteria, including residence history or traveling to areas endemic to Kala Azar. Lastly, the multidisciplinary diagnostic approach of clinical, laboratory, radiological, and epidemiological characteristics led to the accurate diagnosis of Kala Azar in earlier cases.

Treatment:

A holistic treatment approach is necessary to remove the pathogenic *Leishmania* parasites and resolve concomitant symptoms and complications. The mainstay therapy is the administration of anti-leishmanial drugs, with Amphotericin B as the primary therapeutic agent as it has potent *in vitro* activity against all species of *Leishmania* parasites. A single dose of Amphotericin B is started once Kala Azar's diagnosis is established on bone marrow examination in the cases

presented here. The rationale for this choice is based on the drug's ability to kill *Leishmania* parasites and also because of its relatively safe nature than other alternatives. Furthermore, hydration, nutritional support, and treatment of simultaneous infections or other complications are essential in-patient management. Frequent follow-up visits should be conducted to monitor treatment response and adverse effects and to check for clinical and hematological improvement. Treatment outcomes reported in the cases showed marked improvements in the general well-being of the patients, as shown by rates of increased hemoglobin levels (Hb), total leucocytic count (TLC), and platelet count incidences. Second, the resolution of symptoms like fever, anorexia, and abdominal pain was seen, which points toward the right therapeutic regimen being used. A well-balanced use of anti-leishmanial therapy and a full range of supportive treatment strategies are crucial to achieving the best possible treatment outcomes and improved quality of life for those affected by Kala-Azar.

Discussion:

This article's cases of kala-azar, a form of visceral leishmaniasis (VL), illustrate the wide clinical spectrum and approach to managing this neglected tropical disease. These cases are concordant with the abundant and well-documented literature on how Kala Azar can present myriad clinical manifestations and diagnostic conundrums. Studies by also mention a variance in clinical features from isolated prolonged fever and splenomegaly to atypical features such as pleural effusion and pancytopenia, as seen in Case 01 and Case 04^{11,12}. This example highlights the essential three-pronged diagnostic strategy for Ephelides and LNJ: case evaluation, laboratory testing, and biopsy. Although serological methods such as the Immunochromatographic Test (ICT) for Kala Azar antibodies are useful for screening, definitive diagnosis is usually established by bone marrow examination, which was the case in all patients included in this cohort^{13,14}. Nevertheless, the diagnosis of Kala Azar remains a challenge, especially in non-endemic areas where the disease may not be common, and healthcare providers may be unfamiliar with the condition^{15,16}. The differences found conform to all cases in the literature that report on similar cases and point to the polymorphic presentation of Kala Azar. Case 02 illustrates the impulse of incomplete diagnosis when nonclassical clinical features mimic the other hematic maladies, like the initial impression of multiple myeloma due to monoclonal gammopathy^{17,18}. These reinforce the fact that one should have a high index of suspicion for the diagnosis of Kala Azar even though it is less common in non-endemic areas with the aid of an ancillary diagnostic method such as bone marrow aspiration for making a definitive diagnosis^{19,20}. They concluded in the study that the pathophysiological mechanisms that determine the *in vivo* outcome of Kala-Azar resulted from the fine balance of host-parasite interactions. The etiology of the disease is dependent on the intracellular invasion of macrophages *Leishmania donovani* followed by immune

dysregulation, release of cytokines, and eventually system advance^{21,22}. Importantly, the emergence of serious complications such as pleural effusion and pancytopenia in these cases highlights the profound systemic effects of Leishmania infection that demand urgent therapeutic intervention^{23,24}. Kala-Azar is a neglected tropical disease caused by the parasitic species Leishmania; despite advanced diagnostic methods and treatment options, challenges exist in effectively managing Kala-Azar. This is particularly relevant in resource-limited settings, where limited access to healthcare facilities, poor infrastructure, and socioeconomic factors hinder timely diagnosis and treatment initiation Singh et al. Additionally, drug resistance and treatment-related toxicities are significant challenges to achieving the desired therapeutic outcomes. Thus, further research is warranted to gain insight into alternative treatment regimens and adjunctive therapies^{25,26}.

Follow-Up and Outcome:

After treatment had started, all patients were followed up for clinical progress and treatment response. All subjects were evaluated for clinical and biochemical improvement, resolution of symptoms, and side effects due to prescribed medications during these visits. Case 01, He came for a follow-up after 15 days and was found to have improved his general well-being. The fever settled, and he was no longer troubled by his tummy. Laboratory tests showed a rise in hemoglobin, total leucocyte, and platelet count. Further, the abdominal mass, most probably representing Splenomegaly, had reduced, consistent with the beneficial effect of preparation with Amphotericin B. Case 02, Mr. Mohammed Wahidul, also showed clinical recovery at follow-up. Fortunately, his fever abated, and he was no longer in severe pain in his belly. Clinical diagnostic laboratory findings during hospitalization were improved, indicating the treatment's efficacy. In addition, no adverse events were reported related to Amphotericin B treatment. Regrettably, in Case 03, Ms. Kismot Ara died due to complications of Kala Azar before the start of specific treatment. While she was admitted to a hospital soon after, her condition worsened quickly, emphasizing the critical need for early identification and therapeutic intervention to prevent the morbidity and mortality associated with visceral leishmaniasis Case 4. Ms. Fulmoti responded to Amphotericin B, and it was revealed that her condition improved following subsequent follow-up visits. Her fever decreased, and her hemoglobin and platelet levels gradually improved. Furthermore, no treatment-related adverse events were observed, showing a favorable treatment response.

Conclusion:

These are cases where there is no timely diagnosis or treatment of kala-azar. Early detection could result in considerable clinical resolution and avoidance of untoward events. Amphotericin B was successful in these cases except in case 1, even though 2 other patients, cases 2 and 3, were cured from the treatment using amphotericin B. This highlights the importance of clinician awareness to recognize

clinical signs of Kala Azar, which needs early detection so that case fatality is reduced. Moreover, these cases add to the literature on the diverse clinical spectrum and treatment response of the entity of this tropical disease to enrich the corpus of knowledge on this and guide to strategizing future management. This case report is meant to provide insight into these unusual presentations of Kala Azar in RMCH, along with a diagnosis and therapeutic use²⁷. The current report highlights the diagnostic dilemmas faced in atypical Kala Azar presentations and the therapeutic options employed in a tertiary care center by carefully evaluating each case. It also aims to incorporate evidence-based inferences from available literature in the report to help understand strategies of Kala Azar management and its clinical applications. This understanding will enable healthcare professionals to negotiate better the complexities of the Kala Azar diagnosis and management, thereby contributing to superior patient outcomes and reducing the burden of this debilitating disease²⁸. The report will structurally proceed through those case-by-case in an organized and systemic manner, emphasizing the different clinical aspects, investigative findings, and therapeutic methods in every case. After the case reports, an in-depth discussion will help understand the diagnostic dilemmas one may face when atypical Kala Azar presentations are seen, enriching the knowledge with evidence-based literature. In addition, the debate will discuss therapeutic management strategies and their effectiveness in each case, helping us improve our knowledge of Kala Azar management. Pragmatic recommendations for clinical care will finally be synthesized from the collective wisdom of healthcare practitioners at RMCH. This structured approach of the report intends to give a holistic analysis of atypical Kala Azar presentations and discuss their usefulness in clinical management, thus advancing care practices in the challenging disease spectrum^{29,30}.

Conflict of Interest: None.

Acknowledgments:

We are thankful to the Department of Hematology, Rajshahi Medical College Hospital, Bangladesh, and to all the medical staff, researchers, and patients who, through various means, helped better understand the disease and the treatment of Kala Azar. Their steadfast guidance and involvement were the cornerstone in finalizing this study, calling attention to the strength of team-based efforts in translating research to clinical practice.

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- 50 ml PFS
- 50 ml Forte PFS
- 21 ml PD

Mextil
Cefuroxime

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- 70 ml PFS
- 50 ml DS PFS

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Ceftriaxone

- 500 mg IM Injection
- 1 gm IM Injection
- 500 mg IV Injection
- 1 gm IV Injection
- 2 gm IV Injection

Revistar
Flucloxacillin

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- 100 ml PFS

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Ciprofloxacin

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- 100 ml Forte PFS

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Erythromycin

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- 100 ml PFS

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Clindamycin

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Amoxicillin & Clavulanic acid

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Cefuroxime+Clavulanic Acid

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- 70 ml PFS

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Azithromycin

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- 35 ml PFS
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Meropenem

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- 500 mg Capsule
- 15 ml PD
- 100 ml PFS
- 100 ml Forte PFS

Lifcin
Levofloxacin

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- 100 ml Oral Solution

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Gemifloxacin

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Doxycycline

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Ceftazidime

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Clarithromycin

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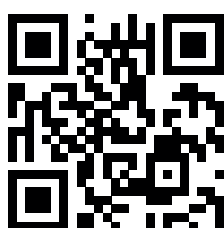
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