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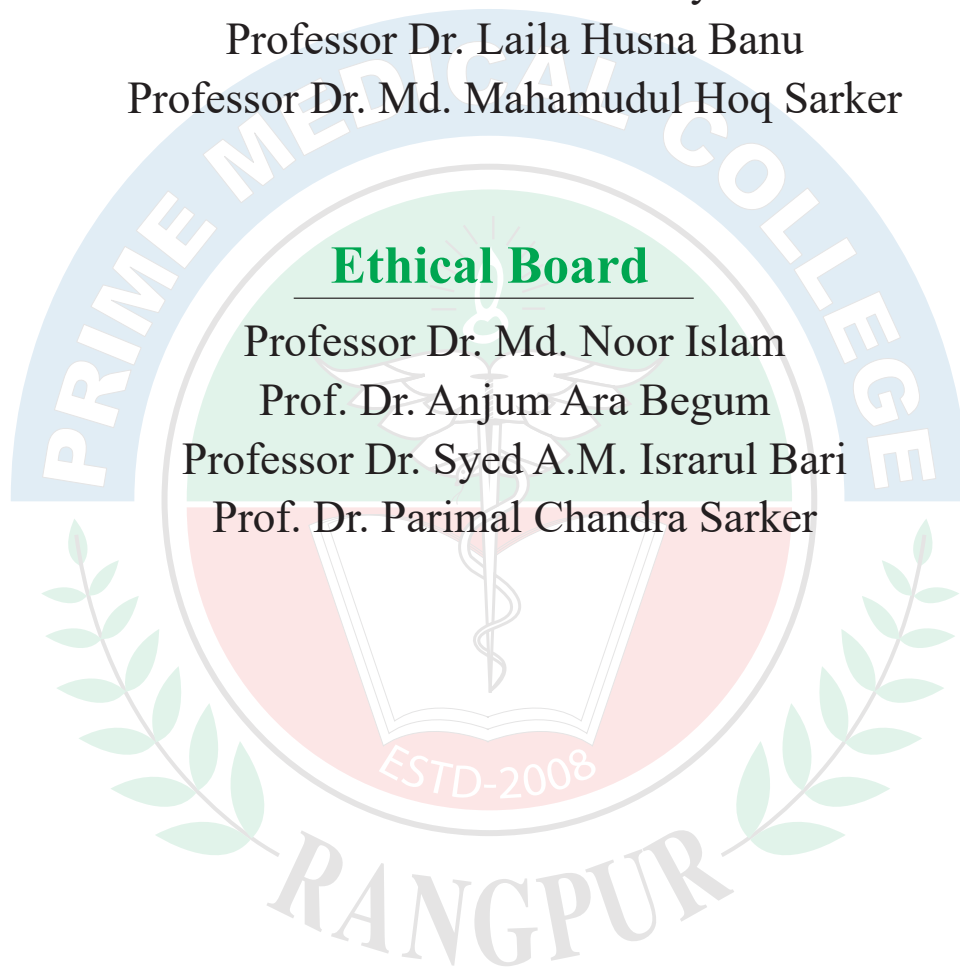
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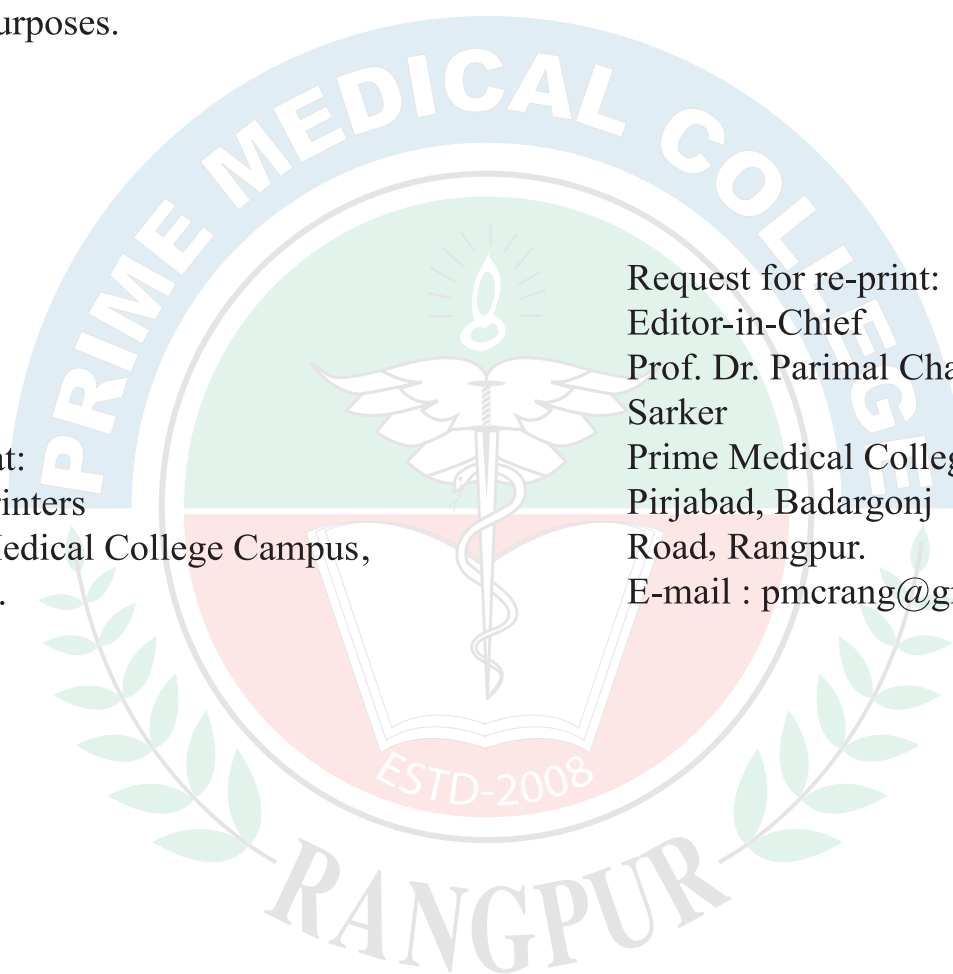
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Editorial

Mitigating the Threat of Nipah Virus through Awareness and Prevention.

Anupam Sarker

Nipah virus (NiV) is a zoonotic pathogen is capable of causing severe respiratory illness and encephalitis in humans and posing an immense health threat to the people of South and Southeast Asia recently.¹ Fruit bats of the *Pteropus* genus, commonly known as (flying foxes), are considered the natural reservoir of the Nipah virus. These bats are widespread across Asia, including Bangladesh, India, and Malaysia, and have been found to carry the virus without showing any signs of illness. One of the major transmission routes of NiV in Bangladesh is through the consumption of contaminated palm sap. This (Palm) sap, also known as toddy, is a popular drink in Bangladesh, especially during the winter season.¹ The sap is harvested from various species of palm trees, including *Borassus flabellifer*, *Phoenix sylvestris*, and *Caryota urens*. The sap is collected in earthen pots, and after a few hours of collection, it ferments and becomes mildly alcoholic. While it is a popular beverage, it has been linked to the transmission of NiV in Bangladesh.²

The Nipah virus is transmitted from animals to humans, primarily through contaminated food or direct contact with infected animals. Once a person is infected, the virus can cause a range of symptoms, including fever, headache, dizziness, vomiting, and in severe cases, respiratory and neurological symptoms. What makes Nipah virus particularly dangerous is that it has a high mortality rate, with reported case fatality rates ranging from 40% to 75%. Additionally, the virus can cause long-term neurological effects in survivors, such as

persistent convulsions and personality changes.³

The precise pathophysiology of Nipah virus (NiV) infection remains incompletely understood; however, it is known to cause severe neurological and respiratory symptoms. Upon entering the body, NiV attaches to specific receptors on host cells, leading to viral replication, cellular death, and the release of inflammatory mediators. The virus has a particular affinity for neuronal cells, leading to inflammation and necrosis in the central nervous system, resulting in symptoms such as fever, headache, confusion, seizures, and coma. The respiratory and neurological symptoms of Nipah virus can lead to severe illness, which can be fatal in some cases.⁴ The virus can also be difficult to diagnose, as its symptoms are similar to those of other viral illnesses, and there are currently no specific antiviral treatments available for Nipah virus infection. Treatment is largely supportive, with a focus on managing symptoms and preventing complications.⁵

There have been several outbreaks of NiV in Bangladesh, with the first reported outbreak occurring in 2001. Studies have shown that NiV outbreaks in Bangladesh are strongly associated with the consumption of contaminated palm sap. In one study, researchers found that NiV RNA was present in 44% of the palm sap samples collected from the trees used to harvest the sap. Additionally, studies have shown that fruit bats are the primary reservoir of NiV in Bangladesh and that they contaminate the sap when they feed on the sap-producing trees.^{3,5}

Several factors contribute to the high incidence of NiV transmission through palm sap

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consumption in Bangladesh. One of the primary factors is the lack of awareness and knowledge about the risks of consuming contaminated sap. Additionally, there is often a lack of sanitation and hygiene practices during the collection and storage of the sap, which can contribute to contamination. Furthermore, the cultural significance of palm sap consumption in Bangladesh, coupled with the high demand for it during the winter season, increases the likelihood of exposure to contaminated sap.^{5,6}

To prevent NiV transmission through palm sap consumption, several interventions have been implemented in Bangladesh. These include the use of protective clothing and equipment during sap collection, boiling the sap before consumption, and public awareness campaigns about the risks of consuming contaminated sap. While these interventions have been somewhat successful in reducing the incidence of NiV outbreaks in Bangladesh, there is still a need for continued efforts to educate the public about the risks of NiV transmission and to improve hygiene and sanitation practices during sap collection and storage.⁷

In summary, the ingestion of palm sap that is contaminated with Nipah virus poses a significant threat to public health in Bangladesh. This threat is exacerbated by the popularity of palm sap as a beverage and a lack of knowledge regarding the hazards of consuming contaminated sap. Mitigating this risk requires a multifaceted approach that includes measures such as utilizing protective equipment during sap collection, boiling sap before drinking it, and conducting educational campaigns to raise awareness of the risks

associated with drinking contaminated sap. It is imperative that efforts to educate the public and improve sanitation practices continue to be prioritized in order to reduce the frequency of Nipah virus outbreaks in Bangladesh.

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Original article

Effects of Femoral Nerve Block and Intravenous Nalbuphine for Positioning during Spinal Anaesthesia in Femur Fracture Surgery.

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ABSTRACT:

BACKGROUND: Fracture of femur is a common and very painful bony injury. Spinal anaesthesia is the preferred anaesthetic technique for these operations but patients usually complain of extreme pain during positioning for this block. **OBJECTIVE:** This study was conducted to observe the analgesic effectiveness of Femoral nerve block (FNB) and intravenous Nalbuphine hydrochloride for reducing pain during positioning of the patient for spinal anaesthesia in femur fracture surgery. **MATERIALS AND METHODS:** After institutional ethical committee clearance 60 of American Society of Anaesthesiologist (ASA) grade I or II adult patients, weight >50 Kg were selected. This prospective observational study was done during the period of January 2022 to June 2022 in Dhaka Medical College Hospital in fracture femur operations. A prospective observational single blind trial was conducted comparing femoral nerve block (FNB) with 15 ml 2% Lidocaine with adrenaline (1:200000) and intravenous 6 to 10 mg Nalbuphine hydrochloride to reduce pain during positioning of patient during spinal anaesthesia. **RESULTS:** Pain assessed on Visual analogue scale (VAS) during positioning was significantly less in FNB group (1.46 ± 0.571) versus IV Nalbuphine group (2.73 ± 0.6396). $P=0.0000$. Time before conduct of spinal anaesthesia was significantly shorter in FNB group (14.666 ± 1.493) minute versus IV Nalbuphine group (22.9 ± 1.876) minute. $P=0.0000$. Quality of patient positioning during spinal anaesthesia was significantly better in FNB group (2.533 ± 0.50852) than IV Nalbuphine group (1.9 ± 0.293) $=0.0000$. Acceptance of patients were significantly high among FNB group 28/02 than IV Nalbuphine group 18/12. $P=0.000031$. **CONCLUSIONS:** Ultrasound (USG) guided FNB provide better analgesia, patient satisfaction, less time to conduct anaesthesia and satisfactory positioning than IV Nalbuphine hydrochloride for spinal anaesthesia in patients undergoing surgery for femur fracture.

Key words: Femoral nerve block (FNB), Spinal anaesthesia, Ultrasound (USG), IV Nalbuphine hydrochloride, Femur fracture.

INTRODUCTION:

Fracture of the femur is a common and very painful bony injury because the periosteum has the lowest pain threshold of the deep somatic

structures. Surgical repair is usually done by either internal fixation of the femur or replacement of the femoral head with arthroplasty. At our hospital spinal anaesthesia was used more frequently than general anaesthesia (GA) for femur fracture surgery¹⁻⁵. To give spinal anaesthesia proper positioning is important preferably sitting position. During positioning due to movement patient complain of extreme pain. To reduce this pain different analgesics or femoral nerve block (FNB) are often used to help the patient to tolerate positioning. There are few data to establish a benefit of one form of analgesia over another. This prospective observational

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study was performed to compare the analgesic effect of FNB (by 2% Lidocaine with adrenaline 1:200000) with IV low dose Nalbuphine hydrochloride (6 to 10 mg) prior to positioning for spinal anaesthesia in patients with femur fracture surgery.

MATERIALS AND METHODS:

Institutional approval and informed consent from the patient were taken prior to the study. Adult patients of both sex, American society of anaesthesiologist grade I or II, weight > 50 kg scheduled for femur fracture surgery under spinal anaesthesia included in this study. Exclusion criteria were patient who does not want to be a part of this study, multiple fracture, peripheral neuropathy, bleeding disorders, mental disorders, communication failure, and allergy to any study drugs and used analgesics up to 8 hours before surgery. Patients were allocated by computer generated random number in to two groups of 30 patients each, femoral nerve block (FNB) group and intravenous (IV) Nalbuphine hydrochloride group. The random allocation sequence was concealed in opaque sealed envelopes until a group was assigned.

All patients were monitored with electrocardiography, pulse oximeter and non-

invasive blood pressure. An infusion of lactated Ringer's solution was given and all patients were also given oxygen (5 L/ minute) via a face mask. Ultrasound (USG) guided FNB⁶⁻⁸ was given (by 15 ml 2% Lidocaine with adrenaline 1: 200000) in FNB group, patients of Nalbuphine group received IV Nalbuphine hydrochloride 6 to 10 mg. After 15 minutes patients of either group were made to sit up for spinal anaesthesia. If any patients of Nalbuphine group complained of pain scores ≥ 4 during positioning further IV Nalbuphine 5 mg was given and watched whether the visual analogue scale (VAS) <4, if it could not be achieved, the patients were excluded from the study, also the patients of failed FNB were excluded from the study. Spinal anaesthesia was performed by anaesthesiologist who was blinded from the study.

Following parameters were then assessed:

1. Pain score using the visual analogue scale (VAS), (0-No pain, 10 maximal pain)
2. Satisfaction by anaesthesiologist during patient positioning for spinal anaesthesia by satisfaction scale (0-No satisfaction, 1-satisfactory, 2-good, 3-optimal).
3. Patient acceptance by a scale of 10. (0-nil, 10-maximum).

Data were analyzed using IBM SPSS version 22.0 software package. Parametric variables were described as mean \pm standard deviation (SD). Some qualitative variables were described as frequency and percentage. Student's t-test was used to compare the two groups. P value < 0.05 was considered as statistically significant and P < 0.001 as highly significant and not significant if > 0.05.

RESULTS:

Table I and II represents the demographic data of the patients. The two groups were comparable in terms of age, weight, sex and fracture site. Baseline values of mean arterial

pressure (MAP), heart rate (HR), oxygen saturation (SpO₂) before intervention and after intervention during positioning were also comparable among two groups. None of the patients in either group had their oxygen saturation below 90% (Table III). Pain assessed by Visual analogue scale (VAS) during positioning was significantly less in FNB group (1.46 ± 0.571) versus IV Nalbuphine group (2.73 ± 0.6396), $P=0.0000$. Time before conduct of spinal anaesthesia was significantly shorter in FNB group

(14.666 ± 1.493) minute versus IV Nalbuphine group (22.9 ± 1.876) minute, $P=0.0000$. Quality of patient positioning during spinal anaesthesia was significantly better in FNB group (2.533 ± 0.50852) than IV Nalbuphine group (1.9 ± 0.293), $P=0.0000$. Acceptance of patients (Yes/No) was significantly high among FNB group 28/02 than IV Nalbuphine group 18/12. $P=0.000031$. Table IV. There was no inadvertent vascular puncture or adverse effect of systemic local anaesthetic drug toxicity in the study groups.

Table I : Comparison of demographic data between two groups

Variables	FNB (n-30)	IV Nalbuphine (n-30)	P value
Age	51 ± 12.86	51.8 ± 11.48	0.80032
Weight	57.3 ± 8.1	58.1 ± 9.1	0.360

Data was expressed as mean \pm SD

Table II: Comparison of demographic data between two groups

Variables	FNB (n-30)	Frequency	Percentage	IV Nalbuphine (n-30)	Frequency	Percentage
Sex						
Male		19	63.33%		21	70%
Female		11	36.67%		09	30%
Fracture site						
Neck		12	40%		11	36.66%
Intertrochanteric		13	43.33%		12	40%
Shaft		05	16.66%		07	23.33%

Table III: Vital clinical parameters before giving analgesia and after giving analgesia during positioning of the patients.

Variables	FNB (n=30)	IV Nalbuphine (n+30)	P Value
MAP mmHg at T0	84.9 ± 6.46	85.43 ± 6.04	0.37167
MAP mmHg during Positioning	85.43 ± 6.04	82.53 ± 5.76	0.3094
HR/min at T0	78.93 ± 6.54	78.4 ± 6.728	0.378
HR/min during Positioning	79.56 ± 6.43	80.26 ± 6.73	0.411
SpO ₂ at T0	98.01 ± 2.04	97.82 ± 2.07	0.756
SpO ₂ during Positioning	98.20 ± 1.90	97.02 ± 2.08	0.592

T0- Base line value, MAP-Mean arterial pressure, HR- Heart rate, SpO₂- Oxygen saturation, Data was expressed as mean \pm SD.

Table IV: VAS score, Time for conduct of anaesthesia, Quality of positioning, Patient acceptance

	FNB(n-30)	IV Nalbuphine(n-30)	P Value
VAS score at T0	7.4±1.037	7.43±1.006	0.4548
VAS score during Positioning	1.46±0.571	2.73±0.6396	0.0000
Time for conduct of anaesthesia	14.666±1.493	22.9±1.876	0.0000
Quality of positioning	2.533±0.50852	1.9±0.29359	0.0000
Patient acceptance (Yes/No)	28/2	18/12	0.000031

VAS- Visual analogue scale, To-Base line value, Data was expressed as mean± SD.

DISCUSSION:

Spinal anaesthesia is universally accepted and preferred technique of anaesthesia for surgery of fracture femur¹⁻⁵. This technique has many advantages over general anaesthesia like early mobility, less chance of deep vein thrombosis and mortality².

Patient positioning has been a challenge during spinal anaesthesia during femur fracture surgery. Sand by- Thomas et al⁹. reported that the most frequently used agent were Midazolam, Ketamine and Propofol. Alternative agents were Fentanyl, Remifentanyl, Morphine, Nitrous oxide and Sevoflurane whereas nerve blocks were infrequently used. Use of FNB to relieve pain from a fracture of femur is well known and now is being used for positioning during spinal anaesthesia.

Jadon A et al¹⁰ compared peripheral nerve stimulator guided FNB with IV fentanyl for spinal anaesthesia in patients undergoing surgery for femur fracture. They concluded that the former is better in terms of analgesia, patient satisfaction, time to conduct anaesthesia, quality of anaesthesia. We used USG for FNB and found similar results.

Durrani et al¹¹ compared FNB with IV Nalbuphine during positioning in patients in fracture femur surgery. They also concluded that FNB is beneficial as it allow relaxation of quadriceps and hence better positioning.

Ranjit et al¹² in their study concluded that USG guided FNB is more effective than IV fentanyl for reducing pain in patients with proximal femur fracture surgery before spinal anaesthesia.

This prospective observational study shows that visual analogue scale (VAS) score value in FNB group were significantly lower than IV Nalbuphine group (Table IV). Many studies reported significantly low pain scores with FNB compare to IV fentanyl⁶⁻⁸.

In the present study in IV Nalbuphine group additional nalbuphine required to give in some patients. In addition in IV Nalbuphine group drowsiness was observed in some patients which required more persons for holding the patient during positioning.

LIMITATIONS:

It was a single center study with small sample size. Farther study in different centers with large sample size is required.

CONCLUSIONS:

USG guided FNB provide better analgesia, patient satisfaction, less time to conduct anaesthesia, more patient acceptance and better quality of positioning than IV Nalbuphine group during spinal anaesthesia in patients undergoing surgery for femur fracture.

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Original article

The Axial Length and Corneal Radius of Curvature Ratio in Bangladeshi Adult Emmetropes.

Maskura Benzir¹, Ifti bin Razzaque², Mostarina Islam³, Taslima Akter⁴, Taslima Akter⁵, Mostana Nazma Begum⁶, Mafruha Rahman⁷

ABSTRACT

CONTEXT: The normal refractive condition of eye is known as emmetropic eye. Emmetropia is the clinical term used by eye specialist to describe a person with perfect vision, also known as '20/20 sight' and the ideal condition describes an eye that without any refractive error or visual defects. Axial length and corneal radius are the main component for refractive error. However there is no published article on this topic in Bangladesh. **OBJECTIVES:** The aim of this article is to evaluate the axial length and corneal curvature ration in Emmetropic Bangladeshi adults. **MATERIALS AND METHODS:** This Cross sectional analytical study was carried out in Department of ophthalmology with collaboration of Anatomy department in Rajshahi Medical College from June 2017 to July 2018 corneal radius curvature, axial length and the ratio was calculated. Data was collected from face to face interview and eye was examined visual activity by Snellen chart, Autokeratometer (Corneal radius), A scan ultrasonography (Axial length). **RESULTS:** The mean AL/CR ratio for emmetropic eye was 3.01 ± 0.109 in right eye and 3.01 ± 0.107 in left eye. **CONCLUSION:** This study conclude that axial length and corneal Radius ratio in emmetropic eye was Around 3 in this article.

Key words: Axial length, corneal radius, AL/CR ratio.

INTRODUCTION

Emmetropia is the normal state of vision which visual acuity is 6/6 and to attained this condition axial length of eyeball and corneal radius have a proper balance¹ otherwise different types of refractive error may arise. Refractive error is the alarming issue now a days and almost two billion people suffer in

this situation globally². About 4.7% people suffer with refractive error in Bangladesh³ and this is the 2nd highest cause of loss of vision⁴. Development of eye occur within 1.5 years of ages with the extensive flattening of cornea⁵ and elongation of eyeball which is complete within 3 years⁶. So full development of eye occurs first few years of life⁷. It was reported that about thirty two genetic markers related to corneal curvature and axial length development⁸⁻¹³.

MATERIALS AND METHODS:

The descriptive cross sectional observational study was carried out to evaluate 400 emmetropic eyes who were attend with the patients, in the department of ophthalmology in Rajshahi Medical college between from July 2017 to June 2018. All individuals were went through direct interview, examining visual acuity by snellen chart. We also measured AL by A scan ultrasonography and CC by Autokeratometer. Ethical clearance also taken from Institutional Review Committee of Rajshahi Medical College, Rajshahi.

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RESULTS:

Table I: Age distribution of the participants (n =400)

Age distribution	Male	Female	Overall
Mean	29.0±6.51	29.6±6.27	29.3±6.37
21-30	55	62	117
31-40	31	44	75
>41	4	4	8

Table II: Frequency distribution of the different variables (n= 400)

Variable	N	minimum	maximum	Mean	Std.Deviation
right axial length	400	21	25	23.15	.746
Left axial length	400	21	25	23.06	.738
RR	400	2.69	3.28	3.0130	.10913
LR	400	2.69	3.25	3.0149	.10710
RCR	400	7.07	8.32	7.6924	.21811
LCR	400	7.09	8.28	7.6851	.21477

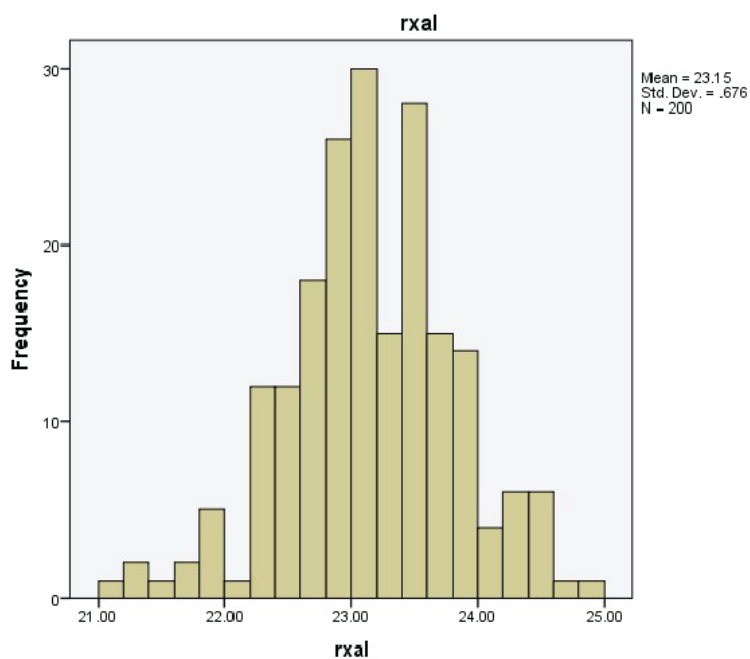


Figure 1: Histogram showing normal distribution of Right axial length.

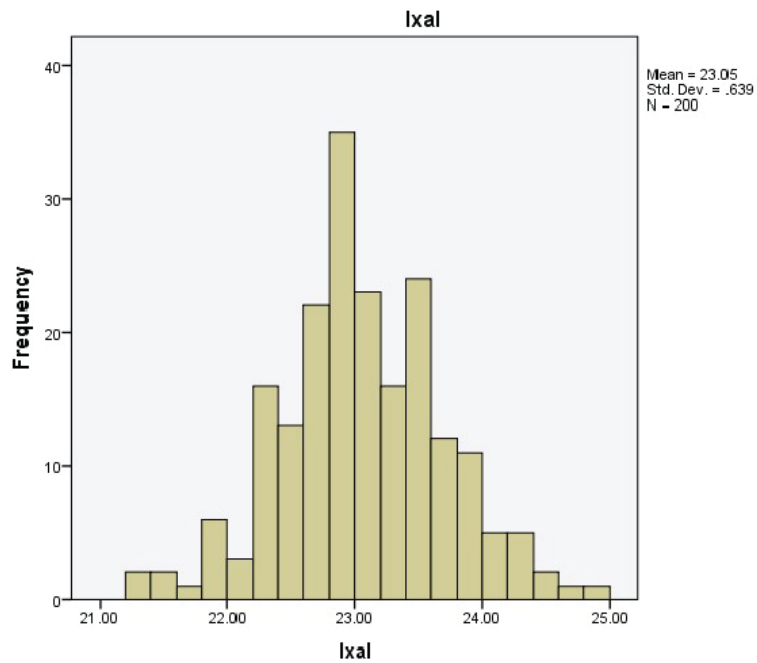


Figure 2: Histogram showing normal distribution of left axial length.

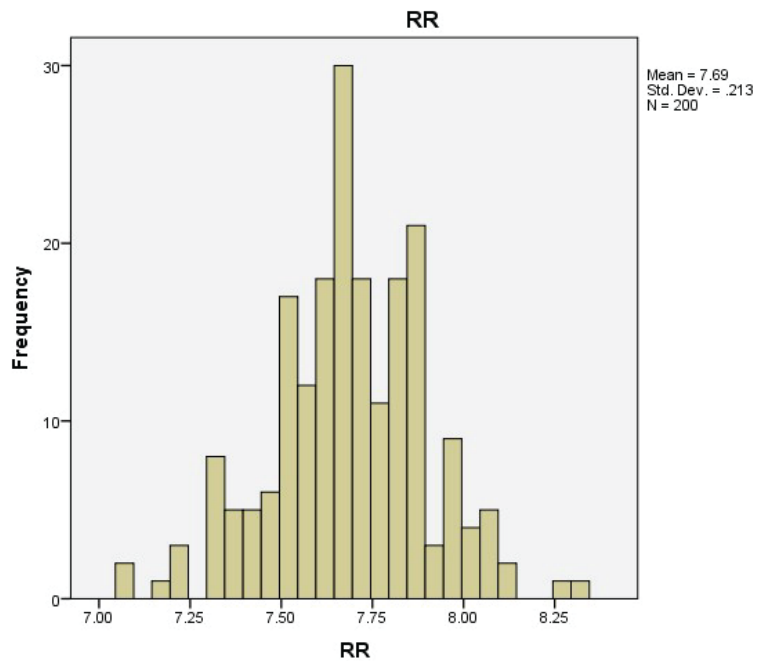


Figure 3: Histogram showing normal distribution of right corneal radius.

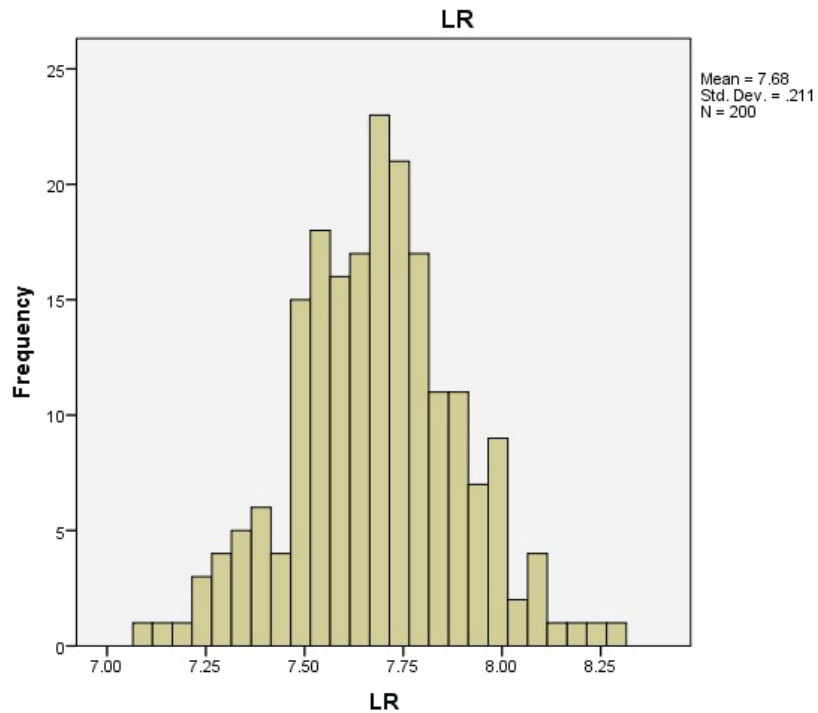


Figure 4: Histogram showing normal distribution of left corneal radius.

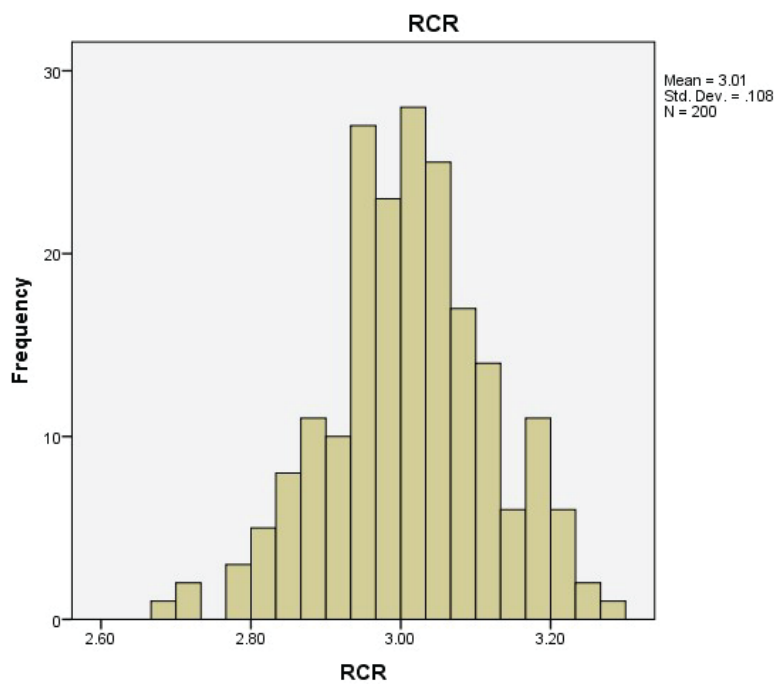


Figure 5: Histogram showing normal distribution of right axial length and right corneal radius ratio.

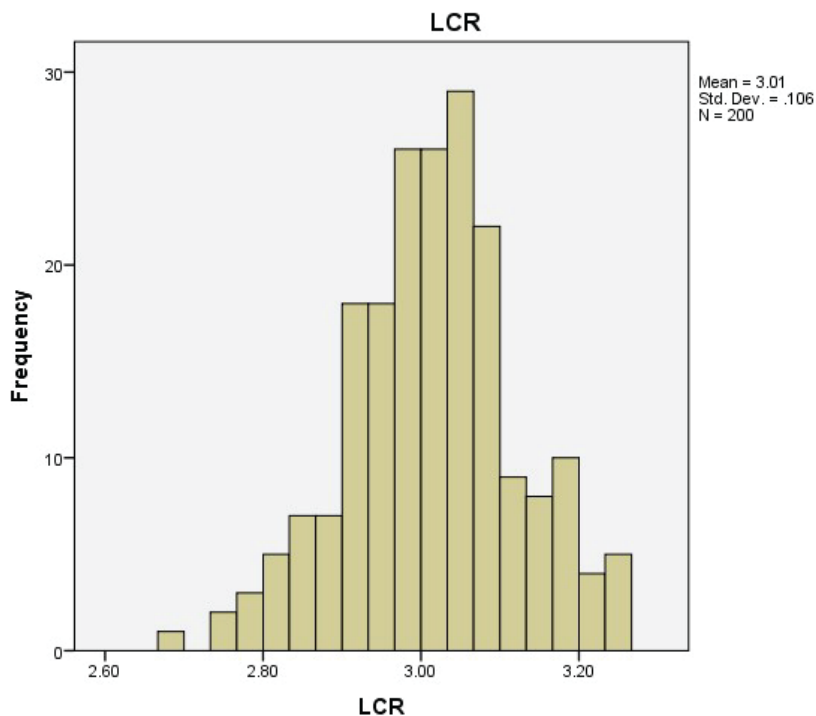


Figure 5: Histogram showing normal distribution of right axial length and right corneal radius ratio.

DISCUSSION

The mean AL/CR ratio for emmetropic adult was 3.01 in both eye; this ranged from 2.69 to 3.28 in right eye and 2.69 to 3.26 in left eye which was similar in both eye. Idea of this ratio came from Stenstrom¹⁴ who was the first investigator and found that it was about 3.00 which was strongly correlate with this study. The Ratio was well coincide with the Grossvernor and Scott¹⁵ in Bloomington which was near 3.00. Another study done in china by Xiangui et al.¹⁶ which was 2.98 ± 0.002 almost match with our study. A study also done in London (1970) by Sorsby A and Leary GA¹⁷ their result also congruent with our study. Similar study done by Mu Jingfeng et al.¹⁸ in China which was 2.97 ± 0.13 and indistinguishable to our study.

CONCLUSION

It was revealed from the result of this study that the ratio between axial length and corneal radius is maintain to achieve emmetropia. A strong relationship always maintain in these two variable which might be helpful in different sector of medical science especially in ophthalmology in intraocular lens in cataract surgery. Through this ratio we can also stratified refractive state of different population such as myopia or hyperopia. This findings might be help in different researcher's society.

As this was a limited study, further large scale study with improved instrument is recommended.

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15. THE AXIAL LENGTH/CORNEAL RADIUS RATIO IN EMMETROPIA

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Original Article

Bloodstream Infection and Trends of Antimicrobial Sensitivity Pattern

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ABSTRACT

BACKGROUND: Bloodstream infection (BSI) by microorganisms constitutes one of the most serious situations in infectious disease. Microorganisms present in circulating blood whether continuously, intermittently, or transiently are a threat to every organ in the body. Prevalence and antimicrobial susceptibility of microorganisms vary depending upon the geography and the use of antibiotics. **OBJECTIVE:** To determine the bacterial profile, antimicrobial susceptibility patterns. **MATERIAL AND METHODS:** This was a retrospective observational analysis a total of 3018 samples from clinically suspected cases of blood stream infection were collected at Ad-din Women's Medical College and Hospital, Dhaka July 2019 to September 2021. All the samples were collected from inpatient's and outpatient's department of our hospital during the study period and processed in Microbiology laboratory. About 10 ml of venous blood for adults and 2-3 ml for children was collected aseptically and transferred into an automated blood culture bottle. The BD BACTEC FX40 automated blood culture method was used to isolate bacterial pathogens and antimicrobial susceptibility test was performed by Kirby-Bauer disc diffusion method following CLSI guidelines. **RESULTS:** A total of 483 (16.1%) pathogens were isolated from 3018 bacteremia suspect patient blood specimens. Gram-negative cocci (58.4%) were predominant organisms recovered followed by Gram-positive Bacilli (41.6%). Majority of BSI were caused by gram negative bacteria predominantly *Salmonella Typhi* (31.1%) followed by *Acinetobacter* (18%), *Enterobacter* (6.8%), *Escherichia coli* (1.9%), *Klebsiella spp.* (0.4%). Maximum (39.1%) were CoNS in Gram-positive cocci and 2.5% were staph aureus. *Salmonella Typhi* isolates appeared to be sensitive to ceftriaxone (91.3%), meropenem (90.7%) and cotrimoxazole (76%). *Acetobacter* were found to be sensitive (75.9% and 74.4%) to levofloxacin and vancomycin. Sensitivity of *E. coli* was 88.9% to ciprofloxacin, 77.7% to cotrimoxazole. Sensitivity rates of ciprofloxacin, gentamycin and levofloxacin were 87.3% for coagulase-negative *Staphylococcus spp.* (CoNS). *Staphylococcus spp.* were most sensitive (91.7%) to the action of vancomycin and (83.3%) to amikacin. **CONCLUSIONS:** The knowledge of bacteriological profile and antimicrobial sensitivity patterns of hospital is crucial for effective management of blood stream infection. Results of this study will help in providing useful guidelines for choosing an effective antibiotic in our hospital. Furthermore, research should also focus on diagnostic stewardship, to establish newer, rapid, automated bacterial identification method and sensitivity analysis that will not only help early initiation of appropriate antimicrobial therapy for better patient outcome but will also defer bacterial resistance.

Keyword: Blood stream infection, Blood culture, Antibiotic sensitivity.

INTRODUCTION

The term bloodstream infection (BSI)

generally refers to the growth of a microorganism from a blood culture obtained from a patient with clinical signs of infection and where contamination has been ruled out.¹ It is characterized by the presence of viable bacterial or fungal microorganisms in the bloodstream that elicit inflammatory response and often accompanied by alteration of clinical, laboratory and hemodynamic parameters.² Bacterial bloodstream infection (BSI) is a global concern. It may range from self-limiting infections to life-threatening sepsis that requires rapid and aggressive antimicrobial treatment.³ It is often associated with increased length of hospital stay which ultimately leads to significant amount of health

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care related costs and a high rate of morbidity and mortality.⁴

Many bacteria such as *Staphylococcus aureus*, alpha-hemolytic *Streptococci*, *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Salmonella* Typhi and *Acinetobacter* species have been reported as a cause of bacteremia with variation in distribution from place to place. As an example, *Salmonella enterica* is a frequently isolated pathogen from blood samples in both African and Asian regions, however their serotypes differ substantially. *Salmonella* Paratyphi is the predominant organism in the *Salmonella* group in Africa whereas *Salmonella* Typhi is the most frequently isolated organism in Asia. Besides their isolation rate and their antibiotic susceptibility pattern varies substantially.⁵

Depending on the age, the severity of infection, other risk factors and the mortality rate for BSI varies between 4.0 and 41.5%. Globally, bloodstream infection affects about 30 million people leading to 6 million deaths⁶ with 3 million newborns and 1.2 million children suffering from sepsis annually.⁷ Changing patterns of epidemiology, lack of proper antimicrobial guidelines in the locality, the emergence of antimicrobial resistance and paucity of good diagnostic facilities are connected to the surge in BSI associated morbidity and mortality.⁸

Increasing antimicrobial resistance is a worldwide concern. It is a serious challenge for health care professionals in prescribing suitable antimicrobial therapy as many bacterial pathogens have developed resistance to most of the antibiotics. Early diagnosis plays a crucial role in managing BSI, and hence, prompt detection of such infections is a critical function of clinical microbiology laboratories. Blood culture is a vital tool for the detection of BSI and remains the gold standard for bacteremia detection. Empiric antimicrobial

therapy is based on knowledge of the microbial profile and their antimicrobial sensitivity patterns, clinical and epidemiological data. Irrational use of drugs has led to an increase of multi drug-resistant bugs and thus worsened the condition.⁹

In most of the cases, antimicrobial therapy is initiated empirically before the results of blood culture are available. Selection of right antibiotic for empiric therapy is of utmost importance. Continuous monitoring trends in the microbiology of BSI pathogens and their antibiotic susceptibility patterns are therefore important to guide empiric antibiotic treatment strategies and infection control programs. Therefore, this study is aimed to determine the bacterial profile, antimicrobial susceptibility patterns.

MATERIALS AND METHODS

This was a retrospective observational analysis a total of 3018 samples from clinically suspected cases of blood stream infection were collected at Admin Medical College and Hospital, Dhaka from July 2019 to September 2021. All the samples were collected from inpatient's and outpatient's department of our hospital during the study period and processed in Microbiology laboratory. About 10 ml of venous blood for adults and 2-3 ml for children was collected aseptically using 70% alcohol and 2% tincture iodine and transferred in to automated blood culture bottles. The BD BACTEC FX40 automated blood culture method was used. In case of a positive growth, the BD BACTEC FX40 automatically gives an alert. Blood culture bottles with no alert signal of bacterial growth after recommended days of incubation is considered culture negative. The positive bottles were sub cultured on MacConkey's agar, blood agar and chocolate agar media. The chocolate agar plates were incubated inside a candle jar to provide 5-10% CO₂, whereas the other two agar plates (blood

agar and MacConkey's agar) were incubated aerobically for 18-24 h at 37°C.

Isolates were further processed according to standard operating procedure (SOP) of the laboratory for its complete identification. Pure cultures of bacterial isolates were subsequently subjected to species identification and confirmation. Gram positive isolates were identified using catalase and coagulase tests. Isolates of members of *Enterobacteriaceae* family were identified biochemically by means of a series of tests: catalase, indole, citrate, urease, H₂S production and triple-sugar iron. Non lactose fermenting Gram negative bacteria were identified by indole, triple-sugar iron, urease, oxidase and catalase tests. Antimicrobial susceptibility tests were performed by using the Kirby-Bauer disc diffusion method and susceptibility patterns were determined following CLSI guidelines.¹⁰ Diameters of the zone of inhibition were measured to the nearest millimeter and categorized as sensitive, intermediate and resistant according to CLSI guidelines.¹⁰ Isolates were classified as either susceptible or resistant to an antibiotic and all the isolates with intermediate resistance were classified as resistant. Culture media and antibiotic discs used in the study were obtained from Oxoid Ltd., UK. Quality control for media was done

by randomly taking the prepared culture media and incubating overnight to see for any growth. In this study multi-drug resistance (MDR) was defined as simultaneous resistance to more than two antimicrobial agents. Isolates of *Staphylococcus aureus* were further tested for methicillin resistance according to the CLSI guidelines by using cefoxitin disc.

RESULTS

During the study period, 3018 blood cultures were analyzed, of which 483 (16.1%) bacteria were isolated. Of the total positive cases, 150 (31.1%) were males and 333 (68.9%) were females. A total of 3018 consecutive samples were received from different wards of the hospital. Positive aerobic bacterial growth was observed in 270 (14.24%) isolates. From 483 isolates recovered from patients, the spectrum of microbes included 201 (41.6%) Gram-positive cocci (GPC) and 282 (58.4%) Gram-negative bacilli (GNB). *Salmonella* was the most frequently Gram-negative isolated blood borne bacterial pathogen in this study accounting for 31.1% of the total isolates. CoNS was the most Gram-positive isolated blood borne bacterial pathogen according to 39.1%.

Table I: Incidence of bacterial growth of study subject (n=3018)

Type growth	Frequency	Percentage (%)
Growth	483	16.1
No growth	2535	83.9

Table II: Age and gender distribution of bacteremic cases

Age group	Males	Females	Total
0-1 month	15	118	133
1 month-1 year	22	29	51
1-5 years	55	78	133
5-10 years	13	17	30
11-20 years	11	21	32
20-30 years	9	16	25
30-40 years	11	16	27
40-50 years	9	18	27
50-60 years	2	6	8
60-70 years	3	7	10
>70 years	0	7	7
Total (%)	150 (31.1%)	333 (68.9%)	483(100)

Table III: Distribution of bacteria isolated from blood sample (n=483)

Type of growth	Frequency	Percentage (%)
Gram negative	282	58.4
Salmonella	150	31.1
Acinetobacter	87	18.0
Enterobacter	33	6.8
E. Coli	9	1.9
Klebsiella	2	.4
Others	1	.2
Gram positive	201	41.6
Staph. aureus	12	2.5
CoNS	189	39.1

Table IV: Drug-sensitivity profile of Gram-negative isolates

Antibiotic	Salmonella (n=150)	Actinobacteria (n=87)	Enterobacter (n=33)	E. Coli (n=9)	Klebsiella (n=2)
Amikacin	89(59.3%)	13(14.9%)	15(45.5%)	1(11.1%)	0(00)
Azithromycin	82(54.7%)	6(6.9%)	21(63.6%)	1(11.1%)	2(100)
Ceftriaxone	137(91.3%)	57(65.5%)	23(69.7%)	1(11.1%)	2(100%)
Ciprofloxacin	97(64.7%)	50(57.5%)	17(51.5%)	8(88.9%)	0(00)
Cotrimoxazole	114(76%)	45(51.7%)	9(27.3%)	7(77.7%)	2(100%)
Gentamycin	77(51.3%)	37(42.5%)	10(30.3%)	1(11.1%)	2(100%)
Imipenem	14(9.3%)	13(14.9%)	1(3%)	0(00)	0(00)
Levofloxacin	25(16.7%)	65(74.7%)	15(45.5%)	0(00)	0(00)
Meropenem	136(90.7%)	10(11.5%)	21(63.6%)	6(66.7%)	0(00)
Ampicillin	76(50.7%)	35(40.2%)	10(30.3%)	2(22.2%)	0(00)
Doxycycline	85(56.7%)	0(00)	8(24.2%)	0(00)	0(00)
Vancomycin	0(00)	66(75.9%)	0(00%)	5(55.6%)	0(00)
Chloramphenicol	77(51.3%)	28(32.3%)	16(48.5%)	5(55.6%)	1(50%)
Tetracycline	81(51.4%)	0(00)	27(81.8%)	4(44.4%)	0(00)

Table V: Drug-sensitivity profile of Gram-positive isolates

Antibiotic	CoNS (n=189)	Staph. Aureus (n=12)
Amikacin	24(12.7%)	10(83.3%)
Azithromycin	49(25.9%)	0(00)
Ceftriaxone	105(55.6%)	0(00)
Ciprofloxacin	165(87.3%)	9(75%)
Cotrimoxazole	119(63%)	0(00)
Gentamycin	165(87.3%)	8(66.7%)
Imipenem	48(25.4%)	7(58.3%)
Levofloxacin	165(87.3%)	0(00)
Meropenem	37(19.6%)	0(00)
Ampicillin	110(58.2%)	6(50%)
Doxycycline	96(50.8%)	5(41.7%)
Vancomycin	117(61.7%)	11(91.7%)
Chloramphenicol	92(48.7%)	0(00)
Tetracycline	97(51.3%)	0(00)

DISCUSSION

Bloodstream infection (BSI) is a challenging problem and sometimes it may be life threatening; therefore, timely detection, identification and antimicrobial susceptibility testing of blood-borne pathogens are one of the most important functions of diagnostic microbiology laboratory.¹

In this study, more frequent bacteremia cases noted in case of females than males. This may be explained as female are involved. This findings are consistent with previous studies.¹¹

In the present study, the culture positivity was 16.1%. This rate of isolation is consistent with many studies.^{9,12-17} High culture positivity ranging from 33.9% to 52.10% were reported by various other authors.^{18,19} The reason may be most of the cases must have taken antibiotics before admission in our hospital and also self-medication is very common in Bangladesh as the antibiotics are commonly available over the counter. Such variation in blood culture positivity across the countries can be explained by various factors such as difference in blood culture system, volume or

the number of blood culture samples, geographical location, nature of patient population, epidemiological difference of the etiological agents, and difference in infection control policies among nations.²⁰

In this study, *Salmonella* Typhi (31.1%) was the predominant gram negative bacteria followed by *Acetobacter* (18%), *Enterobacter* (6.8%), *E. coli* (1.9%) and *Klebsiella* spp. (0.4%) and *S. aureus*. CoNS (39.1%) was predominant gram positive bacteria. Several studies from Bangladesh have identified *S. Typhi* as a common cause of bloodstream infection in this region and reported *Salmonella* species to be responsible for almost half of the disease burden associated with BSI in Dhaka.²¹ More or less similar observations have been seen in cases of bacteremia in different countries, though the proportion and prevalence of the bacterial agents varied.^{22,23} As the only source of *Salmonella* infection is the infected human and fecal contamination of drinking water and food supplies, the highest percentage of *Salmonella* isolates in this study indicate the necessity of proper waste management and infection control practices. Over the past two

decades, CoNS, the usual skin commensals are increasingly being considered bloodstream pathogens in select settings. Improper methods of blood collection and the presence of long-standing intravascular catheters are recognized as possible modes of spread of BSI by CoNS. In fact, two studies^{22,24} reported CoNS as the most common isolate causing BSIs in ICU patients.

In this study found a high percentage of *Salmonella* Typhi isolates appeared to be sensitive to ceftriaxone (91.3%), meropenem (90.7%) and cotrimoxazole (76%) which is consistent with studies carried out in Nepal, Pakistan and Bangladesh.^{5,25,26} This might give us some hope that in future we can again start using these antimicrobials for treatment to *Salmonella* Typhi. This finding shows 64% and 54.7% *Salmonella* Typhi were susceptible to amikacin and azithromycin. A study from Nepal also reported a low rate of azithromycin resistance among tested antibiotics.²⁵

In this study acetobacter were found to be sensitive (75.9% and 74.4%) to levofloxacin and vancomycin which were consistent with other studies.^{9,13,18,27} Enterobacter were susceptible to tetracycline and ceftriaxone (78.9%) and (81.8%) which is consistent with studies carried out in Nepal, India and Pakistan^{9,25,26} This might give us some hope that in future we can again start using these antimicrobials for treatment to Enterobacter.

This study observed sensitivity of *E. coli* was 88.9% to ciprofloxacin, 77.7% to cotrimoxazole and 66.7% to meropenem. Similar findings have been observed across Saudi Arabia and China.^{28,29} *Klebsiella* isolates showed sensitivity rate of 100% to azithromycin, ceftriaxone, cotrimoxazole and gentamycin. However other studies from India, Nepal and Ethiopia showed all the isolates of Gram negative bacteria were susceptible to cotrimoxazole and

meropenem.³⁰

In this study, the sensitivity rates of ciprofloxacin, gentamycin and levofloxacin were 87.3% for coagulase-negative *Staphylococcus* spp. (CoNS) which were consistent with other studies.^{9,27} They reported CoNS infections were amenable to levofloxacin, gentamicin, and chloramphenicol (90% sensitivity). *Enterococcus* spp. had mixed sensitivities toward gentamicin, chloramphenicol, and tetracycline. Ampicillin was however totally effective for *Enterococcus* spp. Alpha and beta-hemolytic *Streptococcus* spp. were uniformly sensitive to penicillin and other beta-lactam antibiotics.

Staphylococcus spp. were most sensitive (91.7%) to the action of vancomycin and (83.3%) to amikacin. Ciprofloxacin and gentamycin where other alternatives *Staphylococcus* spp. isolates were highly responsive (75% and 66.7%). Similar study Banik et al.⁹ *staphylococcus* spp. were most responsive (100%) to the action of teicoplanin, vancomycin, and chloramphenicol. Gentamicin and levofloxacin were other alternatives responsive (>90%) to gentamicin, clindamycin, quinolones, and chloramphenicol besides erythromycin and tetracycline. Several limitations of our study, like this was single center study with shorter duration and small number of isolates which may not reflect the true status of the antimicrobial pattern of wider community or even other hospitals.

CONCLUSIONS

This study revealed that Gram-positive bacteria, especially the isolates of CoNS and *S. aureus* were found to be the most prevalent causative agent of blood stream infections (BSI). Based on the results of antimicrobial susceptibility tests, it might be inferred that antibiotics such as ceftriaxone, meropenem, ciprofloxacin, levofloxacin and amikacin respectively are the effective drugs against

Gram-negative and Gram-positive bacteria. Specific antibiotic utilization strategies like antibiotic restriction, combination therapy, antibiotic usage according to the standard antimicrobial susceptibility testing and antibiotic recycling may help to reduce incidence of blood stream infections. Robust infection control practices and antibiotic stewardship programs may help to reduce incidence of blood stream infections as well as prevent the emergence of resistance.

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Original Article

Normal Inner and Outer Intercanthal Distance in Adult – a Cross-Sectional Study in Rajshahi

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ABSTRACT

INTRODUCTION: The canthi are angles or ends of palpebral fissures. The inner and outer intercanthal distances are the horizontal distances between the medial and lateral canthus of left and right eye of an individual respectively. The IICD and OICD is one of the important periocular measurements of human. **OBJECTIVES :** This study was conducted to find out normal values of IICD and OICD in Bangladeshi people. **METHODS:** This cross-sectional descriptive study was conducted in the department of Anatomy, Rajshahi Medical College, Rajshahi, Bangladesh from July 2016 to June 2017. A total number of 306 normal healthy subjects within the age of 30-70 years were enrolled for this study. Among them 74 were male and 232 were female. **RESULTS:** The mean values of inner and outer intercanthal distances of normal people were 29.20 ± 2.08 mm and 87.64 ± 3.44 mm respectively. The ratio between outer to inner intercanthal distances was 3.01 ± 0.17 . The highest frequency (36.6%) of inner intercanthal distances were within the range of 29-30.99 mm and the highest frequency (34.6%) of outer intercanthal distances were within the range of 87-89.99 mm. **CONCLUSION:** The study helps to establish normal values of inner and outer intercanthal distances for adult people in Bangladesh. Data obtained from the study would serve as reference values when planning aesthetic and post traumatic surgical interventions.

Key words: Inner intercanthal distance (IICD), Outer intercanthal distance (OICD)

INTRODUCTION

Periocular measurement is of value in several clinical specialities including ophthalmology especially in oculoplastic surgery and optometry. It has also tremendous importance in medical and clinical genetics. The intercanthal distance (ICD) is one of the important periocular measurements of human.

The canthi are angles or ends of palpebral fissures, which are elliptical spaces between the upper and lower eyelids. The inner and outer intercanthal distances are the horizontal distances between the medial and lateral canthus of left and right eye of an individual respectively.

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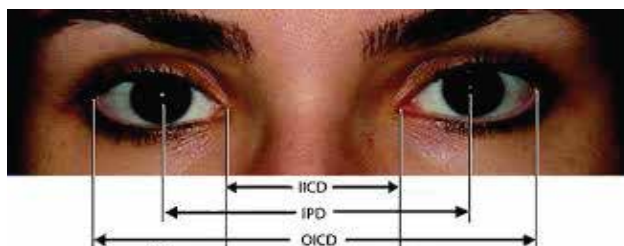


Figure 1: Showing inner intercanthal distance (IICD), outer intercanthal distance (OICD) & interpupillary distance (IPD).¹

Bruce and Timothy (1992)² worked on Malaysians they stated that the normal inner intercanthal distance (IICD) was about

34±4mm. Evereklioglu *et al.* (2002)³ worked on Turkish women of 25-40 years of age and reported that the mean inner and outer intercanthal distance of these women were 3.02cm & 8.73cm respectively. Farkas *et al.* (2005)⁴ worked on Egyptian and Iranian women and their mean inner and outer intercanthal distances were 3.09cm and 8.63cm, 2.46cm and 7.98cm respectively.

Le *et al.* (2002)⁵ worked on Chinese, Thai and Vietnamese women. Their mean inner intercanthal distance with standard deviation (SD) were 3.71±0.33cm, 3.66±0.28cm and 3.67±0.25cm respectively. Farkas *et al.* (2005)⁴ also worked on Thai and Japanese women of Asia. The mean inner and outer intercanthal distances of Thai and Japanese women were 3.60cm and 9.90cm and 3.50cm and 9.33cm respectively.

A study was undertaken by Farhat N *et al.* (2015)⁶ in the Anatomy department of Sir Salimullah Medical College, Dhaka, Bangladesh on photographic estimation of intercanthal width of Bangladeshi women. The researchers reported the mean inner and outer intercanthal distances of Bangladeshi women (25-45 years) were 3.456±0.3585cm and 9.348±0.7174cm respectively.

A cross sectional comparative study was done by Hoque E (2009)⁷ in Rajshahi Medical College Hospital, Rajshahi. In his study, he reported the mean inner intercanthal distance of Bangladeshi people was 3.1cm±0.27cm.

Among the various studies, it is observed that the inner and outer intercanthal distances varies from race to race and certain ethnic groups.

Intercanthal distance is a useful tool in Anatomy, Clinical Genetics and Ocular surgery. Periocular dysmorphology is a cardinal feature for many genetic and teratogenic syndromes. For example, a shortened palpebral fissure width (i.e., distance between inner and outer canthi) is typically associated with fetal alcohol syndrome. Thus

accurate clinical measurement of intercanthal distance is needed for evaluation of inherited diseases as well as planning of reconstructive surgery. So, the parameters of normal inner and outer intercanthal distance in our country should be find out and as far as I know very few studies have been done on this topic.

This study would help us to find out the normal values of inner and outer intercanthal distances for our immediate environment.

MATERIALS AND METHODS

This cross-sectional type of descriptive study was carried out in the department of Anatomy, Rajshahi Medical College (RMC) in collaboration with the department of Ophthalmology and the outpatient department (OPD) of Rajshahi Medical College Hospital (RMCH). A group of normal individuals (306) without ocular disease within the age of 30-70 years were randomly selected attending outpatient department of RMCH during the study period of one year (July 2016 to June 2017). Individuals were included if they had no ophthalmological problem which was confirmed by an ophthalmologist.

The study was approved by the Institutional Review Board (IRB) and the Ethical Review Committee (ERC) of RMC. Data were collected by observation and measuring, then recorded on data collection form. After completion of data collection, they were checked, verified and edited for consistency and validity. Data were processed and analyzed with the help of a computer based SPSS software program. After entry into computer, results were analyzed according to the objectives and variables of the study.

Measurement of Inner and Outer Intercanthal distances:

A Vernier caliper was used to measure inner and outer intercanthal distances. After informed consent had been obtained from the subjects, the measurement was performed.

Each subject was seated comfortably in a chair with the subject's head at the same level as and 40 cm in front of the examiner's head. The subject's face was well illuminated. A Vernier caliper was used against the bridge of the nose of the subject. Each measurement was carried thrice to ensure accuracy. If three or two

values were same then the same value was taken. If the three values were different then the average of the three values was taken. The inner intercanthal distance was measured by having the subject look straight at the examiner (measurement between medial angles of two eyes).



Figure 2: Measurement of inner intercanthal distance by Vernier caliper.

The subject was instructed to look upward for the outer intercanthal distance to be measured. This was to maximize contrast between the

sclera and skin (measured between the lateral angles of two eyes).



Figure 3: Measurement of outer intercanthal distance by Vernier caliper.

RESULTS

In this study, female participants were higher than male. Among the study subjects, female were 75.8% where male were 24.2% (Fig. 4).

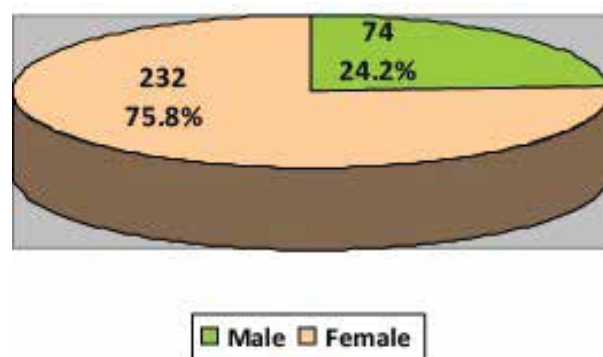


Figure 4: Distribution of study subjects by their sex (n = 306).

The maximum population of study subjects (47.1%) were within the age of 30-40 years.

The mean age of the study subjects was 41.7 ± 9.6 years (Table I).

Table I: Frequency of ages of study subjects.

Age (years)	Study group (n = 306) (%)
30 – 40	144 (47.1)
40 – 50	90 (29.4)
50 – 60	50 (16.3)
≥ 60	22 (7.2)
Mean \pm SD	41.7 ± 9.6

Inner and outer intercanthal distance related statistics are given in Table II. The mean IICD was 29.20 ± 2.08 mm with the range between

23.75 to 36.63 mm whereas the mean OICD was 87.64 ± 3.44 mm with the range between 78.35 to 97.45 mm.

Table II: Inner (IICD) and outer (OICD) Intercanthal distance related statistics.

Statistics	IICD	OICD
Mean (mm)	29.20	87.64
Median (mm)	29.39	87.65
Standard deviation (SD) (mm)	2.08	3.44
Standard error of mean (mm)	0.12	0.20
Minimum (mm)	23.75	78.35
Maximum (mm)	36.63	97.45

The ratio between outer to inner intercanthal distances of study subjects was 3.01 ± 0.17 (Table III).

Table III: Ratio between outer to inner intercanthal distances.

Intercanthal distance related variables	Study subjects (mean \pm SD)
Inner intercanthal distance (mm)	29.20 ± 2.08
Outer intercanthal distance (mm)	87.64 ± 3.44
Ratio OICD/IICD	3.01 ± 0.17

The highest frequency (36.6%) of inner intercanthal distances were within the range of 29-30.99 mm (Table IV & Figure 5).

Table IV: Frequency distribution of inner intercanthal distances.

IICD in mm	Frequency	Percent
23 - 24.99	5	1.6
25 - 26.99	43	14.1
27 - 28.99	83	27.1
29 - 30.99	112	36.6
31 - 32.99	58	19.0
33 - 34.99	4	1.3
>35	1	0.3
Total	306	100.0

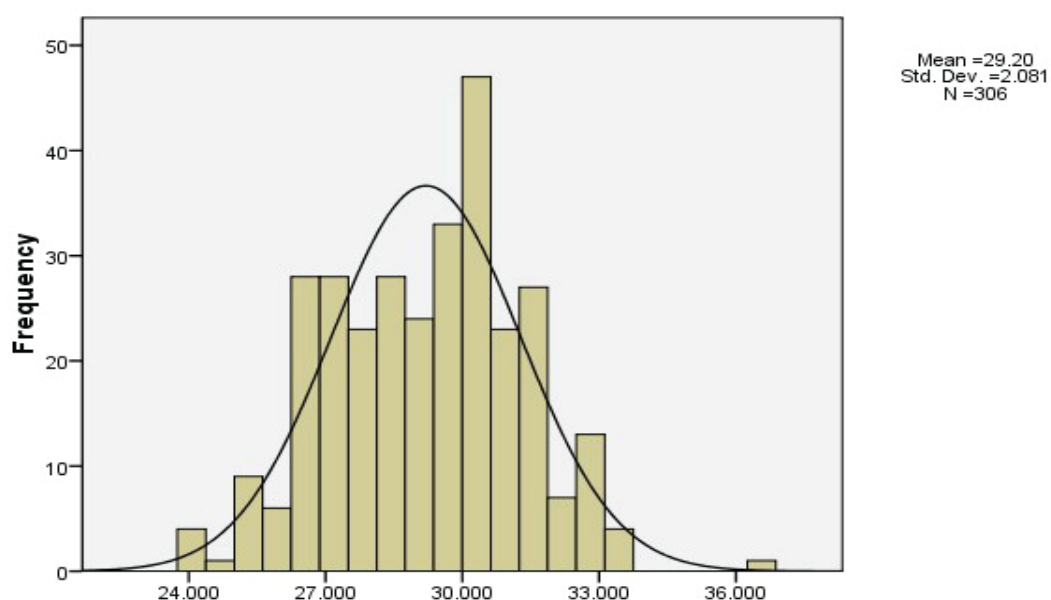


Figure 5: Graphical presentation of frequency distribution of inner intercanthal distances. The highest frequency (36.6%) of inner intercanthal distances were within the range of 29-30.99 mm (Table IV & Figure 5).

Table V: Frequency distribution of outer intercanthal distances.

OICD in mm	Frequency	Percent
78 - 80.99	9	2.9
81 - 83.99	44	14.4
84 - 86.99	67	21.9
87 - 89.99	106	34.6
90 - 92.99	63	20.6
93 - 95.99	15	4.9
>96	2	0.7
Total	306	100.0

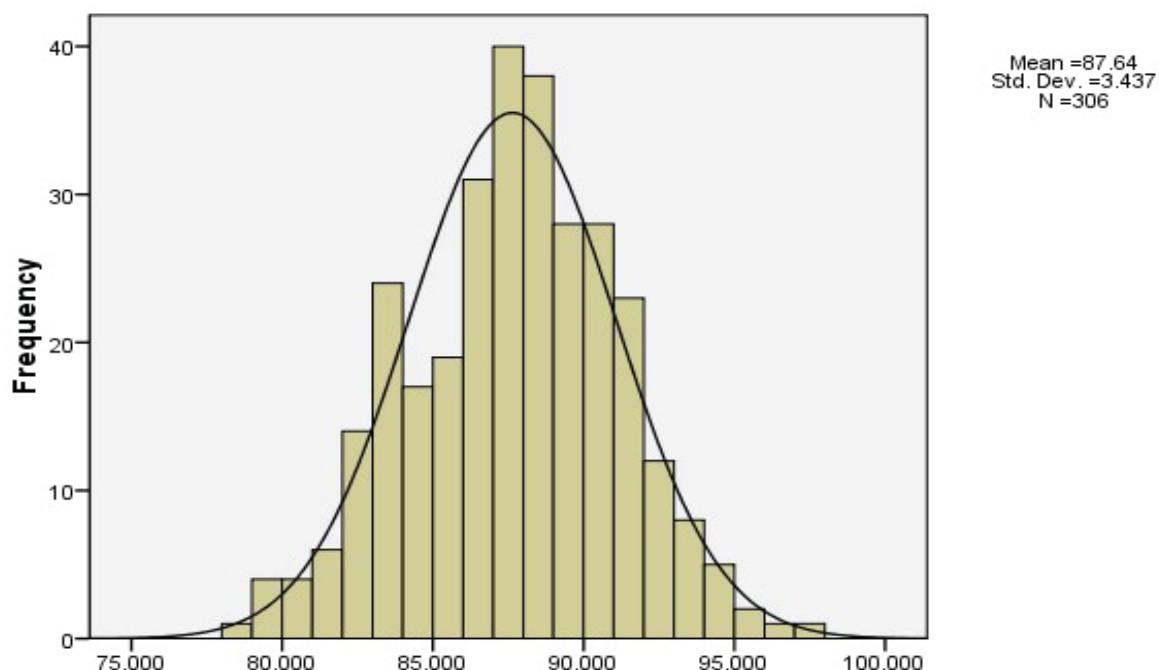


Figure 6: Graphical presentation of frequency distribution of outer intercanthal distances.

Table VI: Comparison of various studies with the present study.

Study	Sample size	Mean IICD	Mean OICD	*P value
Present study	306	29.20±2.08mm	87.64±3.44mm	
Hoque E ⁷ in 2009	130	3.1±0.27cm		P>0.05
Farhat N. <i>et al</i> ⁶ . in 2015	100	3.456±0.3585cm	9.348±0.7174cm	P<0.05
Osunwoke <i>et al</i> ⁸ in 2012	1000	28.22±3.45mm	92.22±6.05mm	P<0.05
EGWA <i>et al</i> ⁹ in 2008	460	42.99±0.39mm	116.81±0.61mm	P<0.05
Mohammad Etezzad-Razavi, and Samira Jalalifar ¹⁰ in 2008	419	29.19±3.36mm	79.82±8.69mm	P>0.05 (IICD) P<0.05 (OICD)
Oladipo <i>et al</i> ¹¹ . in 2011	800	3.44±0.28cm	10.94±0.57cm	P<0.05
Oladipo <i>et al</i> ¹² in 2013	1523	3.66±0.258cm	10.12±0.557cm	P<0.05
Jayarathne <i>et al</i> ¹³ in 2013	103	39.44±3.76mm	90.69±4.65mm	P<0.05

*Data were analysed using **z-test** and were presented as **mean±SD**

Table VI reveals that the result of the present study had similarities with the studies done by

Hoque E⁷ and Mohammad Etezzad Razavi & Samira Jalalifar¹⁰.

DISCUSSION

In the present study the mean inner and outer intercanthal distances were 29.20 ± 2.08 mm and 87.64 ± 3.44 mm respectively (Table II). Hoque E (2009) found the inner intercanthal distance of normal Bangladeshi people was 3.1 ± 0.27 cm. The inner intercanthal distances of both studies were similar and had no significant differences ($p > 0.05$) (Table VI). A study was done by Farhat N *et al* (2015)⁶ who worked on Bangladeshi women. Their mean inner and outer intercanthal distance were 3.46 ± 0.36 cm and 9.35 ± 0.72 cm respectively which were significantly different from the present study ($p < 0.05$ and $p < 0.05$) (Table VI). They worked only on women but this study included both male and female. The difference may be due to the different method of data collection technique. The measurements of this study was taken manually by vernier calipers in living individual whether they took the measurements by using traditional 2D photograph. This might be the possible cause of significant difference between the studies.

Another study was done by Le *et al.* (2002)⁵ who also worked on Chinese, Thai, and Vietnamese women and their mean inner intercanthal width were 3.71 ± 0.33 cm, 3.66 ± 0.28 cm and 3.67 ± 0.25 cm respectively. These findings were significantly different ($p < 0.05$) from the values of the present study. They worked only on women but the present study included both male and female. The possible causes of difference might be due to racial variation and only women participants. Osunwoke *et al.* (2012)⁸ carried out a study on 3-21 years old Ijaws in Nigeria and found the inner and outer intercanthal distances were 28.22 ± 3.45 mm and 92.22 ± 6.05 mm. The results of that study were significantly different ($p < 0.05$) from the present study. The inner intercanthal distance of Nigerian people was lower but outer intercanthal distance was higher than the normal people of the present study (Table VI). Both studies done by Le *et*

al. (2002)⁵ and Osunwoke *et al.* (2012)⁸ took the measurements by vernier calipers which was similar to the present study. But variations might be due to variation in ethnicity, race, nutritional status and age range.

EGWA *et al.* (2008)⁹ studied on 460 Nigerian students and found the mean inner and outer intercanthal distances were 42.99 ± 0.39 mm and 116.81 ± 0.61 mm respectively. The results of the study was significantly different ($p < 0.05$) from the present study (Table VI). Mohammad Etezzad-Razavi and Samira Jalalifar (2008)¹⁰ worked on Iranian people. Their mean inner and outer intercanthal distances were 29.19 ± 3.36 mm and 79.82 ± 8.69 mm respectively. The inner intercanthal distance of that study was similar ($p > 0.05$) to the present study but outer intercanthal distance was significantly different ($p < 0.05$) from the present study (Table VI). These differences might be due to different methods of taking measurements. EGWA *et al.* (2008)⁹ measured the inner and outer intercanthal distances by using a transparent metric ruler calibrated in millimetres. Mohammad Etezzad-Razavi and Samira Jalalifar (2008)¹⁰ took the measurements by a translucent plastic ruler but in this study vernier calipers was used in taking the measurements.

Oladipo *et al.* (2011)¹¹ worked on intercanthal distances of Nigerian people. They carried out the research on Ibibio ethnic group in Akwa Ibibio state within the age of 18-80 years. Their mean inner and outer intercanthal distances were 3.44 ± 0.28 cm and 10.94 ± 0.57 cm respectively. Another study on the measurements of intercanthal distances of Ikwerre School Children in Nigeria done by Oladipo *et al.* (2013)¹². Their mean inner and outer intercanthal distances were 3.66 ± 0.258 cm and 10.12 ± 0.557 cm. The results of the both studies were significantly different ($p < 0.05$) from the present study (Table VI). Jayaratne *et al.* (2013)¹³ worked on Chinese Young adults in and found the inner and outer

intercanthal distances of Chinese young adult were 39.44 ± 3.76 mm and 90.69 ± 4.65 mm respectively. The result of that study was significantly different ($p < 0.05$) from the present study. The inner and outer intercanthal distances of Nigerian and Chinese young adult were higher than the normal people of the present study (Table VI). Jayaratne *et al.* (2013)¹³ used high-resolution 3D stereophotogrammetry for taking the measurements. Oladipo *et al.* (2011)¹¹ used a non-stretchable plastic ruler and Oladipo *et al.* (2013)¹² used the meter ruler for taking measurements. In the present study measurements were taken by vernier calipers. So, these differences might be due to different methodology, different race, ethnicity and different age range.

CONCLUSION

Craniofacial anthropometry is important in the evaluation of facial trauma, facial defect, congenital and post traumatic deformities and easy identification of certain congenital malformation. The normal values of inner and outer intercanthal distances are important for successful reconstruction of the canthal area. Thus it is necessary to have a local data of these parameters since these standards reflect the potentially different patterns of craniofacial growth resulting from racial, ethnic, sexual and dietary differences.

The study helps to establish normal values of inner and outer intercanthal distances for adult people in Bangladesh. The mean values of inner and outer intercanthal distances of normal people were 29.20 ± 2.08 mm and 87.64 ± 3.44 mm respectively. Data obtained from the study might be useful for clinical interpretation of periocular pathology and would serve as reference values when planning aesthetic and post traumatic surgical interventions. As the present study was conducted in a limited territory, further large-scale study is recommended.

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Original Article

Frequency of Peripheral Neuropathy in Newly Detected Type- 2 Diabetes Mellitus Patients on Clinical and Electrophysiological Basis.

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ABSTRACT

BACKGROUND: Diabetes Mellitus is one of the most common chronic non-communicable disease and a common metabolic disorder. Diabetic neuropathy is one of the most frequently encountered complications of diabetes mellitus. The diabetic neuropathy are heterogeneous, affecting different parts of nervous system that present with diverse clinical manifestations. **PURPOSE:** To find out the frequency of peripheral neuropathy in newly detected type-2 diabetes mellitus patients on clinical and electrophysiological basis. **Material and Method:** A cross section study was conducted in the Department of Medicine and Endocrinology, Rangpur Medical college hospital and diabetic somity of Rangpur during the period of January 2011 to December 2011 on newly detected type-2 diabetes mellitus patients. All patients of either sexes were included in this study, who were diagnosed within two months as type-2 diabetes mellitus. Diagnosis of diabetes was done by reports of $>200\text{mg/dl}$ on two consecutive base line random blood sugar (RBS) and of $>126\text{mg/dl}$ fasting blood sugar (FBS) level. All the patients under went neuropathic examination with (neuropathy symptom score and neuropathy disability score) neuropathy scoring system. At least one sensory function was impaired in the study subjects including vibration sensation, monofilament sensation and pain sensation confirming diabetic peripheral neuropathy but at least two common symptoms of painful diabetic peripheral neuropathy, such burning sensation, sharp pain sensation aching pain, abnormal cold or worm sensation and feelings of pins and needles considered as diabetic peripheral neuropathy. **RESULTS:** Among 50 study subjects were 31(62%) male and 19(38%) female. Mean age was 49.13 years and mean BMI 22.85kg/m^2 . It was observed that 12(24%) had peripheral neuropathy as compared to this 38(76%) patients did not have peripheral neuropathy. **CONCLUSION:** Diabetic peripheral neuropathy is fairly common entity in our patients with type-2 diabetes mellitus and was seen as early as within two months of diagnosis in 12(24%) of patients and showed significant correlation between peripheral neuropathy with age, basal metabolic index and high blood sugar levels.

KEY WORDS: Diabetes Mellitus, Peripheral neuropathy, Neuropathy symptoms score (NSS), Neuropathy disability score (NDS).

INTRODUCTION :

Diabetes Mellitus is one of the most common chronic non-communicable diseases and a common metabolic disorder.¹ Type-2 diabetes

mellitus is a common metabolic disorder.² It is increasingly common throughout the whole world.³ The prevalence of Type-2 diabetes mellitus is rising to epidemic proportion. The incidence of type-2 diabetes mellitus increased dramatically in the recent decades due to changes in life style, food habits and increase prevalence in obesity and longevity.⁴

According to WHO approximately 135 million people of whole world have diabetes mellitus in 2004.¹ By the year 2025 WHO predicts that 300 million people will have this disorder.¹ Type-2 diabetes mellitus accounts for about 90% cases of diabetes.⁵ 80% patients of total diabetes mellitus patients reside in developing countries.⁵ Type-2 diabetes mellitus is serious

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disease due to its chronic complications. It constitute substantial burden for both patients and health care system⁶ due to its premature morbidity, through its micro and macrovascular complications.⁷ The microvascular complications of diabetes mellitus which include nephropathy, retinopathy and neuropathy.

Diabetic neuropathy is one of the most frequently encountered complications of diabetes mellitus^{7,8} and commonest non-traumatic cause of limb amputation. The diabetic neuropathy are heterogeneous, affecting different parts of nervous system that present with diverse clinical manifestations. The most common type of diabetic neuropathy is symmetrical, distal sensorimotor polyneuropathy (DPN)⁹, which accounts for approximately 75% of the diabetic neuropathy.¹⁰

A study in Bangladesh reported the prevalence of DPN is 19.7%.¹¹ But there is little data on the prevalence of peripheral neuropathy in diabetic patients at the time of diagnosis, however neuropathy is estimated to be present in 7.5% of patients at the time of diagnosis.¹² The aim of this study is to determine the frequency of peripheral neuropathy at the time of type-2 diabetes mellitus diagnosis.

MATERIALS AND METHOD:

This is hospital based descriptive cross sectional study conducted at department of Medicine and Endocrinology of Rangpur Medical College Hospital, Diabetic Somiti, Radhaballav, Rangpur from January 2011 to December 2011. Total 50 type-2 diabetic subjects were included randomly in this study. The patients fulfilled the selection criteria were enrolled in the study. Inclusion criteria were the patients with age between 18-64 years, of either gender diagnosed as a cases of type-2 diabetes mellitus within 2 months of presentation, that is, having fasting blood

sugar(FBS) of ≥ 126 mg/dl, random blood sugar (RBS) ≥ 200 mg/dl along with no previous history of testing positive for type-2 diabetes mellitus or taking any treatment for diabetes. Exclusion criteria included patients having peripheral neuropathy due to other causes i.e hereditary neuropathy, autoimmune disease, drugs and patients with systemic illness like chronic renal failure, hypothyroidism, vit. B12 deficiency, liver disease, vaculities, leprosy or malignance. In terms of clinical diagnosis, it is generally agreed that peripheral neuropathy is diagnosed by Neuropathy Symptoms Score(NSS) and Neuropathy Disability Score(NDS) Weerasuriya et al.¹³ Neuropathic symptoms score are feelings of pins and needles (paresthesia), abnormal cold or worm sensation in feet, aching pain/burning pain/sharp pain, irritation in feet or legs by bed clothes. Neuropathic signs were defined by neuropathy disability score reduced or absent ankle jerk reflexes, knee jerk reflexes (using an appropriate reflex hammer) and reduced or absent distal sensation by vibration testing (using a 128 Hz tuning fork), fine touch testing (using Seimmes- Weinestein monofilament size 5.07 (10gm). Signs were evaluated through careful neurological examination. At least one sensory function was impaired in the study subjects including vibration sensation, monofilament sensation and pain sensation confirming diabetic peripheral neuropathy but at least two common symptoms of painful diabetic peripheral neuropathy, such burning sensation, sharp pain sensation aching pain, abnormal cold or worm sensation and feelings of pins and needles.

All data generated were statistically analyzed using the computer based statistical package for social science (SPSS) in window version 17. Level of significance was calculated at confidence interval of 95% ($P < 0.05$). Data were calculated by chi-square test and student-T test.

RESULTS:

A total number of 50 newly detected type-2 diabetes mellitus subjects admitted or registered in Rangpur Medical College Hospital and Diabetic Somiti of Rangpur, were

included in this study to find out the frequency of peripheral neuropathy in newly detected type-2 diabetes mellitus. Study subjects were grouped into two, group A (peripheral neuropathy group) and group B (non neuropathy group).

Table-I: Frequency of sociodemographic characteristics of the study subjects(n=50)

Variables	Group A	Group B	Total	Mean value of total	p- value
Mean	53.67±9.6	44.6±13.71		49.13	<0.01 ^s
age(years)					
Age<50 years	4(8%)	12(24%)	16(32%)		
Age>50 years	8(16%)	26(52%)	34(68%)		
Sex					
Male	7(23%)	24(48%)	31(62%)		
Female	5(26%)	14(28%)	19(38%)		
Height(cm)	158.8±7.27	158±7.83		158.54	
Weight(kg)	60.4±11.68	55.1±13.65		57.75	
BMI(kg/m ²)	23.84±3.5	21.86±4.09		22.85	<0.001 ^s

Table-II: Frequency of clinical characteristics of study subjects(n=50)

Variables	Group A	Group B	Mean value	p-value
FBS (mg/dl)	272.52±126.7	247.8±82.02	260.16	<0.001 ^s
Blood urea(mg/dl)	33.6±8.38	27.5±8.73	30.55	<0.001 ^s
Blood pressure	125.67±15.52	121±16.83		
Systolic(mmHg)	80±6.49	78±8.73	123.33	
Diastolic(mmHg)			79.25	

Table-III: Analysis of peripheral neuropathy

Peripheral neuropathy	Frequency	Percentage
Present	12	24%
Absent	38	76%

Table-IV: Peripheral neuropathy present and symptoms

Symptoms	Frequency	Percentages
Present	3	25%
Absent	9	75%

Table-V: Peripheral neuropathy No and symptoms

Symptoms	Frequency	Percentages
Yes	12	31.58%
No	26	68.42%

According to criteria for diagnosis of peripheral neuropathy, 12 (24%) patients, 7 (23%) males and 5 (26%) females out of 50 newly detected type-2 diabetes mellitus patients had peripheral neuropathy and females were affected more than males (26:23) although it is not statistically significant.

The average age of neuropathy group (group A) 53.67 ± 9.6 years is significantly higher ($p < 0.01$) than non neuropathy group (group B) the average age 44.6 ± 13.71 years. The mean BMI of 50 study subjects was 22.85 kg/m^2 . Among them with neuropathy group (group A) the mean BMI was $23.84 \pm 3.5 \text{ kg/m}^2$ and those with non neuropathy group (group B) the mean BMI was $21.86 \pm 4.09 \text{ kg/m}^2$ which was clinically significant ($p < 0.001$) (Table -I).

Among study subjects the fasting blood glucose in group A ($272.52 \pm 126.7 \text{ mg/dl}$) is higher than that of group B ($247.8 \pm 82.02 \text{ mg/dl}$) which is statistically significant ($p < 0.001$). Both systolic and diastolic blood pressure in study subjects were higher in group A (125.67 ± 15.52 and $80. \pm 5.49 \text{ mmHg}$) compared to group B (121 ± 16.83 and $78 \pm 8.72 \text{ mmHg}$). The study also showed that the higher blood urea level in group A ($33.6 \pm 8.38 \text{ mg/dl}$) than the group B ($27.5 \pm 8.73 \text{ mg/dl}$) (Table-II).

On NSS (neuropathy symptoms score) and NDS (neuropathy disability score) 12 (24%) patients had peripheral neuropathy as compared to these 38 (76%) patients did not have peripheral neuropathy on Table-III. On further analysis of patients having peripheral neuropathy 3 (25%) and having symptoms 9

(75%) having no symptoms (Table-IV) while patients having no peripheral neuropathy 12 (31.5%) were symptomatic and 26 (68.42%) have no symptoms (Table-V).

DISCUSSION:

Diabetic peripheral neuropathy is one of the commonest complications of diabetes mellitus and it may be the first presenting symptom in type-2 diabetes mellitus patients. The present study was undertaken to observe the frequency of peripheral neuropathy in newly detected type-2 diabetes mellitus patients of both sexes with age ranging from 18-64 years were considered as the study subjects.

In our study, 24% of newly detected type-2 diabetics patients have clinical and electrophysiological evidence of diabetic peripheral neuropathy which agrees with the finding of 27% of newly detected type- 2 diabetes mellitus patients.¹⁴ Hamman et al also found the prevalence of diabetic peripheral neuropathy in 29% and 26% in their study among the non-Hispanic and Hispanic respectively.¹⁵ Using vibration sensation Nielsen et al observed neuropathy in 38% of their patients¹⁶ and cheng et al in 33% among their Taiwanese patients of diabetes.¹⁷ However Ratzman et al¹⁸ and Pirat¹⁹ observed a lower prevalence of diabetic peripheral neuropathy in 6.3% and 7% respectively in their studies. Weerasuriya et al observed 9.8% of their diabetic patients had evidence of diabetic neuropathy at the time of diagnosis in their study from Srilanka.¹³ This difference in the

prevalence of peripheral neuropathy between their study and ours can be explained because our study used clinical and electrophysiological studies (NSS and NDS), where as neuropathy was assessed by Ashok et al using a biothesiometer which is comparatively less sensitive method for detection of peripheral neuropathy.²⁰ Another factor, our patients may be due to delay in diagnosis of condition, due to lack of awareness and financial resources. Ather N.A et al reported in their study subjects the mean age was 58 ± 11.2 years with peripheral neuropathy²¹. In our study the mean age of patients was 53.67 ± 9.16 years with peripheral neuropathy. In our study 7(23%) were male 5(26%) were female out of 12(24%) ($p < 0.32$). However, Ather et al in this study with peripheral neuropathy showed 36 (20.3%) male and 57 (51.4%) were female out of 159 (53%).²¹ In addition Arindam Dutta et al²² in this study showed that in 29 patients who diagnosed of peripheral neuropathy in which 17 (28%) were males and 12 (31%) females out of 100 newly diagnosed type-2 diabetes mellitus had peripheral neuropathy and females were affected more than the males (31:28) although it is not statistically significant, in our study also females were more affected.

The present study shows by multiple logistic analysis that there is significant correlation between peripheral neuropathy and duration of diabetes, age of the patients, BM, blood pressure and blood glucose level. This association is also observed by weerasuriya et al¹³, Ashok et al²⁰ and Young et al²³ in this study.

CONCLUSION:

Diabetic Peripheral Neuropathy is a fairly common entity in our patients with type 2 DM and was seen as early as within two months of diagnosis in 24% of patients. It is necessary to search for this potentially and disabling complication of Diabetes Mellitus in all

patients at the time of diagnosis and also at periodic intervals.

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Original Article

Status of Fasting Blood Sugar Level in Postmenopausal Women and Associated Risk of Insulin Resistance

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ABSTRACT

BACKGROUND: Post-menopausal women undergo hormonal changes that can potentially affect their metabolic health and increase the risk of developing insulin resistance. Understanding the relationship between fasting blood sugar levels and insulin resistance in this population is crucial for early detection and prevention strategies. **OBJECTIVES:** the aim of the study was to assess the changes of fasting blood sugar concentration in healthy post-menopausal women. **METHOD:** This analytical type of comparative study was done in department of Physiology of Mymensingh Medical College, Mymensingh from January, 2017 to December, 2017. Two hundred healthy women (100 female were postmenopausal as study group and 100 female were reproductive women as control group) aged between 25 to 65 years were enrolled in this study. Body Mass Index (BMI) & Fasting serum glucose concentration of all individual were measured and compared. **RESULTS:** The mean (\pm SD) of BMI & fasting blood glucose were higher in postmenopausal group in comparison to the reproductive women group. **CONCLUSION:** This study concludes that, Menopause is an independent risk factor for impaired fasting blood glucose.

Key words: BMI, Post menopause, Fasting blood glucose.

INTRODUCTION

The period during which the menstrual cycle ceases and the female sex hormones diminish to almost none is called menopause.¹ It begins with changes in ovarian function and gradual decrease in the production of estrogen.² The adverse effects of menopause are attributed to

a decrease in the estrogen level, which leads to alterations in body mass index, insulin levels and also to increase the risk of metabolic disease like diabetes mellitus, osteoporosis.³ BMI is an inexpensive & easy to perform method of screening for weight categories that may lead to health problems. A BMI of 25 to 29.9 is referred as “pre obesity,” a BMI of 30 to 34.9 is class I obesity, 34.9 to 39.9 is class II obesity, and a BMI of 40 or greater is class III obesity.⁴

The BMI is related not only to menopause and menopausal symptoms but also to metabolic syndrome and cardiovascular diseases.⁵ Increased BMI is directly associated with increase metabolic disease.⁶ Metabolic Changes in women as they progressed through menopause found that one out of six women developed blood sugar level.⁷ In addition to this insulin resistance also causes increased activity of hormone sensitive lipase resulting in increased level of free fatty acid & accumulation of abdominal fat.⁸ The fasting serum glucose level in the early morning is normally 80 to 90 mg/100 ml and 115 mg/100

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ml is considered to be the upper limit of normal. A fasting blood glucose level above this value often indicates diabetes mellitus or at least marked insulin resistance.⁹ Following menopause, there is loss of ovarian function. This results in adverse changes in glucose and insulin metabolism, body fat distribution, coagulation, fibrinolysis and vascular endothelial dysfunction.¹⁰

Several types of evidence suggests that menopause could be associated with more rapid progression of glucose intolerance. First, post menopause may be a relative androgenic state compared with pre menopause due to cessation of ovarian estrogen production and continuation of androgen production. Second, greater levels of endogenous androgens are associated with glucose intolerance in both pre-menopausal and post-menopausal women. Third, postmenopausal estrogen therapy reduces fasting plasma glucose levels.¹¹

Insulin, glucagon and epinephrine maintain the glucose concentration in the blood within a fairly narrow interval under diverse conditions. In non-diabetic women, menopause, but not age, is an independent risk factor for elevated fasting plasma glucose levels. However, glucose metabolism is influenced by various genetic and environmental factors.¹²

METHOD

This analytical type of comparative study was carried out in the Department of Physiology, Mymensingh Medical College, Mymensingh, Bangladesh between the period of January, 2017 to December, 2017. Two hundred healthy female subjects (100 healthy female were postmenopausal as study group and 100 female were healthy reproductive as control group) aged between 25 to 65 years were enrolled in this study. All the subjects were female, non-pregnant, non-diabetic and free from other

form of severe illness, selected from Mymensingh Medical College and Mymensingh locality. After proper counseling, written informed consent was taken. Ethical permission was taken from the Institutional Review Committee of Mymensingh Medical College. After selection the subjects were requested to attend the concerned center in the morning on a particular day after overnight fast. Under strict aseptic precaution for estimation of serum glucose about 3 ml of venous blood was collected from antecubital vein and fasting serum glucose concentration were measured by Enzymatic colorimetric, GOD – PAP Method.

Data were expressed as mean (\pm SD) and statistical significance of difference among the group was calculated by unpaired students' test. Statistical analysis was done by using SPSS for windows version- 21. P value <0.05 was considered as significant.

RESULTS

Total number of 200 subjects participated in this study. Among them 100 female of reproductive age (25-45 yrs) were taken as control group (Group I) and 100 female of postmenopausal women (45-65 yrs) were taken as study group (Group II). The present study included estimation of fasting serum glucose of postmenopausal women (study group) and reproductive female (control group).

Body mass index

Figure- 1 shows the comparative study of body mass index in two groups. The mean (\pm SE) of body mass index of control group I and study group II were $25.34 \pm 1.42 \text{ kg/m}^2$ & $28.46 \pm 2.02 \text{ kg/m}^2$ respectively. In study group body mass index was increased.

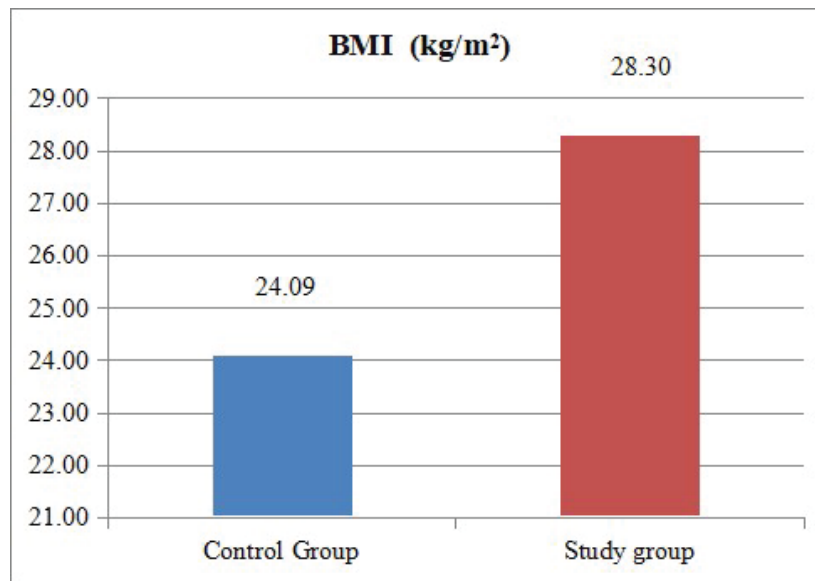


Fig-1: Bar diagram showing mean value of BMI in two groups.

Control Group: Female of reproductive age.
Study Group: Female of post menopause age.

Fasting serum glucose

Table-I and figure-2 shows the result & statistical analysis of fasting serum glucose. The mean (\pm SD) of fasting serum glucose of control group I and study group II were 5.44 ± 1.39 mmol/l & 8.26 ± 2.71 mmol/l

respectively. In study group II fasting serum glucose was increased. Result is statistically highly significant ($p < 0.0001$). Fasting serum glucose in control group female is within normal physiological range.

Table-I: Result & statistical analysis of fasting serum glucose:

Biochemical Parameters	Control group Group I n=100 Mean \pm SD	Study group Group II n=100 Mean \pm SD	Mean Difference	P-value	t-value	Sig.
FSG (mmol/l)	5.44 \pm 1.39	8.26 \pm 2.71	-2.819	0	9.26	**

n=Total numbers of subjects in each group, All the values are Mean \pm SD

Group I: Control female of reproductive age

Group II: Study female of post menopause age

FSG- Fasting Serum Glucose.

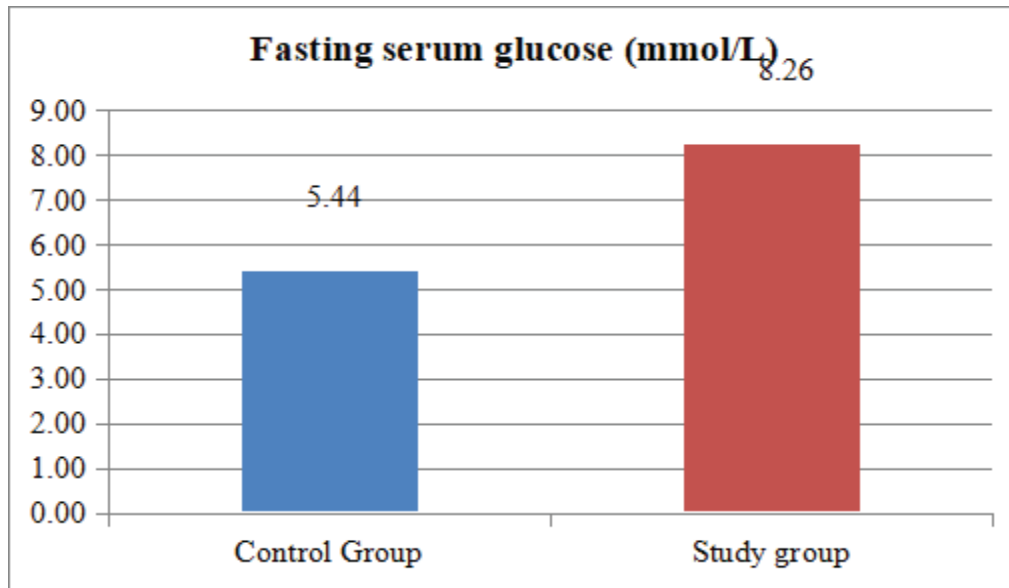


Fig-2: Bar diagram showing mean value of Fasting Serum Glucose in two groups.

Control Group : Female of reproductive age.

Study Group : Female of post menopause.

DISCUSSION

Fasting serum glucose

In this study, mean (\pm SD) fasting serum glucose (FSG) of control group reproductive female (group I) and study group postmenopausal women (group II) were 5.44 ± 1.39 mmol/l & 8.26 ± 2.71 mmol/l respectively. There was significantly increased FSG in study group (II) in comparison to control group and the result is statistically significant at 1% level of probability ($p < 0.001$).

Bishwajit Bhowmik et al. 2012¹³ in this study showed that fasting serum glucose ≥ 7.0 mmol/l was used as the diagnostic criterion. It is consistent with our study. This finding is also consistent with an Indian study¹⁴ but opposite to an Australian study.¹⁵

Fasting blood glucose level was elevated in post-menopausal obese house wives. This result might be due to the direct effect of obesity which causes elevation of glucose and triglycerides levels. So the post-menopausal obese house wives are more susceptible to

diabetes and other metabolic syndrome. This result was similar to that stated by the literature.¹⁶ This is consistent with our study.

A more recent study¹⁷ has shown that post-menopausal women were more likely to have a higher prevalence of diabetes mellitus than pre menopausal women.

Pradhan and Upadhyaya (2013)¹⁸ proposed that diabetes is a far greater risk factor for women than men, women 45 years are twice as likely as men to develop diabetes. This is also similar to our study.

Two recent cross-sectional European studies did not observe any difference in mean fasting serum glucose between pre and post-menopausal women.¹⁹ This finding is not similar to our study.

Estrogens are important participants in metabolic regulation. Loss of the main circulating estrogen, 17 β -estradiol (E2), has effects that go beyond reproductive health. E2-deficiency and impairment of its cellular action lead to an abrupt reduction in metabolic rate,

shift to increased central adiposity, dyslipidemia, and progression of metabolic syndrome (Met S) in post-menopausal women.²⁰

Rebuffe-Scrive et al.²¹ suggest that activation of lipoprotein lipase occur in the omental adipose tissue of postmenopausal women than in that of pre-menopausal women.

Adipocytes and adipose tissue are key players in the pathogenesis of insulin resistance associated with obesity. Hypertrophy dysfunctional adipocytes, mainly encountered in visceral adipose tissue (VAT) and upper body subcutaneous adipose tissue (SAT), are highly lipolytic resulting in enhanced free fatty acids (FFA) release as well as in impaired secretion of adipokines (increased leptin and resistin, decreased adiponectin etc). Ectopic accumulation of FFA would lead to insulin resistance. Insulin resistance is a requisite precursor for the development of type 2 diabetes.²²

CONCLUSION

Post-menopausal estrogen deficiency increases the risk of developing diabetes mellitus in female. Based on the study findings, several recommendations can be made: Regular monitoring: Postmenopausal women should undergo regular monitoring of their fasting blood sugar levels to detect any abnormalities and potential insulin resistance at an early stage. Lifestyle modifications: Encourage Postmenopausal women with elevated fasting blood sugar levels to adopt a healthy lifestyle including regular physical activity, a balanced diet, weight management and stress reduction. Medical intervention: Postmenopausal women with persistent high fasting blood sugar levels and sign of insulin resistance should consult with healthcare professionals for further evaluation and appropriate medical intervention. It is important to acknowledge the limitations of this study: Cross-sectional design: the study's cross sectional design

limits the ability to establish a causal relationship between fasting blood sugar levels and insulin resistance. Longitudinal studies or clinical trials would provide stronger evidence of the temporal association between these variables. Generalizability: The findings may be specific to the study population and may not be generalizable to other populations or ethnicity. Future studies should aim to include diverse samples to enhance the external validity of the findings.

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Original Article

Outcome of Early Intramedullary Fixation of Open Tibial Fracture

Md. Shariful Haque¹, Khaleda Perveen², Mohammad Mushfiqur Rahman³

ABSTRACT

BACKGROUND: Due to the risk of infection, treatment of open tibial fractures is controversial. Traditionally we are used to fixation of open tibial fracture after the healing of open wound. But with the advancement of medical science, we go for early intramedullary fixation of open tibial fracture. In Bangladesh, yearly a good number of cases with open tibia fracture, early intramedullary fixation is used. But we have not enough research-based data regarding the effectiveness of early intramedullary fixation in treating open tibial fracture. **OBJECTIVES:** The aim of this study was to assess the effectiveness and outcome of early intramedullary fixation in treating open tibial fracture. **METHODS:** This prospective observational study was conducted in Prime Medical College Hospital, Rangpur, Bangladesh during the period from January 2013 to December 2020. Total 67 patients with open tibial fracture were enrolled in this study as study population. Proper written consents and predesigned questioner were used for data collection. All data were processed, analyzed and disseminated by using SPSS version 23 program. **RESULTS:** In this study, the average time to surgery was 26 hours. The time to surgery for grade I, grade II and grade IIIA fractures were 27 hours, 34 hours and 21 hours respectively. The average length of hospital stay was 10 days. The overall infection rate was 22.39% (n=15). Superficial infection developed in 9 and deep infection occurred in 6 cases. All Patients were treated with a short course of intravenous antibiotics but only four patients required long time intravenous antibiotics for cellulitis while local wound care and oral antibiotics were sufficient for the remaining three patients. In analyzing the final outcomes of our subjects as per Knee Society Score, we observed that, about half (46%) of the patients got excellent results. Besides this 30%, 9% and 3% patients got good, fair and poor results respectively. **CONCLUSION:** As per the finding of this study we can conclude that, in Gustilo-Anderson grade I, grade II and grade IIIA open tibial fractures, the early intramedullary fixation shows very satisfactory results in short-term treatment regime with low infection and non-union rates.

Keywords: Early intramedullary fixation, Open tibial fracture, Union, Knee Society Score

INTRODUCTION

Due to the risk of infection, treatment of open tibial fractures is controversial. Traditionally we are used to fixation of open tibial fracture

after the healing of open wound. But with the advancement of medical science, we go for early intramedullary fixation of open tibial fracture. In Bangladesh, yearly a good number of cases with open tibial fracture, early intramedullary fixation is used. Early intramedullary fixation is the most popular and widely used technique for the management of tibial shaft fractures. Because of its location tibia is exposed to frequent injury.¹ Tibial fractures, where closed treatment is inappropriate can be treated with plate and screw fixation, intramedullary fixation and external fixation.² Intramedullary fixation is suggested for majority of tibial closed mid shaft fractures and for open fractures with adequate soft tissue cover.³ Since the late 1950's ORIF (Open reduction and internal

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fixation) was reserved for situations where an adequate reduction could not be attained by conservative means.⁴ Basically, treatment of tibial open fractures is difficult and even controversial with no general consensus on their management.⁵ The subcutaneous nature of medial border as well as the delicate blood supply increases the vulnerability to deep infection, open injuries, mal-union and even non-union.⁶ The complication rate in the management of tibial open fractures rise exponentially with high energy trauma, wound contamination, soft tissue disruption, altered vascularity and unstable fractures.⁷ In such cases, the ultimate goal is to achieve bony union without infection and a fully functional pain-free limb.⁸ The management of open fractures is regarded as an orthopedic emergency.⁹ In a study, it was reported that, mono-lateral external fixation has been employed in the management of open tibial fractures with a great success without significant complications.¹⁰ Besides the improvement in antibiotic use as well as surgical technique, the use of intramedullary fixation has evolved from low energy open Gustilo grade 1 and grade 2 fractures to more severe Gustilo grade 3 injuries, with excellent long-term results.¹¹

METHODOLOGY

This prospective observational study was conducted in Prime Medical College, Rangpur, Bangladesh during the period from January 2013 to December 2020. The inclusion criteria

of this study were the patients of 18 years and above from both sexes with Gustilo grade I, II and IIIA tibial open fracture. Severely ill patients and patients with other major diseases like diabetes mellitus, Alzheimer's, Parkinson's were the exclusion criteria as these conditions may hamper the treatment outcome. Total 67 patients with open tibial fracture were enrolled in this study as study population. After explaining the aim of data collection proper written consents were taken from all the participants to avoid biasness. All aseptic measures were taken during the operative period. The whole intervention was conducted in accordance with the principles of human research specified in the Helsinki Declaration¹² and executed in compliance with currently applicable regulations and the provisions of the General Data Protection Regulation (GDPR).¹³ All the demographic and clinical data of the participants were recorded. The final outcomes of the participants were assessed by Knee Society Score.¹⁴ A predesigned questioner was used in data collection. All data were processed, analyzed and disseminated by using MS Excel and SPSS version 23 program as per necessity.

RESULT

In this study, among total 67 participants, 63% were male and the rest 37% were female. So male participants were dominating in number and the male-female ratio was 1.7:1.

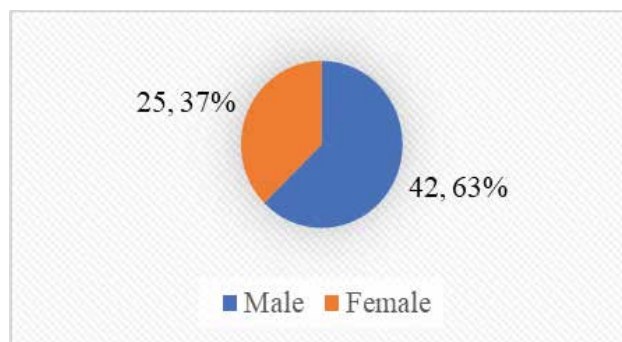


Figure 1: Gender distribution of participants (N=67)

The mean (\pm SD) age of the participants was 43.78 ± 7.23 years. As per the Gustilo grade the highest numbers of our participants were with Gustilo grade II which was 51% among the

total participants. Besides this, 21% was with Gustilo grade III A and the rest 28% was with Gustilo grade I.

Table I: Gustilo grade distribution among participants (N=67)

Gustilo score	n	%
Grade I	19	28%
Grade II	34	51%
Grade III A	14	21%

In assessing the morphology of fractures among our participants we observed that, the highest number of patients were with comminuted fractures which was 43%. Then

34%, 12%, 7% and 3% were with oblique, transverse, segmental and spiral pattern of fractures respectively.

Table II: Morphology of fractures among participants (N=67)

Morphology	n	%
Comminuted	29	43%
Oblique	23	34%
Transverse	8	12%
Segmental	5	7%
Spiral	2	3%

In analyzing the mechanism of injury among total of our participants we found that, in the highest number of patients, open fractures had

been occurred by road traffic accident (RTA) which was 58%. Then 33% were by fall from height and 9% were with sport injury.

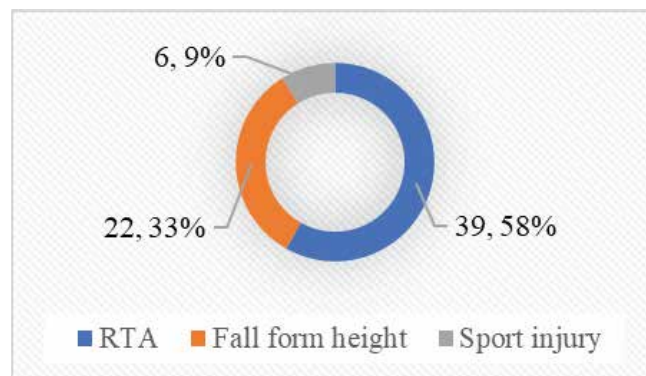


Figure 2: Mechanism of injury of participants (N=67)

In the highest number of cases, middle third tibial fractures were found which was in 48%. Then in 42% and 10% cases distal third and

proximal third tibial fractures were found respectively.

Table III: Location of injury among participants (N=67)

Location	n	%
Middle third	32	48%
Distal third	28	42%
Proximal third	7	10%

In this study, the average time to surgery was 26 hours. The time to surgery for grade I, grade II and grade IIIA fractures were 27 hours, 34 hours and 21 hours respectively. The average length of stay in hospital was 10 days.

Average time of union time was 16.8 weeks. Among them in case of grade I average union time was 15 weeks, then in case of grade II and grade IIIA were 17.4 and 18 weeks respectively.

Table IV: Union time distribution among participants (N=67)

Gustilo grades	Average time
Grade I	15 weeks
Grade II	17.4 weeks
Grade III A	18 weeks

The overall infection rate was 22.39% (n=15). Superficial infection developed in 9 and deep infection occurred in 6 cases. All Patient are treated a short course of intravenous antibiotics

but only four patients required long time intravenous antibiotics for cellulitis while local wound care and oral antibiotics were sufficient for the remaining three patients.

Table V: Infection rate distribution among the participants (N=67)

Infection rate	n	%
Superficial infection	9	13.43
Deep infection	6	8.95
Total	15	22.39

In analyzing the final outcomes of our subjects as per Knee Society Score, we observed that, about half (46%) of the patients got excellent

results. Besides this 30%, 9% and 3% patients got good, fair and poor results respectively.

Table VI: Final outcomes of participants (N=67)

Outcome	n	%
Excellent	35	46%
Good	23	30%
Fair	7	9%
Poor	2	3%

DISCUSSION

The aim of this study was to assess the effectiveness of early intramedullary fixation in treating open tibial fracture. The treatment procedure of open tibial fractures is complex and successful outcomes are dependent on multiple variables.¹⁵ In such cases, infection rates are directly proportional to the severity of injury as defined by the Gustilo-Anderson classification and the host comorbidities.¹⁶ Among total of our patients, superficial infection developed in 9 and deep infection occurred in 6 cases. All Patient are treated a short course of intravenous antibiotics but only four patients required long time intravenous antibiotics for cellulitis while local wound care and oral antibiotics were sufficient for the remaining three patients. Superficial infection usually resolves with minimal intervention; however, deep infection warrants multiple additional surgical procedures and often results in significant morbidity.¹⁷ Hohmann et al. reported low infection rates with primary wound closure in low energy open tibial fractures in selected cases.¹⁸ But another study reported infection rates ranging from 1.8% to 12.5%.¹⁹ The current management trend for Gustilo grade 1, 2, and 3A open fractures of the tibia is to perform a reamed or un-reamed intramedullary nail ideally within six to eight hours of injury.²⁰ In this study, the average time to surgery was 26 hours. The time to surgery for grade I, grade II and grade III A fractures were 27 hours, 34 hours and 21 hours respectively. The average length of stay in hospital was 10 days. Although there is a 'six-hour rule' for this purpose, multiple studies have shown that this narrow time window should not be followed properly.²¹ In our study, there is no association between type of closure and infection yet apposition with nylon interrupted sutures was associated with the highest deep infection rates. In analyzing the final outcomes of our subjects as per Knee Society Score, we observed that, about half

(46%) of the patients got excellent results. Besides this 30%, 9% and 3% patients got good, fair and poor results respectively. In analyzing final outcomes, Rajasekaran et al. found closed wounds primarily in high energy open tibial fractures with 86.7% excellent results.²² All these findings may be helpful in the treatment arena of open tibial shaft fracture.

CONCLUSION & RECOMMENDATION

As per the finding of this study we can conclude that, in Gustilo-Anderson grade I, grade II and grade IIIA open tibial fractures the early intramedullary fixation shows very satisfactory results in short-term treatment regime with low infection and non-union rates. This was a single centered study with small sized samples. Moreover, the study was conducted at a very short period. So, the findings of this study may not reflect the exact scenario of the whole country. For getting more specific findings we would like to recommend for conducting more studies regarding the same issue with larger sized sample.

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Original article

Evaluation of the Antihypertensive Efficacy and Tolerability of Perindopril in Elderly Hypertensive Patients

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ABSTRACT:

BACKGROUND: Hypertension is the most common cardiovascular disease and is one of the leading causes of morbidity and mortality. Perindopril has better efficacy and tolerability in management of blood pressure in elderly patients with hypertension. **OBJECTIVE:** To assess the antihypertensive efficacy and tolerability of perindopril. **METHODS:** A Prospective Cohort study was conducted in Medicine out patient Department of Sir Salimullah Medical College and Mitford Hospital and Tairunnessa Memorial Medical college & Hospital from January 2017 to December 2017. A total number of 74 elderly patients having hypertension were taken. Tab –Perindopril (4-8mg). In this group pre and post treatment BP was measured on day 01 (pretreatment) & follow up at 6weeks & 12 weeks. Reduction of BP & side effect of perindopril was observed. **RESULTS:** In patients treated with perindopril pretreatment BP was 150/97 mm of Hg which was reduced to 137/92 mm of Hg on 6 weeks, 122/80 mm of Hg on 12 weeks. Perindopril treatment group showed significant fall in BP & has lesser side effect. **CONCLUSIONS:** Perindopril is effective & tolerated for the treatment of hypertension.

KEY WORDS: Antihypertensive, perindopril, Hypertension, Systolic and Diastolic Blood Pressure.

INTRODUCTION

Hypertension is the leading cause of cardiovascular disease that affects about 972 million individuals worldwide.¹ In Bangladesh approximately 20% of adult and 45 to 60% elderly people suffer from hypertension. Higher incidence of metabolic syndrome and life style related factors may play an important role in pathology of hypertension.²

The overall prevalence of hypertension was 26.4 % and the prevalence was higher in women (32.4 %) than men (20.3 %).³ The presence of hypertension in elderly patients has a markedly worsened risk for cardiovascular complications. But early treatment of hypertension in elderly patients reduced the incidence of all complications. Even small decreasing blood pressure by 5 mmHg (for example, from 150/100 to 145/95 mmHg) can decrease the risk of stroke by 34%. It can also decrease the risk of heart disease by 21%.⁴ The Joint National Committee on the Detection, Evaluation and Treatment of High Blood Pressure (JNC-7) recommends a target BP of 140/90 mmHg. Once hypertension is detected pharmacological and non-pharmacological interventions should be implemented. Instituting lifestyle modifications is paramount, along with medical therapy at the earliest detection of the pre-hypertensive patient. In Bangladesh for the treatment of hypertension in elderly DM patients antihypertensive drugs are available such as – Angiotensin converting

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enzyme inhibitors (ACEi), ARBs (Angiotensin receptor blockers), Calcium channel blocker and Thiazide diuretics.⁵ Among the many antihypertensive agents, The Hypertension guideline from Eight joint National Committee (JNC 8) has recommended ACEi (perindopril) as first line agents in elderly hypertensive patients. There is significant evidence that interruption of RAAS can provide cardioprotective properties and also has renoprotective properties (reduce microalbuminuria) of perindopril in elderly patients compared with other antihypertensive.⁶ ACEIs lower blood pressure by inhibiting the conversion of angiotensin I to angiotensin II, thereby preventing vasoconstriction and aldosterone production. ACEi are also considered alternative first line hypertension treatments in the elderly population with diabetic renal disease.⁷ Generally Perindopril are well tolerated and incidence of side effects of Perindopril such as hypotension, back pain, hyperkalemia, skin rash, headache, dizziness, fatigue. So this present study is carried out to evaluate the antihypertensive efficacy and tolerability of Perindopril in controlling Blood pressure in elderly hypertensive patients.

MATERIALS and MATHODS

This prospective cohort study was conducted in the Department of Pharmacology and therapeutic in Sir Salimullah Medical College and Mitford Hospital. Total duration of study was from January 2017 to December 2017. A total number of 74 elderly patients with 60 -75 years age having mild to moderate hypertension (Systolic BP 140 – 179 mm of Hg and Diastolic BP 90 – 109 mm of Hg) were inclusion criteria. Patients who were already on others antihypertensive drugs and concurrent others drugs (NSAID, K+ Sparing diuretics) and Patients with other comorbidities such as heart failure, acute renal failure, hepatic failure, respiratory failure, acute severe bronchial asthma were exclusion

criteria. After proper counseling, the aim, objectives, risks and the procedure of study were explained in details to the subjects. Only positive respondents were recruited as study subjects. Written informed consent was taken from the subjects. Patients who did not previously treated by antihypertensive drugs were included. All patients were diagnosed by Medicine OPD physician of Sir Salimullah Medical College, Hospital and Tairunnessa Memorial Medical College, Hospital. Blood Pressure was measured by arterial sphygmomanometer in sitting posture and considered as base line Blood Pressure. Patients were prescribed and treated with Perindopril orally in a dose of 4-8 mg depending on a body weight and level of Blood Pressure. Post treatment Blood Pressure was followed up at the end of six weeks and twelve weeks. The follow up Blood Pressure at the end of six weeks and twelve weeks were compared with base line Blood Pressure.

Compliance was checked by face to face interview. Then their general information and data was collected and all the information was recorded in data collection sheet. Study was carried out with prior protocol approved by the thesis protocol review committee and ethical committee of Sir Salimullah Medical College. All the patients attending the Medicine outpatient department over a 90 days period were included. All the prescription were used for analysis. The information in the prescription were used to complete a customized proforma. Statistical analyses were done using SPSS version 22 for Windows.

RESULTS

A total number of 74 elderly patients having hypertension were taken Tab –Perindopril ((4-8mg) In this group pre and post treatment BP was measured on day 01(pretreatment) & follow up at 6weeks & 12 weeks was compared. Reduction of BP, side effect of perindopril were observed.

Table I: Baseline demographic data of the perindopril treated group (n=74)

Age (Years)	Perindopril n=74
Age(Years)	
60-64	45(60.8)
65-69	25(33.8)
>70	4(5.4)
Mean±SD	63.95 ± 3.08
BMI (kg/m ²)	25.69 ± 5.08
Systolic BP(mm of Hg)	150.57±8.92
Diastolic BP(mm of Hg)	97.77±5.11

Table I shows baseline demographic data of the two groups. Mean age of the patients were 62.97 ± 2.32 years.

Table II : Systolic blood pressure before and after treatment by perindopril (n=74)

Interval of measurement of Systolic BP (mm of Hg)	Pre-treatment B.P. With Perindopril (in mm/Hg) (Mean±SD) (n=74)	Post treatment B.P. with Perindopril (in mm/Hg) (Mean±SD) (n=74)	Mean Difference Between 1 st & 3 rd visit	P – value
1 st visit (Day 01)	147.95 ± 5.63			
2 nd visit (at 6 weeks)		138.47 ± 5.09	22.20	
3 rd visit (at 12 weeks)		125.74 ± 7.06		0.001 ^{***}

Paired 't' test was done within two groups to measure the level of significance

*** = Significant at $p < 0.001$

Table II shows Mean systolic blood pressure of the patients at day 01 (pretreatment) & after treatment at 6 weeks and at 12 weeks. There was significant reduced in systolic BP at day 01 (pretreatment) and after treatment at 12 weeks but no significant difference was found at 6 weeks.

Table III: Diastolic blood pressure before and after treatment with Perindopril (n=74)

Interval of measurement of diastolic BP (mm of Hg)	Pre-treatment B.P. with Perindopril (in mm of Hg) (n=74) (Mean±SD)	Post-treatment B.P. with Perindopril (in mm of Hg) (n=74) (Mean±SD)	Mean difference between 1 st & 3 rd visit	P - value
1 st visit (Day 01)	95.93 ± 7.32			
2 nd visit (at 6 weeks)		90.85 ± 4.18		0.001***
3 rd visit (at 12 weeks)		84.08 ± 4.55	11.85	

paired 't' test was done within groups to measure the level of significance.

*** = Significant at p<0.001

Table III shows Mean Diastolic blood pressure of the patients at day 01 (pretreatment) & after treatment at 6 weeks and at 12 weeks. There was significant reduced in Diastolic BP at day 01 (pretreatment) and after treatment at 6 weeks and at 12 weeks.

Table IV: Distribution of study subjects according to adverse effects of Perindopril treated Group (n=74).

Adverse effects	Perindopril (n=74)
Headache	12 (16.2)
Dry cough	11 (14.9)
Postural hypotension	9 (12.2)
Back pain	4 (5.4)
Dizziness	5 (6.8)
Nausea/vomiting	6 (8.1)

DISCUSSION

In this study, total 74 elderly hypertensive patients were enrolled in study population. This research work was conducted in Department of Pharmacology & therapeutics, SSMC. All study population was given Perindopril. The base line information & follow up after 6 wks and 12 wks were taken. There are many studies indicated similar efficacy profile for Perindopril.⁶ In this study findings compared with result of some published articles in the world to verify this result.

We measure the base line information and in follow up time at 6 wks & 12 wks after drug consumption. Here, the mean base line BP in Perindopril treated patient was mm of 147/95 Hg which was reduced to 138/90 mm of Hg on 6 wks & 125 /84 mm of Hg by the 12 weeks . In this study shows that Perindopril is a better drug in effectively reducing BP of patients. There was a highly significant fall in BP in the group treated with Perindopril. Similarly, 2014, reported that a longitudinal interventional study (involving 80 patients) was done.⁶ In that study it showed systolic BP reduction in Perindopril treated group was 70% and .Diastolic BP reduction was 60% in perindopril treated group. Several other Studies have found similar response & reported that in after 12 weeks study reported that Perindopril did control the BP in 50% in Perindopril treated group.⁸

The ESCORT study found that Perindopril provided effective and prolonged well tolerated BP control & they concluded that Perindopril was a useful 1st line drug in treatment of hypertension.⁷

In this research work drug related patient compliance was seen as drug related adverse effect. Most common adverse effect observed were headache(16.2%), patients in olmesartan treated group, had dry cough(14.9%) in Perindopril treated group, postural hypotension

were 12.2% in this group. The other adverse effect Include dizziness, nausea, and vomiting, back pain.

The present study showed that Perindopril control BP (systolic & diastolic) effectively and tolerability was also good.

CONCLUSION

The study can be concluded as that Perindopril has better control of blood pressure in elderly hypertensive patients and also well tolerated with fewer adverse effects. The sample size was small and time period was limited & study was done only two tertiary care hospital Of BD were limitation.

So, recommended that, in future large studies are required on these drugs to explore antihypertensive property and adverse effect profile at different doses of drugs for longer duration to get a more effective result can be done.

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Original Article

Assessment of Body Composition and Nutritional Status by Arm Anthropometry of Primary School children in Rajshahi, Bangladesh.

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ABSTRACT

CONTEXT: Worldwide malnutrition is a major problem in adolescent but there are different types of nutritional problem shows impact in this group remarkably. **OBJECTIVES:** The aim of the study is to determine body composition and nutritional status of school going children using arm anthropometry. **METHODS:** This cross sectional type of descriptive study was conducted to assess the body composition and nutritional status by arm anthropometry among school going children and also to determine the age-sex specific variation of arm composition and nutritional status in them. A total of 317 children from different primary schools of Rajshahi district were studied. Samples were distributed into age groups of 6-10 years. The anthropometric measurements of height, weight, triceps skin fold thickness and mid arm circumference were recorded. The arm composition was assessed using standard equations. **RESULTS:** The Mid arm circumference was almost similar in both sexes. Arm muscle area (AMA), arm muscle estimate (AME), arm fat area (AFA), arm-fat estimate (AFE) and arm-fat index (AFI) were significantly change in both sex. Nutritional status was assessed using standard classification of arm muscle-area by height (AMAH). Nutritional status by AMAH showed most of the studied children's nutritional status was average (79.14%). The prevalence of wasted and below average children were 0.9% and 1.4% respectively. All the wasted and below average children were found mainly in 6-10 years age group. **CONCLUSION:** Though the body composition and nutritional status among school going children in Rajshahi district were found satisfactory but the girls need more attention regarding their nutrition and there is also necessity to create consciousness about childhood obesity and its effect.

Key words: Arm muscle area (AMA), arm muscle estimate (AME), arm fat area (AFA), arm-fat estimate (AFE), arm-fat index (AFI), arm muscle-area by height (AMAH), Triceps fold, mid arm circumference.

INTRODUCTION:

Body composition refers to proportion of fat and fat free mass in the body. A healthy body

composition is one that includes a lower proportion of fat and higher proportion of fat free mass.¹ Mid childhood is one of the critical and sensitive period for development of obesity. During these period, an onset of obesity may increase the risk of persistent obesity later in life.² Body composition is extremely difficult to assess with fair accuracy, and several techniques have been developed for an accurate estimation and distribution of adiposity. In numerous epidemiological and clinical situations, the body composition is determined with bioelectrical impedance analysis, dual X-ray absorptiometry and computerized tomography³ a major difficulty in the interpretation of body composition analysis is different methods may yield

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different results for the same variable in individual and these are limited to the clinical research due to their complexity and cost. So the body composition assessment based on arm anthropometry is an important method of choice. Again the methods that are usually used to measure the nutritional status of school children such as weight, height and body mass index (BMI) are not effective to accurately distinguish truly malnourished children from those with simple underweight. For instances, the BMI does not differentiate between individuals whose excessive weight is as a result of excessive fat or excessive muscular development. On the other hand AMAH (Arm Muscle Area by Height) is developed as a better index of growth and nutritional status of children. Generally, the assessment of Muscularity and adiposity are done using skinfolds thickness and circumference measurement.^{3,4}

The arm anthropometry is a set of measurement of the shape of arm which includes mid arm circumference, tricep skin fold thickness and arm length. The derived measures are arm muscle area (AMA), Arm fat area (AFA), Arm-fat index (AFI), Arm fat estimate (AFE), Arm muscle estimate (AME) that are used to assess arm composition. The AMA is able to measure the degree of muscularity thus reflecting the body protein reserve. The AFA measures the body adiposity thus reflecting the body calorie reserve stored in the form of body fat. The value of AFA is considered to be the best indicator of body fat among school children.⁵ AMAH is developed as an index of growth and nutritional status of children and is more useful in a situation where the accurate age of the child cannot be ascertained.⁶ It is, therefore, used as a supplement to the current standards of height for age, and weight for height scores so as to enable researchers in the field of child growth and nutrition assessment to obtain complete data on child's body composition and nutritional status assessment.

These measures are calculated from mid arm circumference (MAC) and triceps skin fold (TSF) thickness and are used to determine the body composition.⁷ The arm muscle area by height (AMAH) is derived to assess the nutritional status related to reserve body protein and longitudinal growth patterns.⁷ Recently, several investigations have shown the direct association of disease, biochemical changes, clinical diagnosis and nutritional status with arm composition. Furthermore, age-sex and population specific arm anthropometry seems to be an important technique to determine body composition & nutritional status in epidemiological, clinical diagnosis and disease prevalence. It is evident that the body composition variations are generally attributed to geographic, environmental, genetic and socioeconomic factors across populations.^{3,5}

Compared to the under-five children, there is a dearth of information about the growth and nutritional status of school children in Bangladesh. This may be as a result of much concern being given to pre-school children who are more at risk of under-nutrition than school children. It is also perceived wrongly that school children are healthy and may not be at risk of under-nutrition. But now-a-days childhood obesity has been identified as an important health problem over the past decades. Obesity during childhood has been established to be strongly associated with that in adulthood and also with several chronic diseases such as diabetes, some types of cancer and cardiovascular diseases. In addition, being underweight is an index of malnutrition and is also recognized as an underlying cause of some health disorders. Therefore, proper assessment of the body composition as well as nutritional status in school children is a critical concern in public health evaluation and clinical screening.

The present study is therefore aimed to determine body composition and nutritional

status of school going children using arm anthropometry in Rajshahi District.

MATERIALS AND METHODS

The descriptive cross sectional observational study was carried out to evaluate 317 primary school going children age group between 6-10 years of both sexes from different schools of Rajshahi District during July 2016 to June 2017. All subjects went through face to face interview with the help of semi structured questionnaire. Age was determined by checking their birth certificate. Height, weight and mid arm circumferences were taken by portable weighing machine and measuring tape. Triceps skin fold was measured by skin fold calipers (Accu measure). Sample population was selected by purposive random sampling. Ethical permission was taken from the Institutional Review Committee of Rajshahi Medical College, Rajshahi.

RESULTS

The present study was intended to determine the body composition and nutritional status of school going children in Rajshahi based on arm-anthropometry. The study included 317

children (aged 6-10 years). The arm composition was assessed by determining AMA, AFA, AFI, AFE and AME by using standard equations.⁸ After data collection, processing and analysis were done. Observations and results were noted carefully. The results were presented in the forms of tables with necessary interpretation and inference. Collected data were analyzed by using computer based on SPSS software version-16. The test of significance was conducted by ANOVA and independent 't' test. The level of significance was set up at 0.05 and $P < 0.05$ was considered to be statistically significant. The findings that were obtained from data analysis are documented below.

Table I shows age distribution of study participants ($n=317$) that highest number of participants were in 6-8 age group which was 59 percent.

Table I: Distribution of primary school going children by their age ($n=317$)

Age	Frequency	Percentage
6-8	187	59.0
9-10	130	41.0

Sex of the participants

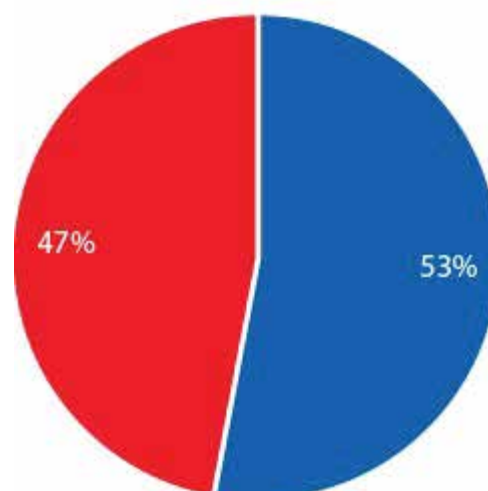


Figure 1: Distribution of primary school going children by their sex ($n=317$) Where both male and female almost equal.

Table II illustrates the minimum mean weight (18.99 kg) was found among 6 years old children and maximum (52.00 kg) was found

in 10 years old children. So, the mean weight was gradually increased with age. The result is statistically highly significant ($p < 0.00$).

Table-II: Comparison of mean weight (kg) of school going children in different ages

Age in yrs.	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
6	62	18.9903	1.93575	.24584	18.4987	19.4819	16.00	24.50
7	63	23.0127	4.08461	.51461	21.9840	24.0414	17.00	39.00
8	62	24.7387	2.88639	.36657	24.0057	25.4717	20.00	32.40
9	65	30.2123	4.77361	.59209	29.0295	31.3952	21.00	39.50
10	65	36.2400	6.00676	.74505	34.7516	37.7284	24.00	52.00

ANOVA

Weight in kg	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	91791.260	10	9179.126	223.298	.000
Within Groups	28322.741	689	41.107		
Total	120114.001	699			

Table III represents the mean height was increased with age and maximum value was found in 10 years age groups and minimum

was found in 6 years age groups. The result is statistically highly significant ($p < 0.00$).

Table-III: Comparison of mean height (cm) of primary school going children in different ages

Age in yrs.	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
6	62	115.7000	3.61894	.45961	114.7810	116.6190	110.00	122.00
7	63	120.7937	5.71334	.71981	119.3548	122.2325	107.00	136.00
8	62	124.4839	4.89477	.62164	123.2408	125.7269	117.00	135.00
9	65	130.7077	5.28995	.65614	129.3969	132.0185	120.00	141.00
10	65	140.4154	8.00711	.99316	138.4313	142.3994	110.50	160.00

ANOVA

Height in cm	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	162765.906	10	16276.591	388.025	.000
Within Groups	28901.635	689	41.947		
Total	191667.540	699			

Table IV shows that, documents the mean gradually was increased with age and maximum value was found in 10 years age groups and minimum was found in 6 years age

groups. But the maximum values of 7 -10 years age groups were found same. The result is statistically highly significant ($p < 0.00$).

Table-IV: Comparison of mean mid arm circumferences of primary school going children in different ages

Age in yrs.	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
6	62	16.1855	.70265	.08924	16.0070	16.3639	15.00	17.00
7	63	16.9365	1.01000	.12725	16.6821	17.1909	15.00	20.00
8	62	17.4274	.73466	.09330	17.2409	17.6140	16.00	20.00
9	65	18.6154	.92605	.11486	18.3859	18.8448	16.00	20.50
10	65	19.0385	.98547	.12223	18.7943	19.2826	17.00	20.00

ANOVA**Mid arm circumference in cm**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4891.189	10	489.119	249.451	.000
Within Groups	1350.981	689	1.961		
Total	6242.170	699			

Table V showing the mean triceps skin fold thickness (mm) was changed irregularly with age and maximum value was found at 10 years

age group and minimum was found in 8 years age group. The result is statistically highly significant ($p < 0.00$).

Table-V: Comparison of mean triceps skin fold thickness (mm) of primary school going children in different ages.

Age in yrs.	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
6	62	9.1226	1.02867	.13064	8.8613	9.3838	8.00	12.00
7	63	9.4286	2.76624	.34851	8.7319	10.1252	6.00	19.00
8	62	9.0887	.98980	.12570	8.8373	9.3401	6.00	10.00
9	65	11.4923	3.07268	.38112	10.7309	12.2537	7.00	19.00
10	65	10.8000	1.15515	.14328	10.5138	11.0862	8.00	13.00

ANOVA**Triceps skin fold in mm**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	783.384	10	78.338	15.681	.000
Within Groups	3441.981	689	4.996		
Total	4225.365	699			

Table VI illustrates the mean gradually was increased with age and so, maximum value was found in 10 years age group and minimum

was found in 6 years age group. The result is statistically highly significant ($p < 0.00$).

Table-VI: Comparison of mean AMA (cm²) of school going children in different ages

Age in yrs.	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
6	62	13.9597	1.51887	.19290	13.5740	14.3454	11.00	16.00
7	63	14.8000	2.16094	.27225	14.2558	15.3442	13.00	23.00
8	62	16.5516	2.11650	.26880	16.0141	17.0891	14.00	23.00
9	65	19.4000	1.96691	.24397	18.9126	19.8874	15.00	23.00
10	65	20.2354	2.37923	.29511	19.6458	20.8249	15.00	23.00

ANOVA

AMA (cm ²)	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	35509.926	10	3550.993	276.015	.000
Within Groups	8864.126	689	12.865		
Total	44374.053	699			

Table VII shows the mean was gradually increased with age upto 10 years age group then it changed irregularly. The result is statistically highly significant ($p < 0.00$).

Table-VII: Comparison of mean AFA (cm²) of school going children in different ages

Age in yrs.	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
6	62	6.6952	.94826	.12043	6.4543	6.9360	5.00	9.00
7	63	6.9810	1.39698	.17600	6.6291	7.3328	5.00	9.00
8	62	6.6323	1.37921	.17516	6.2820	6.9825	4.00	9.00
9	65	7.8462	.86115	.10681	7.6328	8.0595	6.00	11.00
10	65	8.6926	1.27749	.15845	8.3761	9.0092	6.00	12.00

ANOVA

AFA(cm ²)	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3040.865	10	304.086	58.445	.000
Within Groups	3584.806	689	5.203		
Total	6625.671	699			

Table VIII representing the mean of AFI was changed irregularly with age

Table-VIII: Comparison of mean AFI (%) of primary school going children in different ages

Age in yrs.	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
6	62	31.2456	3.19812	.40616	30.4335	32.0578	24.00	38.00
7	63	30.1587	3.28833	.41429	29.3306	30.9869	24.00	35.00
8	62	28.7742	4.29800	.54585	27.6827	29.8657	20.00	38.00
9	65	28.7415	2.80395	.34779	28.0468	29.4363	25.00	35.00
10	65	30.0591	3.80481	.47193	29.1163	31.0019	25.00	36.00

ANOVA

AFI(%)	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	3531.218	10	353.122	19.114	.000
Within Groups	12728.699	689	18.474		
Total	16259.917	699			

Table IX documents the mean of AFE gradually was increased with age up to 10.

Table-IX: Comparison of mean AFE (cm²) of primary school going children in different age

Age in yrs.	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
6	62	7.3010	.76138	.09670	7.1076	7.4943	6.00	8.50
7	63	7.3508	.99800	.12574	7.0995	7.6021	5.00	10.00
8	62	7.6952	1.02608	.13031	7.4346	7.9557	5.00	10.00
9	65	8.9585	1.21856	.15114	8.6565	9.2604	5.00	11.00
10	65	10.0000	1.28087	.15887	9.6826	10.3174	7.00	13.00

ANOVA

AFE(cm ²)	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3386.039	10	338.604	82.876	.000
Within Groups	2815.015	689	4.086		
Total	6201.054	699			

Table X reveals the mean of AME was gradually increased with age and so, maximum value was found in 10 years age group and minimum was found in 6 years age group. The result is statistically highly significant ($p < 0.00$).

Table-X: Comparison of mean AME (cm²) of school going children in different age

Age in yrs.	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
6	62	13.9560	1.00267	.12734	13.7013	14.2106	12.20	15.35
7	63	15.8175	2.93309	.36953	15.0788	16.5561	12.60	30.00
8	62	15.9677	1.46229	.18571	15.5964	16.3391	14.00	21.00
9	65	17.9015	1.57594	.19547	17.5110	18.2920	15.00	22.80
10	65	18.9354	2.07541	.25742	18.4211	19.4496	15.00	22.80

ANOVA

AME(cm ²)	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	31146.451	10	3114.645	255.579	.000
Within Groups	8396.581	689	12.187		
Total	39543.032	699			

Table XI illustrates that the nutritional status of maximum children (79.14%) was average. Among them maximum 32.42% average children were found in 6-9 years age. After

average and above average were 2% in 6-9 years age group. Only 0.6% were wasted in this group.

Table-XI: Assessment of nutritional status using AMAH among primary school going children in Rajshahi in different age groups

Age group	<-1.6 (Wasted)	-1.6 to <-1 (Below average)	-1 to <1 (average)	1 to <1.6 (Above average)	1.6 to >1.6 (heavy)	Total
6-9 yrs.	4(0.6%)	7(1%)	227(32.42%)	14(2.0%)	0(00%)	252(36.0%)
10 yrs	1(0.3%)	1(0.3%)	48(5.42%)	15(1.42%)	0(00%)	65(7.43%)

DISCUSSION

Anthropometry is still a preferred technique for assessing body-composition and nutritional status and proving its increasing importance in epidemiological and clinical investigation.^{7,4}

The present study is based on arm anthropometry which included a total 317 school going children of Rajshahi where 36% were children of 6-9 years (Table-I) and only 7.43% were in 10 years. Boys and girls were almost equal (Figure-1). Weight and height were increasing with age. Mean mid arm circumferences was increasing with age and some changes in irrespective of sex which was similar to Jaswant and Nitish³, Senbanjo et al.² No gender difference in different anthropometric measurements was observed in this study in children of 6-9 years age group.

The anthropometric statistics found in this study were progressively increased with increasing age except TSF, AFA, AFI and AFE in both boys and girls. Similar type of trend was also observed by Jaswant and Nitish³ in children of Assam, India. But Sen, Mondal and Ghosh⁹ observed that only TSF

and AFI did not increase with age in Rajbanshi children (West Bengal, India). On the other hand, De¹⁰ observed all the measurements of arm composition were increased with age from 10 years old girls of West Bengal, India.

However, the mean values of arm composition in this study were found normal when compared with reference values for arm composition by Rolland-Cachera et al.⁴ When compared with the Sonowal Kachari children and adolescents of Assam (Northeast India), children of this study were found higher in relation to muscularity and adiposity.

The mean values of weight, height, MAC and TSF that were found in this study children were less than the measurements of Iranian children found by Bagheri Z and Heydari, S.T.¹¹

These differences in anthropometry and body composition could initially be attributed to a number of factors, such as, genotype, diet and eating habits, physical activity, socioeconomic status and environmental conditions in which they live Sen & Mondal⁷; Rolland-Cachera.⁴ Although a wide range of environmental

factors are more or less associated with body-composition in children and adolescents, the most important of which are nutrition and infections, and the relative interactions between them. Sexual dimorphism in body-composition and fat-patterns are primarily attributed to the action of sex steroid hormones, genetic and/or environmental factors which influence the changes in body-composition during childhood and commencement of puberty. Early life experiences involving adverse environmental condition, intrauterine growth retardation, poor physical growth during early childhood and subsequent catch-up growth can also impact on growth attainment, body-composition, and health related outcomes later in adulthood Jaswant and Nitish.³

After assessing the Nutritional status by AMAH, most (79.14%) of the children's nutritional status was found average, the wasted was 0.9% and below average was 1.4% and these two groups of children were found in 6-10 years age group. Similar type of trend was also observed by Senbanjo et al² in Southwest Nigerian children.

composition statistics, the AMAH is considered to be an interesting index in identifying chronic-undernutrition where both muscle-mass and fat-mass are depleted, especially in developing countries when data pertaining to age is either missing or inappropriate Singh and Mondal. However, the combination with arm composition and conventional anthropometric indices appear to be useful for the body-composition and nutritional status assessment Sen, Mondal and Dey, Chowdhury & Ghosh.¹² Apparently, the use of AMAH improved the accuracy of investigation in undernutrition assessment and hence seems more appropriate indicator of undernutrition. This could allow for an objective, systematic and early screening of ill-health condition and promote rational and early initiation of optimal support, thereby reducing morbidity, mortality, worsening of the quality of life and global healthcare costs. The changes in muscularity are utilized as a universal index of nutritional status and body-composition where height is more strongly related to muscle-mass rather than to adiposity pattern Singh and Mondal, 2014. Furthermore, it is evident that the body's response to

Study	Percentage of wasting
Present study P	0.9% (Rajshahi children)
Sebbanjo, Oshikoya and Njokanma, 2013	19.6% (Nigerian children)
Chowdhury and Ghosh, (2009) ¹²	43.1%-45.3% (Santal tribal children of India)
Sen and Mondal, 2013	16.38% (Assam, Northeast India)
Sen, Mondal and Dey, 2011	37.29% (boys 19.55 and girls 15.74%) (Children from a Muslim community in West Bengal, India.

The high values of wasting in these countries are instructive as recorded that Nigeria and India have one of the highest prevalence's of childhood under-nutrition in the world.

The arm anthropometric measures can provide better assessment of muscularity and adiposity over conventional anthropometric measure, though it is relatively insensitive to short-term alterations in body-composition. Of the arm

malnutrition followed a hierarchical sequence in which the body-fats are depleted first followed by muscles, and if undernutrition continues, body-composition is further deteriorated Frisancho, 1987.

In this study, AMA and AFA were evaluated by arm anthropometry where bone area could not be evaluated. Therefore in this study arm anthropometry is an authentic method to

measure the body-composition and nutritional status.

CONCLUSION

From the findings of present study it could be concluded that the anthropometric statistics were increased with increasing age except TSF, AFE, AFA and AFI. The age and sex specific mean TSF, AFA, AFE and AFI did not show any age specific trends but the proportions were significantly changes with sex. Nutritional status by AMAH showed maximum (79.14%) children's nutritional status was average. The pre pubertal aged children (6-10years) were prone to malnutrition. Arm anthropometry may be an acceptable tool to measure the body composition and nutritional status as it has no significant ($p>0.05$) difference with the MRI findings. In this study, it was observed that there is necessity to concentrate about girls' nutrition and also to be conscious about childhood obesity and its various effects.

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Original article

Association between Blood Groups and Refractive Errors among First Year Medical Students in Tertiary Care Medical College in Bangladesh.

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ABSTRACT

BACKGROUND: Blood groups have been associated with different diseases including eye diseases. It has been hypothesized that there exists some correlation between myopia and ABO blood group. Regarding etiology of myopia, the contributing factors include both environmental and genetic factors. To find other risk factors for development of myopia research is still going on. **OBJECTIVE:** To find out association between blood groups and refractive errors in medical students of Prime Medical College, Rangpur. This study may help to identify the subject at risk of being developing myopia. **METHODS:** After ethical clearance from Prime Medical College and informed consent from 136 1st year MBBS students, Snellen's eye chart was used to examine visual acuity. Blood groups were determined by slide method. Chi square test of association was done. **RESULTS:** Out of 136 subjects, 66(48.52%) were males and 70 (51.50%) were females. Most common ABO blood group in this population was found to be O positive (33.08%) followed by B positive (28.01%). Out of 136 participants, 55(40.44%) were Myopics, i.e 31(56.40%) females and 24 (43.63%) males. O blood group showed higher prevalence of myopia when compared to other ABO blood groups. **CONCLUSIONS:** Prevalence of myopia was higher in O blood group as compared to other blood groups but it was not statistically significant.

KEY WORDS: ABO blood group, Myopia, Medical students, Association.

INTRODUCTION

The first human ABO system blood grouping was discovered by K. Landsteiner in 1901, is the most commonly used blood grouping system although many blood grouping systems have been identified so far.¹ Depending on the presence of antigens on RBCs surface he classified blood into 4 groups A, B, AB and O.² The scientific basis for safe practice of blood transfusion is discovery of

ABO system and findings of red cell agglutinin and recognition of blood groups.^{1,3} ABO is determined by the nature of different proteins present on the surface of red blood cells.⁴ The blood groups distribution is necessary as it plays a vital role in genetics, blood transfusion, organ transplantation, genetic research, human evolution. The genetic inheritance pattern of ABO blood groups has been well documented. The blood groups has association with some diseases has been documented by several researchers. Blood group A is associated with cancer stomach has been stressed.⁵ Another study found maximum incidence of hypertensive and migraine patients' in blood group O and minimum in blood group AB patients.⁶

Myopia, hypermetropia and astigmatism are different types of refractive errors.² The common refractive error myopia occurs with some familial tendency and is strongly suggestive of genetic causation.⁷ Major risk factor for causing myopia are reading, writing,

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outdoor exposure and family history.⁸ One researcher in his study on suggested that familial myopia as a whole or its components are genetically determined and a low degree of myopia is probably autosomally dominant.⁹ There is a substantial evidence of inheritance from parent to off spring.¹⁰ The association of ABO blood groups with eye diseases have shown by some researchers and the highest risk of occurrence of myopia was seen in blood group O.²

There is lack of work regarding association of myopia and blood groups in other parts of the world as well as in our country. So, we planned to find out if there is any association between myopia and ABO blood groups among medical students of PMC. This study may help to identify that particular blood group are at the risk of myopia. There is likelihood that by avoiding controllable risk factors like physical activities, diet and excessive near work such as, writing, reading, computer or smart phone usage and playing video games, they can be saved from myopia and its complications.

MATERIALS AND METHODS

A cross sectional study was undertaken among the first year medical students of Prime Medical college in Bangladesh. The

students who were not willing to participate in the study were excluded from the study. A total of 136 medical students constituted the study sample. Informed consent was obtained from the participants. Blood group of the subjects was determined by slide method using red cell suspension in 0.9% saline and matching it against anti A, anti B and anti D antisera and microscopy. Details regarding myopia and family history of myopia were collected via detailed questionnaire from participants who confirmed usage of spectacles or contact lenses for vision correction and they were again tested for refraction in the Ophthalmology department. Institutional Ethical clearance was obtained for the study. All Statistical analysis was done using SPSS version 21. Pearson's chi-square test was applied. P value of < 0.01 was considered statistically significant.

RESULTS:

A total of 136 students were included in the study, of which males were 48.52% and females were 51.50%. The most common ABO blood group in this study was 33.08% O positive, followed by B positive (28%), A positive (18%) and AB positive (11.26%) (Table I).

Table-I: Gender distribution of various blood groups in medical students

Gender	Blood group distribution								Total N (%)
	A+ N (%)	B+ N (%)	AB+ N (%)	O+ N (%)	A- N (%)	B- N (%)	AB- N (%)	O- N (%)	
Male	12 (50.0)	16 (42.10)	6 (37.50)	25 (55.55)	1 (50.00)	1 (33.33)	2 (66.66)	3 (60.00)	66 (48.52)
Female	12 (50.0)	22 (57.90)	10 (6.16)	20 (25.45)	1 (50.00)	2 (66.66)	1 (33.33)	2 (40.00)	70 (51.50)
Total	24 (18.0)	38 (28.0)	16 (11.26)	45 (33.08)	2 (1.47)	3(2.20)	3 (2.20)	5 (4.00)	136 (100)

Out of 136 participants, myopics were 55 (40.44%). Among them 31 (56.40%) were females and 24 (43.63%) were males, while

59.60% were Non myopics which was statistically non-significant (Table II).

Table-II: Gender distribution among Myopics and Nonmyo-pics

Gender	Myopics N (%)		Non myopics N (%)		Total N (%)
Males	24	(43.63)	42	(51.85)	66 (48.52)
Females	31	(56.40)	39	(48.14)	70 (51.50)
Total	55	(40.44)	81	(59.60)	136 (100)

χ^2 Value=6.0867; df=1; p value= 0.10747, NS

Table-III: Association of blood group with respect to myopia distribution among medical students

Blood group	Myopics N (%)		Nonmyopics N (%)		Total N (%)
A	16	(61.53)	10	(38.46)	26 (19.11)
B	15	(36.60)	26	(63.41)	41 (30.14)
AB	6	(31.60)	13	(68.42)	19 (13.97)
O	18	(36.0)	32	(64.0)	50 (30.67)
Total	55	(40.44)	81	(59.60)	136 (100.0)

χ^2 Value=11.35 df=3; p value=0.01, NS

Higher prevalence of myopia was found in O blood group about 36.0% followed by blood group A 61.53%, blood group B 36.60% and AB blood group 31.60% respectively. The highest risk of myopia was found in blood group O which was not statistically significant also (Table III).

DISCUSSION

The most common blood group in this population was found to be O blood group about 36.0% followed by A, B and AB blood groups. This result is similar to Arif et al¹¹ and Ved et al¹².

About 55 participants out of 136 were myopics, of which 31 were females and 24 males. In our study, there is gender predisposition to develop myopia, slightly higher in females, unlike other studies.

In other studies the prevalence of myopia was found higher in B blood group followed by

A blood group, AB blood group and O blood group respectively¹⁰ Seth et al¹³ in Punjab also reported similar findings with blood group B predominating followed by groups A and O on correlation of blood groups in myopia patients. Parallely, other earlier studies also found blood group B to be have the highest frequency of occurrence in myopic patients further supporting our findings Garg et al¹⁴, Deshmukh et al¹⁵.

CONCLUSION

In our study, we found O blood group having slightly higher risk of developing myopias when compared to other blood groups. Further studies with bigger sample sizes need to be undertaken in the future, to understand the link in between myopia and blood groups if any. More research is however required to substantiate this explanation.

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Case Report

A sporadic case: A 60-years-old Female with Liddle's Syndrome

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ABSTRACT:

Liddle's syndrome is a rare, inherited condition that is primarily characterised by hypertension, hypokalaemia and metabolic alkalosis; decreases renin and aldosterone level. Liddle syndrome is caused by genetic changes in either the SCNN1B or SCNN1G genes and is inherited in an autosomal dominant manner involving increased activity of the epithelial sodium channel (ENaC) in luminal membrane of collecting tubules.

Key words: Liddle's syndrome, hypokalaemia, hypertension

INTRODUCTION:

Hypokalaemia associated with Hypertension is one of the conditions, we frequently search for secondary cause of hypertension. There are some conditions associated with hypertension, hypokalaemia and metabolic alkalosis. Liddle's syndrome is one of them.

Liddle's syndrome is an autosomal dominant disease characterised by salt sensitive hypertension, hypokalaemia, metabolic alkalosis, low plasma renin activity and

hypoaldosteronism, caused by disproportionate salt and water reabsorption at the distal collecting tubules.^{1,2} Usually affect younger age group but rarely it may be diagnosed in later. It responds to treatment with epithelial Na⁺ channel blocking drugs (e.g. triamterene).³ There are a few pedigrees or isolated cases that have been reported worldwide.⁴ We present a case of a 60 years old female who presented with Liddle syndrome.

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CASE HISTORY:

A 60 years old female was referred to our hospital for evaluation of recurrent hypokalaemia. She experienced weakness of her limbs and then attend GP where she diagnosed as hypokalaemia for several episodes. She had tried potassium supplements and then resolved her symptoms. She had no history of taking diuretics, licorice ingestion, vomiting and diarrhoea. She is a known case of diabetes for 3 years with good glycaemic control and hypertensive for 5 years with irregular medication. She had history of episodic raise of her blood pressure. None of her family member has been suffering from such type of illness.

On evaluation, BP was 180/100 mm of Hg. The rest of general and systemic examination

was normal except fundoscopic examination revealed grade 2 hypertensive retinopathy.

On investigations, complete blood count was normal. Her serum electrolyte showed: serum sodium (Na) 142 mmol/L, serum potassium(K) 2.50 mmol /L (hypokalaemia), serum chloride (Cl) 97 mmol /L, bicarbonate (HCO₃) 37 mmol/L (metabolic alkalosis). Serum creatinine was 1.2 mg/dl. Chest x-ray was also normal. ECG showed left ventricular hypertrophy. Patient was placed on Olmesartan and Spironolactone without any effect on hypertension, hypokalaemia and metabolic alkalosis. For these clinical picture further investigations were advised. Twenty-four hours urine potassium was 55 mmol/L (Reference Range: 25-125 mmol/24hrs), Serum cortisol level was 10 mcg/dl (Reference Range: 5-25mcg/dl) . Her serum aldosterone level was 1.07 ng/dl (Reference Range 2.52-39.2 ng/dl) and direct renin level 5.07 microIU/L (Reference Range: 5.5-45.6 microIU/L), in our patient both values were lower than the reference range.

In patient with hypertension, hypokalaemia and metabolic alkalosis, one could consider possibilities of Conn's syndrome, Cushing's syndrome, hypertension with diuretics therapy, licorice ingestion and Liddle's syndrome. This patient had no history of diuretic therapy or licorice ingestion. Her serum cortisol level was normal ruling out the possibilities of Cushing's syndrome. In view of hypertension, hypokalaemia, metabolic alkalosis and associated with hyporeninemic hypoaldosteronism, a rare diagnosis of Liddle's syndrome was considered. She was put on Olmesartan and Triamterene.

After 6 weeks follow up, her BP was 135/80 mm of Hg, serum potassium was improved to 3.6 mmol/L, bicarbonate was 26 mmol/L.

DISCUSSION:

Liddle's syndrome is an autosomal dominant disorder caused by hyperactivity of the

amiloride-sensitive sodium channel (ENaC) of the principal cell of the cortical collecting tubule.⁵ In 1963, Liddle described a family in which multiple siblings developed early onset severe hypertension and hypokalemia.⁶ Genetic studies have revealed mutations in the genes coding the beta or gamma subunits of ENaC (chromosome 16p) that cause deletions of proline-rich regions.^{7,8} These regions are important to regulation of ENaC activity as they facilitate binding of Nedd4, a regulatory repressor that promotes channel degradation.^{5,2} The inability of beta and gamma subunits to bind Nedd4 results in constitutive expression of sodium channels at the apical surface of principal cells, leading to increased rates of sodium reabsorption, volume expansion and hypertension.⁸

The typical presentation of patients with Liddle's syndrome includes early onset severe hypertension, hypokalemia, metabolic alkalosis in the setting of low plasma renin and aldosterone.^{3,8} Hypokalemia and metabolic alkalosis develop in response to reabsorption of cationic sodium in the absence of an anion; This creates a lumen-negative electrical gradient, which promotes secretion of potassium and hydrogen ions into the collecting tubule.^{7,8} In untreated patients, cardiovascular complications are common.

Treatment of Liddle syndrome with Amiloride or Triamterene lowers blood pressure and corrects the hypokalaemia and alkalosis.^{4,9}

CONCLUSION:

The presentation of Liddle's syndrome may be sometimes in later part of life. The drug used for treatment of secondary hypertension in Liddle's syndrome is different from that of other causes of secondary hypertension. So the clinician must be aware and consider all possibilities to make an accurate diagnosis in hypertensive patient with hypokalaemia and metabolic alkalosis.

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