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Journal of Army Medical College Jashore

ISSN : 2789-1135 (Print)

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JOURNAL OF
ARMY MEDICAL COLLEGE
JASHORE

Volume - 4
Number - 1
January 2023

An Official Organ of Army Medical College Jashore

Website: https://amcjbd.org

Journal of Army Medical College Jashore (JAMCJ)
January 2023 | Volume 4 | Number 1
ISSN: 2789-1135 (Print)

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Journal of Army Medical College Jashore (JAMCJ)
January 2023 | Volume 4 | Number 1
ISSN: 2789-1135 (Print)

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Journal of Army Medical College Jashore (JAMCJ)
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Journal of Army Medical College Jashore (JAMCJ)
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JOURNAL OF ARMY MEDICAL COLLEGE JASHORE

January 2023 | Volume 4 | Number 1

ISSN: 2789-1135 (Print)

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Journal of Army Medical College Jashore (JAMCJ)
January 2023 | Volume 4 | Number 1
ISSN: 2789-1135 (Print)

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JOURNAL OF ARMY MEDICAL COLLEGE JASHORE

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ISSN: 2789-1135 (Print)

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Janury 2023, Vol. 4, No. 1, Page: 1-2
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Editorial ***Open Access***

Role of Public Health Professionals in Pandemic

Brig Gen Md Nazrul Islam Khan
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Public health is about the prevention of disease and limiting the impact of the disease once it has occurred. Public health is crucial now more than ever as the entire world works to limit the spread of COVID-19[1]. Public health is a broad phrase that incorporates a variety of disciplines and fields of study. Public Health's areas of specialization include epidemiology, biostatistics, vaccination and immunology, program planning and evaluation, policy, and health care administration[2]. With respect to the pandemic, examples of public health measures are tracking the spread of disease, developing models predicting the number of cases, developing and testing novel vaccines, COVID-19 screening and testing, public health messaging, public health prevention guidelines, contact tracing, and setting guidelines for schools, work, and other social activities. Public health is the most vital intervention in reducing the number of cases, but also to lessen the burden on the health care system[3].

Public health specialists play a crucial role when pandemics strike. These professionals are in charge of teaching people about these diseases, including how the diseases are spread, who are at risk, and what precautions to be taken to lower the chance of contracting these diseases, as pandemics are frequently seen as public health emergencies. For instance, local public health professionals implement emergency preparedness plans and provide assistance to those in underserved populations. To ensure that local, state, and federal policies and laws are followed during pandemics, these public health experts also collaborate with local, state, and federal public health officials[4].

While the COVID-19 pandemic continues to affect the global community, public health professionals have started to look towards the future, and how society can be better prepared for future pandemics, based on what we have learned from this coronavirus and healthcare responses around the world. Public health experts are important players since they participate in numerous institutions and governmental levels and offer the best advice to the general public for controlling and preventing the spread of diseases. In this COVID-19 pandemic situations public health professionals are playing a key role by working in health departments, hospitals, and government agencies, are on the front lines of the fight[5].

Public health experts are in the spotlight as the coronavirus causes global shutdowns. They play an important role while frequently working behind the scenes and not directly with patients. The management strategies used by public health experts during the corona pandemic ultimately have a significant effect on its final outcome4. They follow five management strategies in these pandemic situations, which are public education, advising government officials, contact tracing, screenings, and virus testing. One of the most crucial things public health professionals is giving education about how to control corona virus outbreak[6]. Workers at every level of the system are in continuous communication with medical professionals and researchers; depending on the information they gain about how the virus behaves, they construct guidelines for the general public. This includes typical virus protection practices like hand washing and surface disinfection. Health officials are educating the public about certain practices including social withdrawal, self-quarantine, and isolation during the COVID-19 epidemic and explaining why these activities are essential[7].

One of another ways of public health professionals is managing the corona pandemic is by advising government officials at the local, state, and federal levels. The nation's top public health agency, the Centers for Disease Control and Prevention (CDC), is monitoring the virus's progress and advising the federal government on how to proceed. This guidance is essential since it helps determine for quick response to ensure required services, travel restrictions, border closures, and emergency declarations. They collaborate closely with local and state officials to monitor the spread of the disease and help hospitals through aware about rush of patients and provide knowledge of service according to severity[8].

Public health professionals are frequently in charge of contact tracing when a new instance of the virus manifests. According to the World Health Organization, this process involves identifying all of the people who came into touch with the sick person. Then, officials notify everyone on that list that they may have been exposed so that they can monitor their health and, if necessary, self-quarantine[9].

As the situation evolves the public health professionals' role in the corona pandemic changes. These workers frequently have the task of screening arriving patients at hospitals, clinics, and borders. This procedure often entails taking the patient's temperature and getting in-depth information about their travel history and symptoms of the coronavirus. Officials can use this information to evaluate who needs to be admitted and who needs to be quarantined. Hospitals are

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less likely to become overburdened in this way[4]. The tests that hospitals need to confirm coronavirus cases are typically provided by public health officials. Most of the time, they collaborate with nearby doctors to decide how to distribute the kits rather than directly offering to test the general population. When supplies are limited, they may need to decide which requests are most critical. They also receive, handle, and restock the testing kit supplies. This is one of the most vital and challenging duties for public health organizations since testing is crucial for monitoring the spread of the virus[5].

Over the years, public health specialists have been crucial in managing infectious diseases. However, the COVID-19 pandemic has brought new difficulties to this subject and highlighted several areas that require development. Demonstrated how essential public health is while also assisting experts in finding areas for improvement as needed. As the epidemic has increased, the need for public health professionals is good news for individuals who are interested in working in this industry. By learning more about public health, including the impact COVID-19 anyone get help by understanding this field better and determine the right career pathway[5].

The goal of public health is to support people in achieving better health and well-being for themselves and their communities by encouraging healthy lifestyle choices, arranging educational programes and efforts to assist communities in learning more about healthy living, illness prevention, and injury prevention and lowering the chance of accidents[10,11]. In addition to identifying and stopping the transmission of infectious diseases among people, including those in neighborhoods, cities, and nations[10].

Professionals in public health use Officials in local, state, and federal governments are also advised to adopt policies that boost up health and well-being. As a result of these public health initiatives, many communities now have access to improved food options, clean drinking water, less air pollution, safety regulations for cars, and other health services[12].

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[Journal of Army Medical College Jashore, January 2023;4(1):1-2]

https://amcj-bd.org/
Journal of Army Medical College Jashore
January 2023, Vol. 4, No. 1, Page: 03-07
ISSN : 2789-1135 (Print)

Original Article ***Open Access***

Role of Diffusion Weighted Magnetic Resonance Imaging (MRI) in Evaluation of Acute Ischaemic Stroke: A Study on 120 Cases

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Abstract

Background: Diffusion weighted (DWI) MR imaging is sensitive to the microscopic random motion of the water molecule protons, a value known as the apparent diffusion coefficient (ADC), which is measured and captured by this type of imaging. **Objective:** The purpose of the present study was to determine diagnosis accuracy of diffusion weighted MRI in evaluation of acute ischemic stroke. **Methodology:** This study was cross-sectional study of patients who presented with clinical features of stroke and underwent imaging by 3 Tesla MRI machine. **Results:** Age range was 38 to 77 years. Mean age of the patient was 64.5 years. In the study, the maximum incidence was in the 6th decade 26(43.3%), followed by the 5th decade 19(31.6%). Male to female ratio was 1.14:1. No significant difference was observed in respect of demographic profile. Vascular topography of lesions revealed that MCA involvement had 27(45.0%) of patients, ACA in 25.0%, PCA in 18.3% of patients. The sensitivity and specificity were 98.1% and 71.4% respectively. Similarly, the positive predicative value and negative predicative value for the same was 96.2% and 83.3% respectively. **Conclusion:** Acute ischemic stroke is one of the leading causes of mortality and morbidity worldwide. Proper evaluation and early detection reduced the burden of stroke. Present study concluded that Diffusion weighted MRI is more sensitive for early ischemic changes than T2-W and FLAIR MRI alone. DWI plays an important diagnostic tool in patients with acute ischemic stroke, and salvage people by early specific treatment thereby. *[Journal of Army Medical College Jashore, January, 2023;4(1):03-07]*

Keywords: Ischemic stroke; magnetic resonance imaging; diffusion weighted sequence

Introduction

Stroke is ranked as the second leading cause of death worldwide with an annual mortality rate of about 5.5 million. Not only does the burden of stroke lie in the high mortality but the high morbidity also results in up to 50% of survivors being chronically disabled. Thus, stroke is a disease of immense public health importance with serious economic and social consequences[1]. According to the definition proposed by the World Health Organization in 1970, "stroke is rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer, or leading to death, with no apparent cause other than of vascular origin"[2].

There are two main types of strokes: ischemic and hemorrhagic. Ischemic strokes are far more common than hemorrhagic strokes. Ischemic strokes can be due to large vessel atherosclerosis, aorta-cardio embolism, small-vessel occlusion. The clinical impact of stroke depends on the location, size/severity of the stroke itself. The most specific diagnostic investigation is either CT or MRI of head. CT of head is preferred early because it will exclude hemorrhage. CT of head is good for hemorrhage whereas MRI of brain is good for infarction particularly brain stem & cerebellum[3].

Diffusion-weighted imaging (DWI) is a form of MR imaging based upon measuring the random Brownian motion of water molecules within a voxel of tissue. In general, simplified terms, cellular swelling and highly cellular tissues exhibit lower diffusion coefficients. Thus,

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diffusion is particularly useful in cerebral ischemia and tumor characterization. DWI signal contrast can be quantified by apparent diffusion coefficient (ADC) maps and it acts as a tool for treatment response evaluation and assessment of disease progression[4]. The DWI infarct pattern with ADC mapping is correlated with the pathogenic mechanisms underlying stroke and predict clinical outcome. Therefore, a deeper understanding of DWI is necessary for physicians treating patients with acute ischemic stroke[5].

DWI is particularly useful in several cases, where conventional MR sequences like T2 weighted imaging (T2WI) do not show significant changes in the images. For instance, in pathological conditions like stroke arising from ischemia, signal intensity on T2WI does not change until at least 8 h after the onset of stroke and then appears hyper-intense in the stroke region[9]. However, DWI and ADC maps can show the changes in brain as early as 30 min or even earlier, after the onset of stroke. The signal intensity changes over time in DWI and ADC maps, changing from hyper-intense signal to hypo-intense signal on DW images and from hypo-intense to hyper-intense signal on ADC maps, from acute to chronic stage[6,7]. Pathological changes can be detected in its early stages using DWI sequence, even when other modes of imaging might not show changes in tissue. Therefore, aim of this study was to see the role of diffusion weighted MR image in evaluation of particularly early form of acute ischemic stroke, and hence to start the definite treatment as early as possible to minimize further damage and maximizing the clinical outcome.

Methodology

Study Settings and Population: This cross sectional study was carried out at CMH Dhaka during the period from July 2020 to June 2021. Before the commencement of the study, a verbal consent was taken from all the patient. It was assured that all the information would be keep confidential. Study subjects were patient with clinically diagnosed as stroke in emergency & casualty department and undergone MRI of brain in the department of Radiology & Imaging, CMH, Dhaka, Bangladesh.

Study Procedure: The procedure was briefly explained to the patients including the risk of contrast examination. All the information was collected in pre-designed data collection sheets. After that all the relevant data were compiled on master chart first. Statistical analysis such as descriptive analysis and frequency of the result were done by SPSS software. The results were presented in tables, pie chart and bar graphs. Magnetic Resonance Imaging Machine 3.0-Tesla, model-GE made in USA was used in the imaging procedure. Routine MRI protocol for brain (T1W, T2W, FLAIR) was done and then DWI and ADC map were conducted. The findings of T1W, T2W, FLAIR, DW and ADC map MRI were summarized in different tables. Then imaging findings of the MRI of brain were compared between routine protocol (T1W, T2W, FLAIR) and DWI & ADC map.

Statistical Analysis: Statistical analysis was performed by Windows based software named as Statistical Package for Social Science (SPSS), versions 22.0 (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.). Continuous data were expressed as mean, standard deviation, minimum and maximum. Categorical data were summarized in terms of frequency counts and percentages. Chi-square test was used for comparison of categorical variables and Student t test was applied for continuous variables. Every efforts were made to obtain missing data. A two-sided P value of less than 0.05 was considered to indicate statistical significance. Differences between case and control were tested.

Ethical Clearance: All procedures of the present study were carried out in accordance with the principles for human investigations (i.e., Helsinki Declaration) and also with the ethical guidelines of the Institutional research ethics. Formal ethics approval was granted by the local ethics committee (Ref: Ethical committee, CMH Dhaka.). Participants in the study were informed about the procedure and purpose of the study and confidentiality of information provided. All participants consented willingly to be a part of the study during the data collection periods. All data were collected anonymously and were analyzed using the coding system.

Results

According to this figure, out of 120 study subjects, 53% are male and 47% are female (Figure I).

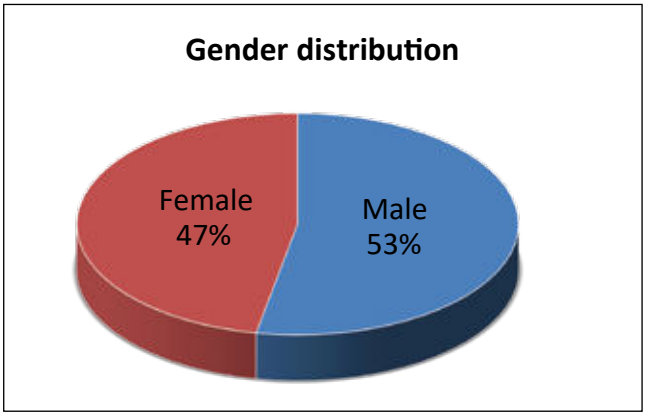

Figure 1: Gender distribution of study subjects (N=120).

Among the demographic profile of 120 patients, including their age range and sex distribution. The data is presented in a frequency table format, with a breakdown of the number of males and females in each age group. The mean age of the patients is 65.2 ± 7.83 years (Table 1).

According to three stroke variables. The first variable is the diagnosis of stroke, which shows that 88.30% of the patients had an acute ischemic lesion, while the remaining 11.70% had a non-acute ischemic lesion. The second variable is the

duration of stroke, which indicates that 63.33% of the patients had a stroke duration of more than 12 hours, while 36.67% had a duration of 12 hours or less. The third variable is the type of ischemic lesion, which reveals that 90.00% of the patients had an acute ischemic lesion, while the remaining 10.00% had other types of lesions (Table 2).

Table 1: Demographic Profile of the Patients (n=120)

Age Group	Sex with frequency		Total
	Male (n= 64)	Female (n= 56)	
30 to 45 Years	10(15.6%)	4(7.14%)	14(11.6%)
46 to 60 Years	20(31.2%)	18(32.14%)	38(31.6%)
61 to 75 Years	24(37.5%)	28(50.0%)	52(43.3%)
≥75 Years	10(15.6%)	6(10.71%)	16(13.3%)
Mean ± SD	65.2 ± 7.83		

Table 2: Distribution of the study patients according to stroke variables (n=120)

Variables	Frequency	Percent
Diagnosis of Stroke*		
Non-acute ischemic lesion	14	11.7
Acute ischemic lesion	106	88.3
Duration of stroke*		
12 Hours	44	36.67
>12 Hours	76	63.33
Ischemic lesions*		
Acute Ischemic Lesion	108	90.0
Others lesion	12	10.0

Among these cases, common clinical hemiplegia was reported in 120 patients, accounting for 100% of the cases. Impaired consciousness was observed in 36 patients, representing 30% of the cases, while vertigo was reported in 16 patients, or 13.3% of the cases. Dysphasia and headache were observed in 28 (23.3%) and 26 (21.6%) patients, respectively. Dysphagia and cranial nerve palsy were less common, reported in 6 (10%) and 22 (18.3%) patients, respectively (Table 3).

Table 3: Clinical presentation of stroke patient (n=120)

Clinical presentation	Frequency	Percent
Hemiplegia	120	100.0
Impaired consciousness	36	30.0
Vertigo	16	13.3
Dysphasia	28	23.3
Dysphagia	12	10.0
Headache	26	21.6
Cranial nerve palsy	22	18.3

Table 4 presents the baseline hemodynamic status of the 120 study subjects, consisting of 64 males and 56 females. The table includes vital signs such as temperature, heart rate, respiratory rate, and mean arterial blood pressure, along with their respective frequencies and p-values. The mean temperature for males and females was 35.78 ± 1.22 and 35.72 ± 1.26°C, respectively, and there was no significant difference between the two genders. Similarly, there were no significant differences in heart rate or respiratory rate between males and females. The mean arterial blood pressure for males and females was 91.80 ± 78.43 and 92.22 ± 26.20 mmHg, respectively, with no significant difference observed between the genders. Overall, the baseline hemodynamic status of the study subjects was similar between males and females.

Table 4: Baseline hemodynamic status of the study subjects (n=120)

Variables	Frequency		P value
	Male (n=64)	Female (n=56)	
Vital signs			
Temperature (C)	35.78 ± 1.22	35.72 ± 1.26	1.025ns
Heart rate (b/pm)	96.43 ± 17.35	94.53 ± 16.13	0.857ns
Respiratory rate (breath/min)	24.23 ± 6.23	25.17 ± 7.2	1 0.502ns
Mean arterial BP (mmHg)	91.80 ± 78.43	92.22 ± 26.20	1.008ns

The table 5 provides information on the MRI findings of 120 patients, including 64 males and 56 females. The arterial territory involved in the majority of cases was the middle cerebral artery (MCA), with a frequency of 50.0%. The next

Table 5: MRI findings of the study population (n=120)

MRI findings	Frequency		P value
	Male (n=64)	Female (n=56)	
Arterial territory involved			
Middle cerebral artery (MCA)	64(50.0%)	44(39.2%)	108(45.0%)
Anterior cerebral artery (ACA)	32(25.0%)	28(25.0%)	60(25.0%) 22(18.3%)
Posterior cerebral artery (PCA)	8(12.5%)	14(25.0%)	14(11.6%)
Others (AICA, PICA, or SCA)	8(12.5%)	6(10.71%)	
Size			
Small sized	24(37.5%)	26(46.4%)	50(41.7%)
Intermediate sized	18(28.1%)	14(25.0%)	32(26.7%)
Large sized	22(34.3%)	16(28.5%)	38(31.7%)
Mass Effect			
Present	12(18.7%)	10(17.8%)	22(18.3%)
Absent	52(81.2%)	46(82.2%)	98(81.7%)
Lesion age (ADC map)			
Low ADC	56(87.5%)	52(92.8%)	108(90.0%)
Normalize to raised ADC	8(12.5%)	4(7.1%)	12(10.0%)

most common arterial territory was the anterior cerebral artery (ACA) at 25.0%. The size of the lesion was categorized into three groups, with small-sized lesions being the most frequent (41.7%), followed by large-sized lesions (31.7%). Mass effect was present in 18.3% of cases. The majority of the lesions (90.0%) had low ADC values, while only 10.0% had normalized to raised ADC values. Overall, the table provides valuable information on the MRI findings of stroke patients and highlights the importance of differentiating between various arterial territories and lesion sizes.

Table 6 provides information about the diagnostic accuracy of diffusion-weighted MRI in the assessment of acute ischaemic stroke. The study included 120 patients, out of which 106 had acute ischaemic lesions, and the remaining 14 had non-acute ischaemic lesions. The table presents the types of lesions identified through diffusion-weighted MRI findings, which were ischaemic lesion and other lesions. Out of the 108 ischaemic lesions detected, 104 were acute ischaemic lesions, and four were non-acute ischaemic lesions. Among the 12 other lesions identified, two were acute ischaemic lesions, and ten were non-acute ischaemic lesions. These findings suggest that diffusion-weighted MRI has a high diagnostic accuracy in detecting acute ischaemic lesions in patients with acute stroke.

Table 6: Diagnostic accuracy of diffusion-weighted MRI in the evaluation of acute ischaemic stroke (n=120)

Diffusion-weighted MRI findings		
	Acute Ischaemic Lesion (n=106)	**Non-Acute Ischaemic Lesion (n=14)**
Ischemic lesion (n=108)	104	4
Other lesions (n=12)	2	10

Discussion

About 98% of the early ischemic lesions were detected by DWI, whereas with early T2-weighted or FLAIR images, only 71% (P=0.002, $\chi 2$) and 80% (P=0.02, $\chi 2$) of lesions, respectively, were found. DWI is the most reliable method for early detection of cerebral ischemia, definition of the infarct core, and differentiation of acute ischemia from stroke mimics[8]. Within minutes of an ischemic insult, a core region of tissue exhibits profound loss of blood flow and becomes irreversibly damaged, even if blood flow is rapidly restored. DWI detects decreases in the self-diffusion of water molecules as early as 11 minutes after symptom onset[9]; these changes are probably related to cellular energy failure and early cytotoxic edema, reflecting the physiologic consequences of ischemic injury.

Diagnosis of stroke largely depends on clinical presentation. Stroke-mimics account for 19% to 30% of suspected stroke presentations, with diverse underlying etiology[10]. With advances in MRI technology, ischemic lesion can be identified with high accuracy using DWI (88% to 100% sensitivity, 95% to 100% specificity). A false-negative DWI result is possible. False-negative DWI is associated with less severe strokes, a longer time from onset to scan, small vessel disease, and localization in the posterior circulation, such as patients with small punctate infarcts located within the brainstem (e.g., as medulla) or deep gray nuclei (e.g., thalamus)[11]. False-positive DWI findings may occur in a variety of non-ischemic lesions, such as cerebral abscess (increased viscosity), lymphoma (dense cell packing), acute demyelination (myelin vacuolization), Creutzfeldt-Jakob disease (spongiform change), and encephalitis/seizure/ transient global amnesia (cytotoxic edema)[12]. Most are readily distinguishable from acute infarcts if DWI findings are considered in conjunction with findings from other MRI sequences.

In this study 108 patients were detected as acute ischemic stroke, but 12 were non-acute ischemic lesion. Transient ischemic attack, subacute ischemia or chronic lesion denotes the non-acute stroke. The percentage of TIA patients with a DWI lesion increases with increasing total symptom duration13 and with increasing duration between TIA symptom onset and performance of the initial DWI[14]. TIA is defined as a transient episode of neurological dysfunction caused by focal brain, spinal cord, or retinal ischemia without signs of acute infarction by neuroimaging. Similarly, even in patients with transient neurological attacks, episodes of acute atypical or non-focal neurological symptoms, DWI showed acute ischemia in 23%[15]. All these findings suggest that there is an important role for DWI in monitoring patients with acute ischemic stroke. DWI is a better imaging method than conventional MRI in detecting early ischemic lesions in stroke patients.

Conclusion

Stroke is one of the foremost causes of morbidity, mortality and a socioeconomic challenge. This is particularly true for developing countries like Bangladesh, where health support system including the rehabilitation system is not within the reach of ordinary people. Early detection and risk stratification reduced the burden of stroke. Thus, present study concludes that DWI in conjunction with ADC map MR imaging is a gold standard diagnostic modality in evaluation and management of acute ischaemic stroke.

Acknowledgements
None.
Conflict of interest
No conflict of interest.
Financial Disclosure
The author(s) received no specific funding for this work.
Authors' Contributions
Md Tanshed Arafat, Syed Zoherul Alam, Tanjima Yeasmin Liza, Tanshina Afrin conceived and designed the study, analyzed the data, interpreted the results, and wrote up the draft manuscript. Md Tanshed Arafat, Tanjima

Yeasmin Liza, Tanshina Afrin involved in the manuscript review and editing. All authors read and approved the final manuscript.

Data Availability

Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate

Ethical approval for the study was obtained from the Institutional Review Board. The written informed consent was obtained from all study participants. All methods were performed in accordance with the relevant guidelines and regulations.

How to cite this article

Arafat MT, Alam SZ, Liza TY, Afrin T, MR. Role of Diffusion Weighted Magnetic Resonance Imaging (MRI) in Evaluation of Acute Ischaemic Stroke: A Study on 120 Cases. J Army Med Coll Jashore 2023;4(1):3-7

Publication History

Received on: 11 October 2022
Accepted on: 27 December 2022
Published on: 1 January 2023

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https://amcj-bd.org/
Journal of Army Medical College Jashore
January 2023, Vol. 4, No. 1, Page: 08-11
ISSN : 2789-1135 (Print)

Original Article ***Open Access***

Evaluation of Biochemical Parameters in Type 2 Diabetic Patients at Tertiary Care Hospital

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Abstract

Background: Diabetes is still a challenging non-communicable disease due to its long-term metabolic effects. In uncontrolled DM derangements of metabolism results in over production of advanced glycation end products (AGEs). **Objective:** This study was aimed to establish the relationship between glycemic status and some biochemical parameters to assess the metabolic profile of type 2 diabetic populations. **Methodology:** This was an analytical cross-sectional hospital-based study. Blood was collected from T2DM patients and healthy controls. Fasting (FBG), 2 hours after breakfast blood glucose (2hABG), HbA1C, lipid profile- total cholesterol (TC), triglycerides (TAG), LDL-C, HDL-C in fasting state along with liver and renal function profile were done. **Result:** Blood was collected from 91 T2DM patients and 45 healthy controls. In present study, diabetic individuals had a higher level of HbA1C (6.856 ± 1.508 vs. 5.478±0.554, <0.001); significant hyperglycemia both in fasting (8.417±2.252 vs. 5.336±0.987, <0.001) and well-fed state (12.160±3.886 vs. 9.078±1.845, 0.003). There was significantly higher TAG (185.098±82.323 vs. 118.541±29.235, <0.001), LDL-C (101.355±31 vs.95.514±18.245, 0.014) in diabetic patients compared to control. Positive significant correlations of liver and renal function were found with glycemic indices due to uncontrolled production of AGEs. **Conclusion:** A significant positive correlation for liver enzyme (AST) and creatinine with glycemic indices suggest that evaluating liver and kidney functions in DM might help in prediction and assessment of type 2 diabetes risks. *[Journal of Army Medical College Jashore, January, 2023;4(1):08-11]*

Keywords: DM; AGEs; HbA1c; SGPT; creatinine

Introduction

Diabetes and its complications are rapidly becoming the world's most significant cause of morbidity and mortality[1,2]. In Bangladesh there were 5.9 million cases of diabetes with a comparative prevalence of 6.3% in adults aged 20-79 years which costs 42.6 USD per diabetic person[3]. So there is no doubt to conclude that diabetes has emerged one of the most challenging problems in 21st century. The adverse effects of persistently elevated plasma glucose levels on the different body parts vary according to the cell types. The complex cascade of events which leads to cellular malfunction in response to high levels of glucose is not fully understood. One of these events is the formation of advanced glycation end products (AGEs)[4].

The elevated level of glucose starts forming covalent bonds with plasma proteins through a non-enzymatic process known as glycation. Protein glycogen reactions leading to AGEs are thought to be the major cause of different diabetic complications[5]. These intercellular AGEs play an important role as stimuli for activating intracellular signaling pathways as well as modifying the function of intracellular proteins[6]. The mechanism by which glycation alters the cell functions include denaturation and functional decline of the target protein and lipid, organ therapy due to accumulation of AGEs in tissue, activation of the receptor-mediated signal pathway in cells, and generation of oxidative stress and carbonyl

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stress[7]. Eventual randomized clinical trials and epidemiological logical studies have shown that control of glucose level is related to reducing the rates of neuropathy, retinopathy, nephropathy and cardiovascular diseases[8].
Assessing biochemical parameters are therefore considered as major therapeutic tools for the stoppage of organ damage and other complications of diabetes[9].The current study was conducted on type 2 diabetic patients compared to non-diabetic control group to get good evaluation of different biochemical parameters at tertiary level hospital.

Methodology

Study Settings and Population: This was an analytical cross-sectional hospital-based study conducted at the Department of Biochemistry of BIRDEM General Hospital to evaluate the biochemical parameters on type 2 diabetic patients aged between 30 to 65 years. Patients suffering from type 2 diabetes and visited the outpatient department of BIRDEM for their routine medical checkups were included as the study subjects. Age and gender-matched healthy persons were included as control. Type 2 diabetic patients with chronic liver and kidney disease, acute infection-urinary and respiratory tract infection, pregnancy and with complications were excluded.

Questionnaire and Data Collection: The study data were collected by personal interview using a pretested questionnaire containing demographic condition, past medical history, family history, duration of diabetes, history of treatment of diabetes and hypertension, smoking, alcohol behavior and dietary habit. The subjects were also asked for the presence of any other complications of diabetes. Sample Collection: Overnight fasting diabetic patients were selected and about 10 ml venous blood was collected from each patient. From this blood, 3 ml was delivered in fluoride vial for estimation of fasting blood glucose and lipid profile. Rest 5 ml into EDTA tube for HbA1C, serum SGPT, ALP and serum creatinine. 2 hours after breakfast 2 ml blood was collected for blood glucose estimation. Collected blood was allowed to clot at room temperature and then centrifuged at 3000 rpm for 10 minutes. Separated serum was stored in refrigerator at -20°C. Biochemical analysis: Plasma glucose, serum total cholesterol, triglyceride were measured by enzymatic end point technique using dimension clinical chemistry system using Flex reagent cartridge. HDL-C was measured by the fully automated reagent format of Dimension clinical chemistry system (Siemens Healthcare Diagnostics GmbH Germany) and LDL-C concentration was calculated by Friedwald's formula[10]. HbA1c was measured by high performance liquid chromatography (HPLC) method by VariantTM ll Turbo Kit-2.0. ALT was estimated by spectrophotometers UV method using ALT (GPT) opt.Kit (RANDOX). ALP was measured by Orthophosphoric Monoester Phosphohydrolase (HUMAN GmbH, Germany). Serum creatinine was measured by alkaline-picrate method (RANDOX laboratories, UK).

Statistical Analysis: All data were recorded systematically in preformed data collection form (questionnaire) and quantitative data were expressed as mean and standard deviation and qualitative data were expressed as frequency distribution and percentage. Statistical analysis was performed by using window-based computer software devised with Statistical Packages for Social Sciences (SPSS-17) (SPSS Inc, Chicago, IL, USA).

Results

A total number of 91 T2DM patients and 45 apparently healthy individuals were randomly selected with their written consent after explaining the total procedure. Among them 30% were male and 70% were female. The baseline characteristics were compared between diabetic and normal participants. Diabetic individuals had higher level of HbA1c (6.856±1.508 vs. 5.478±0.554, <0.001) compared to normal individuals. Significant hyperglycemia both in fasting (8.417±2.252 vs. 5.336±0.987, <0.001) and well-fed state (12.160±3.886 vs 9.078±1.845, 0.003) were also observed. There were significantly higher TAG (185.098±82.323 vs. 118.541±29.235, <0.001), LDL-C (101.355±31 vs.95.514±18.245, 0.014) in DM patients compared to normal participants (Table 1).

Table 1: Evaluation of Baseline Characteristics between Diabetic Patients and Control Participants (Mean±SD)

Variables	DM patients	Control	P value
FBG (mmol/L)	8.417±2.252	5.336±0.987	<0.001
ABF (mmol/L)	12.160±3.886	9.078±1.845	0.003
HbA1c (%)	6.856±1.508	5.478±0.554	<0.001
TC (mg/dl)	175.038±45.327	137.703±36.127	0.160
LDL-C (mg/dl)	101.355±31.00	95.514±18.245	0.014
TAG (mg/dl)	185.098± 82.323	118.541±29.235	<0.001
HDL-C (mg/dl)	39.299±9.238	40.784±4.721	0.001

Data were calculated using Students t-test was done; **highly significant (p <0.001)

High SGPT (p=0.045), ALP (p=0.001) and serum creatinine (p<0.001) indicated impaired hepatic and renal functions respectively in DM patients compared to normal individuals (Table 2).

Table 2: Evaluation of liver and renal functions of DM patients with healthy participants (Mean±SD)

Variables	DM patients	Control	P value
SGPT (IU/L)	27.483±7.295	24.705±7.993	0.045
ALP (IU/L)	214±97.372	161.244±64.859	0.001
Serum creatinine	1.944±0.980	1.112±0.410	<0.001

Data were calculated using Students t-test was done; **highly significant (p <0.001)

Correlations of SGPT, ALP and S. creatinine with glycemic

Table 3: Correlation of Liver and Renal Functions with Glycemic Index of Diabetic Population

Variables	FBS		2hABF		HbA1c	
	r-value	P-value	r-value	P-value	r-value	P-value
SGPT	0.242	0.021	0.246	0.246	0.285	0.006
ALP	0.080	0.454	-0.043	-0.043	0.009	0.930
Serum creatinine	0.392	<0.001	0.363	0.363	0.450	<0.001

Pearson's correlation was done.

indices were determined by Pearson's correlation. SGPT had positive correlations with all the glycemic indices (for FBS r=0.242, p=0.021, 2hABF r=0246, p=0.019 and HbA1c r= 0.285, p=0.006) than ALP. Serum Creatinine was also significantly correlated with glycemic indices for FBS (r=0.392, p<0.001), 2hABF (r=0.392, p<0.001) and HbA1c (r= 0.450, p<0.001) (Table 3).

Discussion

Diabetes complications are considered to be multifactorial in origin. With increasing evidence one of the major pathways involved in the development and progression of both micro vascular and macro vascular disease due to chronic hyperglycemia is the biochemical process of advanced glycation. Early identification of this disease prevents significant failures of vital organs engaged primarily in metabolic pathways. Thereof dyslipidemia is primarily responsible for atherosclerotic coronary heart disease in people with T2DM[11]. In our study higher level of serum TAG (p <0.001), LDL-C (p=0.014) and low HDL-C (p=0.001) were observed in diabetic patients; this might be due to poor glycemic control. Though a similar type of study was done in Pakistan; the study found only significant hypertriglyceridemia in diabetic patients compared to normal individuals[12]. Though we are aware of metabolic changes of type 2 diabetes and its effects[13], our observations of its impact on liver and kidney function is limited in context of our country. It was reported that elevated liver enzymes and uric acid level is common characteristics in T2DM in the Rancho Bernardo Study[14]. In this study we evaluated liver and renal function with glycemic status of type 2 diabetes. We observed the changes in liver enzymes for diagnosed type 2 diabetic Bangladeshis, but for predicting renal function we looked correlation with serum creatinine (p <0.001) only. A significant elevation of serum ALT (p=0.045) and ALP (p=0.001) levels were observed in the diabetics. This suggests that diabetes patients have inclined tendency toward alterations of liver enzymes. There are several studies which report that there is an elevation in liver enzymes in diabetics. The most common cause of mild elevation of serum ALT is non-alcoholic fatty liver disease, which is the most prevalent liver disease in T2DM[15].

Conclusion

Significantly high liver enzyme and creatinine were observed in type 2 diabetics. A significant positive correlation for liver enzyme (AST) and creatinine with glycemic indices suggest that evaluating liver and kidney functions in DM might help in prediction and assessment of type 2 diabetes risks. Large-scale prospective randomized controlled trials will be needed in the future to confirm these results. It is reasonable to consider that good glycemic control is required to maintain metabolic parameters within the range.

Acknowledgements
None.
Conflict of interest
The authors have no conflicts of interest to disclose.
Financial Disclosure
The author(s) received no specific funding for this work.
Authors' Contributions
Aziz M, Ayub T, Islam F conceived and designed the study, analyzed the data, interpreted the results, and wrote up the draft manuscript. Aziz M contributed to the analysis of the data, interpretation of the results and critically reviewing the manuscript. Ahmed F, Nusrat J, Nadia F involved in the manuscript review and editing. All authors read and approved the final manuscript.
Brig Gen (Retd) Reza Ershad involved in the manuscript review and editing. All authors read and approved the final manuscript.
Data Availability
Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.
Ethics Approval and Consent to Participate
Ethical approval for the study was obtained from the Institutional Review Board. The written informed consent was obtained from all study participants. All methods were performed in accordance with the relevant guidelines and regulations.

How to cite this article
Aziz M, Ayub T, Islam F, Ahmed F, Nusrat J, Nadia F. Evaluation of Biochemical Parameters in Type 2 Diabetic Patients at Tertiary Care Hospital. J Army Med Coll Jashore, 2023;4(1):08-11
Publication History
Received on: 7 September 2022
Accepted on: 24 October 2022
Published on: 1 January 2023

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https://amcj-bd.org/
Journal of Army Medical College Jashore
January 2023, Vol. 4, No. 1, Page: 12-16
ISSN : 2789-1135 (Print)

Original Article ***Open Access***

Efficacy and Safety of Androgenetic Alopecia in the Treatment of Platelet-Rich Plasma Injections: A Clinical Trial

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Abstract

Background: Platelet-rich plasma (PRP) treatment may encourage hair growth by promoting cellular maturation, differentiation, and proliferation. **Objective:** The purpose of the present study was to evaluate the efficacy and safety of Androgenetic Alopecia in the treatment of Platelet-Rich Plasma Injections. **Methodology:** It was a study period carried out EW VM Health Bangladesh Ltd., Dhaka from January 2019 to June 2022. The patients with androgenetic alopecia were included in this study. PRP was prepared using a single spin method (Regenlab SA). Upon activation, it was injected in the androgen-related areas of scalp. Three treatment sessions were performed with an interval of 21 days and a booster session at 6 months following the onset of therapy. **Results:** This study showed that majority (90.0%) were male and only 10.0% cases were female. Androgenetic alopecia was found to be present in 80% of population aged in 20 to 40 years. Hair density (hair/cm2) significantly increased at 3 months (153.71± 30.16), at 4 months (168.34±35.66) at 5 months (154.18±36.49) and at 6 months (152.69 ± 37.76) compared to the onset of therapy one moth. 16% were increase hair less than 10.0%, 34.0% were 10.0 to 20.0%, 32.0% were 20.0% to 50.0%, 8.0% were >50 increase and only 10% were decrease hair. **Conclusions:** In conclusion platelet-rich plasma injections may have a positive therapeutic effect on male and female pattern hair loss without remarkable major side effects. *[Journal of Army Medical College Jashore, January, 2023;4(1):12-16]*

Keywords: Androgenetic alopecia, hair loss, platelet-rich plasma

Introduction

Androgenetic alopecia (AGA) is a common chronic hair loss disorder. It is characterized by progressive hair loss, affecting both sexes[1]. It affects 80.0% of men and 50.0% of women during their lifetime[2]. Its' frequency increases with age, despite the fact that it may start at puberty. Independent of age and gender, patients diagnosed with AGA may undergo significant impairment of quality of life, since hair is considered to be an important feature of self-image[1]. Hair loss affects self-esteem, personal attractiveness and may lead even to depression and other negative effects of life[3].

A number of products have been proposed as hair loss therapies. Drug therapies specifically approved by Food and Drug Administration (FDA) for treating AGA are limited to minoxidil and finasteride. Both can be used alone or combined[4]. Despite the therapeutic options available, low patient compliance and satisfaction rate as well as the plethora of topical and often important systematic adverse effects lead to the search of new treatment options for AGA[5].

Platelet-rich plasma (PRP) is created through concentrating platelets found in whole blood[6]. It can aid in tissue regeneration, bone regeneration, and wound repair[7–11]. Platelet-rich plasma treatment has also been suggested to promote hair growth, encourage cell survival and proliferation, and prolong the anagen phase of the hair cycle[12–14.] Platelet-rich plasma is thought to exert its

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effects in androgenetic alopecia (AGA) via delivery of concentrated growth factors to the hair follicle and surrounding area. Emerging evidence has begun to characterize the dermal and follicular response to several growth factors[7].

Platelets are able to secrete growth factors, adhesion molecules, and chemokines. After being activated, those effective factors interact with the local environment and promote cell differentiation, proliferation, and regeneration[15-16]. Published data also highlighted that PRP contains major growth factors, including basic fibroblast growth factor (bFCF), platelet-derived growth factor (PDGF), vascular endothelial growth factor (VEGF), epidermal growth factor (EGF), transforming growth factor-β (TGF-β), and insulin-like growth factor-1 (IGF-1)[17]. In the past decade, PRP has been studied and widely used in alopecia, acne scarring, skin rejuvenation, chronic wounds, and vitiligo[18]. Comparing with traditional nonsurgical therapies and the surgical approaches such as hair transplantation, PRP is believed as a promising treatment of AGA with lower cost and fewer adverse effects. This study was to evaluate the clinical efficacy and safety of PRP injections in AGA.

Methodology

Study Design and Population: This was a prospective cohort study carried out EW VM Health Bangladesh Ltd., Dhaka. Total 50 patients with androgenetic alopecia were included in this study. PRP was prepared using a single spin method (Regenlab SA). Upon activation, it was injected in the androgen-related areas of scalp. Three treatment sessions were performed with an interval of 21 days and a booster session at 6 months following the onset of therapy. All participants were ≥18, who had not received any topical or systematic treatment for their hair loss during the last 6 months. Patients with present or a history of immunosuppression (malignancy, chemotherapy, steroid therapy), dermatological diseases affecting the scalp, autoimmune disorders, hematologic disorders, platelet dysfunction syndrome and on anticoagulation therapy were excluded from our study. Patients with a tendency for keloids were also excluded. Patients taking aspirin or other non-steroidal anti-inflammatory drugs (NSAIDs) discontinued their use 7 days before treatment.

Intervention and Follow Up: Diagnosis of AGA was made in all patients based on a detailed medical history (any drugs causing hair loss), clinical examination and laboratory tests. Laboratory tests were assessed in order to exclude other hair loss causes, such as anaemia, poor nutrition, thyroid dysfunction, syphilis or polycystic ovary syndrome. The stage of alopecia was evaluated according to the Hamilton-Norwood scale for men and Ludwig scale for women.

Platelet-Rich Plasma Preparation: For the preparation of PRP, RegenKit BCT-3 (Regenlab®) was used. Initially, whole blood was collected from the antecubital vein of the patient (16 ml). The blood was then introduced into two tubes (RegenBCT) and centrifuged for 5 min at 1500 g using the laboratory centrifuge RegenA-PRPCentri. Each tube contained a thixotropic gel composed of a mixture of polymers for plasma separation and sodium citrate solution, as an anticoagulant, located above the separator gel. Therefore, after centrifugation, the blood was fractionated with the red blood cells being trapped under the gel and cellular elements settling on the surface of the gel. After removal of 2 ml of upper supernatant plasma (PPP, platelet-poor plasma) from each tube, 3 ml of PRP was yielded, which was resuspended by gentle inversions of the tube. Total amount of yielded PRP was about 6 ml and it was loaded in 1 ml syringes, ready for injections. The concentration of platelets in PRP was approximately 5.8 times as great as that in whole blood.

Statistical Analysis: The collected data were checked and coded manually and then entered into computer. The numerical data obtained from the study were analyzed and significance of difference was estimated by using the statistical methods. Data were expressed in frequency, percentage, mean and standard deviation as applicable. Comparison between groups was done by unpaired student's t test, chi-square test, and test as applicable. Analysis of data was done by using computer based SPSS program (version 11.5). Probability less than 0.05 was considered as significant.

Ethical Consideration: All procedures of the present study were carried out in accordance with the principles for human investigations (i.e., Helsinki Declaration) and also with the ethical guidelines of the Institutional research ethics. Formal ethics approval was granted by the Ethics Review Committee of Local Institute. Participants in the study were informed about the procedure and purpose of the study and confidentiality of information provided. All participants consented willingly to be a part of the study during the data collection periods. All data were collected anonymously and analyzed using the coding system.

Results

This study shows maximum (44%) were 20-30 years. The average was 33.50±10.01 years (Table 1).

Table 1: Age distribution of the study subject (n=50)

Age Group	Frequency	Percent
20 to 30 Years	21	44
31 to 40 Years	18	36
41 to 50 Years	5	10
>50 Years	4	8
Mean±SD	33.50±10.01	

Majority (90%) were male and 10% were female (Table 2). Maximum (50%) were alopecia stage III (Table 3).

Table 2: Sex distribution of the Study Subject (n=50)

Gender	Frequency	Percent
Male	45	90.0
Female	5	10.0

Table 3: Alopecia stage distribution of the study subject (n=50)

Alopecia stage	Frequency	Percent
II	12	24.0
III	25	50.0
IV	11	22.0
V	2	4.0

Hair density (hair/cm2) significantly increased at T3 (153.71± 30.16), at T4 (168.34±35.66) at T5 (154.18±36.49) and at T6 (152.69 ± 37.76) (Table 4).

Table 4: Hair Density in Different Time Points (Mean±SD)

Time	Hair density
One month	142.19±30.16
Two months	142.79±30.48
Three months	153.71±33.24
Four months	168.34±35.66
Five months	154.18±36.49
Six months	152.67±37.76

About 16% were increase <10%, 34% were 10-20%, 32% were 20-50%, 8% were >50 increase and only 10% were decrease (Table 5).

Table 5: Hair density at 6 months after receiving of PRP for treatment of androgenetic alopecia

Percentage Increase	Frequency	Percent
<10%	8	16
10 to 20%	17	34
20 to 50%	16	32
>50%	4	8
Decrease	5	10

Discussion

Androgen metabolism involved: androgen-dependent processes are predominantly due to the binding of dihydrotestosterone (DHT) to the androgen receptor (AR)[8]. DHT-dependent cell functions depend on the availability of weak androgens, their conversion to more potent androgens via the action of 5 alpha-reductase, low enzymatic activity of androgen inactivating enzymes, and functionally active AR present in high numbers. The predisposed scalp exhibits high levels of DHT, and increased expression of the AR. Conversion of testosterone to DHT within the dermal papilla plays a central role, while androgen-regulated factors deriving from dermal papilla cells are believed to influence growth of other components of the hair follicle. Current available treatment modalities with proven efficacy are oral finasteride, a competitive inhibitor of type 2,5 alpha-reductase, and topical minoxidil, an adenosine-triphosphate-sensitive potassium channel opener which has been reported to stimulate the production of vascular endothelial growth factor in cultured dermal papilla cells[9].

Hair follicle has a very complex biologic structure and growth of the hair process is regulated by specific growth cycles. The mature follicle undergoes successive transformation from anagen to catagen (apoptosis-driven regression) to telogen[10-11]. Role of apoptosis (by the pathway of caspases cascade) in determining the passage from anagen to catagen is well known. Many growth factors play a fundamental role in the life-long cyclic transformation of the hair follicle functioning as biologic switches that are turned on and off during the different phases, controlling the active phase and promoting apoptosis to induce catagen and telogen[4,6].

The beneficial effects of PRP in AGA thus can be attributed to various platelet-derived growth factors causing improvement in the function of hair follicle and promotion of hair growth. It is safe, cheap, and non-allergic and it appears to be a useful adjuvant in the management of AGA. This study shows that majority (90%) are male and only 10% cases are female. Androgenetic alopecia was found to be present in 80.0% of population aged in 20 to 40 years. This findings consistent with other studies[7-19]. Similar study reported AGA was found to be prevalent in 58 percent of population aged 30 to 50 years[20].

This study shows hair density (hair/cm2) significantly increased at 3 months (153.71± 30.16), at 4 months (168.34±35.66) at 5 months (154.18±36.49) and at 6 months (152.69 ± 37.76) compared to the onset of therapy one moth. The highest hair density recorded was at four months. This findings are well agreement with other study[1,6,10]. They reported In our study using non-invasive evaluation methods, such as dermoscopic photomicrographs, a significant increase rate in hair density of 19.29% and 9.19% was noted at 3 and 6 months respectively with large variability in results (from no improvement to significant improvement). Hair density followed an upward curve, reached a peak at 3 months, decreased at 6 months but its value was significant higher than that of baseline (One month). At 6 months, hair density continued its downward trend although remaining significantly higher than that of one moth. Hair loss after the second treatment session (3 months) decreased and at 4 months reached normal levels. Nevertheless, at 6 months (T5), number of hairs pulled during hair pull test were increased to five, without, however, reaching the number of eight hairs of one months. Taking these in account, the

booster session at 6 months was necessary, in order to maintain and improve the results achieved. Finally, at 1 year (T6), number of hairs pulled increased to six, less than eight (T1).

In this study shows 16% were increase less than 10%, 34% were 10 to 20%, 32% were 20 to 50%, 8% were more than 50 increase and only 10.0% were decrease. In some previous studies, PRP has been found to be a useful alternative in the treatment of AGA[21-23]; however, other studies have questioned its effectiveness[24]. Similar study noted that PRP improved hair density by 19.17% in men with AGA at 2 months after application, and this improvement was sustained at 4 months. Our findings are consistent with those of Ho et al[25]. In the study by Alves et al[26] the mean increase in hair density at 6 months of treatment was 7.6%, whereas we observed an increase of 19.17%. This discrepancy could in part be attributed to the inclusion of patients of both sexes.

Uebel et al[27] observed a significant improvement in hair density and stimulation of growth when follicular units were pre-treated with platelet plasma growth factors before their implantation. There was a significant difference in the yield of follicular units on comparing the experimental with the control areas of the scalp. The areas treated with platelet plasma growth factors demonstrated a yield of 18.7 follicular units per cm^2 whereas the control areas yielded 16.4 follicular units per cm^2, an increase in follicular density of 15.1 percent. The ever increasing literature has also seen modifications of PRP to increase its therapeutic results. Takikawa et al[28] investigated a low-molecular weight heparin, as a carrier for PRP. Dalteparin/ protamine (DP), in water soluble micro particles, acts as a biomaterial to adsorb, stabilize and gradually release the GFs in PRP, as almost all of them are known to be heparin binding. Platelet-rich plasma could be used to improve hair restoration parameters like hair density in AGA monotherapy or adjunct therapy.

Conclusion

Platelet-rich plasma (PRP) injection for androgenic alopecia is a simple and feasible treatment option for hair loss and can be regarded as a valuable adjuvant treatment modality for androgenic alopecia. Although PRP has sufficient theoretical scientific basis to support its use in hair restoration, hair restoration using PRP is still at its infancy. Considering its excellent safety profile and relatively low cost, PRP hair treatment is a promising treatment option for patients with thinning hair.

Acknowledgements
None.
Conflict of interest
No conflict of interest.
Financial Disclosure
The author(s) received no specific funding for this work.
Authors' Contributions
Khan AT, Hashem MA, Hassan MK conceived and designed the study, analyzed the data, interpreted the results, and wrote up the draft manuscript. Begum S, Jakia M, Sakib MIU involved in the manuscript review and editing. All authors read and approved the final manuscript.
Data Availability
Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.
Ethics Approval and Consent to Participate
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How to cite this article
Khan AT, Hashem MA, Hassan MK, Begum S, Jakia M, Sakib MIU. Efficacy and Safety of Androgenetic Alopecia in the Treatment of Platelet-Rich Plasma Injections: A Clinical Trial. J Army Med Coll Jashore, 2023;4(1):12-16
Publication History
Received on: 7 October 2022
Accepted on: 24 November 2022
Published on: 1 January 2023

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https://amcj-bd.org/
Journal of Army Medical College Jashore
January 2023, Vol. 4, No. 1, Page: 17-23
ISSN : 2789-1135 (Print)

Original Article ***Open Access***

Incidence of Adverse Events among Hospitalized COVID-19 Patients with Co-morbidities admitted at Different Dedicated Hospital during Pandemic

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Abstract

Background: The incidence of adverse drug reactions is significantly higher among COVID-19 positive patients. **Objective:** This study aimed to observe the incidence of suspected adverse events of selected medicines amoxicillin-clavulanic acid combination, steroid, and montelukast in hospitalized COVID-19 in addition to their regular medication. **Methodology:** This prospective analysis was performed from February 15, 2021, to June 15, 2021, upon 638 COVID patients and 223 COVID like illness patients. COVID-19 patients were collected from the COVID unit of Bangabandhu Sheikh Mujib Medical University, Dhaka, Dhaka Medical College Hospital, Mugda Medical College Hospital, Dhaka, Shaheed Suhrawardy Medical College Hospital, Dhaka. The laboratory investigations values of SGPT, RBS, serum electrolytes, and serum creatinine of day one and day five and interpreted the 12-lead ECG tracing paper of the same days assessed hepatotoxicity, nephrotoxicity, cardiotoxicity, and metabolic disorders. **Results:** The results showed the incidence of adverse events was 39.5% in COVID. Nephrotoxicity (9.2%), hyperglycemia (28.2%), hyponatremia (18.2%), and hypokalemia (4.7%) were observed more among COVID-19 patients and was statistically significant ($p \leq 0.05$). More adverse events occurred in COVID-19 patients who had diabetes mellitus (54.1%), ischemic heart disease (50.9%), and COPD (52.2%). **Conclusion:** In conclusion Nephrotoxicity, hyperglycemia, hyponatremia and hypokalemia were observed more among COVID-19 patients. More adverse events occurred in COVID-19 patients who had diabetes mellitus, ischemic heart disease and COPD. *[Journal of Army Medical College Jashore, January, 2023;4(1):17-23]*

Keywords: Incidence; Adverse Events; Hospitalized COVID-19 Patients; Pandemic

Introduction

The treatment plan is recommended according to the category of COVID 19 patients and this has been reported in the National Guidelines on Clinical Management of COVID-19 Bangladesh[1]. For asymptomatic patients only supportive care and home isolation are recommended. For mild cases without comorbidities and with controlled comorbidities only symptomatic management, home isolation and monitored with finger pulse oximetry are necessary. Mild cases with multiple uncontrolled comorbid and prothrombotic state such as high risk-pregnancy and active malignancy should receive thromboprophylaxis along with symptomatic management and should be admitted[3]. For moderate cases along with standard of care patients are treated with low molecular weight heparin, steroid, remdesivir, and oral antibiotic as amoxicillin Clavulanic acid or doxycycline may be given if bacterial infection is suspected. Severe cases are treated as like moderate cases; here IV broad spectrum antibiotic is recommended[4]. Up-to-date, for acute management of COVID-19, evidence-based guidelines are mandatory to guide the clinicians in this pandemic situation[5].

In Ireland, Kelly et al6 performed a retrospective analysis

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to assess clinical outcomes and adverse drug events among hospitalized COVID-19 patients who were treated with off-label hydroxychloroquine and azithromycin. The researchers' observation was that these drugs did not help clinical improvement rather than to cause significant toxicity like hypoglycemia, elevated liver function tests, and QT prolongation, highlighting the importance of monitoring all repurposed agents for adverse events[7].

Another retrospective observational review was conducted of AEs associated with Pfizer products in COVID-19 treatment like corticosteroids, azithromycin, chloroquine/ hydroxychloroquine lopinavir-ritonavir, ceftriaxone, tofacitinib, and anticoagulants. This pharmacovigilance surveillance study provides hepatitis, diarrhea, and QT prolongation[8]. Sun et al[9] have performed a retrospective analysis among COVID-19 positive patients admitted to the hospital in China to observe the incidence, type, and risk factors associated with adverse drug reactions where drug-induced gastrointestinal disorders and liver system disorders were predominated. The incidence of hepatic abnormalities significantly increases after infection with COVID-19 and during the disease, which may indicate the effect of SARS-CoV-2 on the liver or side effects of the medications used by patients[10].

In Bangladesh, to treat hospitalized COVID-19 patients' systemic steroid, montelukast, fexofenadine, third-generation cephalosporin, penicillin, meropenem, macrolides, antiparasitic and antiviral are commonly used in different hospitals along with the standard of care[11]. Several clinical observations indicated a temporal relationship between viral infections and the simultaneous or subsequent development of drug rashes as virus-infected cells might be more sensitive to drugs and drug metabolites than normal cells[12]. The underlying viral infections may increase infected patients' susceptibility to adverse drug reactions. However, the mechanisms whereby viral infections might induce or contribute to the development of drug-induced adverse effects are currently unknown[13]. This study aimed to observe the incidence of suspected adverse events of selected medicines amoxicillin-clavulanic acid combination, steroid, and montelukast in hospitalized COVID-19 in addition to their regular medication.

Methodology

Study Design and Population: This study was a multicenter cross-sectional study. The study was conducted and supervised in the Department of Pharmacology of Bangabandhu Sheikh Mujib Medical University to partially fulfill the Doctor of Medicine (MD) degree in Pharmacology. This study was conducted in the COVID unit of Bangabandhu Sheikh Mujib Medical University, Dhaka Medical College Hospital, Mugda Medical College Hospital, Shahid Suhrawardy Medical College Hospital, and non-COVID unit of the National Institute of Diseases of the Chest and Hospital. This study was carried out from October 2020 to July 2021 (actual enrollment started after getting approval from IRB, i.e., February 2021). The study populations were the hospitalized COVID-19 patients who met the selection criteria. Inclusion criteria were age more than 18 years and below 65 years of both sex, COVID-19 patients who were treated with any two drugs of amoxicillin-clavulanic acid combination, steroid, and montelukast, in addition to standard of care with medications who were treated with any two drugs of amoxicillin-clavulanic acid combination, steroid, and montelukast, in addition to standard of care with medications. Exclusion criteria were age less than 18 years and more than 65 years, Pregnant and lactating mother, Patients who were previously diagnosed with chronic kidney disease and chronic liver disease or patients who were treated with anti-tubercular medicines. Purposive sampling was applied to collect the data.

Study Procedure: For documentation, the information about particulars of patient, complete diagnosis of the disease, details about the prescription sheets, random blood sugar (RBS), liver function test (serum glutamic pyruvic transaminase or SGPT), renal function test (serum electrolytes, serum creatinine), and interpretation of Electrocardiogram (ECG) on the day of admission and 5th day after dose administration during the hospitalization for both groups of patients, a data collection sheet was prepared. The information was recorded in data collection forms for COVID-19. After taking the written informed consent filled the data collection form from patients' hospital admission papers and treatment sheets on the day of admission. On the second day, the data collection form was filled with the reports of hematological parameters and tracing paper of the ECG as of baseline value before drug administration on the first day of admission. The patients were advised to repeat the same hematological parameters and ECG on the 5th day after dose administration during the hospitalization and filled the rest of the data collection form after the reports were available. To detect adverse drug events during the treatment period, reviewed baseline and repeat data. All the documents were documented as photographs in distinct patient folders.

Assessment of Adverse Event: Assessed the incidence of existing known adverse events, whether it was worsening or not, or emerged any new adverse events that occurred concurrent to COVID-19 drug therapies. SGPT/ALT values of days one and five were compared and assessed with the internationally accepted standard reference value given in the patients' investigation paper for hepatotoxicity. The normal value of SGPT is 7 to 56 U/L and three times the upper limit of normal was considered as hepatotoxicity. Serum creatinine values of days one and five were compared and assessed with the internationally accepted standard reference value given in the patients' investigation paper to evaluate nephrotoxicity. The normal value of serum creatinine is 0.74 to 1.35 mg/dL for men and 0.59 to

1.04 mg/dL for women. An increase of serum creatinine of 0.3 mg/dL then the normal value was considered as nephrotoxicity. RBS values of day one and day five were compared and assessed with the internationally accepted standard reference value to evaluate metabolic disorder. According to the American Diabetes Association, the normal value of RBS is 4.4 to 10 mmol/L. In this study < 4.4 mmol/L was considered hypoglycemia and >10 mmol/L was considered hyperglycemia. Serum electrolytes (Na+, K+) values of days one and five were compared and assessed with the internationally accepted standard reference value given in the patients' investigation paper to evaluate electrolytes imbalance. The normal value of Na+ is 135 to 145 mmol/L. In this study < 135 mmol/L was considered as hyponatremia and 145 mmol/L was considered as hypernatremia. The normal value of K+ is 3.5 to 5.5 mmol/L. In this study < 3.5 mmol/L was considered as hypokalemia and > 5.5 mmol/L was considered as hyperkalemia. By interpreting the 12-lead ECG tracing paper, assessed cardiotoxicity focus upon QT interval (i.e., >500 ms is prolonged QT). Except for this finding, cardiac abnormalities like old myocardial infarction, left ventricular hypertrophy, right bundle branch block, right axis deviation, p-pulmonale, and tachycardia were also observed and assessed for adverse events concerning these. Since ADRs may act through the same physiological and pathological pathways as different diseases, they are difficult and sometimes impossible to distinguish. According to the guide of WHO, "Safety of Medicines - A guide to detecting and reporting adverse drug reactions," the following step-wise approach may be helped to assess possible drug-related adverse events: Ensure that the medicine ordered was the medicine received and taken by the patient at the dose advised, Verify that the onset of the suspected adverse event was after the drug was taken, not before, Determine the time interval between the beginning of drug treatment and the onset of the Event. The severity of adverse events was assessed by the Adverse Event severity grading scale mentioned in the National Guidelines on the Pharmacovigilance System in Bangladesh, 2018- mild, moderate, severe, fatal.

Statistical Analysis: All raw data were recorded, processed, and analyzed using SPSS (Statistical Package for Social Science) version 20. An appropriate statistical test (chi-square (x2), independent sample t-test, mann-whitney U test, and spearman rank correlation) was used to analyze the data. The data were expressed as mean ± standard deviation (SD) and median for continuous variables and frequency and percentage for categorical variables. The chi-square (x2) test was employed to compare categorical data between groups. To compare the continuous data between groups, using an independent sample t-test or mann-whitney U test where applicable. Results were presented in tables & figures. Calculated 'p' value <0.05 was considered significant because all analysis was done at a 95% confidence level.

Ethical Consideration: Submitted the research protocol to the Institutional Review Board (IRB) of Bangabandhu Sheikh Mujib Medical University to review the scientific and ethical issues related to the research to obtain the required approval. After reviewing the protocol, the Institutional Review Board of BSMMU issued a Clearance Letter Memo No. BSMMU/2021/956 dated 02/02/2021. The study objectives were explained to each participant and written informed consent was taken from the patient who willingly participated in the study. Strictly maintained treatment and investigation papers confidentiality. The information of the treatment and investigation papers were only used for this research purpose. Thus, the researcher maintained the anonymity of the individual patients.

Results

A total number of 861 cases were enrolled in this study after meeting inclusion and exclusion criteria. Among them, 638 (74.1%) cases were COVID-19 positive and were admitted in different COVID dedicated hospitals in Dhaka, and 223 (25.9%) cases were admitted in NIDCH, Dhaka for their COVID like symptoms were enrolled in this study.

Demographic Characteristics of Study Subjects

Table 1 shows the demographic characteristics of hospitalized COVID-19 and COVID like illness patients. The average age for hospitalized COVID-19 patients who had adverse events was (53 ± 10 years; 43 to 63 years) and who had no adverse events was (50 ± 12 years; 38 to 62 years). The independent sample t- test was done where the comparison between adverse events and age was significant ($p \leq 0.05$). Adverse events occurred more with increased age among COVID-19 positive cases and more adverse events was occurred in the age group of 51 to 60 years. The spearman Rank correlation test was done where the correlation between age group and adverse events was significant ($p \leq 0.05$). Among the 638 COVID-19 hospitalized patients 386 (60.5%) patients were male and 252 (39.5%) patients were female. Adverse events occurred 42.5% in male and 34.9% in female. The chi-square test was done to assess sex difference in the adverse events occurred which was not significant ($p > 0.05$).The average age for hospitalized COVID like illness (CLI) patients who had adverse events was (50±12 years; 43 to 63 years) and who had no adverse events was (50 ± 12 years; 38 to 62 years). The independent sample t- test was done where the comparison between adverse events and age was significant ($p \leq 0.05$). Adverse events occurred more with increased age among COVID-19 positive cases and more adverse events was occurred in the age group of 51 to 60 years. The spearman Rank correlation test was done where the correlation between age group and adverse events was significant ($p \leq 0.05$).

Table 1: Demographic characteristics of study subjects in hospitalized COVID-19 patients (n= 638).

Characteristics	Adverse Event		P value
	Yes	No	
Mean Age± SD	53±10	50±12	0.001[a]
Age Groups			
≤30 years	21.7%	78.3%	
n = 46	(10/46)	(36/46)	
31 to 40 years	28.8%	71.2%	
n = 73	(21/73)	(52/73)	
41 to 50 years	40.6%	59.4%	
n = 106	(43/106)	(63/106)	0.003[b]
51 to 60 years	43.4%	56.6%	
n = 221	(96/221)	(125/221)	
>60 years	42.7%	57.3%	
n = 192	(82/192)	(110/192)	
Gender			
Male	42.5%	57.5%	
n = 386	(164/386)	(222/386)	
Female	34.9%	65.1%	0.056[c]
n = 252	(88/252)	(164/252)	

n: Total number of cases, SD: standard deviation, %: percentage, all percentage was calculated as row percentage; p-value: probability value; Here, p-value calculated from; a = independent sample t- test, b = Spearman Rank correlation test; c = Chi-Square test and

Table 2 shows the correlation of adverse event with age. The spearman rank correlation test was done where compared between age and incidence of adverse events in COVID-19 patients was significant ($p \leq 0.05$).

Table 2: Correlation of adverse event with age in COVID-19 patients

Study population	r value	p value*
COVID-19	0.116	0.003

*Spearman Rank correlation test was done to measure the level of significance.

Co-morbidities of study subjects of hospitalized COVID-19 patients

Table 3 shows that adverse events were occurred more in diabetic patients (54.1%) than the patients who had no diabetes (26.0%). The association between diabetes mellitus and adverse events was significant ($p \leq 0.05$). Diabetic patients were 2.08 times more at risk for developing adverse events.

Table 4 shows that adverse events were occurred more in hypertensive patients (47.3%) than the patients who had no hypertension (33.5%). The association between hypertension and adverse events was significant ($p \leq 0.05$). Hypertensive patients were 1.41 times more at risk for developing adverse events.

Table 3: Association between adverse events and diabetes mellitus of hospitalized COVID-19 patients

Diabetes mellitus	Adverse Event		RR	P value
	Yes	No		
Present (n = 307)	54.1% (166/307)	45.9% (141/307)	2.08	<0.001
Absent (n = 331)	26.0% (86/331)	74.0% (245/331)		

RR = Relative Risk

Table 4: Association between adverse events and hypertension of hospitalized COVID-19 patients

Hypertension	Adverse Event		RR	P value
	Yes	No		
Present (n = 227)	47.3% (131/227)	52.7% (146/227)	1.41	<0.001
Absent (n = 361)	33.5% (86/361)	66.5% (245/361)		

RR = Relative Risk

Table 5 shows though the adverse events occurred more in ischemic heart disease patients (50.9%) than the patients who had no ischemic heart disease (38.4%), the association between ischemic heart disease and adverse events was not significant ($p > 0.05$). Ischemic heart disease patients were 1.33 times more at risk for developing adverse events.

Table 5: Association between adverse events and ischemic heart disease of hospitalized COVID-19 patients

Ischemic Heart Disease	Adverse Event		RR	P value
	Yes	No		
Present (n = 55)	50.9% (28/55)	49.1% (27/55)	1.33	0.070
Absent (n = 538)	38.4% (224/583)	61.6% (359/583)		

RR = Relative Risk

Table 6 shows that adverse events occurred in the same (39.7% and 39.5%) among the patients who had bronchial

Table 6: Association between adverse events and bronchial asthma of hospitalized COVID-19 patients

Bronchial asthma	Adverse Event		RR	P value
	Yes	No		
Present (n = 63)	39.7% (25/63)	60.3% (38/63)	1.01	0.975
Absent (n = 575)	39.5% (227/575)	60.5% (348/575)		

RR = Relative Risk

asthma and not. The association between bronchial asthma and adverse events was not statistically significant ($p > 0.05$).

Table 7 shows though the adverse events occurred more in COPD patients (52.2%) than the patients who had no COPD (39.0%), the association between COPD and adverse events was not significant ($p > 0.05$). COPD patients were 1.34 times more at risk for developing adverse events.

Table 7: Association between adverse events and COPD of hospitalized COVID-19 patients

COPD	Adverse Event		RR	P value
	Yes	No		
Present (n = 23)	52.2% (12/23)	47.8% (11/23)	1.34	0.205
Absent (n = 615)	39.0% (240/615)	61.0% (375/615)		

RR = Relative Risk

Discussion

The research described 252 adverse events in 638 hospitalized COVID-19 patients from February 15, 2021, to June 15, 2021. The drug of interest were systemic steroids, amoxicillin-clavulanic acid combination, and montelukast respectively. In this study, the rate of suspected adverse events was 39.5% in COVID-19 patients. In addition, the most reported reaction for COVID-19 patients was nephrotoxicity (9.2%), hyperglycemia (28.2%), hyponatremia (18.3%). Though there was no cardiotoxicity occurred but the patients who had cardiac abnormalities according to their ECG, the incidence of adverse events was more among them.

The demographic characteristics of the participants in this study were similar to other studies[14-16], with the prevalence of men, patients over 60 years of age, with concomitant diseases, and using multiple drugs more adverse events were observed among them. The mean age of the patients with ADRs and without ADRs group was 45.2 ± 17.5 and 46.0 ± 16.2 years, respectively[9]. In another study in Brazil[12], the most affected age group was 45-64 years (36.8%), with a mean age of 60.5 years ± 1.8 years. In this study, the mean age of COVID-19 with and without adverse events was 53 ± 10 and 50 ± 12 years, respectively and this value was nearer the previous study.

The male predominance in COVID-19 ADR reporting is consistent with observations of a greater risk of COVID-19 in males than in females[17]. In Ghana's June 2020 interim report on the descriptive analysis of COVID-19-related spontaneous reports from VigiBase, more males (55.7%) were reported to have ADRs than 38.8% in females[18]. In this study, males were also predominant than females in both groups but this difference concerning adverse events was not statistically significant.

More than 50% of the patients presented other diseases or risk factors, such as hypertension, diabetes, and cardiovascular diseases[19]. In this study, among the co-morbid conditions diabetes mellitus, hypertension, and bronchial asthma were more in COVID-19 patients. The association between adverse events and co-morbidities was significant in both groups for diabetes mellitus and hypertension.

Medication reconciliation is necessary at transitions of care to decrease medication discrepancies, potential adverse effects, and ADEs in especially the high-risk group of patients receiving polypharmacy[18]. The treatment of COVID-19 patients with co-morbidities may result in problematic polypharmacy and an increased risk of drug-drug interactions[11]. The consequence of polypharmacy among the aged population is often correlated with poor compliance, drug-drug interactions, medication errors, and adverse drug reactions[20]. In this study, the patients who were treated with more than 4 drugs, the incidence of adverse events occurred more among them in both groups and the association between adverse events and polypharmacy was statistically significant in both groups.

All previous studies regarding adverse drug reactions or events were related to the drugs like chloroquine and hydroxychloroquine, azithromycin, lopinavir/ritonavir, remdesivir, anti-inflammatory medications (such as corticosteroids and other compounds). In one study, drug-induced gastrointestinal disorders and liver disorders were predominant among the detected adverse events[15]. A retrospective analysis in China showed that ADRs in patients with COVID-19 were mainly characterized by gastrointestinal reactions, liver injury, rash, and hyperlipidemia[9]. A cross-sectional study was done by Melo et al[19]. The main sites of manifestation of the reactions they noticed in their research were: cardiac, gastrointestinal, skin, and hepatobiliary systems.

As the drug of interest for observing the suspected adverse events was different from other previous studies so, the results of this study showed that the most observed adverse events among COVID-19 were nephrotoxicity, hyperglycemia, and hyponatremia. A probable reason may be the incidence of acute renal injury[21] significantly increases with COVID-19 infection though the reason was not clearly understood and increased use of systemic steroids. The incidence of hepatotoxicity was observed more among CLI patients and the possible cause was the patients were chronically ill and treated over a period of time with multiple drugs.

The majority of the ADRs were rated as possible, indicating that there could be alternative causes of the reactions apart from the suspected drug[17]. In another study, more than 80% of the reactions were classified as probable or possible. This is due to the complexity of evaluating a

causal relationship between a drug and an adverse reaction. This is because there are multiple approaches and different scenarios that can bring uncertainties regarding the causal link of the reaction, including the underlying disease itself as a confounding factor, competing with the drug for the cause of the reaction[19].

This study showed that the rate of adverse events was higher in hospitalized COVID-19 patients than CLI patients when treated with the same specific drug of interest in addition to other medicines they received. However, the cause of the higher rate of adverse events was not evaluated. Therefore, further study was recommended for this evaluation.

Conclusion

The incidence rate of adverse events in the hospitalized COVID-19 patients was higher. In this study suspected adverse events were observed for the drugs which are common among most prescribed medicines for the treatment of COVID-19. Other metabolic disorders were observed more among COVID-19 patients. In addition, this study provides support for best practices in pharmacovigilance, which can contribute to effective and safe regulatory decision-making for patients.

Acknowledgements
None.
Conflict of interest
No conflict of interest.
Financial Disclosure
The author(s) received no specific funding for this work.
Authors' Contributions
Sarwar S, Rahman MS conceived and designed the study, analyzed the data, interpreted the results, and wrote up the draft manuscript. Ansary AMAA, Mohith MT involved in the manuscript review and editing. All authors read and approved the final manuscript.
Data Availability
Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.
Ethics Approval and Consent to Participate
Ethical approval for the study was obtained from the Institutional Review Board. The written informed consent was obtained from all study participants. All methods were performed in accordance with the relevant guidelines and regulations.

How to cite this article
Sarwar S, Rahman MS, Ansary AMAA, Mohith MT. Incidence of Adverse Events among Hospitalized COVID-19 Patients with Co-morbidities admitted at Different Dedicated Hospital during Pandemic. J Army Med Coll Jashore, 2023;4(1):17-23
Publication History
Received on: 7 October 2022
Accepted on: 24 November 2022
Published on: 1 January 2023

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https://amcj-bd.org/
Journal of Army Medical College Jashore
January 2023, Vol. 4, No. 1, Page 24-27
ISSN : 2789-1135 (Print)

Original Article ***Open Access***

Types of Malocclusion and Causes among School Children Aged 11 to 16 Years in Dhaka City of Bangladesh

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Abstract

Background: There are different types of malocclusion found among the children. **Objective:** The purpose of the present study was to see the types of malocclusion and causes among school children aged 11 to 16 years in Dhaka city. **Methodology:** This study was designed as a cross-sectional study was carried out in four high schools in Dhaka city, Bangladesh. The study was conducted from May 2015 to November 2015 for a period of six months on 384 secondary school children aged between 11 to 16 years Systematic Random Sampling from four high schools of Dhaka city. The participants were included those who had no preventive and interceptive orthodontic treatment previously carried out and participants having late mixed or early permanent dentition. Students who are undergoing orthodontic treatment or who have completed orthodontic treatment earlier, Students who are suffering from any systemic disease. **Results:** Out of 384 children normal occlusion was 43.2% and malocclusion was 56.7%. Out of 56.7% malocclusion, 24.7% was class I malocclusion, 22.9% class II malocclusion and 9.1% was class III malocclusion. The distribution of participants according to type of possible cause(s) for developing malocclusion was family history was 17.7%, skeletal was 19.0% and history of pre-mature extraction was 23.4% cases. **Conclusion:** Angle's class I malocclusion is the most common while Angle's class III is the least prevalent malocclusion. Premature extraction was found the most common cause of malocclusion. *[Journal of Army Medical College Jashore, January 2023;4(1):24-27]*

Keywords: Malocclusion; School Children; Late Mixed Dentition

Introduction

Occlusion may be defined as a manner in which the upper and lower teeth intercuspate between each other in all mandibular positions and movements[1]. It is a result of neuromuscular control of the components of the masticatory systems namely: teeth, periodontal structures, maxilla and mandible, temporo-mandibular joints (TMJ) and their associated muscles and ligaments[2]. An individual's occlusal status is generally described by two major characteristics: intra-arch relationship, the relationship of the teeth within each arch to a smoothly curving line of occlusion and inter-arch relationship, the pattern of occlusal contacts between the upper and lower teeth[3].

A physiologic occlusion differs from a pathological occlusion in which the components function efficiently and without pain, and remain in a good state of health[4]. It can be either normal occlusion or malocclusion. Specifically, in this state the teeth remain firm, do not migrate or cause pain during and after contact. The Temporomandibular Joint (TMJ) and associated structures should function freely and without pain. In an epidemiological study, the terminology of occlusion encompassed all the occlusal variations ranged as ideal occlusion, normal occlusion and malocclusion[5].

Deviation in space conditions; spacing and crowding. This

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comprehensive system however was developed for epidemiological purpose with little emphasis upon treatment need[2]. It was widely used in studies of the prevalence in malocclusion in various country of the world as shown in the Table 1. Developing from the principles of defining and recording individual traits of malocclusion in the above study, Working Group 2 (WG2) of Federation Dentaire International (FDI) had later developed a simplified method of measuring occlusal traits[6].

An ideal occlusion is a hypothetical or theoretical concept based on the anatomy of the teeth and rarely found in nature. The concept is applied to a condition when the skeletal bases of maxilla and mandible are of the correct size relative to each other and the teeth should be in correct relationship in all three plane of space at rest[7]. The purpose of the present study was to see the types of malocclusion and causes among school children aged 11 to 16 years in Dhaka city.

Methodology

Study Settings and Population: This study was designed as a descriptive cross sectional study was carried out in four high schools in Dhaka city, Bangladesh. The study was conducted from May 2015 to November 2015 for a period of 06 (six) months on 384 secondary school children aged between 11 to 16 years Systematic Random Sampling from four high schools of Dhaka city. The participants were included who had no preventive and interceptive orthodontic treatment previously carried out and participants having late mixed or early permanent dentition. The participants were excluded participants having major local problems such as trauma or any history of surgical approach which affects the growth and development of facial structures or body, students who were undergoing orthodontic treatment or who have completed orthodontic treatment earlier, students who were suffering from any systemic disease. This study was approved by the institutional review board (IRB) of this hospital.

Study Procedure: Data were collected using a preformed data collection sheet. The relevant socio-demographic data of these patients were collected and recorded. Data were collected and Parents/guardians were provided with a description of the study, informed consent form (written in Bengali) and a family history/lifestyle questionnaire (written in English). In addition, trained research assistants were explained the study procedures. Data were obtained from noninvasive physical examination and completion of the questionnaire. Examined data were recorded on specifically designed forms containing identification number age, sex, address, and telephone number of the participant or guardians in addition to the occlusal features.

Statistical Analysis: All data were recorded systematically in preformed data collection form (questionnaire) and quantitative data were expressed as mean and standard deviation and qualitative data were expressed as frequency distribution and percentage. Statistical analysis was performed by using window-based computer software devised with Statistical Packages for Social Sciences (SPSS-17) (SPSS Inc, Chicago, IL, USA). 95% confidence level was taken. Uniformly distributed data was evaluated by ANOVA, Student t-test and significance was defined as 'p' value < 0.05.

Results

A total number of 384 students were recruited for this study after fulfilling the inclusion and exclusion criteria. Figure 1 showed distribution of participants according to type of Occlusion. Normal occlusion was 43.2% and malocclusion was 56.7%. Out of 56.7% malocclusion, 24.7% was class I malocclusion, 22.9% class II malocclusion and 9.1% was class III malocclusion.

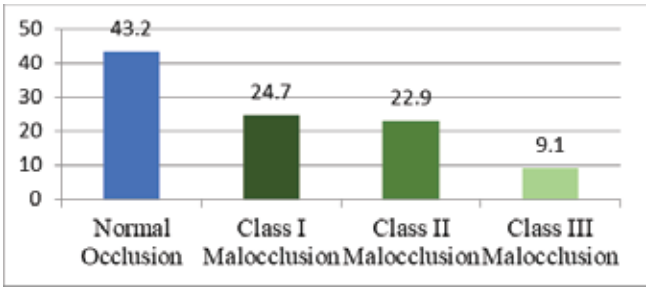

Figure I: Bar diagram showing distribution of malocclusion according to type of occlusion

Table 1 showed distribution of participants according to type of malocclusion. Open bite was 6.8%, deep bite was 20.1%, spacing was 22.9% and crowding was 29.7%. Open bite was absent in normal occlusion children.26 (11.9%) malocclusion children had open bite, 49 (22.5%%) malocclusion children had deep bite, 56 (25.7%)

Table 1: Distribution of Malocclusion According to type of other features of Malocclusion

Types of Malocclusion	Malocclusion		Total	P value
	Present	Absent		
Open Bite				
• Present	26(11.9%)	0(0.0%)	26 (6.8%)	0.001
• Absent	192(88.1%)	166(100.0%)	358(93.2%)	
Deep Bite				
• Present	49(22.5%)	28(16.9%)	77(20.1%)	0.174
• Absent	169(77.5%)	138(83.1%)	307(79.9%)	
Spacing				
• Present	56(25.7%)	32(19.3%)	88(22.9%)	0.139
• Absent	162(74.3%)	134(80.7%)	296(77.1%)	
Crowding				
• Present	91(41.7%)	23 (13.9%)	114 (29.7%)	0.00
• Absent	127(58.3%)	143 (86.1%)	270 (70.3%)	

Chi-square test was done to measure the level of significance.

malocclusion children had spacing and 91 (41.7%) had crowding. There were significance in open bite and crowding among malocclusion group.

Discussion

Occlusion is defined as a manner in which the upper and lower teeth intercuspate between each other in a result of neuromuscular control of the components of the mastication systems namely Teeth, Periodontal structures, Maxilla and Mandible, Temporomandibular Joints and their associated muscles and ligaments[7]. Epidemiological studies[8-10] of occlusion and malocclusion not only help in orthodontic treatment planning and evaluation of dental health services but also offer a valid research tool for ascertaining in the aetiology of malocclusion. Present study was conducted with the aim of assessing the frequency of malocclusion among school children aged 11 to 16 years in Dhaka City Bangladesh.

In this study, maximum participants were in age group 12 years followed by 11 years, 13 years, 14 years, 16 years and 15 years. Mean age was 13.21 ± 1.68 years. Male female ratio was 1.06:1. Mean age was 13.52 ±1.83 years relevant to male female ratio was 1.08:1 in the study of Ajayi, (2008) which is consistent with this study. Male female ratio was 1:1.11 in the study of Reddy et al[3]. In another study[8] the mean age was 13.50 ± 5.80 years and male female ratio was 1.26:1.

In this study, maximum no. of face form was oval (51.8%), maximum no. of (57.6%) face profile was straight and maximum no. of (76.6%) lips were competent. Among malocclusion participant maximum face form was oval (50.9%), maximum (58.3%) face profile was straight and maximum (77.5%) lips were competent. There was no significant difference in face form, face profile and lips in malocclusion. In this study, maximum no. of Angle's molar relationship was Class I in both sides, similarly maximum no. of Canine relationship was Class I in both sides. Complete over bite was in 75.0% cases. In malocclusion, Class I molar relationship was 140 (64.2%), Class II was 48 (22.0%) and Class III was 30 (13.8%) in right side, similarly Class I molar relationship was 134 (61.5%), Class II was 56 (25.7%) and Class III was 28 (12.8%) in left side. There was statistical significant difference in molar occlusion between malocclusion and normal occlusion group.

In this study, it was observed that open bite was 6.8%, deep bite was 20.1%, spacing was 22.9% and crowding was 29.7%. In a study[11] it has been reported that crowding was the most common type of malocclusion (29.75%) followed by deep overbite (13.23%) and open bite (2.03%). Crowding was 23.1% and open bite was 4.1% cases[12]. Lower anterior crowding in 11.8% and open bite in 3.0% cases[3]. Occlusal traits such as overbite and open bite was found to be 5.79% and 10.86% cases[13]. In this study, crowding, open bite and deep bite was little higher comparing above studies.

In this study type of possible cause(s) for developing malocclusion was recorded, family history was 17.7%, skeletal was 19.0% and history of pre-mature extraction was 23.4%.Among malocclusion, 36 (16.5%) had family history of malocclusion, 39 (17.9%) had skeletal and 52 (23.9) had history of pre-mature extraction. There were no significant differences in family history of malocclusion, skeletal and history of pre-mature extraction between malocclusion and normal occlusion children.

Conclusion

In this study-Angle's class I Malocclusion is the most common. It has been also observed that Open bite, Deep bite, Spacing and Crowding are significantly found among the students of the age group of 11 to 16 years.

Acknowledgements
None
Conflict of interest
The authors have no conflicts of interest to disclose
Financial Disclosure
The authors have received grant from the Department of Public Health and Informatics BSMMU for conducting the study.
Authors' Contributions
Tipu MMR, Mafruha MI, Chakraborty M conceived and designed the study, analyzed the data, interpreted the results, and wrote up the draft manuscript. Mafruha MI, Chakraborty M, Sharma N contributed to the analysis of the data, interpretation of the results and critically reviewing the manuscript. Tipu MMR, Yusuf MA, Ghosh R, Shahed AM involved in the manuscript review and editing. All authors read and approved the final manuscript.
Data Availability
Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.
Ethics Approval and Consent to Participate
Ethical approval for the study was obtained from the Institutional Review Board. The written informed consent was obtained from all study participants. All methods were performed in accordance with the relevant guidelines and regulations.

How to cite this article: Tipu MMR, Yusuf MA, Mafruha MI, Chakraborty M, Sharma N, Ghosh R, Shahed AM. Types of Malocclusion and Causes among School Children Aged 11 to 16 Years in Dhaka City of Bangladesh. J Army Med Coll Jashore, 2023;4(1):24-27

Publication History
Received on: 7 September 2022
Accepted on: 24 October 2022
Published on: 1 January 2023

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https://amcj-bd.org/
Journal of Army Medical College Jashore
January 2023, Vol. 4, No. 1, Page: 28-34
ISSN : 2789-1135 (Print)

Original Article ***Open Access***

Socio-Demographic Characteristics of Sexual Assault Cases at a City of Bangladesh: Experience of 80 cases

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Abstract

Background: Violence is the act of purposely bringing harm to another being. Aggression can come suddenly, or gradually grow in situations, but in extreme cases result in assault, harassment, rape and even murder. When the aggression is combined with sexual perversion turns to common sexual crime- Rape. **Objective:** The aim of the study was to determine pattern of such sexual crime and socio- demographic feature of the alleged assault cases in Sylhet city. **Methodology:** This retrospective study was carried out in the Department of Forensic Medicine at Sylhet MAG Osmani Medical College, Sylhet, Bangladesh from January 2021 to December 2021 for a duration of one year with maintaining ethical concern. Rape cases from 6 metropolitan police stations of Sylhet city were selected for medicolegal examination with their consent and opinion was given regarding the issues. **Results:** A total number of 80 cases of alleged rape victims, age ranging from 5 to 39 years old woman were studied. Findings reflects that among 80 female sexually assaulted victims 64% cases were in between 11 to 20 years of age group. About three-fourths 58.75% of the victims were Muslims, 38.75% cases were unmarried, 41.25% cases were working and 72.20 % were with poor socioeconomic background. The majority of the victims 31.25% cases knew the assailants & most of the incidents 27.5% cases occurred in accused's house followed by relative's house 22.5% cases and victim's house 17.5% cases. Majority cases (37.5%) came after 1 week to 1 month of the incident. **Conclusion:** Violence in any form is pestilent and the study content may conclude the baseline information beneficial to focus on the facts to act on. *[Journal of Army Medical College Jashore, January, 2023;4(1):28-34]*

Keywords: Victims; sexual assault; rape; rape trauma syndrome; IPV; SSV

Introduction

Rape is the most detested form of violence against women practiced by men to contend & avail masculinity over female in the modern patriarchal society. It is defined as the unlawful sexual intercourse by a man with a woman without her consent, against her will or with her consent obtained by force, fear, or fraud or with any woman with or without her consent below the age of 16 years[1,2]. Another definition of Rape is physically forced or otherwise coerced penetration-even if slight-of the vulva or anus, using a penis, other body parts or an object. The attempt to do so is known as attempted rape[3]. Ours is a country of multi religion & among them Muslim community is predominant. According to the Muslim religion, Islam does not define rape differently because any sexual intercourse out of marriage is a crime in Islam. No age is exempted from such kinds of sexual assault, physical as well as mental coercion like rape. Children are the common victims due to superstitious belief that sexually transmitted diseases (STDs) may be cured by intercourse with a virgin. Younger a girl, greater the possibility of her being virgin[4]. It is now widely recognized that anybody from a three-year-old girl to a fifty-year-old woman may be abused.

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Bangladesh Penal Code (BPC-375) defines six different aspects of special considerations which are laid down[6]. The slightest penetration of the penis within the vulva, such as the minimal passage of glans between the labia with or without emission of semen or rupture of hymen, constitutes a rape[4]. So it can be said rape is an allegation easily made, hard to prove and harder to disprove. Sexual intercourse by a man with his wife, the wife not being under thirteen years of age, is not rape[1] or the wife not being under fifteen years of age, is not rape[4]. The definition of rape is not updated still in some aspects as there is no saying about the marital rape without consent. We have two acts for the punishments for the rapists. Punishment for rape in BPC-376 is stated that imprisonment for life or imprisonment for 10 years with fine but in case of wife it is for two years or fine, or both[5]. According to section 9 of The Nari O Shishu Nirjatan Daman Bishesh Ain 2003, the highest punishment for death of the rape victim is rigorous imprisonment for life with fine. Recently the government of Bangladesh has approved an amendment of the Women and Children Repression Prevention (Amendment) Ordinance 2020 -'Death or Lifetime Rigorous Punishment' in response to different protests & nation-wide street demonstrations organized across the country. This means that rape is punishable by the death penalty as the highest punishment for rape, amid waves of anti-rape demonstrations across the country[6].

During the emerging situation of COVID-19, it is found that sexual violence against women is increasing day by day worldwide. The discussion involves the female victims who suffer from huge impact both physically & mentally long-short term consequences termed as "Rape Trauma Syndrome" including some physiological reactions as well as some psychosexual disturbance in regular behavior of the victim. This mostly leads to disharmony in future life as the culture holds women accountable by victim-blaming practice & tears down all the desire and expectations of a victim. This may heighten the self-blaming notion and guilt feeling which further may lead to suicidal actions. A recent survey among 38,125 women conducted by a human rights organization in 53 out of 64 districts in Bangladesh, 4,622 women were mentally tortured, 1,839 women were physically abused, 203 sexually abused[7]. From January 2001 to December 2019, 6,900 women were victims of domestic and sexual violence. About 1,490 women were brutally gang-raped, 483 women were killed after being raped, and 35 women committed suicide after being raped[8]. Another report conducted during the COVID-19 situation; from January to September 2020, 397 women were died because of domestic and sexual violence, and only 208 cases were filed. At least 975 women were raped, 204 women were made victims of rape attempt, and death after raped 43 women. 12 women were committed to suicide after raped[9]. The very next year, approximate 1,247 women were raped in the January-November 2021 period, while 286 faced attempts at rape. Forty-six of them died following rape while nine committed suicides. But many cases remain unreported because of the fear of being stigmatized. These current data were compiled from ten reputed newspapers. All these facts reveal that Bangladesh has been engulfed by Rape epidemic amid the COVID-19 pandemic. These statistics reveal such a horrifying picture of the insecure position of the women in the decent world. This study was a modest attempt to describe the current status of the particular loathsome violence like rape.

Methodology

Study Settings and Population: This was a descriptive type of cross-sectional study conducted in the Department of Forensic Medicine at Sylhet MAG Osmani Medical College, Sylhet, Bangladesh. The data were congregated from the medicolegal reports during the period of 1 year starting from January 1 till December 30, 2021 with proper jurisdiction. A number of medicolegal injury reports of living victims in the SOMC were enrolled in this study as study population by following a set of inclusion and exclusion criteria.

Study Procedure: The alleged rape victims who gave informed written consent were sent for medicolegal examinations within the above mentioned period are recorded. After the physical examination, radiological report and microbiological report, opinion was given whether the signs of forceful sexual intercourse were present or not. The demographic characteristics included sex, age, occupation, level of education, social status, the pattern of injury included bodily injury (presence of wound and site of wound) and ano-genital injury. Complete confidentiality was ensured throughout the study.

Statistical Analysis: All the relevant collected data was compiled on master chart first and Statistical analyses was done by computer software devised as the statistical package for social science (SPSS window version14). The value will be express as frequencies, percentage, the results were present in tables.

Ethical clearance: The whole study protocol was approved by the institutional ethical board addressing the ethical concerns.

Results

Overall, the total number was 609, among them 580 were females. Sylhet is the 4th largest city in Bangladesh with 6 metropolitan thanas (police station). A total number of 80 cases from these Metropolitan station areas were recruited fulfilling the inclusion and exclusion criteria. The age of the victims ranged from a five year old child to a thirty nine year old woman. Most vulnerable age group of the victims (64%) belonged to 11 to 20 years of age group followed by 21 to 30 years of age (23%) (Table 1).

The area distribution of the assault had taken place

showing that most cases (64%) are of rural origin where urban cases cannot be ignored as significant cases are also (36%) (Figure I).

Table 1: Evaluation of Baseline Characteristics between Diabetic Patients and Control Participants (Mean±SD)

Age group	Frequency	Percent
0 to 10 Years	6	7
11 to 20 Years	51	64
21 to 30 Years	18	23
More than 31 Years	5	6
Total	**80**	**100.0**

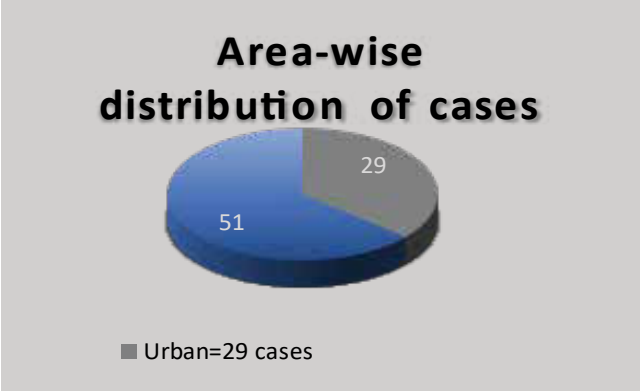

Figure I: Pie-chart showing the area-wise distribution of cases (n=80)

Most of the victims (28%) were examined within 7 days after rape. Of them 8% of the victims were examined in same day after rape. But majority almost 38% of the victims was examined after 1 week to within 1 month followed by 11% even beyond 1 month. On second day & third day, least cases were received (Table 2).

Table 2: Time of Examination of Victims after Rape (n=80)

Time of Examination	Frequency	Percent
Same day	6	8
Second day	3	4
3rd day	10	1
4th to 7th	22	28
After 1 week to 1 month	30	38
Beyond 1 month	9	11
Total	**80**	**100.0**

Distribution of the injuries on the alleged rape victims found during examination are shown. It represents majority cases (65%) had no injury but injury only in the body other than genitalia manifests 13.75%, only genitalia is 10%,

Figure II: Pie-chart showing the distribution of injuries in the victim's body (n=80)

Evidence of forceful sexual intercourse was found in 25% cases associated with physical injuries on the body in the form of abrasions & bruises. Although major part of the victims 68% did not show any positive physical findings of forceful sexual act. And 7% cases were virgo intacta (Table 3).

Table 3: Findings of Rape Victims after Physical Examination (n=80)

Injuries	Frequency	Percent
Intact hymen	5	7
Recent hymen tears with bruise and abrasion	20	25
Old hymen tears with no bruise and abrasion	55	68
Total	**80**	**100.0**

No positive finding in favour of sexual intercourse was found in 100% cases as the result showed no spermatozoa in all the specimen of high vaginal swab (Table 4).

Table 4: Results of Laboratory Tests of Biological Specimen of Victims (n=80)

Spermatozoa	Frequency	Percent
Present	0	0
Absent	80	100.0

Pregnancy status after rape was found in only 16.0% cases (Figure III).

The socio demographic characteristics of the respondents are shown in table 5. Here maximum victims were unmarried (39%) working women (41%), belonging to Muslim community (47%) & low socio-economic class (73%) (Table 5).

The assailants were unknown to victim in 25% cases while known to victim was 75% cases of different categories (Figure IV).

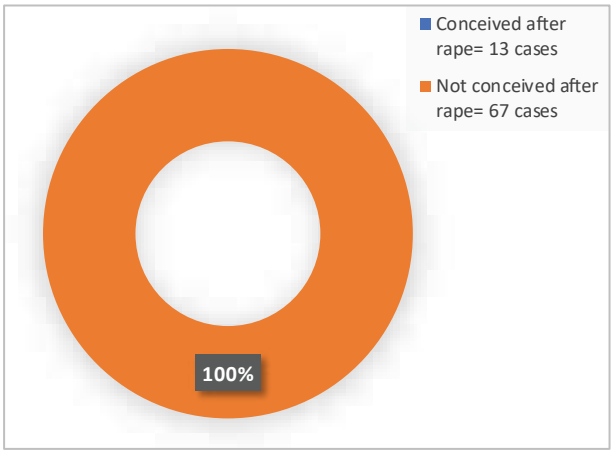

Figure III: Pie-chart Showing Distribution of Victims according to Pregnancy Status (n=80)

Table 5: Frequency of studied socio-demographic variables (n= 80)

Socio-demographic	Frequency	Percent
Variables Marital Status		
Married	27	34
Unmarried	31	39
Widow	4	5
Separated	18	22
Religion		
Islam	47	59
Others	33	41
Occupation		
Student	25	32
Working	33	41
Not Working	22	27
Socioeconomic status		
Lower class	58	73
Middle class	20	25
Upper class	2	2

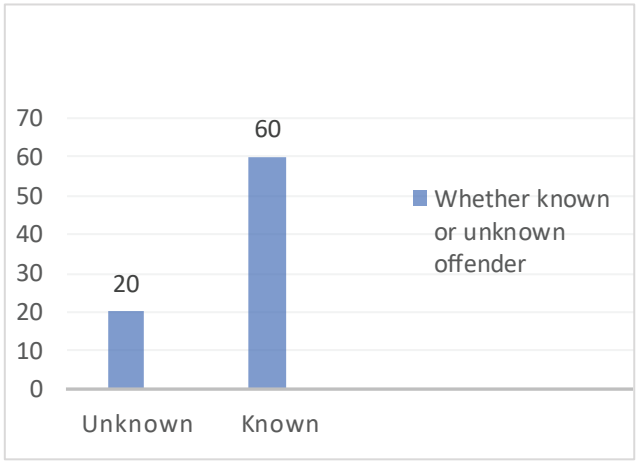

Figure IV: Bar diagram showing whether known or unknown offender (n=80)

In this study the pattern of relationship is shown between the victim & the offender. About 25.0% assailants were total stranger to the victims whereas 31% were acquaintant to the victims. In majority cases occurrence place was at accuser's house (28%) followed by relative's house 23.0% and victim's house 17%. Rest were in roadside fields (12%), guest house or hotel (11.0%) even in madrasa 1.0% cases. Also the number of assailants committed the assault & the place of occurrence is given here. A total 78(97%) cases were single male involved cases while only 2(3%) cases were found as gang rape participated by two or more assailants (Table 6).

Table 6: Relationship of victims with Assailant and Number of Assailants (n=80)

Variables	Frequency	Percent
Type of Relationship		
Acquaintance	25	31
Relatives	10	13
Neighbour	16	20
Close Friend	3	4
Students of the same school	1	1
Stranger	20	25
Master and servant	3	4
Teacher and student	2	2
Place of incidence		
Victim's house	14	17
Accused house	22	28
Relative's house	18	23
Isolated place/Roadside	10	12
Field/Park/Jungle	6	8
Guest house / hotel	9	11
Madrasa	1	1
Number of Assailant		
Single	78	97
Multiple	2	3

Distribution of victim's mental condition reflecting 78% victims were depressive and 22% were anxious following the horrendous tragedy occurred in the victim's life (Figure V).

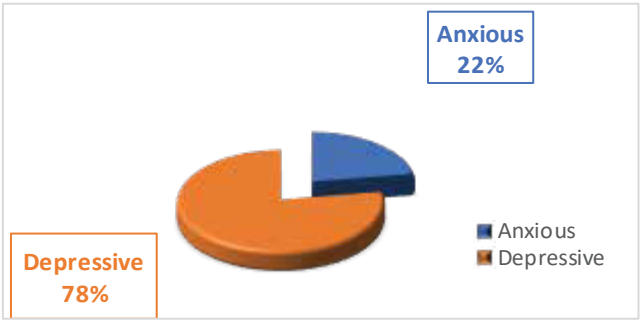

Figure V: Pie-chart presenting mental status of the alleged rape victim (n=80)

Discussion

The misdemeanors of the society that mostly gets away from our sight are the sexual offences committed against the women- "Rape". It is the most neglected public concern & remains unreported because of some prejudice, harassment & huge social stigmata. It is estimated that approximately 35% of women worldwide have experienced sexual harassment in their life[10]. Women who seek justice are being embarrassed publicly & harassed in the court premise, judged by the media as well as by their own family. It is still considered as disgraceful accusation for a female in the society & often blamed the victim for the wrongdoing. This perception invariably damages the self-esteem & confidence of the victim who has not even been guilty at all. For this, the victim has to battle first with her sense to bring the fact to light & claim justice, then with the family where she belongs. Finally with the community she lives in. Moreover, the state services for public safety like as the police & health services-usually are reluctant to carry out proper investigation system till to the closure by the court verdict.

In this study, the age range was in between 5 to 39 years. Among them, majority (64%) of the victims was between 11-20 years. Similar findings were observed by Sarker et al[11], Hossain et al[12], and DuMont[16] where they reported that most of the victims were young, below the age of 20 years. Belonging from Muslim community 59%, it is consistent with the preponderance of our country population. Ali N et al[13] and Islam et al[14] also reported similar Muslim predominance (95.5%). Maximum victims were unmarried as shown in Table 2, coming from poor backgrounds & working as occupational status shown in Table 6. This can be explained by a single fact; that is, lack of awareness crime identification, realizing of being the victim of the system, being ignorant of their rights and the fact that they can complain and take the help of law, all contribute to their being abused and assaulted[15].

Similar study has the conducted in India by Sarkar et al[11] which differ from the religion of our study result as majority abuse group belongs to Hindu community. The age group that has been victimized majorly are ranged 11-20 years with 55.76% of cases. Most of the victims (61%) were unmarried like our study. There was also found 2% widows which is 5% in our cases. Rest findings are in agreement with of Sarkar et al[11] , DuMont[16] and Islam et al[14]. This dwell on the thought that young adolescent & unmarried girls are most vulnerable group to target for the savage temptation of men. A new emerging concept IPV-(Intimate partner violence) involving all forms of (physical+mental+sexual) abuse to women with controlling behaviour has been discussed lately which is least reported in our country in the form of domestic violence context. It's because people believe that husbands are justified to beat their wives in certain circumstances[17]. This is higher among younger, less educated women with less educated husbands of poor households, accepting the fate of domestic abuse both physically & mentally.

Majority of the victims 68% did not show any positive physical findings of forceful sexual intercourse. While 25% cases showed recent forceful sexual intercourse in association with physical injuries on the body in the form of abrasions & bruises. The result of negative evidence does not exclude rape and positive evidence does not confirm rape. Various possibilities are to explain about finding presence/absence of injuries which does not exclude the prevalence of violence. One of the mainstreams is minimum resistance from the alleged victim which is for complete control over the victim by the assailant. High vaginal swab (HVS) collected from all 80 cases for seminal analysis concludes negative result. It explains the fact of late attendance of the sexual assault victims in medico-legal examination. This finding is similar with Al-Azad MAS et al[2], Hossain MN et al[12] and Islam MN et al[14]. Among these cases pregnancy test was found positive found 16%. A Significant percentage of the victims (41%) were examined within 7 days after rape & almost 38 % of the victims was examined after 1 week to within 1 month followed by 11% even beyond 1 month. Only 8% cases were examined in same day after rape. This indicates the interval between the assault and medical examination is one of the prime factor for the negative outcome of the test. Chances of yielding positive result are even more odd by the impuissant wounded persons as they change clothes or take bath, urinate, or washes their private parts before getting examined. This is from the conception of purifying themselves from the dreadful incident. The swab report showing no spermatozoa does not mean no sexual intercourse has taken place. Absence of positive findings may be due to non-emission, aspermia, previous vasectomy, very old age or poor technique by the examining doctor[18]. Moreover, non-penetrative sexual act or using barrier method can be the factor of failure of detection of spermatozoa in high vaginal swab.

In the study, the most reported place of occurrence was the accused house 28% followed by relative's house 23% and victim's own house 17%. Some cases of roadside/nearby field 12% also mentioned as found during the study. Sarkar et al[11] (41.1%) and Grossin et al[19] (41%) cases reported of the incidence occurred at victim's house. Nearly half of the cases have committed by the familiar persons to the victim about 44% similar to the study of Sarkar et al[11] (44.4%). Also 40.8% cases of sexual coercion occur by an acquaintance[20]. About 25% of the rapists were strangers to the victim according to our study. Rest were either acquaintance, friends, neighbours, relatives and others. This finding is in line with that of the research done by Sarker et al[11] and Al-Azad MAS et al[2]. According to our study, only 2 cases (3%) were gang rape committed by two or more assailants but remaining 97% cases were done by an individual person. Sarkar et al[11] observed 7.8% similar

incidence and Riggs et al[21] found more than one assailant were involved in 20% cases. The female survivors 29 cases (36.75%) out of 80 cases were from urban while 51 cases (63.75%) cases were of rural line.

A term widely been used now-a-days SVV-(Sexual violence victimization) for the victims across the board. Sexual violence victimization (SVV) is a crucial issue at the national as well as at global level. It is also a severe human rights, health, and public policy concern[22]. Victims of sexual violence endure extensive adverse health and psychological impacts along with negative education outcomes, including dropout[23]. In our study both anxious and depressive state of mental condition was found among 100% victims examined which is similar with study by Ferdous NF et al[24]. Perhaps this state results from the thought of being socially isolated & feeling of guilt from humiliation they suffer by the surroundings.

Conclusion

The common rule of nature is that the perpetrators usually prey on the weakling species which is defended since the dawn of time. However, violence is the weapon of establishing the male chauvinistic behaviour. To create dominance, younger females are even more preferred subject. Alarming fact that now-a-days it is normalized that violence is a part of the society. Depreciation of moral values is the primitive factor of all causes. The government are adopting multidisciplinary strategies to realize the magnitude of the issue of oppression on the susceptive group. Personal awareness both in male-female should be amplified among the young groups on good and bad touch. Young males are also to acknowledge the consequences with punishment of such act. So to fight the violence, cognizance from all sectors is the demand of time.

Acknowledgements
None.
Conflict of interest
The authors have no conflicts of interest to disclose.
Financial Disclosure
This research project was not funded by any group or any institution.
Authors' Contributions
Begum RA, Sumon MSR & Sharmin N were contributed from protocol preparation upto report writing. Islam MS & Rahman N were involved in the manuscript writing and revision. All authors read and approved the final manuscript.
Data Availability
Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.
Ethics Approval and Consent to Participate
Ethical approval for the study was obtained from the Institutional Review Board. The informed written consent was obtained from all study participants as this was a prospective study. All research procedure were performed in accordance with the relevant guidelines and regulations.

How to cite this article
Begum RA, Sumon MSR, Sharmin N, Islam MS, Rahman N. Socio-Demographic Characteristics of Sexual Assault Cases at a city in Bangladesh: Experience of 80 cases. J Army Med Coll Jashore, 2023;4(1):28-34
Publication History
Received on: 7 September 2022
Accepted on: 24 October 2022
Published on: 1 January 2023

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https://amcj-bd.org/
Journal of Army Medical College Jashore
January 2023, Vol. 4, No. 1, Page: 35-39
ISSN : 2789-1135 (Print)

Original Article ***Open Access***

Pattern of Orthopaedic Surgical Cases with their Management and Post-Operative Outcomes among Forcefully Dismissed Myanmar Rohingya Nationality (FDMN) at Cox's Bazar Medical College Hospital in Bangladesh

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Abstract

Background: Forcefully dismissed Myanmar Rohingya nationality are displaced from their country with different medical and surgical condition. **Objective:** The purpose of the present study was to distribution and determinants of orthopaedic surgical cases among Forcefully Dismissed Myanmar Rohingya Nationality. **Methodology:** This prospective hospital-based study was conducted in the Department of Orthopaedic and Traumatology at Cox's Bazar Medical College Hospital, Cox's bazar, Bangladesh from January 2019 to June 2022 for a period of three and half years. All the patients who were presented with orthopaedic surgical cases among Forcefully Dismissed Myanmar Rohingya Nationality (FDMN) at Cox's bazar Medical College Hospital were selected as study population. **Results:** A total number of 832 cases were recorded from August 2017 to 2022 for a period of more than five years. The most common mode of injury among the study population was road traffic accidents (RTA) which was 261(31.4%) cases followed by blunt trauma, fall from height and physical assault which were in 189(22.7%) cases, 114(13.7%) cases and 92(11.1%) cases respectively. However, pellet injury and trivial trauma were in 67(8.1%) cases in each. There were several kind of orthopaedic conditions reported during the study period. The most common was the blunt trauma which was 241(29.0%) cases. Minor injury and fracture of shaft of tibia and fibula were the second most common injury which was 141(17.0%) cases and 133(16.0%) cases respectively. However, fracture of shaft of femur and radius-ulna were reported in 92(11.0%) cases in each. Fracture of shaft of humerous was found in 58(7.0%) cases. Fracture of neck of femur and hand injury were in 17(2.0%) cases in each. Trochanteric Fracture was also reported in 8(1.0%) cases. **Conclusion:** In conclusion, the most common mode of injury among the study population was road traffic accidents (RTA) followed by blunt trauma, fall from height and physical assault. *[Journal of Army Medical College Jashore, January, 2023;4(1):35-39]*

Keywords: Distribution and determinants; orthopaedic surgical cases; FDMN; Rohingya Nationality

Introduction

The Rohingya people have faced decades of systematic discrimination, statelessness and targeted violence in Rakhine State, Myanmar[1]. Such persecution has forced Rohingya women, girls, boys and men into Bangladesh for many years, with significant spikes following violent attacks in 1978, 1991-1992, and again in 2016[2] and yet it was August 2017 that triggered by far the largest and fastest refugee influx into Bangladesh. Since then, more than 773,000 Rohingya including more than 400,000 children have fled into Cox's Bazar[3].

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In Myanmar, entire villages were burned to the ground, families were separated and killed, and women and girls were gang raped[4]. Most of the people who escaped were severely traumatized after witnessing unspeakable atrocities. These people found temporary shelter in refugee camps around Cox's Bazar, Bangladesh, which remains home to the world's largest refugee camp[5]. As of October 2022, over 943,000 stateless Rohingya refugees reside in Ukhiya and Teknaf Upazilas. The vast majority live in 34 extremely congested camps, including the largest single site, the Kutupalong-Balukhali Expansion Site, which is host to more than 635,000 Rohingya refugees[6].

More than five years into this multifaceted collaborative response, the situation has continued to stabilize[7]. Basic assistance is being provided, living conditions in the camps have improved somewhat and disaster risk mitigation measures have been largely successful. However, despite progress, the Rohingya remain in an extremely precarious situation. The root causes of their plight in Myanmar have not been addressed and their future is yet uncertain[8]. Refugees have access to the basics, such as food and health care, but they are still extremely vulnerable, living in highly challenging circumstances, exposed to the monsoon elements and dependent on aid. The purpose of the present study was to distribution and determinants of orthopaedic surgical cases among Forcefully Dismissed Myanmar Rohingya Nationality.

Methodology

Study Settings and Population: This retrospective cross-sectional study was conducted in the Department of Orthopaedic and Traumatology at Cox's Bazar Medical College Hospital, Cox's bazar, Bangladesh from January 2017 to June 2022 for a period of three and half years. All the patients who were presented with orthopaedic surgical cases among Forcefully Dismissed Myanmar Rohingya Nationality (FDMN) at Cox's bazar Medical College Hospital were selected as study population. The patients who were unwilling to participate in this study were excluded from this study.

Study Procedure: Eligible patients for enrollment in the present study had to sustain an osseous infectious process confirmed by radiological findings lasting more than 2 weeks without acute symptomatology. Analyses were based on clinical records, demographics (age and gender), body temperature, the bone involved. The orthopaedic surgical cases were included in this study. The management was done according to the surgical condition of the patients.

Statistical Analysis: Statistical analysis was performed by Windows based software named as Statistical Package for Social Science (SPSS), versions 25.0 (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.). Continuous data were expressed as mean, standard deviation, minimum and maximum. Categorical data were summarized in terms of frequency counts and percentages. Every efforts were made to obtain missing data.

Ethical consideration: All procedures of the present study were carried out in accordance with the principles for human investigations (i.e., Helsinki Declaration) and also with the ethical guidelines of the Institutional research ethics. Formal ethics approval was granted by the local ethics committee. Participants in the study were informed about the procedure and purpose of the study and confidentiality of information provided. All participants consented willingly to be a part of the study during the data collection periods. All data were collected anonymously and analysed using the coding system.

Results

A total number of 832 cases were recorded from August 2017 to 2022 for a period of more than five years. All these patients were presented with the different orthopaedic surgical cases. From august 2017 Forcefully Dismissed Myanmar Rohingya Nationality (FDMN) were arrived at Cox's Bazar of Bangladesh and 92 cases were reported as orthopaedic surgical cases. In 2018 and 2019 around 182 cases and 202 cases were attended with orthopaedic surgical cases. However, only 62 cases were reported during the peak time of COVID-19 in 2020. Furthermore, in the year of 2021 and 2022 around 132 cases and 162 cases were treated in the hospital (Figure I).

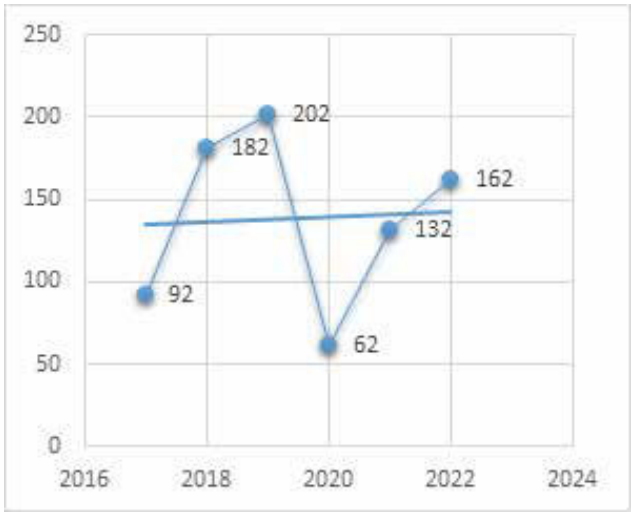

Figure I: Line Chart showing the Year wise Distribution of Study Population (n=832)

Majority of the study population were in the age group of 20 to 40 years which was 449(54.0%) cases followed by less than 20 years, 40 to 60 years and more than 60 years which were 149(17.9%) cases, 133(16.0%) cases and 101(12.1%) cases respectively. The mean age with SD of the age of the study population was 38.9±12.5 years with the range of 2 years to 79 years (Table 1).

Table 1: Distribution of Study Population according to Age Group (n=832)

Age Group	Frequency	Percent
Less than 20 Years	149	17.9
20 to 40 Years	449	54.0
40 to 60 Years	133	16.0
More than 60 Years	101	12.1
Total	**832**	**100.0**
Mean±SD (Years)	38.9±12.5 (2 to 79)	

Male was the predominant than female which was 566(68.0%) cases and 266(32.0%) cases respectively. Male and Female ratio was 2.1:1 (Figure II).

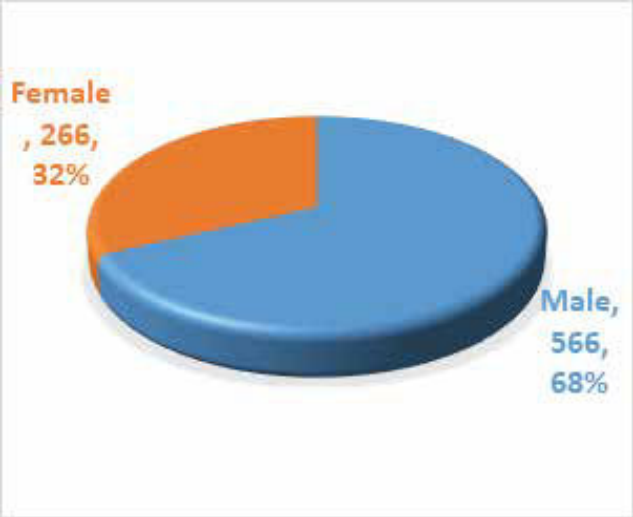

Figure II: Pie chart showing the Gender Distribution (n=832)

The most common mode of injury among the study population was road traffic accidents (RTA) which was 261(31.4%) cases followed by blunt trauma, fall from height and physical assault which were in 189(22.7%) cases, 114(13.7%) cases and 92(11.1%) cases respectively. However, pellet injury and trivial trauma were in 67(8.1%) cases in each (Table 2).

Table 2: Distribution of Study Population according to Mode of Injury (n=832)

Mode of Injury	Frequency	Percent
Physical Assault	92	11.1
RTA	261	31.4
Pellet Injury	67	8.1
Fall from Height	114	13.7
Trivial Trauma*	67	8.1
Blunt Trauma	189	22.7
Others	42	5.0
Total	**832**	**100.0**

*Colle's fractures, Trochanteric fracture, neck femur fracture aged people

There were several kind of orthopaedic conditions reported during the study period. The most common was the blunt trauma which was 241(29.0%) cases. Minor injury and fracture of shaft of tibia and fibula were the second most common injury which was 141(17.0%) cases and 133(16.0%) cases respectively. However, fracture of shaft of femur and radius-ulna were reported in 92(11.0%) cases in each. Fracture of shaft of humerous was found in 58(7.0%) cases. Fracture of neck of femur and hand injury were in 17(2.0%) cases in each. Trochanteric Fracture was also reported in 8(1.0%) cases (Table 3).

Table 3: Confirmed Diagnosis of Study Population (n=832)

Fracture	Frequency	Percent
Shaft of Tibia And Fibula	133	16.0
Shaft of Femur	92	11.0
Neck of Femur	17	2.0
Trochanteric Fracture	8	1.0
Radius and Ulnar	92	11.0
Shaft of Humerous	58	7.0
Hand Injury	17	2.0
Ankle	33	4.0
Blunt Trauma	241	29.0
Minor Injury	141	17.0
Total	**832**	**100.0**

The patietns were classified in broad three category in the context of management. Major operation was performed in 383 cases. However, minor operation was done in 183 cases out of 832 cases of study popultion. Furthermore the conservative management was performed among 266 cases out of 832 cases (Figure III).

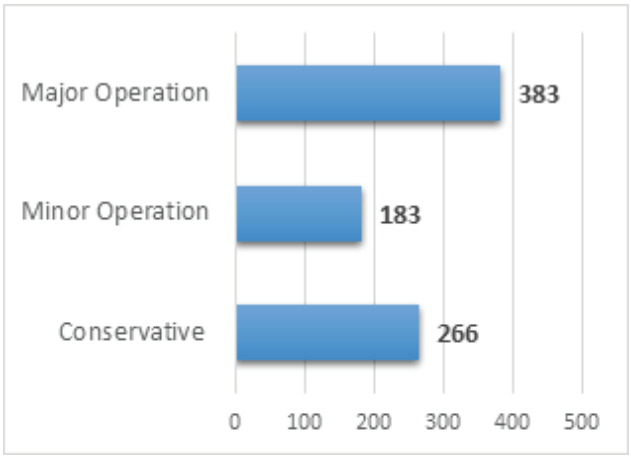

Figure III: Distribution of Study Population according to Management of Cases

Almost all patients were recovered and were discharged which was 726(87.2%) cases. However, infection was reported in the form of minor and major infection which were 67(8.0%) cases and 33(4.0%) cases respectively.

Death was reported in 7(0.8%) cases (Table 4).

Table 4: Post-Surgical Outcomes among the Study Population (n=832)

Post-Surgical Outcomes	Frequency	Percent
Recovered	726	87.2
Death	7	0.8
Minor Infection	67	8.0
Major Infection	33	4.0
Total	**832**	**100.0**

Discussion

When hundreds of thousands of terrified Rohingya refugees began flooding onto the beaches and paddy fields of southern Bangladesh in August 2017, it was the children who caught many people's attention[1]. As the refugees almost 60 per cent of whom were children poured across the border from Myanmar into Bangladesh, they brought with them accounts of the unspeakable violence and brutality that had forced them to flee. Those fleeing attacks and violence in the 2017 exodus joined around 300,000 people already in Bangladesh from previous waves of displacement, effectively forming the world's largest refugee camp[7]. Five years later, about half a million Rohingya refugee children are living in exile from their home country. Many of them have been born into this limbo.

A total number of 832 orthopedic cases were recorded from August 2017 to December 2022 for a period of more than five years[9]. All these patients were presented with the different orthopedic surgical cases with varying etiology. From august 2017 Forcefully Dismissed Myanmar Rohingya Nationality (FDMN) were arrived at Cox's Bazar of Bangladesh and 92 cases were reported as orthopedic surgical cases. In 2018 and 2019 around 182 cases and 202 cases were attended with orthopedic surgical cases. However, only 62 cases were reported during the peak time of COVID-19 in 2020. Furthermore, in the year of 2021 and 2022 around 132 cases and 162 cases were treated in the hospital[10].

Almost a million Rohingya are currently living in refugee camps in Cox's Bazar in Bangladesh. The Rohingya rely entirely on humanitarian assistance for protection, food, water, shelter and health, and they are living in temporary shelters in highly congested camp settings[11]. The treatment seeking Rohingya have attended I the hospital in all ages. Majority of the study population were in the age group of 20 to 40 years which was 449(54.0%) cases followed by less than 20 years, 40 to 60 years and more than 60 years which were 149(17.9%) cases, 133(16.0%) cases and 101(12.1%) cases respectively. The mean age with SD of the age of the study population was 38.9±12.5 years with the range of 2 years to 79 years.

The humanitarian response in Bangladesh remains focused on meeting the massive humanitarian needs and on mitigating the impact of the seasonal monsoon rains[13]. However, additional international support is urgently needed to step up the assistance from purely humanitarian and day-to-day support towards addressing medium-term challenges, including resilience, education, registration, and programmes to protect the most vulnerable refugees including children, women and people with specific needs[12].

As the Rohingya continue to cross the border during the time points, it has been found a growing number of traumatic injuries that require surgical care. Treatment are given by different NGOs, Organization and UN supported agencies. The most common mode of injury among the study population was road traffic accidents (RTA) which was 261(31.4%) cases followed by blunt trauma, fall from height and physical assault which were in 189(22.7%) cases, 114(13.7%) cases and 92(11.1%) cases respectively. However, pellet injury and trivial trauma were in 67(8.1%) cases in each. Similarly, it has been reported that since August 2017, the hospital has treated victims of gunshot wounds, land-mine explosions, and other injuries from conflict. A number of cases have included untreated infections that formed dangerous abscesses or improperly treated injuries that required correction[14]. Hope foundation and reported that the list of injuries is growing and most of the victims are presented with automobile accidents, fires, wild animal attacks, and accidents inside the city-sized camp of more than 620,000 Rohingya refugees. In addition, they have supplied a Disaster Assistance Response Team of nurses to assist hospital surgical teams treating critically injured Rohingya. Many injuries require extensive orthopedic procedures followed by around-the-clock post-operative care[15].

The lack of specialised healthcare for both refugee and host communities in Cox's Bazar remains a serious concern. There is inadequate provision of secondary healthcare, including good-quality 24-hour surgical capacity, comprehensive obstetric and neonatal care, paediatric services, and treatment for non-communicable diseases, including mental health and chronic illnesses. MSF remains one of the main organisations providing inpatient services for paediatric, neonatal and adult patients.

Conclusion

In conclusion, the most common mode of injury among the study population was road traffic accidents (RTA) followed by blunt trauma, fall from height and physical assault. Male was the predominant than female. Most of the study population are in the younger adult with wide variation of age. Major operation has been performed in highest number of cases. However, minor operation and conservative management are also applied. Further large scale study should be conducted to get the determinants of

the injury. Management facilites should be increased.

Acknowledgements
None.
Conflict of interest
No conflict of interest.
Financial Disclosure
The author(s) received no specific funding for this work.
Authors' Contributions
Ali MA, Jahan SA, conceived and designed the study, analyzed the data, interpreted the results, and wrote up the draft manuscript.
Harun-Ar-Rashid AKM, Kamal MS, Hussain MA & Shahed AM involved in the manuscript review and editing. All authors read and approved the final manuscript.
Data Availability
Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.
Ethics Approval and Consent to Participate
Ethical approval for the study was obtained from the Institutional Review Board. The written informed consent was obtained from all study participants. All methods were performed in accordance with the relevant guidelines and regulations.

How to cite this article
Ali MA, Jahan SA, Harun-Ar-Rashid AKM, Kamal MS, Hussain MA, Shahed AM. Pattern of Orthopaedic Surgical Cases with their Management and Post-Operative Outcomes among Forcefully Dismissed Myanmar Rohingya Nationality (FDMN) at Cox's Bazar Medical College Hospital in Bangladesh. J Army Med Coll Jashore, 2023;4(1):35-39
Publication History
Received on: 7 October 2022
Accepted on: 24 November 2022
Published on: 1 January 2023

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https://amcj-bd.org/
Journal of Army Medical College Jashore
January 2023, Vol. 4, No. 1, Page: 40-43
ISSN : 2789-1135 (Print)

Original Article ***Open Access***

Socio-demographic Characteristics and Clinical Profiles of Hybrid and Non-Hybrid Forms of Fibro-Osseous Lesions in Craniomaxillofacial Region

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Abstract

Background: Fibro-osseous lesion is not specifically diagnostic but comprises an undetermined number of pathological entities. **Objective:** The purpose of the present study was to see the socio-demographic characteristics and clinical profiles. **Methodology:** This was cross-sectional observational type of study at the Department of Oral & Maxillofacial Surgery of Dhaka Dental College & Hospital, Dhaka (DDCH), Shaheed Suhrawardi Hospital, Dhaka (SSH) and Bangabandhu Sheikh Mujib Medical University (BSMMU) from January 2004 to December 2005. Participants were selected for the study who attended into outpatient and inpatient departments with fibro-osseous lesions during study period, irrespective of age & sex. patients were included who gave informed consent, patients attended with jaw swellings, and radiologically suspecting as fibro-osseous lesions, Biopsy proven fibro-osseous lesions. A standardized structured data collection sheet was used to collect necessary information of the study history of the patients and clinical examination; radiology, histopathology and macroscopic findings of surgical specimen were recorded. All patients were advised initially for radiological examination which includes orthopantomogram (OPG), postero-anterior (P/A) view of skull with mandible, lateral view of skull with mandible. After taking informed consent, biopsy was done. The diagnosis was established initially in all cases preoperatively on the basis of an incision biopsy. After incision and reflection of mucoperiosteum, bony window was made by rongeurs, drill bur or chisel according to need. Postoperatively every surgical specimen was examined carefully and sectioned to examine the nature of tissue within the tumour and examination of the expansion and perforation of the bone was performed. Then histologic examination was done for re-evaluation. **Results:** Among the studied 40 populations, 34(85%) were non-hybrid and rest 6 (15%) were hybrid form. Among them Ossifying Fibroma 10(25%), Cemento-ossifying Fibroma 4(10%), Fibrous Dysplasia (monostatic) 15(37.5%), Fibrous Dysplasia (polyostotic) 1(2.5%), Fibrous Dysplasia (craniofacial)1(2.5%), Cementifying Fibroma3(7.5%) Most of the patients' age was between 11 to 30 for both hybrid and non- hybrid form. Males and females were equally prevalent of fibro-osseous lesions. Out of 40 patients, 19 (47.5%) were males and 21 (2.5%) were females. No difference was found between male and female prevalence in Hybrid and Non-hybrid forms. Most of the patients (80%) came from rural area and 20% of the patients from urban area. **Conclusion:** In conclusion, Fibro osseous lesion is common among young of both sexes mainly rural population predominant. *[Journal of Army Medical College Jashore, January, 2023;4(1):40-43]*

Keywords: Socio-demographic characteristics; clinical profiles; ABC; ossifying fibroma; cementifying fibroma; cemento-ossifying fibroma

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Introduction

Fibro-osseous lesions characteristically demonstrate replacement of normal bone architecture by a benign fibrous tissue containing varying amount of mineralized

material such as cementum, osteoid and woven quoted by Waldron[1]. Fibrous dysplasia is a congenital, metabolic, nonfamiliar disturbance that produces 2.5% of all bone tumors and 7% of all nonmalignant tumors of bone[2].The term "fibrous dysplasia" was first suggested by Lichtenstein[3]. It is characterized by a permanent osseous maturation arrest at a metaplastic woven bone stage[4]. It is considered to be a benign self-limiting lesion of adolescents which is growing endosteally tends to follow the general structure of bone which is then thickened and deformed. Montgomery et al[6] described ossifying fibroma specifically as a clinical entity. It belongs to a group of lesion with marginal definition, ease of enucleation and which may give the impression of benign neoplastic[5]. Ossifying fibroma bone is a central neoplasm of bone. Formerly, it was considered to be an odontogenic tumour but now it is taught to be an osteogenic neoplasm.It is an encapsulated neoplasm consisting of fibrous tissue, metaplastic bone and mineralized masses. There is a remarkable similarity between this lesion and cementifying fibroma clinically and histopathologically. Therefore, no practical distinction can be made between the so-called cementifying and ossifying fibroma. Waldron and Giansanti[7] felt that cemento and ossifying fibroma are the different stages of the same disease process. They are categorized together as COF in 1992 World Health Organization (WHO) classification of odontogenic tumour. The term "Aneurysmal bone cyst" was first used by Jaffe and Lichtenstein.It is categorized among the fibro-osseous lesion in 1992 WHO classification.There may be different combination within this form i.e. ABC may be associated with the early active phase of fibrous dysplasia as a secondary vascular change within the pre-existing primary lesion, fibrous dysplasia[5] or it may be associated with other fibro-osseous lesions like ossifying fibroma, cementifying fibroma and cemento-ossifying fibroma[4] Juvenile ossifying fibroma is a controversial lesion that has been distinguished from the larger group of ossifying fibromas on the basis of age of the patients, most common sites of involvement and clinical behaviour. It is an uncommon lesion compared with the usual ossifying fibroma and is described as aggressive ossifying fibroma, psammomatoid ossifying fibroma, cementifying fibroma and psammous desmo-osteoblastoma. It is separated from other ossifying fibromas because of its greater cellularity and psammoma-like ossification and, as mentioned earlier its frequent appearance in a younger age group and potential aggressive behavior[8].

Methodology

Study Settings and Population: It was cross-sectional observational type of study at the Department of Oral & Maxillofacial Surger of Dhaka Dental College & Hospital, Dhaka (DDCH), Shaheed Suhrawardi Hospital, Dhaka (SSH). And Bangabandhu Sheikh Mujib Medical University (BSMMU) from January 2004 to December 2005. A total 40 participants were selected for the study who attended into outpatient and inpatient departments with fibro-osseous lesions during study period, irrespective of age & sex. patients were included who gave informed consent, patients attended with jaw swellings, and radiologically suspecting as fibro-osseous lesions, Biopsy proven fibro-osseous lesions. Patients were excluded who had not be clinically or radiologically susceptible for fibro-osseous lesions, psychotic patients and pregnant women.

Study Procedure: A standardized structured data collection sheet was used to collect necessary information of the study history of the patients and clinical examination; radiology, histopathology and macroscopic findings of surgical specimen were recorded. All patients were advised initially for radiological examination which includes orthopantomogram (OPG), postero-anterior (P/A) view of skull with mandible, lateral view of skull with mandible. After taking informed consent, biopsy was done. The diagnosis was established initially in all cases preoperatively on the basis of an incision biopsy. The tissue was processed for preparation of slide and stain with haematoxylin and eosin to study under a light microscope. After incision and reflection of mucoperiosteum, bony window was made by rongeurs, drill bur or chisel according to need. As soon as tissue was removed, it was then immersed into a preservative considering 10% neutral buffer formalin as ideal for 24 to 48 hours. Before immersing in a preservative solution, the specimen was rinsed in normal saline to remove excess blood. Postoperatively every surgical specimen was examined carefully and sectioned to examine the nature of tissue within the tumour and examination of the expansion and perforation of the bone was performed. Then histologic examination was done for re-evaluation.

Data Analysis: All the data were analyzed after thorough checking, cleaning, editing and compiling by the software SPSS.win V-11.6. Descriptive statistics were followed first and then appropriate statistical tests were performed to find out the association between different variables when and where necessary. I consulted with an expert in the field of bio-statistics to bring up the correct and unbiased result for the study.

Results

During the period of January 2004 to December 2005 a total number of 40 consecutive patients were studied, those were attending in outpatient and inpatient department of DDCH, SSH and BSMMU based on inclusion and exclusion criteria. Among the studied population 34(85%) were non-hybrid and rest 6(15%) were hybrid form. Among them Ossifying Fibroma 10(25%), Cemento-ossifying Fibroma 4(10%), Fibrous Dysplasia (monostatic) 15(37.5%), Fibrous Dysplasia (polyostotic)

1(2.5%), Fibrous Dysplasia (craniofacial) 1(2.5%), Cementifying Fibroma 3(7.5%) (Table 1).

Table 1: Frequency distribution of the diseases

Name of the disease	Frequency	Percent
Ossifying Fibroma	10	25.0
Cemento-ossifying Fibroma	4	10.0
Fibrous Dysplasia (monostatic)	15	37.5
Hybrid form	6	15.0
Fibrous Dysplasia (polyostotic)	1	2.5
Fibrous Dysplasia (craniofacial)	1	2.5
Cementifying Fibroma	3	7.5
Total	**40**	**100.0**

Most of the patients' age was between 11 to 30 for both hybrid and non-hybrid form.

Males and females were equally prevalent of Fibro-osseous lesions. Out of 40 patients, 19 (47.5%) were males and 21 (2.5%) were females. No difference was found between male and female prevalence in Hybrid and Non-hybrid forms. (Table 2)

Most of the patients (80%) came from rural area and 20% of the patients from urban area (Figure-I).

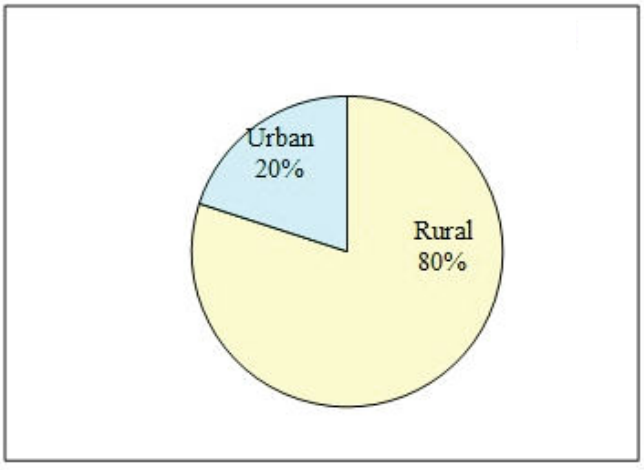

Figure-I: Distribution of Patients by area

Discussion

During the period of January 2004 to 2005 a total number of 40 consecutive patients were studied those were attending in Oral and Maxillofacial Surgery department at DDCH, SSH and BSMMU and clinically and radiologically suspected and confirmed histologically fibro-osseous lesions of the jaws based on inclusion and exclusion criteria. Among the studied population, 34 patients were non-hybrid and rest 06 were hybrid form.

According to Berger and Jaffe; Stewart et al., Obwegesser et al.,[9-11] it showed that fibrous dysplasia is often diagnosed in infancy or childhood and females are most often affected than males. In age distribution of ossifying fibroma, there is a wide age range but the peak incidence is in the 3rd and 4th decade. Eversole et al[12]. analyzed that females are five times as frequently affected as males. But, according to Summerlin and Tomich,[13] female to male ratio is 2:1. Patients of Juvenile ossifying fibroma are most commonly seen in younger than 15 years and there is no sex predilection.In this study, it was observed that age distribution of fibro-osseous lesions varied widely. But, it was most commonly found in 11-30 years of age. Mean age of patients was 24.98(±SD13.4) and the age distribution was positively skewed. Mean age of patients of non-hybrid and hybrid form of fibro-osseous lesions was 26.35years (±SD113.92) and 17.17 (±SD6.18) respectively. Though the t-test showed no significant difference (p=0.123) between the two mean age but hybrid patients had lower mean age. In sex distribution of patients, both male and female patients were equally prevalent in fibro-osseous lesions. Out of 40 patients, 19(47.5%) were male and 21(52.5%) were female. No prevalence was found between male and female in both hybrid and non-hybrid form of fibro-osseous lesions.Hybrid form is one type of fibro-osseous lesions where there is a combination of fibro-osseous lesion with ABC. There may be different combinations within this form i.e. according to Adekeye et al[5]. ABC may be associated with the early active phase of fibrous dysplasia as a secondary vascular change within the pre-existing primary lesion. It may be associated with other fibro-osseous lesions like ossifying

Table-2: Distribution of Non-hybrid and hybrid and cases among Age and sex group.

Age category	Non-hybrid form		Hybrid form		Total	
(year)	Frequency	Percent	Frequency	Percent	Number	Percent
6-10years	1	2.9	1	16.7	2	5.0
11-20 years	13	38.2	3	50.0	16	40.0
21-30 years	13	38.2	2	33.3	15	37.5
31-40 years	3	8.8	0	0	3	7.5
41-72 years	4	11.8	0	0	4	10
Sex						
Male	16	47.1	3	50	19	47.5
Female	18	52.9	3	50	21	52.5
Total	**34**	**100**	**6**	**100**	**40**	**100**

fibroma, cementifying fibroma and cemento-ossifying fibroma[6]. Blayney et al[14] reported young aged patient with fibro-osseous lesion

In this study, it showed that most of the patients (80%) of both hybrid and non-hybrid form of fibro-osseous were from rural area and size of the swelling of hybrid form were comparatively bigger i.e. >36sq. cm (50% cases of hybrid form). The giant lesion is related to the rural character of our population where proper diagnosis and treatment are often misleading and delayed due to poor socio-economic status, lack of awareness due to ignorance and poor referral system.

Conclusion

In conclusion, it can be predicted that there is no significant association of between age and gender fibro-osseous lesion, are predominant in rural area. These findings will help in understanding the fibro osseous lesion of young aged both sex are more affected.

Acknowledgements
None.
Conflict of interest
The authors have no conflicts of interest to disclose.
Financial Disclosure
This research project was not funded by any group or any institution.
Authors' Contributions
Shahed AM, Ahmed M, Molla MR conceived and designed the study, analyzed the data, interpreted the results, and wrote up the draft manuscript. Haque MA, Alam MS involved in the manuscript review and editing. All authors read and approved the final manuscript.
Data Availability
Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.
Ethics Approval and Consent to Participate
Ethical approval for the study was obtained from the Institutional Review Board. The written informed consent was obtained from all study participants. All methods were performed in accordance with the relevant guidelines and regulations.

How to cite this article
Shahed AM, Ahmed M, Molla MR, Haque MA, Alam MS. Socio-demographic Characteristics and Clinical Profiles of Hybrid and Non-Hybrid Forms of Fibro-Osseous Lesions in Craniomaxillofacial Region. J Army Med Coll Jashore, 2023;4(1):40-43
Publication History
Received on: 7 September 2022
Accepted on: 24 October 2022
Published on: 1 January 2023

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https://amcj-bd.org/
Journal of Army Medical College Jashore
January 2023, Vol. 4, No. 1, Page 44-49
ISSN : 2789-1135 (Print)

Original Article ***Open Access***

Knowledge and Practices about Reproductive Health Issues among Adolescent in a Rural Area of Bangladesh

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Abstract

Background: Aadolescents are particularly vulnerable to health risks, especially in the area of reproductive health. In Bangladesh about one-third of adolescent women are already mothers and another 5 percent are pregnant with their first child. The proportion of adolescent women who have begun childbearing increases rapidly with age, from 14 percent at age 15 to 58 percent at age 19 which are more likely in rural area urban (37 percent versus 25 percent). **Objective:** The purpose of the present study was to know about the knowledge and practice about Reproductive Health Issues among adolescent in a rural area of Bangladesh. **Methodology:** This descriptive type of cross sectional study was conducted among 270 adolescent boys and girls who were selected purposively at Kamrangirchar area of Dhaka district in Bangladesh from the period of 1 November to 15 November 2021 with the objectives to know the knowledge and practice about Reproductive Health Issues among adolescents.The data was collected by using a semi structured questionnaire. **Results:** A total 270 respondents were interviewed face to face. Their mean age was 14.7741 years. Among 270 girls maximum 212 (88.33%) had menstruation history and 28(11.66%) cases didn't. Age of menarche were within the age group 12 to 14 years were 163 (76.88%) and 8(3.77%) were below 10 years of age. Majority 140 (66.06%) respondents had regular menstrual cycle whereas 72(33.96 %) cases were respond irregular cycle. We found majority 109(51.41) used old and torned cloths whereas 56(26.41%) used sanitary napkin and 47(22.16) used cotton at the time of period of menstruation. Again 141(66.50) girls had respond they washed menstrual materials with water and soap, only 13(6.13%) add savlon and however 47(22.16%) had no knowledge because they used only plain water. 99(46.69%) respondents drying of menstrual materials with normal air, 55(25.94%) in dark and dirty place, onmaterial behind the door, 56(26.41%) girls keep in dark place, only 35(16.50%) used dry clean box and packet.115 (42%) of respondents had knowledge on age of marriage is less than equal to 18 years, 95(35%) respondent respond more than 18years of age and 60(22%) did not known. Present study showed 149(55%) respondent had knowledge regarding STDs whereas 100(37%) had no knowledge and 21(8) became confused. **Conclusion:** Majority of them belonged to low economic status. *[Journal of Army Medical College Jashore, January 2023;4(1):44-49]*

Keywords: Reproductive health; menstruation; adolescent

Introduction

Adolescence is a period, between 10 to 19 years in general, characterized by significant physiological and psychological change[1]. The young people, being confused and anxious about unprecedented physical changes together with inability to endure such shame and embarrassment, are increasingly at greater risks of adverse reproductive health outcomes with longstanding consequences through the exposure to drugs, coercive sexual acts as well as violence[2]. The reproductive health of adolescents is a growing concern in health sectors all

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over the world. Although "adolescence" is applicable to both sexes, it is well recognized that girls are more prone to the hazards of adolescence than boys[3]. Adolescence is the transition period from childhood to adulthood and is widely recognized as a time of great opportunity. It is also considered as a period with vulnerabilities, in terms of both biological (physical and psychological) and environmental (national and international politics along with influence of family, community, neighbors, peers and schools) aspects. At present, the adolescent cohort among the global population is the largest ever, adolescents aged 10-19 years comprise about 18% of the global population. Moreover, reproductive health problems are the major cause of death among women aged 15 to 19 years[4]. Adolescence, a near-universal period of the socialization cycle, is characterized as a phase of human growth and development that occurs after childhood and before adulthood and includes individuals between the ages of 10 and 19[5]. Adolescence is a transitional stage that includes multidimensional changes, including physical, psychological, emotional, and social changes[6]. Bangladesh has a large adolescent population of approximately 36 million, which means that more than one-fifth of the total population is between the ages of 10 and 19. According to the population census of 2011, among the adolescent population, about 49% are girls[7]. This population will continue to increase according to population projections[8]. Globally, one-fifth of the total population are adolescents; among all adolescents, 85% live in developing countries. Ensuring the healthy reproductive health status of adolescents, particularly in developing countries, is a growing concern[9]. Adolescence is a crucial and vulnerable period when physical and mental changes take place and adolescents feel stressed due to these transitions[10]. A review in 2011, based on demographic health surveys (DHS) conducted in 11 countries (Cambodia, Indonesia, Marshall Islands, Nauru, Papua New Guinea, Philippines, Samoa, Solomon Islands, Timor-Leste, Tuvalu and Vietnam), reported that adolescents have poor knowledge and less access to information and services on reproductive health[11]. The majority of young people in the Asia-Pacific region are not able to receive reproductive health services. They are vulnerable to reproductive health risks and sexually transmitted infections, including HIV. Their human rights are violated due to this denial of reproductive health services and education. The fifth Asia Pacific Conference on Reproductive and Sexual Health and Rights, held in Beijing, China, 2009 declared the need to improve the sexual and reproductive health and rights of young people[12]. The knowledge and practices related to use of sanitary protection during menstruation is a vital aspect of health education. Data on reproductive and general health concerns of this young population are scarce, without which, meaningful programs cannot be implemented. Although menstruation is a natural process, it is linked with several misconceptions and practices, which sometimes result in adverse health outcomes[13].

Adolescence is the period when major physical changes take place and secondary sexual characteristics appear. Therefore, accurate and adequate reproductive health knowledge at this age is crucial for developing proper practices and behavior regarding reproductive health for the future. In reality, adolescents are poorly informed about their own bodies and health. Moreover, the information available to them is most often incomplete, inadequate, and confusing[14]. Proper Adolescent Reproductive Health (ARH) education can provide adolescents with culturally relevant, age-appropriate and scientifically accurate information. This can give adolescents the opportunity to explore their knowledge, attitudes, and values on reproductive health (RH) as well as in practicing those skills while taking decisions related to their personal lives[15].

In Bangladesh, the total number of adolescents (10-19 years of age) is 34 million, which represents 23% of the country's population. 20 About 12% of the adolescents belong to the age group of 10-14 years and 11% are in the age group of 15-19 years[16]. Among the adolescent girls, 11% belonging to the age group of 10-14 years and 46% from the age group of 15-19 years are reported as married[17]. In Bangladesh, the sexual and reproductive health (SRH) status of the adolescent population, including those who are unmarried and married, remains an area of significant concern. Many adolescents, especially adolescent girls in Bangladesh, are not given adequate opportunities to enhance their overall health during their process of growing up. In making informed life choices, they begin to encounter tremendous challenges, for example, a substantial number of adolescents experience risky or unwanted sexual behaviors and do not get prompt or proper care[18]. SRH is still a cultural taboo in Bangladesh, especially for adolescents, and SRH information and services present a critical gap for unmarried adolescents, particularly girls, which leaves them vulnerable to health risks and discriminatory care[19].

Parents do not feel comfortable discussing SRH issues with their adolescent children, and schools provide minimal information on SRH[20]. Similarly, adolescent boys also face similar educational and cultural restrictions.A dearth of adequate knowledge and appropriate information on SRH makes them confused, scared, excited, and curious; causes insomnia; and raises a number of questions in their mind[21]. Adolescent boys look for support from their close ones for tackling these problems, but the irony is that no one helps them or even shows enough empathy to respond to their query[22].

In Bangladesh, reproductive health is still generally focused on women's reproductive health concerns. Few SRH programs address males for helping them to get better care for their partners, which may make the SRH situation

of older adolescent girls worse, especially for married girls in Bangladesh[23,24]. The hypothesis of the present study is that adolescent in rural Bangladesh have incorrect knowledge or misconceptions about reproductive health. Given these circumstances, it is imperative to understand to what extent adolescent girls have knowledge about reproductive health, the status of their correct or incorrect knowledge, and the factors associated with their knowledge. The importance of the present study lies in providing information that program managers and policy makers can use to support their ongoing programs and develop appropriate interventions to improve awareness about reproductive health among rural adolescent in Bangladesh.

Methodology

Study Settings and Population: The study was descriptive type of cross-sectional was conducted for a period from November 1st to November 15th 2021. Data was collected from 270 adolescents using self-administered questionnaire. The respondents were informed about purpose of study and before collection of data a written infromed concent was taken assuring that the collected data would be confidential.

Study Procedure: Interviews has been conducted with structured and semi-structured questions. Which comprised several topics like socio-demographic characteristics (Age, Education, Occupation, Income level) also include knowledge and practice on reproductive health issues.

Statistical Analysis: All data were recorded systematically in preformed data collection form (questionnaire) and quantitative data were expressed as mean and standard deviation and qualitative data were expressed as frequency distribution and percentage. Statistical analysis was performed by using window-based computer software devised with Statistical Packages for Social Sciences (SPSS-17) (SPSS Inc, Chicago, IL, USA).

Results

In table 1 showed that among 270 respondents mean age was 14.7741 years. Majority 240,88.88% were girls, 256,94.81% were Muslim. Regarding occupation almost 31% were students and service holder and majority 98,36.29% had income level within 10,000-20,000 Taka. In Table 2 showed that 212 girls started menstrual cycle, 163,77% were within 12-14 age group. Regularly menstruated 140,66.03 in number. During menstrual period majority 109,51.41% habit use old torned cloths and they washed with soap and water, make dry with normal air and finally preserve behind the doors. Majority 171,80.66 girls had history to use menstrual material more than 6 months. Among respondents 156, 57.77% cases were unmarried and 19.7.03% cases were separated as well.

In Figure I showed the levels of education of respondents. Among 240 girls 121 were completed secondary education, 43 were primary, 29 were illiterate and only 19 completed higher secondary. Among 30 boys 9 completed secondary level whereas 9 were illiterate. And also completed primary and higher secondary 8 and 4 in number respectively.

Table 1: Variables Related to Socio-Demographic Characteristics of Respondents (n=270)

Variables		Frequency	Percent
Age Group			
• ≤12 Years		65	24.07
• 13 to 15 Years		95	35.18
• ≥15 Years		110	40.74
Mean ±SD	14.7741±2.13940		
Gender			
• Girls		240	88.88
• Boys		30	11.11
Religion			
• Muslim		256	94.81
• Hindu		12	4.44
• Christian		2	0.74
Occupation			
• Household work		75	27.77
• Service		83	30.74
• Student		82	30.37
• Richshawpuller		02	0.74
• Day labour		11	4.07
• Others		17	6.29
Marital status			
• Married		95	35.18
• Unmarried		156	57.77
• Separated		19	7.03
Monthly Family Income (TK)			
• <10,000		57	21.11
• 10,000-20,000		98	36.29
• 20,000-30,000		64	23.70
• >30,000		51	18.88

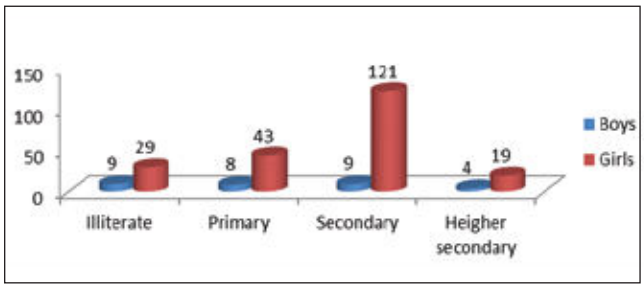

Figure I: Distribution of Respondents According to Levels of Education

Table 2: Menstrual hygiene related information (n=240)

Characteristics	Frequency	Percent
Starting of Menstruation		
• Yes	212	78.51
• No	28	10.37
Age at Menustration (n=212)		
• <10 years	8	3.77
• 10-12 years	79	37.26
• 12-14 years	163	76.88
• >14 years	20	9.43
Menstrual cycle (n=212)		
• Regular	140	66.03
• Irregular	72	33.96
Duration of Period (n=212)		
• ≤7days	146	68.86
• >7days	53	25.00
• Did not responed	13	6.13
Material used at the time of menstruation (n=212)		
• Sanitary napkin	56	26.41
• Old torned cloth	109	51.41
• Cotton	47	22.16
Washing process of used material during menstrual period (n=212)		
• With soap and water	141	66.50
• With soap, water and savlon	13	6.13
• Only water	42	19.81
• others	16	7.54
Drying process (n=212)		
• Direct sunlight	19	8.96
• Normal air	99	46.69
• Dark and dirty area	55	25.94
• Cornar of room	39	18.39
Preservation process(n=212)		
• Clean dry box and packet	35	16.50
• Behind the door	103	48.58
• Dark place	56	26.41
• Others	18	8.49
Repeated use of Menstrual Material (n=212)		
• ≤ 6months	41	19.33
• > 6months	171	80.66

In Table 2 showed that 212 girls started menstrual cycle, 163,77% were within 12-14 age group. Regularly menstruated 140,66.03 in number. During menstrual period majority 109,51.41% habit use old torned cloths and they washed with soap and water, make dry with normal air and finally preserve behind the doors. Majority 171,80.66 girls had history to use menstrual material more than 6 months.

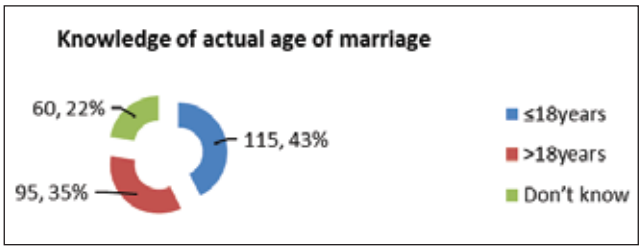

Figure II: Showing the Knowledge of actual marriage age

In Figure II showed Knowledge of actual marriage age. 115, 43% respondents respond ideal age was less than and equal to 18 years whereas 60,22% didn't respond.

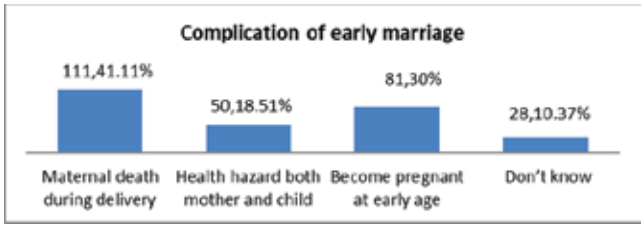

Figure III: Showing the Knowledge of complication of early marriage

In Figure 3 showed Knowledge of complication of early marriage. 111, 41.11% respondents had good knowledge of complication that was maternal death at the time of delivery, 81,30% respond early pregnancy.

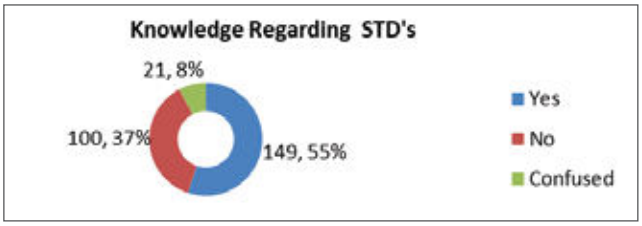

Figure IV: Showing the Knowledge on STD's

In Figure 4 showed Knowledge on STD's. Surprisingly 149,55% respondents had knowledge of STD, whereas 100,37% had no knowledge and 21,8% were confused.

Discussion

The study was descriptive type of cross-sectional study conducted in Keraniganj Upazilla Health complex intended to explore on knowledge and practices about reproductive health issues among 270 respondents in rural area in Bangladesh by using semi structured questionnaire. Majority of respondents were 110 (40.74%) within the age group more than 15 years, 95 (35.18%) within the age group 13-15 years and 65 (24.07%) was with equal or less than 12 years of age respectively. The Mean age was 14.7741±2.13940. 256(94.81%) respondents were Muslims and 156(57.77%) respondents were unmarried. In Study by

Bhuiya 2003 in Bangladesh, out of 32 million adolescents, 51% are girls and half of them are married aged in between 15-19 years. Most of the respondents 130(48.14%) were educated secondary level, 51(18.88%) were primary level, 23(0.003%) was heigher secondaryand 38(14.07%) were illiterate. Data from the Bangladesh Demographic Health Survey-2007 shows that the percentage of adolescent women age 15-19 years had completed secondary education has increased from 18% to 59%[25]. Majority 83(30.74%) were service holder, 82(30.33%) were student, 75(27.77%) were household workers and rest were others.

In Bangladesh, a large number of adolescent and young women migrate from rural areas to participate in wage labour. Most of them live in city slum areas and work in the garment industry. As estimated 80% of all total garments worker are female, of whom 50% are adolescent girls[15]. Maximum 98(36.29%) had monthly income equal or more than 10,000 Taka and 57(21.11%) had monthly income less than 10,000 Taka. Out of 270 respondents, 88.33% had history of menstruation[26]. Adolescents from urban areas showed pragmatic knowledge about reproductive health issues than their rural counterparts. This disparity could be attributed to cultural differences, including norms and practices, between rural and urban areas in which they are nurtured. In addition, the urbanites enjoy relatively more access to information and services offered by government and non-government organizations, concentrated largely in urban areas, henceforth, harnessed more knowledge about reproductive issues[27]. Highest percentage of the respondents 163(76.88%) experienced their menarche were within the age group 12-14 years, 79(37.26%) within the age group 10-12 years, 20(12.5%) of respondents were within the age group equal and more than 14 and 8(9.43%) was with less than 8(3.77%) years of age respectively. The mean age of menarche was 14 years. It is comparable to a study about "General and Reproductive Health of Adolescent Girls in Rural South India" in which, out of 190 adolescents, 124 girls had attained menarche (65.26%) and the mean age of menarche was 13.9 years[28]. It was revealed in our study, 56(26.41%) of respondents knowledge and practice during menstruation time used sanitary napkin, 109(51.41%) used old torn cloth, 47(22.16%) used cotton. This findings may comparable to a study conducted in Rajasthan of India in 2006 that 89% of girls use cloths and rags and 11% of girls share used menstrual cloths and rags with others to absorb their menstrual flow[15]. In our study, 32% had no knowledge on complications due to unhygienic practice during menstrual cycle. 68% correctly mentioned infection and the rest were incorrectly mentioned itching and others, compared with the study in rural Bangladesh is that 12% of the study population had the basic understanding of reproductive tract infections[29].

In the present study about the knowledge on age at marriage, 115(42.59%) of respondents knowledge on age of marriage is less than equal to 18 years, 95(35.19%) of respondents knowledge on age of marriage is more than 18 years and 60(22.22%) is not known. According to Rahman M M and Kabir M, majority of the adolescents did not know the legal age at marriage. About 62.4% of adolescents correctly state the legal age at marriage for girls, whereas only 12% knew about legal age at marriage for boys[30]. In our study, About the knowledge on symptoms of STIs, 115(42.59%) respondents' knowledge on symptoms of sexually transmitted diseases is lower abdominal pain, 100(37.03%) respondents is itching and 55(20.37%) respondents don't have knowledge on symptoms of sexually transmitted diseases. A recent evaluation study of data on 3362 adolescent girls irrespective of their marital status found that more than half (54.8%) of the adolescent 574 Awareness about Reproductive Health Issues among the Adolescent Girls in a Rural Area of Bangladesh have heard about STIs as well as AIDS[31]. In present study, the adolescent in the rural area of Bangladesh have not sufficient knowledge about reproductive health issues. Today's adolescent girls are the mother of tomorrow and adolescent girls have to experience the reproductive health near future. So, clear and correct knowledge of adolescent on reproductive health will help them to maintain a good and sound reproductive health in future. The communication between parents and children was not explored. This study, therefore, suggests further investigation in this regard.

Conclusion

Adolescents' population has tremendous demographic significance because at the same time they are the present and the future population of a country. Bangladesh still faces formidable obstacles in the path to the goals of health of reproductive well being due to inadequate knowledge or misconception about reproductive health issues. So, proper knowledge is a pertinent part of life. The awareness remains dismal among adolescent girls who have very low knowledge on STDs. This may be due to their lack of interest and shyness about this issue. It is our responsibility to improve the condition of reproductive health of adolescent girls by continuous mass campaigning through different medias and also by giving detailed information in our text book about it as well as there is an urgent need to bring out the real capability of the government health facilities.

Acknowledgements
None
Conflict of interest
The authors have no conflicts of interest to disclose
Financial Disclosure
The author(s) received no specific funding for this work.
Authors' Contributions
Begum N, Begum S, Afrin M conceived and designed the study, analyzed the data, interpreted the results, and wrote up the draft manuscript. Afrin M, Biswas TS contributed to the analysis of the data, interpretation of the

results and critically reviewing the manuscript. Begum N & Shewly NR involved in the manuscript review and editing. All authors read and approved the final manuscript.

Data Availability

Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate

Ethical approval for the study was obtained from the Institutional Review Board. The written informed consent was obtained from all study participants. All methods were performed in accordance with the relevant guidelines and regulations.

How to cite this article: Begum N, Begum S, Afrin M, Biswas TS, Shewly NR. Knowledge and practices about Reproductive Health Issues among Adolescent in a Rural Area of Bangladesh. J Army Med Coll Jashore, 2023; 4(1):44-49

Publication History

Received on: 7 September 2022
Accepted on: 24 October 2022
Published on: 1 January 2023

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