JOURNAL
OF
ARMY MEDICAL COLLEGE CHATTOGRAM

"Transforming Health Care Through Research"

Journal of Army Medical College Chattogram (JAMCC)

Early Detection and Prevention of Chronic Kidney Disease

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Chronic Kidney Disease (CKD) is a common disorder and its prevalence is increasing worldwide including Bangladesh. Early diagnosis on the basis of presence of proteinuria or reduced estimated glomerular filtration rate could permit early intervention to reduce the risks of cardiovascular events, kidney failure and death that are associated with chronic kidney disease. In developed countries, screening for the disorder is most efficient when targeted at high-risk groups including elderly people and those with concomitant illness (Such as diabetes, hypertension or cardiovascular disease) or a family history of chronic kidney disease, although the role of screening in developing countries is not yet clear. Effective strategies are available to slow the progression of chronic kidney disease and reduce cardiovascular risk. Treatment of high blood pressure is recommended for all individuals with, or at risk of chronic kidney disease. Use of angiotensin-converting-enzyme inhibitors or angiotensin receptor blockers is preferred for patients with diabetic chronic kidney disease or those with the proteinuric non-diabetic disorder. Glycaemic control can help prevent the onset of early stages of chronic kidney disease in individuals with diabetes. Use of statins and aspirin is beneficial for most patients with chronic kidney disease who are at high cardiovascular risk, though research is needed to ascertain how to best prevent cardiovascular disease in this cohort. Models of care that facilitate delivery of the many complex aspects of treatment simultaneously could enhance management, although effects on clinical outcomes need further assessment. Novel clinical methods to better identify patients at risk of progression to later stages of chronic kidney disease, including kidney failure are needed to target management to high-risk subgroups.

References

1. Khalil A, Abdalrahim M. Knowledge, Attitudes and Practices towards Prevention and Early Detection of Chronic Kidney Disease. International Nursing Review. 2014;61(2):237-245.

2. United State Renal data System, Annual data Report. Atlas of Chronic Kidney Disease and End Stage Renal disorder in the United States. National Institutes of Health. National Institute of Diabetes & Digestive and Kidney Diseases. Bethesds. USA. 2016.

3. Yusoff DM, Yousof J, Kueh Y. Knowledge, Attitude and practices of the risk for Chronic Kidney Disease among patients in a Tertiary Teaching Hospital. the Malaysian Journal of Nursing. 2016;8(2):3-11.

4. Sa'adeh HH, Darwazeh RN, Khalil AA, Zyoud SM. Chronic Kidney Disease of Hypertensive Patients towards Prevention and Early Detection of Chronic Kidney Disease: A Cross Sectional Study. Clinical Hypertension. 2018;24:6.

5. Desai M. Early Detection and Prevention of Chronic Kidney Disease. 2019 5th International Conference on Computing Communication. Control and Automation (ICCUBEA) Puna. India. 2019;1-5.

6. Asmelash D, Chana E, Desalegn G, Assefa S, Anynlem GL, Fasil A. Knowledge and Practices towards Prevention and Early Detection of Chronic Kidney Disease. International Journal of Hypertension. 2020;2020:8 (Article ID-2860143).

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Clinical Presentation and Immediate Outcome of Infant of Diabetic Mother: A study in A Tertiary Care Military Hospital

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ABSTRACT

Background : Infant of Diabetic Mother (IDM) often have complications associated with fetal hyperinsulinemia induced by maternal hyperglycemia. Infants born to Diabetic Mother (IDM) possess definite idiosyncratic characteristics, which includes Large for Gestational Age (LGA) and high morbidity hazards. Compared to infants of non-diabetic mothers, the neonatal mortality rate in IDM is over five times more and is complex at all Gestational Ages (GA) and birth weight for gestational age groups. This study was conducted to evaluate the clinical presentation and immediate outcome of IDM in a tertiary care Military hospital.

Materials and methods: This prospective study was conducted in Department of Paediatrics in Neonatal unit of Combined Military Hospital Chattogram. During this period, all IDM (Pregestational & gestational) delivered in this hospital was enrolled for this study. In this study, a total of 62 IDM were included delivered during the study period.

Results: Results suggest that more than half of the infants developed Respiratory distress (51.6%) which is the highest among all the complications. Followed by Neonatal Jaundice (32.3%), Neonatal Sepsis (19.4%), Polycythemia (11.3%), Birth Asphyxia (9.7%), Congenital heart disease/Anomalies (8.1%), Hypoglycemia and Birth injuries both (6.5%), Hypocalcaemia (4.8%), Seizure (3.2%), Others (1.6%) and death (1.6%). Our study also suggest that 51.6% was large for gestational age.

Conclusion: The study was conducted from the perspective of Bangladesh and the social conditions and metrological parameters were involved in this study. Considering the limitations, Authors would like to recommend that more study should be conducted taking multiple centers in consideration.

Key words: Congenital anomalies; Diabetes Mellitus; Infant of diabetic mother; Uncontrolled blood sugar.

Introduction

Infant of Diabetic Mother (IDM) often have complications associated with fetal hyperinsulinemia induced by maternal hyperglycemia[1]. In the first trimester, maternal hyperglycemia can cause diabetic embryopathy, which results in major birth defect and spontaneous abortions. In the second and third trimesters, maternal hyperglycemia can cause fetal hyperglycemia, hyperinsulinaemia, hypocalcaemia, polycythaemia, hyperbilirubinaemia, hypertrophic cardiomyopathy, delayed lung maturation and Large for Gestational Age (LGA)[2,3]. Though many IDMs have an uneventful perinatal progression, there is still an augmented peril of difficulties. Many of these can be diminished but not eradicated, with appropriate obstetric and pediatric interference. However, a recent analysis specified that there is still much scope for development because of the multiplicity of aspects. This study was conducted to evaluate the clinical presentation and immediate outcome of Infant of Diabetic Mother in a Tertiary Care Military Hospital.

Materials and methods

This prospective study was conducted at Department of Paediatrics in Neonatal Unit of Combined Military Hospital Chattogram for 1 year period from 1.12.2019 to 30.11.2020. This study was permitted by the Combined Military Hospital Chattogram, Bangladesh, where all the collected data were analyzed and stored. Ethical clearance taken from concern authority and written informed agreement was attained from the parents or guardians.

During this period all IDM (Pregestational & gestational) delivered in this hospital were enrolled for this study. The survey was conducted on 62 IDM. Among them 30 were male and 32 were female. First, for ethical issues written consent was taken from all the parents and then the relevant information from the history, physical examination and investigation findings were recorded in a purposely prepared questionnaire. Investigations routinely underwent were capillary blood glucose at 1, 2, 3, 6,12, 24, 36 and 48 hours of age by using glucostix. The glucostix (Capillary blood glucose) was used for screening purpose and for prompt diagnosis and management of hypoglycaemia.

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Estimation of peripheral venous blood glucose level was done for further confirmation of diagnosis of hypoglycaemia. Serum calcium level were measured routinely at 6, 24, 48 hours of age and later if the baby remains hypocalcaemic or symptomatic. Septic screening at 1 hour & 24 hour of age was done routinely. Blood samples were collected each time in all cases by trained nurses. Tests were done by autoanalyzer and interpreted by expert persons. Among other investigations: S. Fractionated Bilirubin, CXR-AP view, plain X-ray of lumbosacral spine, Hb%, TC, DC, blood culture, ECG, echocardiography etc. were done as indicated by clinical parameters. Results were analyzed by analyzing software SPSS version 27.

Mother's obstetrics history involved data concerning their socio-economic status, urban/rural background, family history of diabetes mellitus (In parents). Ultrasonographic findings and HbA1c (In 1st trimester in presentational DM and at diagnosis in GDM) were assessed. Other allied obstetrical and medical complications were noted.

Results

In this study, total 62 IDM were included. 30 were male (48.4%) and 32 (51.6%) were female. Almost 81% (50) of the infants were born at the gestational age of 37-41 weeks, 17.7% (11) born <37 weeks and 1.6% (01) ≥ 41 weeks of gestation. Further, 67.7% (42) of the infant's birth weights were on an average 2.5-3.99 kg, 17.7% (11) ≤ 2.5 kg and 14.6% (09) ≥ 4kg. Almost 88% (54) of the infants were delivered through LSCS, 9.7% (06) spontaneous vaginal delivery and 3.2% (02) assisted vaginal delivery (Table I). 51.6% (32) infant was Large for Gestational Age (LGA), 45.2% (28) Appropriate for Gestational Age (AGA) and 3.2% (02) Small for Gestational Age (SGA) (Table II). Among various complications, Respiratory distress was found in 51.6% (32) of infants, Neonatal Jaundice 32.3% (20), Neonatal Sepsis 19.4% (12), Polycythemia 11.3% (07), Birth Asphyxia 9.7% (06), Congenital heart disease / Anomalies 8.1% (05), Hypoglycemia and Birth injuries both 6.5% (04), Hypocalcaemia 4.8% (03), Seizure 3.2% (02), Others 1.6% (01) and death 1.6% (01) (Table III). Approximately 52% (32) of the infants needed 4-7 days to recover from their complications and approximately 34% (21) infants took ≤ 3 days to recover (Table: IV). Time for establishment of full feeding required <24 hours 25.8% (16), 24-72 hours 48.4% (30) patient and more than 72 hours 25.8% (16) patient respectively (Table V). 51.6% (32) infants were given Dextrose infusion and Oxygen therapy, 32.3% (20) were treated with proper antibiotics. Further, 32.3% (20) infants were treated with phototherapy. Followed by 11.3% (07) with CPAP, 4.8% (03) with Calcium supplements, 3.2% (02) with Inj. Phenobarbitone, 3.1% (01) with Ventilation and 1.6% (01) with exchange transfusion, respectively (Table VI).

Table I : Characteristics of infants of diabetic mother (n= 62)

Characteristics	Number	Percentage (%)
Sex		
Male	30	48.4
Female	32	51.6
Gestational Age (Weeks)		
< 37	11	17.7
37-41	50	80.7
≥ 41	01	1.6
Birth weight (Kg)		
≤ 2.5	11	17.7
2.5-3.99	42	67.7
≥ 4	09	14.6
Delivery Mode		
LSCS	54	87.1
Spontaneous Vaginal	06	9.7
Assisted vaginal	02	3.2

Table II : Birth weight and relation of gestational age (n= 62)

Birth wt. in antenatal chart	No. of patient	Percentage (%)
< 50 centile (SGA)	2	3.2
50-90 centile (AGA)	28	45.2
>90 centile(LGA)	32	51.6

Table III : Clinical presentation of infants of diabetic mother (n=62)

Complications	Number	Percentage (%)
Hypoglycemia	04	6.5
Neonatal Jaundice	20	32.3
Respiratory distress	32	51.6
Neonatal Sepsis	12	19.4
Birth Asphyxia	06	9.7
Polycythemia	07	11.3
Birth Injuries	04	6.5
Seizure	02	3.2
Hypocalcaemia	03	4.8
Congenital heart disease/Anomalies	05	8.1
Others	01	1.6
Death	01	1.6

Table IV : Duration of hospital admission (Days) of infants of diabetic mother

Days	Number	Percentage (%)
≤ 3	21	33.9
4-7	32	51.6
≥ 7	09	14.5

Table V : Time of feeding commence of infants of diabetic mother (n=62)

Hours	Number	Percentage (%)
<24	16	25.8
24-72	30	48.4
> 72	16	25.8

Table VI : Treatment given (n=62)

Treatment	Number	Percentage (%)
Dextrose infusion	32	51.6
Antibiotics	20	32.3
Oxygen therapy	32	51.6
CPAP	07	11.3
Ventilation	01	3.1
Calcium supplements	03	4.8
Phototherapy	20	32.3
Exchange transfusion	01	1.6
Inj. Phenobarbitone	02	3.2

Discussion

According to who report 2016, 8% (12.88 million) of total population of Bangladesh was affected by diabetes mellitus. Among them, a note worthy figure is female. GDM progresses among 6.7% of all pregnancies in our people. Whereas, in western world, only 2 to 3% of all pregnancies are currently being diagnosed as GDM[4,5]. The infant of diabetic mother is at an increased risk of complications compared to infants of non-diabetic mothers[1].

In the last few years several search and survey work have been conducted on IDM and the morbidity of the infants. Sugawara et al between May 2010 and July 2013 conducted a research on 42 Japanese IDM and their mothers at their facility. Infant of diabetic mother had more complications than nondiabetic mother. The authors found higher rate of hypoglycemia which was around between 70% and 81.2%[6]. Opara et al conducted a study for over two years on IDM. Authors found that the commonest morbidities were Hypoglycemia (Suggestively greater in IDMs than non-IDMs) and hyperbilirubinaemia in 30 (63.8%) and 26 (57.4%) infants correspondingly[7]. Mahmoodand Kayes conducted a survey on IDM and found that the occurrence of hypoglycaemia was greater in infants of pregestational diabetic mothers as paralleled to that of gestational diabetic mothers (38.09% and 12.9%) individually[4]. Makwana et al conducted a survey on 34 infants born on diabetic mother. Authors found that respiratory distress was the commonest problem, found in 20 (58.82%) IDMs followed by congenital anomalies in 16 (47.05%) cases and Hypoglycemia in 15 (44.11%)[8]. Further, Mohammad H. Al-Qahtani reported that about 70% of the IDM were born with the issue of Gestational Diabetes Mellitus (GDM) whereas, almost 26% were born with type 2 Diabetes Mellitus (DM) and solitary 4.5% infants with type 1 DM. The maximum common IDM morbidities were found to be Hypomagnesaemia[8].

Studies suggest that infants born from diabetic mother tend to have higher birth weights (Except the disease is severe)[10-13]. In our study we also found that major portion of neonate were LGA, which is 51.6%.

However, it is interesting to mention here that Ranade et al found hypoglycemia among 50% of the infants of diabetic mother[14]. Studies suggest that hyperglycaemia of mother in pregnancy disclosures the infant to the jeopardy of RDS, since insulin constrains gene expressions of surfactant proteins A and B in lung epithelial cells[15-17]. However, mature infants born to mothers with diabetes has exposed to bear a six-fold increase in peril of RDS, consistent with this study (51.6%)[18].

The infant of diabetic mother is at an augmented risk of difficulties compared to infants of non-diabetic mothers. The reasons of the fetal and neonatal sequelae of maternal diabetes are multifactorial. Nevertheless, some of the perinatal difficulties can be outlined to the effect of maternal glycemic regulation on the fetus. Further, significant amount of the perinatal difficulties in IDMs can be prevented by suitable peri-conceptional and prenatal attention[19-22].

Limitation

This study is exceptional as it is the first regional study that emphases on maternal and neonatal results. Our data is analogous to global figures. This study had limited margins mostly because of its slightly limited access to some data. In this study, the maternal nutritional status, obtainability of laboratory data, data imitating treatment objective attainment for instance, fasting glucose level post initiation of therapy were inaccessible. The experience of single center data is another limitation of this study.

Conclusion

This study discussed the clinical presentation and immediate outcome of infant of diabetic mother. 62 infants were taken into consideration in this study. The study was conducted from the perspective of Bangladesh and the social conditions and metrological parameters were involved in this study. More than half of the infants took birth with Respiratory distress (51.6%) followed by Neonatal Jaundice (32.3%), Neonatal Sepsis (19.4%), Polycythemia (11.3%). Treatment were provided and more than half of the infants recovered within 4-7 days' period. Number of death was very less (1.6%).

Recommendations

Considering the above limitations, author would like to recommend that more study should be conducted with taking multiple centers in consideration.

Disclosure

All the authors declared no competing interests.

References

1. Pedersen J, Osler M. Hyperglycaemia as the cause of characteristic features of the foetus and newborn of diabetic mothers. Dan Med Bull.1961; 78-83.

2. Makwana M et al. Int J ContempPediatr. 2017;4(4):1228-1231.

3. Cheng YW, Caughey AB. Gestational diabetes: diagnosis and management. J Perinatal. 2008;28;657-664.

4. Mahmood CB, Kayes MI. Problems and immediate outcome of infants of diabetic mothers. Journal of Bangladesh College of Physicians Surgeons. 2008; 26(2):67-72.

5. Mahtab H, Latif ZA, Pathan MF. Diabetes mellitus: A handbook for professionals. Dhaka: Diabetic Association of Bangladesh. 1997.

6. Sugawara D, Maruyama A, Imanishi T, Sugiyama Y, Ichihashi K. Complications in infants of diabetic mothers related to glycated albumin and hemoglobin levels during pregnancy. Pediatrics Neonatology. 2016;57(6):496-500.

7. Opara PI, Jaja T, Onubogu UC. Morbidity and mortality amongst infants of diabetic mothers admitted into a special care baby unit in Port Harcourt, Nigeria. Italian journal of pediatrics. 2010; 36(1):1-6.

8. Makwana M, Dabi JC, Soni JP, Bhati RL, Mourya HK, Garg Y. The clinical evaluation of the infants of diabetic mothers (IDMS) born in a tertiary care hospital. Int J ContempPediatr. 2017; 4(4):1228-1231.

9. Al-Qahtani MH. Infants of diabetic mothers: 4 years analysis of neonatal care unit in a teaching hospital, Saudi Arabia. Saudi Journal of Medicine Medical Sciences. 2014; 2(3):151.

10. Al-Biltagi M, Tolba OARE, Rowisha MA, Mahfouz AE-S, Elewa MA. Speckle tracking and myocardial tissue imaging in infant of diabetic mother with gestational and pregestational diabetes. Pediatric cardiology. 2015; 36(2):445-453.

11. Mitanchez D, Yzydorczyk C, Siddeek B, Boubred F, Benahmed M, Simeoni U. The offspring of the diabetic mother–short-and long-term implications. Best practice research Clinical obstetrics gynaecology. 2015; 29(2):256-269.

12. Cordero L, Paetow P, Landon MB, Nankervis CA. Neonatal outcomes of macrosomic infants of diabetic and non-diabetic mothers. Journal of neonatal-perinatal medicine. 2015; 8(2):105-112.

13. Ashwal E, Hod M. Gestational diabetes mellitus: Where are we now? Clinicachimicaacta. 2015; 451:14-20.

14. Ranade A, Merchant R, Bajaj R, Joshi N. Infants of diabetic mothers--an analysis of 50 cases. Indian pediatrics. 1989; 26(4):366-370.

15. Azad M, Moyce B, Guillemette L, Pascoe C, Wicklow B, McGavock J, et al. Diabetes in pregnancy and lung health in offspring: Developmental origins of respiratory disease. Paediatric respiratory reviews. 2017; 21:19-26.

16. Piper JM, Xenakis EMJ, Langer O. Delayed appearance of pulmonary maturation markers is associated with poor glucose control in diabetic pregnancies. The Journal of Maternal-Fetal Medicine. 1998; 7(3):148-153.

17. Miakotina OL, Goss KL, Snyder JM. Insulin utilizes the PI 3-kinase pathway to inhibit SP-A gene expression in lung epithelial cells. Respiratory research. 2002;3(1):1-10.

18. Hay WW. Care of the infant of the diabetic mother. Current diabetes reports. 2012; 12(1):4-15.

19. Harris DL, Gamble GD, Weston PJ, Harding JE. What happens to blood glucose concentrations after oral treatment for neonatal hypoglycemia? The Journal of pediatrics. 2017; 190:136-141.

20. Wouldes TA, Battin M, Coat S, Rush EC, Hague WM, Rowan JA. Neurodevelopmental outcome at 2 years in offspring of women randomised to metformin or insulin treatment for gestational diabetes. Archives of Disease in Childhood-Fetal Neonatal Edition. 2016; 101(6):F488-F493.

21. Mitanchez D, Burguet A, Simeoni U. Infants born to mothers with gestational diabetes mellitus: mild neonatal effects, a long-term threat to global health. The Journal of pediatrics. 2014; 164(3):445-450.

22. Harris DL, Weston PJ, Harding JE. Lactate, rather than ketones, may provide alternative cerebral fuel in hypoglycaemic newborns. Archives of Disease in Childhood-Fetal Neonatal Edition. 2015; 100(2):F161-F164.

Comparative Efficacy of Nebulised 3% Sodium Chloride Versus 0.9% Sodium Chloride Plus Salbutamol Solution in the Treatment of Acute Bronchiolitis

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ABSTRACT

Background: Acute bronchiolitis is the most common respiratory tract infection between 2 months to 2 years baby, particularly in winter. Respiratory syncitial virus is the leading cause. No consensus exists on the management of bronchiolitis, other than oxygen therapy, hydration and nutrition. Hence, the present study was conducted to compare the efficacy of nebulized 3% Sodium chloride solution versus 0.9% Sodium chloride plus Salbutamol solution in the treatment of acute bronchiolitis.

Materials and methods: A prospective randomized controlled study of 100 children between 2 to 24 months with Acute Bronchiolitis. Patients were randomized into two group, A and B who received 3% Sodium chloride and 0.9% Sodium chloride plus Salbutamol nebulisation respecively. Nebulisation was given 6 hourly and outcome variables were assessed by clinical severity score, length of hospital stay and length of oxygen therapy.

Results: Baseline clinical severity score and O_2 saturation in group-A were (8.1±1.0 and 94.9±3.8) and in Group B were (8.3±1.7 and 94.6±3.6) respectively. At 72 hours, the mean severity score for the group-A and B were (1.3 ±0.99) and (4.24 ± 1.48) respectively. Group-A required a shorter oxygen therapy compared to group-B (15.0±6.0 hours versus 26.4±5.04 hours respectively). 46(92%) of group-A children recovered and discharged by 72 hours whereas 29 (58%) of group-B showed the same. Length of hospital stay was shorter in group-A compared to group-B (58.1±22.0 hours versus 74.7±27.2 hours). None of the cases encountered any side-effects.

Conclusions: 3% Sodium chloride nebulisation can be considered as an effective treatment for acute bronchiolitis. It significantly reduced the clinical severity score and length of hospital stay and oxygen therapy compared to 0.9% Sodium chloride plus Salbutamol.

Key words: Bronchiolitis; Nebulisation; Salbutamol; Sodium chloride.

Introduction

Acute bronchiolitis is the most common respiratory tract infection in children between 2 months to 2 years, particularly during winter[1]. Peak age is 2 to 6 months. Upto to 3% of all children are hospitalized for acute bronchiolitis in their first year of life[2]. Respiratory Syncytial Virus (RSV) is the leading cause and is responsible for >50% of cases[3]. Other agents include Influenza, Parainfluenza, Adeno virus, Rhino virus, Rheo virus, Mycoplasma, Human Metapneumovirus and Human Boca virus[4]. Risk factors include non-breastfeeding,

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parental smoking, overcrowding, prematurity, male sex[5]. Bronchiolitis is an infection of the bronchiolar epithelium, characterized by cough, wheeze, chest tightness and respiratory distress. Despite of high prevalence of acute bronchiolitis, no definite consensus exists in the management of the disease. Management is mainly supportive. Hydration, nutrition and oxygenation is the mainstay of treatment. Other than these, nebulisation with 3% Sodium chloride, Normal saline plus Salbutamol, only Normal saline, Adrenaline, Ipratropium bromide are used but they are still in controversy. Study suggest that 3% saline solution for infants with bronchiolitis, due to its ability to lower the viscosity of secretions, reduce airway oedema, and improve mucociliary function. This hypertonic saline solution favorably alters mucociliary clearance in both normal and diseased lungs. Though role of antiviral and antibiotic is also controversial, almost all the cases of acute bronchiolitis in Bangladesh are treated with antibiotics[6,7]. Hence, the current study was undertaken to compare the efficacy of nebulized 3% Sodium chloride solution with 0.9% Sodium chloride plus Salbutamol solution in the treatment of acute bronchiolitis with an objective of improvement in clinical severity score and duration of O_2 therapy and hospital stay.

Materials and methods

A prospective randomized controlled study was carried out for a period of 12 months from January 2017 to December 2017 at Combined Military Hospital (CMH) Momenshahi, Mymensingh, Bangladesh. The study protocol was approved by the hospital ethical committee. Study population comprises of 100 admitted children between the age of 2 months to 24 months   presenting with pre-existing runny nose, cough, wheeze, chest tightness and respiratory distress.

All the patients were divided into two groups by using computer generated random number table. Group-A received nebulisation with 2 ml of 3% Sodium chloride solution and group-B received 2.5 ml of 0.9% Sodium chloride plus 0.5 ml of Salbutamol solution at 6 hours interval until improved enough to be discharged. Each group received the same supportive treatment like head up position, suction, feeding, oxygen therapy (When oxygen saturation < 93%), fluid and electrolyte management, paracetamol for fever, and counseling. Following randomization and intervention, cases were monitored by Clinical Severity Score (CSS) at 12 hour intervals till discharge. Oxygen therapy was started or stopped when the patients SPO_2 was below and above 93% respectively. Length of hospital stay means from time of admission to time of discharge. Discharge was on clinical ground only. These children were subjected to the need based investigations including Complete Blood Count (CBC), Chest X Ray (CXR) and Arterial Blood Gas Analysis (ABG). Informed written consent was obtained from parents. Detailed clinical history and examination findings were recorded in a standard predesigned proforma. Assessment of patient's CSS and SpO_2 readings by pulse oximeter were done at admission. The outcome variables were i) Clinical severity score ii) Length of hospital stay iii) Oxygen saturation in room air iv) duration of oxygen supplementation v) Side effects of drugs. Collected data were processed and analyzed using computer software SPSS version 19.

Table I : Clinical Severity Score (CSS)

Variables	0	1	2	3	Total
Respiratry rate	<30 bpm	31 to 45 bpm	46 to 60 bpm	>60 bpm	3
Wheezing	None	Terminal Expiratory/ only with stethoscope	Entire expiration / Audible on Expiration without stethoscope	Inspiration and expiration without stethoscope	3
Retraction	None	Intercostals only	Tracheosternal	Severe with nasal flaring.	3
General condition	normal			Irritable, lethargic, or poor feeding	3

They were reassessed every 12 hours, clinical response was determined by improvement in CSS and O_2 saturation, and for those whose CSS was not improving or was worsening, antibiotic and other supportive measures were added.

Inclusion criteria
i) Age between 2 months to 24 months.
ii) Meet clinical definition of Bronchiolitis.
iii) Clinical severity score 1-10 (Table-1).

Bronchiolitis was clinically defined as the first episode of acute wheezing in children less than two years of age, starting as a viral upper respiratory infection (Coryza, cough or fever).

Exclusion criteria
i) Acute severe bronchiolitis with impending respiratory failure.
ii) Acute severe bronchiolitis with concomitant infection.
iii) Acute severe bronchiolitis with Congenital Heart Disease.
iv) Those who already received treatment outside for acute bronchiolitis.

Results

100 children with Acute Bronchiolitis met the inclusion criteria included in the study. About 33 (66%) of the children in Group-A were 2-6 months old as opposed to 29 (58%) in Group-B. Very few children were above the age 12 months, 2(4%) in group-A and 4(8%) in group- B. The mean age of the children were 9.2 ± 3.2 and 9.1 ± 3.1 months in group A and B respectively with a male predominance in the both groups, 28(56%) in group-A and 29(58%) in group-B (Table II).

Table II : Demographic characteristics between groups

Age in months	Group-A(HS) (n = 50)	Group B(NSS) (n = 50)	p- value
2-06	33(66%)	29(58%)	
06-12	15(30%)	17(34%)	
12-24	2(4%)	4(8%)	
Mean ± SD#	9.2 ± 3.2	9.1 ± 3.1	0.82
Male	28(56%)	29(58%)	0.5
Female	22(44%)	21(42%)	

All the cases in both the groups presented with runny nose, cough, breathing difficulty, chest indrawing and rhonchi but feeding difficulty was presenting feature in 25 (50%) cases in group-A and 28 (56%) cases in group–B. Wheezing was presenting feature in 47(94%) cases in group-A and 48(96%) cases in group-B. Only 7(14%) cases in group-A and 8(16%) cases in group-B presented with nasal flaring. In group-A, 13(26%) cases and in group-B,12(24%) cases presented with fever (Table III).

**Table III :** Clinical presentation of the cases on admission

Clinical presentation	Group-A(HS)	Group- B(NSS)
Runny nose	50(100%)	50(100%)
Cough	50(100%)	50(100%)
Breathing difficulty	50(100%)	50(100%)
Feeding difficulty	25(50%)	28(56%)
Wheeze	47(94%)	48(96%)
Chest in-drawing	50(100%)	50(100%)
Nasal flaring	07(14%)	08(16%)
Tachypnoea	45(90%)	43(86%)
Tachycardia	46(92%)	44(88%)
Rhonchi	50(100%)	50(100%)
Fever	13(26%)	12(24%)
Oxygen saturation (Mean± SD)	94.9 ±3.8	94.6 ±3.6

Baseline clinical characteristics as per clinical severity score were almost similar in both the groups (p > 0.05 in each case) (Table IV).

Table IV : Comparison of baseline Respiratory Distress Assessment Instrument (RDAI) score and Clinical severity

Baseline clinical characteristics	Group-A (HS) (n = 50)	Group B (NSS) (n = 50)	p value
Respiratory rate	2.4±0.5	2.6±0.4	0.142
Wheezing	2.1±0.5	2.0±0.3	0.193
Retraction	2.0±0.5	2.0±0.6	0.859
General condition	2.3±1.3	2.7±0.9	0.083
Clinical severity score	8.1±1.	8.3 ±1.87	0.943

Mean clinical severity score at base line, at 12 hours, at 24 hours, at 36 hours, at 48 hours, at 60 hours, and at 72 hours in Group-A (HS) were 9.1, 7.2, 6.4, 4.1, 3.6, 2.2, 1.3 while in Group-B (NSS) score were 9.3, 8.5, 7.6, 6.2, 5.1, 4.8, 4.4 respectively. Clinical severity score of both the treatment groups were reduced by three days but reduction was more significant in children who received nebulised 3% Sodium chloride (Figure- 1).
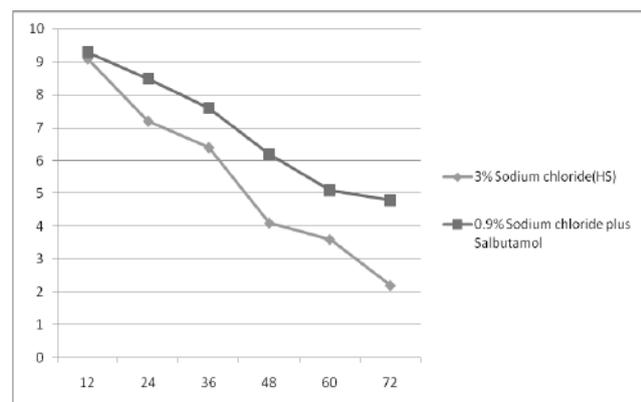
Figure 1 : Comparison of mean clinical severity score of two groups at 12 hourly intervals

In Group-A (HS) 4(8%) and in Group-B (NSS) 5(10%) patients required oxygen supplementation. The patients of Group-A on an average required 15 hours of oxygen therapy, while the patients of Group-B required 26.4 hours of oxygen therapy. Duration of oxygen therapy significantly reduced in Group- A compared to Group-B (Table-V).

Table V : Comparison of duration of oxygen therapy (In hours) between groups

Duration of oxygen therapy	Group- A (HS) (n = 4)	Group -B (NS) (n = 5)	p value
Mean ± SD	15.0±6.0	26.4±5.4	0.02

46 (92%) of the children in Group-A were recovered by 72 hours and discharged from the hospital, whereas 29(58%) of the children in Group-B were recovered and discharged during the same period (p < 0.05) (Table VI).

Table VI : Comparison of recovery and discharge from hospital between groups

Length of hospital stay was significantly less in Group-A in comparison to group-B (p<0.05).

Recovery and discharge	Group-A (n=50)	Group-B (n=50)	p value
Rapid (Within 72 hours)	46(92%)	29(58%)	< 0.001
Gradual (After 72 hours)	4(8%)	21(42%)	

3% Sodium chloride nebulisation significantly reduced clinical severity, length of hospital stay and duration of oxygen therapy in case of acute bronchiolitis in comparison to 0.9% Sodium chloride plus Salbutamol. Both modalities of treatment were found to have no adverse effect.

Discussion
Bronchiolitis is a common problem in children between two months to two years and is the most common cause of hospitalization[1]. The present study was carried out to see whether 3% Sodium chloride (Hypertonic saline) nebulisation reduces clinical severity and length of hospital stay in children with bronchiolitis than does nebulisation with 0.9% Sodium chloride plus Salbutamol. The two study groups in the present study were almost similar with respect to their demographic characteristics like age and sex, baseline clinical characteristics and clinical severity score. The study demonstrated that clinical severity score of both the treatment groups were reduced and oxygen saturation in room air are improved within three days but the reduction was much earlier in children who received nebulisation with 3% Sodium chloride than those who received 0.9% Sodium chloride plus Salbutamol. The mean duration of oxygen supplementation was shorter in the Group-A (15.0±6.0) hours

than that in the Group-B (26.4±5) hours. Majority 46(92%) of the 3% Sodium chloride group children recovered within 72 hours, whereas 29(58%) of the children of 0.9% Sodium chloride plus Salbutamol group recovered from the disease during the same period. None of the patients encountered any side-effects. In the present study 3% Sodium chloride nebulisation significantly reduced the length of hospital stay. Most patients 46(92%) in 3% Sodium chloride group discharged within 3 days of treatment. Similar observation was seen in another study, mean length of hospital stay was shorter in hypertonic saline group[8]. In the present study the mean duration of oxygen supplementation was significantly shorter in 3% Sodium chloride group than that in the 0.9% Sodium chloride plus Salbutamol group. Almost similar observation was seen by Martin et al[9]. Consistent with the findings of the present study several investigators have reported the use of hypertonic saline solution for infants in bronchiolitis with substantial benefits of therapy reported by many of them[10,11]. The investigators showed that nebulized 3% Sodium chloride (HS) decreases the Length of Stay (LOS) in the hospital as compared with normal saline plus Salbutamol (NSS) among infants hospitalized with the disease[12]. Many of them used bronchiolitis severity score to evaluate patients over time and they found that inhaled 3% Sodium chloride with epinephrine administered by nebulisation every 6-8 hours improved the bronchiolitis severity score and reduced the length of hospital stay in hospitalized patients when compared with 0.9% saline with epinephrine[13]. None of the studies reported any side effects. These findings go in favor of many studies[14-16]. The mean length of hospital stay was much shorter (On an average 58 hours) in the 3% Sodium chloride group than that in the 0.9% Sodium chloride plus Salbutamol group (74 hours). A systematic review of four RCTs involving 254 infants with acute viral bronchiolitis (189 in-patients and 65 out-patients) concluded that nebulised 3% Sodium chloride may significantly reduce the length of hospital stay and improve the clinical severity score. However, an orthodox finding was reported by another small RCT which investigated the use of hypertonic saline in the emergency department setting, and the authors suggested that immediate clinical benefits may not be seen with nebulised hypertonic saline[17]. Airway oedema and mucus plugging are the predominant pathological features in acute viral bronchiolitis[18]. 3% Sodium chloride solution decreases airway oedema, improves mucus rheologic properties and mucociliary clearance, and thus decreases airway obstruction[19]. It is thought that 3% Sodium chloride facilitates removal of inspissated mucus through osmotic hydration, disruption of mucus strand cross-linking and reduction of mucosal oedema[20]. In summary, in this study both treatment groups demonstrated clear evidence of clinical improvement and oxygen saturation, but 3% Sodium chloride group in comparison with 0.9% normal saline plus Salbutamol group showed more efficacy in relieving symptom, improving oxygenation and reducing length of hospital stay in children with acute bronchiolitis. It seems that the use of nebulised 3% Sodium chloride in children admitted with moderate to severe viral bronchiolitis is a safe and effective therapy.

Limitation
Small number of study population and shorter duration of study period.

Conclusion
The study concluded that 3% Sodium chloride nebulisation significantly reduced clinical severity, length of hospital stay and duration of oxygen therapy in case of acute bronchiolitis in comparison to 0.9% Sodium chloride plus Salbutamol. Both the modalities of treatment were found to have no adverse effect.

Acknowledgement
All the patient and their parents participated in the study group.

Recommendation
Hypertonic solution nebulisation should be preferred instead of nebulisation with normal saline and salbutamol combination in acute bronchiolitis cases.

Disclosure
All the authors declared no competing interest.

References
1. Kusel MM, Klerk ND, Holt PG, Kebadze T, Johnston SL, Sly PD. Role of respiratory viruses in acute upper and lower respiratory tract illness in the first year of life: A birth cohort study. The Pediatric Infectious Disease Journal. 2006; 25(8):680-686.

2. Murray J, Bottle A, Sharland M et al. Risk factors for hospital admission with RSV bronchiolitis in England: a population-based birth cohort study. PloS one. 2014; 9(2):e89186.

3. Caballero MT, Polack FP. Respiratory syncytial virus is an "opportunistic" killer. Pediatric Pulmonology. 2018; 53(5):664-667.

4. Murphy FA, Gibbs EP, Horzinek MC, Studdert MJ. Veterinary virology. Elsevier;.1999 Oct 27.

5. Simoes EA. Environmental and demographic risk factors for respiratory syncytial virus lower respiratory tract disease. The Journal of pediatrics. 2003; 143(5):118-126.

6. Florin TA, Plint AC, Zorc JJ. Viral bronchiolitis. The Lancet. 2017; 389(10065):211-224.

7. Kabir AR, Mollah AH, Anwar KS, Rahman AK, Amin R, Rahman ME. Management of bronchiolitis without antibiotics: A multicentre randomized control trial in Bangladesh. Actapaediatrica. 2009; 98(10):1593-1599.

8. Sharma BS, Gupta MK, Rafik SP. Hypertonic (3%) saline vs 0.9% saline nebulization for acute viral bronchiolitis: A randomized controlled trial. Indian pediatrics. 2013;50(8):743-747.

9. Martín Martín R, Yep Chullen G, Sánchez Bayle M, Villalobos Pinto E, Flores Pérez P. Estudio sobre la eficacia y utilidad de la solución salina hipertónica al 3% en la bronquiolitis aguda del lactante hospitalizado. Pediatría Atención Primaria. 2013; 15(58):109-115.

10. Sarrell EM, Tal G, Witzling M, Someck E, Houri S, Cohen HA, Mandelberg A. Nebulized 3% hypertonic saline solution treatment in ambulatory children with viral bronchiolitis decreases symptoms. Chest. 2002; 122(6):2015-2020.

11. Tal G, Cesar K, Oron A, Houri S, Ballin A, Mandelberg A. Hypertonic saline/epinephrine treatment in hospitalized infants with viral bronchiolitis reduces hospitalization stay: 2 years experience. IMAJ-RAMAT GAN-. 2006; 8(3):169.

12. Anil AB, Anil M, Saglam AB, Cetin N, Bal A, Aksu N. High volume normal saline alone is as effective as nebulized salbutamol normal saline, epinephrine normal saline, and 3% saline in mild bronchiolitis. Pediatric pulmonology. 2010; 45(1):41-47.

13. Uysalol M, Ha lak F, Özünal ZG, Vehid H, Uzel N. Rational drug use for acute bronchiolitis in emergency care. The Turkish Journal of Pediatrics. 2017; 59(2):155-161.

14. Ipek IO, Yalcin EU, Sezer RG, Bozaykut A. The efficacy of nebulized salbutamol, hypertonic saline and salbutamol/hypertonic saline combination in moderate bronchiolitis. Pulmonary pharmacology & therapeutics. 2011; 24(6):633-637.

15. Walters S, Ward W. Lower respiratory disease. Health Care Needs Assessment. First Series. 2004;1.

16. Jacobs JD, Foster M, Wan J, Pershad J. 7% Hypertonic saline in acute bronchiolitis: A randomized controlled trial. Pediatrics. 2014; 133(1):e8-13.

17. Zhang L, Mendoza Sassi RA, Wainwright C, Klassen TP. Nebulised hypertonic saline solution for acute bronchiolitis in infants. Cochrane database of systematic reviews. 2017(12).

18. Mandelberg A, Amirav I. Hypertonic saline or high volume normal saline for viral bronchiolitis: mechanisms and rationale. Pediatric pulmonology. 2010;45(1):36-40.

19. Gordon J. MCQ tutor for students of microbiology. Butterworth-Heinemann. 2014 May 12.

20. Al-Ansari K, Sakran M, Davidson BL, El Sayyed R, Mahjoub H, Ibrahim K. Nebulized 5% or 3% hypertonic or 0.9% saline for treating acute bronchiolitis in infants. The Journal of pediatrics. 2010; 157(4):630-634.

Quantitative Structural Studies on Human Placenta Associated with Pregnancy Induced Hypertension

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ABSTRACT

Background: The placenta is key organ for fetal growth. Maternal diseases may affect it's macroscopic and microscopic structures. It is usually discharged from the uterus after birth of the baby. The purpose of the study to microscopically observed the villous and intra-villous space point counting technique of placenta.

Material and Methods: Observational descriptive approach has been applied for the study. Placenta sample were collected from Obstetric Department of Chittagong Medical College Hospital (CMCH) patient with pregnancy induced hypertension. Ten placentas were microscopically examined at the Anatomy Department of Chittagong Medical College after proper processing. Quantitative studied of villous and inter-villous space of the placenta had done using point counting technique. Group A and B represent central and peripheral portion of the placenta respectively.

Results: Percentage of villous area in Group A was 51.11%±1.54% and Group B was 50.85%±1.46%. Student 't' test was done to find out the mean difference between villous area of Group-A and Group-B which was statistically non significant (p>0.05). Inter-villous space in Group A mean was 20.68%± 2.74%, in Group B was 19.54%± 2.24%. Student 't' test was done between mean of Group-A and Group-B. Distribution was found statistically insignificant (p>0.05).

Conclusion: Histological study of placenta is very uncommon in clinical practice. Encouraging large scale study can be conducted for clinical and academic purpose.

Key words: Inter-villous space; Placenta; Pregnancy Induced Hypertension (PIH); Villous space area.

Introduction

The placenta is a multifunctional anatomical organ developed in female during pregnancy. Hypertension is a cardiovascular disease. Hypertensive disorder complicating pregnancy is common[1]. Villi and inter- villous space are gross structural components of the placenta. In human placenta, villous tree are rooted in the chorionic plate. The villi core has fetal vessels. Surrounding the villi develops space within placenta called inter-villous space. Uterine spiral artery provides blood in these spaces. There is no direct communication between maternal and fetal circulatory system[2]. Trophobastic cells form selective barrier between two biological independent circulatory systems. Uncontrolled pregnancy induced hypertension may alter uteroplacental blood flow. Most likely placenta has decreased blood flow[3]. Circulatory compensatory mechanism developed within placenta. Impact of pregnancy induced hypertension may change qualitative as well as quantitative pattern of villous, inter-villous space and others placental histological components[4]. There are also pathological changes in endothelial and sub endothelial tissue. There might be unequal histological changes from centre to peripheral area of the placenta[5]. The mechanisms responsible for the pathogenesis of Pregnancy Induced Hypertension (PIH) have not yet been fully understood. But the disease is considered to be a multifactorial. Several studies have showed risk of PIH increased by genetic factor like pregnancies with positive familial history, environmental factor like obesity and life style[6]. Hypertension often complicates pregnancy and is responsible for different morbidity and mortality of mothers and foetus[7]. Some important clue may reveal through histological structures of the placenta[8]. The placenta is still poorly studied organ that may offer significant insights into human reproduction[9]. In this study we have used 10 human placenta collected from women with hypertension and microscopically observed villous and inter-villous space point counting technique.

Materials and methods

This was an observational descriptive study done in the Department of Anatomy of Chittagong Medical College during a study period of two years from January 2016 to December 2017. Patients of PIH were collected from the Obstetric and Gynaecology Department of CMCH after informed written consent. Placenta samples were collected from same department after enrollment of the patients with PIH in systematic random procedure. After collection the placenta was prepared for the histological study after maintaining proper procedure. Ten placentas were microscopically examined at the Anatomy Department of Chittagong Medical College after proper processing. Quantitative studied of villous and inter-villous space of the placenta had done using point counting technique. Group A and B represent central and peripheral portion of the placenta respectively.

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Two placental tissue blocks were taken from 2 widely separated cotyledon of each placenta (Figure 1). One block was taken from the cotyledon lying just opposite the insertion of the umbilical cord noted as Group A and other block from the peripheral noted as a Group B. Each block was measuring approximately 1cm x1cm x 0.5cm.

Tissues were fixed in 10 percent formaline in a plastic container for 72 hours. Following standard tissue preparation procedures two paraffin blocks were made from each tissue and sections were taken from each paraffin block at 5 microns thickness. After that tissue were stained with Haematoxylin and Eosin (H & E) stain.
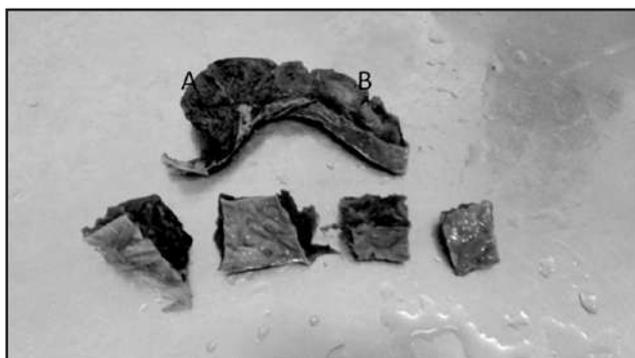

Figure 1 : Placental cut section showing central (A) and peripheral (B) cotyledon

Measurement of the total area occupied by the chorinic villi was done using the Zeiss integrating eyepiece (Figure 2). These special eyepieces permit more rapid measurement and are accurate enough to measure the component part of placental tissue.

A replica of zeiss integrating eyepiece was prepared with transparent plastic sheet. The Zeiss eyepiece was designed by Henning Reseau Pattern 25 Points. The eyepiece contains a point network of 25 points arranged within a circle, which delimits the counting field. The test point graduation serves for determining the quantity in volume, percents of individual constituents in a heterogeneous material according to the point counting procedure.

Every point of the lattice, which accidentally lays villous and intervillous spce above a particular component, is counted as a 'hit for that component. After completing the count, the hits for each component are separately added up and percentage of the sum to the total count determined. The quota of hits for each individual component is equal to its volume share i.e. the number of hits is proportional to the volume parentage. In the present study, this integrating eyepiece was used to measure the volume percentage of (Chorionic villi) villous area and inter-villous space.

The counting was done under light microscope with low and high magnification (40 objective x 10 eyepiece) in slides stained with routine H & E stain. At a high magnification using an x40 eyepiece, the position of each point on

the graticule, falling on any component of chorinic villi i.e. stem villi, terminal villi and inter-villous space were recorded for each field. Then the eyepiece with the graticule was rotated 90 degrees keeping the field constant. Again, the position of each point on the graticule was recorded. Thus 50 points were recorded for each field. Ten such fields were studied beginning from the basal plate side of the section toward the opposite direction.

On each slide (Section) therefore, (50 x 10) or 500 point positions were recorded. As one good section (Slide) from each of the two blocks prepared from each placenta was examined a total of (500 x 2) or 1000 points positions were recorded for each placenta. Total ten placentas were examined.
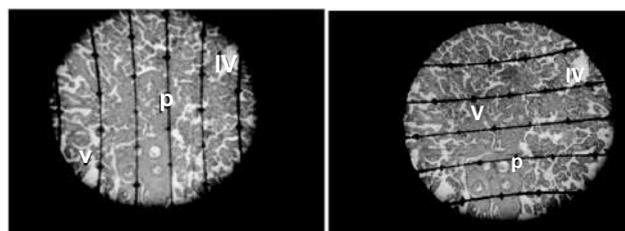
Figure 2 : Photomicrograph of placental slide under integrating eye piece showing villous space v) inter- villous space iv) point (p) marked by symbol (H & E stain x100)

Results

Microscopic examination of the placenta in this study can be treated as quantitative point counting measurement of villous space area.

Table I : Histological analysis of placental villous space area

Parameter	Minimum	Maximum	Mean+SD	p-value
Villous area Group A	245	273	255.56±7.6	
Percentage of Group A	49.0%	54.6%	51.11%±1.54%	0.065[NS]
Villous area Group B	245	268	254.24±7.28	
Percentage of Group B	49.0%	55.6%	50.85%±1.46%	

Group A- Central portion of the placenta, Group B- Peripheral portion of the placenta, NS: Not Significant.

Table I showing percentages of villous area where in villous area Group A was 51.11%±1.54%, in villous area Group B was 50.85%±1.46%. Student 't' test was done to find out the mean difference between villous area of Group-A and Group-B which was found not to be significant statistically (p>0.05).

Microscopic examination of the placenta in this study can be treated as quantitative point counting measurement of inter-villous space area.

Table II : Histological analysis of placental inter-villous space

Parameter	Minimum	Maximum	Mean±SD	p-value
Inter-villous space Group A	76	131	103.41±13.68	
Percentage of Group A	15.2%	26.2%	20.68%±2.74%	0.200[NS]
Inter-villous space Group B	82	126	97.68±11.22	
Percentage of Group B	16.4%	25.2%	19.54%±2.24%	

Group A- Central portion of the placenta, Group B- Peripheral portion of the placenta, NS: Not Significant.

Histological analysis of inter-villous space where in inter-villous space Group A mean was 20.68%± 2.74%, in inter-villous space Group B was 19.54%± 2.24% (Table II). Student t test was done between mean of Group-A and Group-B. Distribution was found statistically insignificant (p>0.05).

Discussion

The placental histology may give useful information for complicated pregnancy[10]. Different part of the placental tissue may vary the histological components[11]. Statistically distributions were insignificant among the group of both villous and inter-villous spaces of placental histological study (p<0.05). Wong & Latour (1966) showed, volume of total villous area is 57.7% in the normal group[12]. However Begum et al found mean±SD volume of the villous area of the placenta was 54.60±5.77, 52.01±3.40 and 51.01±5.57 in normal, mild and moderate anaemic respectively[13]. Aherne and Dunnill stated that for all types of placenta, the volume of the inter-villous space is reduced slightly by the deposition of fibrin[14]. The low mean placental weight could be due to diminished amount of villous tissue and stroma and more voluminous inter-villous space. The gross reduction of placental tissue in the preeclampsia, placenta impedes normal placentation and pathologically results in massive microscopic changes in the placenta[15]. A reduction in the proportional volume peripheral villi and an increase in that of stem villi were found in the placenta of the preeclamptic women but no change were seen in the volume of total chorionic villi and inter-villous space[16]. Adequate and prompt treatment for patient with pregnancy induced hypertension is required to avoid complication[17].

Conclusion

This study was done for academic purpose. Several national and international studies show alteration of gross microscopic pattern of villous tree as well as inter-villous space. Microstructures of the placenta are changed for compensatory and pathological mechanism in hypertensive individual. Placental inadequate microcirculatory system developed in complicated pregnancy. This may be initiate degenerative processes in villous tree and the vessels. Although huge studies regarding placenta has done. But clinical applications of placental researches are not practiced significantly. Large scale future study of the placenta will help clinical and academic field.

Disclosure
The author declared no competing interests.

References
1. Roberts, JM, Redman CW. Pre-eclampsia: More than pregnancy-induced hypertension, Lancet. 1993; 341(8858):1447-1451.

2. Fox H. Effect of hypoxia and trophoblast in organ culture. Am J Obs Gynaecol.1970; 107: 1058-1064.

3. Ahmed Maimoona, Daver Pekhag, Rekha G. Study of placental changes in pregnancy induced hypertension. International journal of reproduction, contraception, obstetrics & gynaecology. 2013; 2(4):525-527.

4. Boyd PA, Scott A. Quantitative structural studies on human placenta associated with preeclampsia, essential hypertension and intrauterine growth retardation. Br J Obstet Gynaecol. 1985; 92:714-721.

5. Majumdar S, Dasgupta H, Bhattacharya K, Bhattacharya A. A Study of Placenta in Normal and Hypertensive Pregnancies. J Anat Soc India. 2005; 54(2):1-9.

6. Benirschke K, Kaufmann P. Pathology of the human placenta. New York7 Springer-Verlag. 2000; 947.

7. Nag U, Chakravarthy VK, Rao DR. Morphological changes in placenta of hypertensive pregnant women. JRRMS. 2013; 3(2):1-4.

8. Yetter JF. Examination of the Placenta, American Academy of Family Physicians. 1998;   57(5):1045-1054.

9. Navbir P, Alka N, Gupta A. Histological changes in placentas in pregnancies complicated by preeclampsia and eclampsia and correlation with foetal outcome, International Journal of Pharmacology & Biological Science. 2012; 3(2), 0975-6299.

10. Baergen RN. The placenta as witness. Clin Perinatol. 2007; 34: 393-407.

11. Zhang R, Yang Huang A, Z. Quantitative (Stereological) study of placental structures in women with pregnancy iron-deficiency anemia. Eur J Obstet Gynecol Reprod Biol. 2001; 97(1): 59-64.

12. Wong TC & Latour JPA. Microscopic measurement of the placental components in an attempt to assess the malnourished newborn infant. American Journal of Obstetrics and Gynecology. 1966; 94:942-950.

13. Begum M, Ara S, Kishwara S, Nurunnabi A S M & Rayhan A K. Microscopic Changes of the Placental Components in Maternal Anaemia. Bangladesh Journal of Anatomy. 2010; 8(2):59-63.

14. Aherne W & Dunhill MS. Quantitative anatomy of the placenta. Journal of Pathology and Endocrinology. 1966; 91:123-139.

15. Udainia A, Bhagwat SS, Mehta CD. Relation between placental surface area, infarction and foetal distress in pregnancy induced hypertension with its clinical relevance. Journal of Anatomical Society of India. 2004; 53(1):27-30.

16. Teasdale F. Gestational changes in the functional structure of the human placenta in relation to fetal growth: a morphometric study. American Journal of Obstetrics and Gynecology. 1980; 137: 560-563.

17. Motwani R Sontakke YGoyal M. Effects of Pregnancy Induced Hypertension on Human Placenta. Journal of Evaluation of Medical And Dental Sciences. 2013; 33(2):6275-6282.

Long Bone Fracture Fixation with Surgical Implant Generation Network Nail at Chattogram

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ABSTRACT

Background: The Surgical Implant Generation Network (SIGN) intramedullary nailing system was designed to treat long bone fractures in developing countries. SIGN project is the brain child of American Orthopaedic surgeon Dr. Lewis G Zirkle with objective of supplying free implants for long bone fracture patients who lives below poverty level. To evaluate the result of SIGN nail treatment for long bone fracture.

Materials and methods: This prospective observational study was carried out from February 2011 to February 2014 at the Department of Orthopaedics, Chittagong Medical College Hospital, Chattogram. Patients presented with trauma and long bone fractures were initially stabilized according to ATLS protocol and later on definitive fixation done with SIGN nail according to OT availability. Patient demography, fracture characteristics and outcome measures in terms of duration of surgery, hospital stay, complications (Superficial & deep infection) weight bearing time & union time were studied.

Results : Out of 68 patients, 61 were male and 7 were female. Age range was 18-65 years. 50 cases were femur fracture and 20 cases were tibia fracture. Among them 2 patients had bilateral femur fracture. In case of tibia, closed reduction was done in 8 cases. All the other cases were fixed after open reduction. 5 cases were revision surgeries which were previously fixed with other methods. In 6 cases, dynamization done due to delayed union. In 4 cases, there was distal screw hole infection. Hospital stay was 1-3 wks and time of union was 20 wks. 1 case of non union reported.

Conclusion: SIGN nail fixation for long bone fractures was the most effective method of treatment and had an excellent results. It is effective in fixation of acute fracture as well as late cases and non unions.

Key words : Femur and tibia; Fracture; Long bone; SIGN nail.

Introduction

Trauma is a growing global public health concern and a major cause of death and disability worldwide. Each year nearly 5 million people worldwide die from injuries, approximately the number of deaths caused by HIV/AIDS, malaria, and tuberculosis combined. Ninety percent of these injuries occur in developing countries and that number is growing. Road trafic accidents account for 1.2 million of these 5 million deaths. For each death from trauma, three to eight more are permanently disabled[1-3]. Accidents involving motor vehicles are the main cause of nonfatal injuries, with majority being musculoskeletal trauma.

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What is SIGN?

SIGN   means Surgical Implant Generation Network.

With the mission of improving fracture care worldwide, it was created in 1999 as a humanitarian, non-profit corporation. Goal was to provide improved health care and appropriate orthopaedic treatment of fractures at little or no cost to people in need throughout the developing world. SIGN project is the brain child of American Orthopaedic Surgeon Dr. Lewis G Zirkle . Under this project they provide SIGN nail with its accessories free of cost worldwide to under privileged people who simply can not afford health care after trauma. There are more than 150 projects worldwide in poverty stricken countries of Africa, North & South America and Asia[4]. We began our journey as SIGN family in February, 2011.

What's the speciality of SIGN nail?

The SIGN system is a solid Intramedullary Nail (IMN) with interlocking capability through a mechanical aiming device that enables the placement of proximal and distal interlocking screws without the need for image guidance. The nails are made of stainless steel, solid-stronger with less bending than hollow nails. Less infection as less area for biofilm to adhere. Slots-allow for compression and distraction of fracture site to accelerate healing. For operative fixation,

- No need of C-Arm
- No need of power reaming
- No need of fracture table.

So, can be used in countries where health care infrastructure does not provide these supports [5-7]. Chattogram is the port city of Bangladesh with lots of heavy industrial outlets with good population of trauma victims. Most of the victims are the working force and the only income generating source of their family. Due to economic constraints, most can not afford proper treatment leading to increasing number of permanent disability each year. SIGN opened the door for these poverty streaked sufferers and brought smile back to their family members.

This is a prospective observational study to evaluate the result of long bone fractures (Femur & tibia) treated with SIGN nail.

Materials and methods

This is a prospective observational study. Study period was between February 2011 to February 2014. The place of study was Department of Orthopaedics, Chittagong Medical College Hospital, Chattogram. Patients presented with trauma and long bone fractures were initially stabilized according to ATLS protocol. Patients who met the criteria & gave consent to get enrolled in the programme were selected and definitive fixation done with SIGN nail. Patient demography and outcome measures were studied in terms of duration of surgery, hospital stay, complications (Superficial & deep infection) & union time.

Inclusion criteria

- Age – 18 years & above
- Close fracture and Gustillo type-1, II &
  III-A fracture of shaft of tibia & femur
- Patient unable to bear expenses of treatment
- Who consented to come for follow up.

Exclusion criteria

- Age < 18 years
- Fracture within 5 cm of proximal & distal articular surface
- Gustillo type III-B & III-C fractures
- Fracture shaft with intra articular extension
- Serious head injury, spinal injury & polytrauma patient.

Before commence the study necessary permission was obtained from the proper authority.

Results

Total number of patients were 68. 61 were male and 7 were female.11 cases lost in follow up.
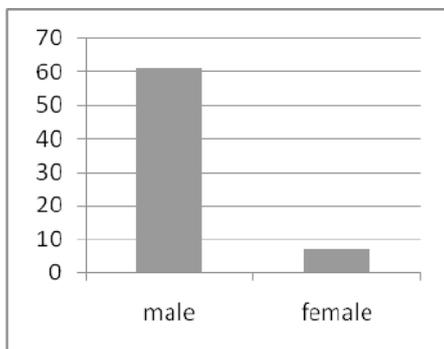
Figure 1 : Chart showing male-female ratio

Age range was 18-65 years (Av. 38 years).

59 cases were following motor vehicle accident.

50 cases were Femur & 20 cases were Tibia. One patient had ipsilateral fracture of femur and tibia. Another patient had bilateral fracture femur.
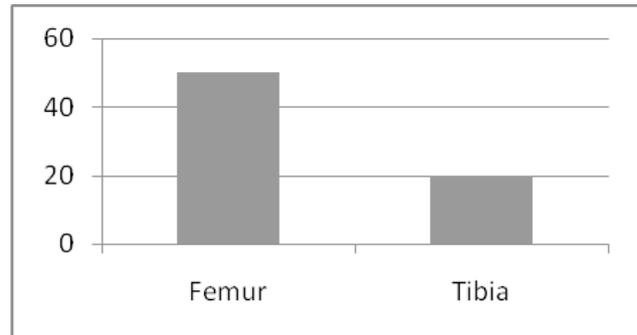
Figure 2 : Chart showing number of tibia and femur

8 cases of Tibia were done by closed method & rest were done by open procedure. Operative time was 105 minutes (Range 60-180 minutes). All done by antegrade nailing. 5 cases were revision surgeries. Dynamization in 6 cases due to delayed union. In 4 cases, distal screw hole infection found. Among them two were deep seated infection. Hospital stay was 1-3 wks (Av. 14 days). Weight bearing was allowed after 12 wks. Mean time of union was 20 wks. 1 case of non union reported.
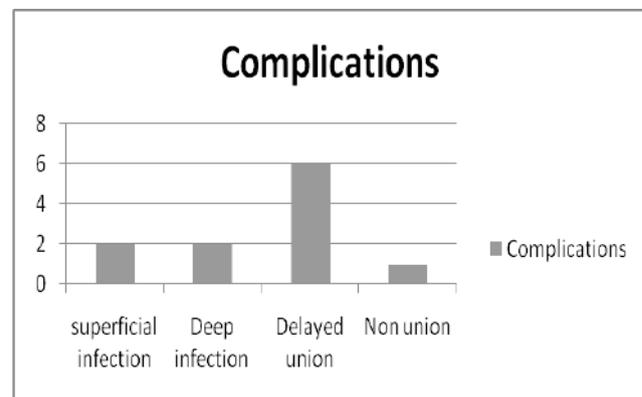
Figure 3 : Complications after surgery

Figure 4 : Segmental comminuted fracture Femur –pre op/post op /after union

Fracture Tibia Fibula   After consolidation & removal of nail   Happy face of the pt. squatting

Figure 5 : Fracture Tibia fibula- pre op/ after union/removal

Segmental comminuted fracture
Tibia Fibula pre and post op.   2 years after surgery showing good healing

Figure 6 : Pre op/ Post op/After union

Delayed union after
Dynamization done
->showing consolidation

Fracture Shaft Femur & after surgery

Figure 7 : Pre op/Post op/After union

Discussions

Road traffic accidents are the major cause of long bone fractures in developing world, and tibia and femur are the most commonly involved bones. Males most commonly involved. Most cases were following motor vehicle accident. SIGN nail is a solid nail with a 9 degree bend in proximal 5 cm. Has two dynamic locking slots distally and one dynamic and one static slot proximally. Designed to be placed without use of fluoroscopy, power reaming or a fracture table and may be inserted in either an antegrade or a retrograde direction[5-7]. Open reduction of the fracture usually necessary as no fluoroscopy used & since it is a solid nail no option to put guidewire after preliminary close reduction. Also there is a lengthy delay between the time of injury and surgery. Cause being late presentation and overload of patients at our centre. Closed IM interlocking nailing is the gold standard treatment[8].

Mode of injury was motor vehicle accident in 59 out of 68 cases. All the cases in our series were done antegradely. All needed open reduction except 8 cases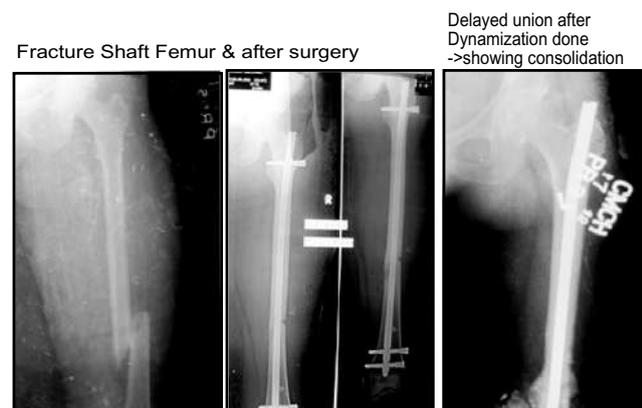 of tibia which could be done by closed method. Patients who were operated after three weeks and those with multiple comminution were augmented with autogenous cancellous bone graft. Follow up was done at 2 wks, 6 wks, 12 wks and subsequently at every 12 wks interval. Healing rate with SIGN nail was comparable to reported cases done by closed methods[8-10]. All fractures healed except one after intramedullary fixation with the SIGN nail. 6 fractures required nail dynamization for the treatment of delayed union. Two interlocking screws located distant from the insertion point missed the screw hole of nail, acted as polar screw and did not lead to any further complications. Two distal fractures healed in valgus angulation of >10 degree. Hospital stay for patients with SIGN surgery was 7-21 days . Complications encountered with this intervention included superficial (two patients) & deep infection (two patients) all involving the distal screw site which is comparable with studies on SIGN nail by Ikem et al and Ikpeme et al[11,12]. The superficial infections were managed by antibiotics and dressings with povidone iodine. Deep infection necessitated nail removal after consolidation. Mean duration to union was 20 weeks which is comparable to other studies with different nails[11,8]. One case of non union was reported. It was an exchange nailing for previously operated fracture shaft of femur with conventional first generation hollow nail. The patient was an expatriate worker living in SaudI Arabia and follow up could be done only through internet.

Limitations
- Sample size small.
- Single centre study.

Conclusion
We serve a population of around 15 million living in an area of around 250 sq. miles with even some part of bordering Myanmar. Modern management of trauma patient is very expensive, difficult and far beyond the reach of average populations of our country. With the SIGN surgery, it is free of cost. Patients heal more quickly, shortening their hospital stay. Therefore, the burden on families is reduced allowing them to return home and to their livelihood early.
SIGN nail fixation for long bone fractures was an effective method of treatment and had excellent results. It is effective in fixation of acute fractures as well as late cases and non unions.

Disclosure
All the authors declared no competing interests.

References

1. Beveridge M, Howard A. The burden of orthopaedic disease in developing countries. J Bone Joint Surg Am. 2004; 86:1819-1822.

2. GBD 2016 Disease and Injury Incidence and Prevalence Colloborators. A Systemic Analysis for the Global Burden of Disease study. Lancet. 2017; 390:1211-1259.

3. Zirkle LG Jr - Injuries in developing counties—how can we help? The role of orthopaedic surgeons. ClinOrthop Relat Res. 2008; 466 (10):2443–2450.

4. www.sign-post.org.

5. Zirkle LG -Technique Manual of SIGN IM Nail & Interlocking Screw System Insertion &Extraction Guide. Revision # TM. 2008;11(15):33.

6. Zirkle LG, Shearer D. SIGN technique for retrograde and antegrade approaches to femur. Tech Orthop. 2009; 24:247-252.

7. Carsen S, Feebel R. T, Part S. S. H, Simon D. A. Treatment with the SIGN Nail in closed Diaphyseal Femur Fractures Results in Acceptable Radiographic Alignment. Clin Orthop Relar Res. 2015; 473:2394-2401.

8. Ricci, William M. MD; Gallagher, Bethany MD; Haidukewych, George J. MD Intramedullary Nailing of Femoral Shaft Fractures: Current Concepts. JAAOS. 2009 ; 17(5):296-305.

9. EL-Menyar A, Muneer M, Samson D et al. Early versus late Intermedullary nailing for traumatic femur fracture manag;ement : Meta Analysis. J Orthop Sur Res. 2018; 160:3. Doi.org/10.1186/S-13018-0856-4.

10. Shah RK, Moehring D, Singh R et al. Surgical Implant Generation Network (SIGN) intramedullary nailing for open fractures of the tibia. Int Orthop. 2004; 28:163–166.

11. Ikem IC, Ogunlusi JD, Ine HR- Achieving interlocking nails without using an image intensifier. IntOrthop. 2007; 31(4):487–490.

12. Ikpeme I, Ngim N, Udosen A, Onuba O, Enembe O, Bello S. External jig-aided intramedullary interlocking nailing of diaphyseal fractures: Experience from a tropical developing centre. Int Orthop. 2011; 35:107-111.

Health Care Seeking Pattern of Diabetic Patients in A Selected Rural Community

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ABSTRACT

Background: Diabetes is an important public health problem, one of four priority Non-Communicable Diseases (NCDs) targeted for action by world leaders. Both the number of cases and prevalence of diabetes have been steadily increasing over the past few decades. To reduce avoidable mortality from diabetes and improve outcomes, it is necessary to insight into the total picture of health care. This baseline study is to determine the current status of intervention being operated for control of Diabetes Mellitus (DM).

Material and methods: This cross sectional descriptive study was conducted among the type 2 diabetic patients at selected rural communities of Chattogram during January to December 2016 aiming to assess the healthcare seeking pattern. By using convenience sampling technique, data were collected by pretested semi-structured questionnaire by face to face interview method. The sample size was 250. Data were analyzed using SPSS version 20.

Results: Mean (±SD) age was 52.08 (±10.409) years. Female respondents (62.8%) were predominant. Most of the respondents were Muslims (78%) and married (86.4%). Majority (38.8%) had primary level of education. Average monthly family income of respondents was 9732.00 taka. Most of them (70.8%) had no family history of diabetes. Majority (99.6%) of them did not practice calculated calorie based diet. Majority (87.2%) of the respondents had been detected diabetes by physician. They were suffering from diabetes for 5.58(±3.064) years. In this study, 75.6% of the respondents received diabetic health care from allopathy or MBBS doctor. Among them 56.6% were attached to Govt. health care center keeping in mind about cost, availability, choice of specific doctor, facility and environment. There was significant association of health care seeking pattern with age and monthly family income of the respondents (p<0.05).

Conclusion: There is a urgent need for increasing the awareness of diabetes management in primary healthcare sector. Continuing education on diabetes accompanied by regular assessment of knowledge is crucial. Appropriate planning and policy, more skilled professionals, inter-sectoral coordination and adequate intervention are needed to combat diabetes in future.

Key words: Health care seeking pattern; Rural area; Type 2 diabetes.

Introduction

Diabetes is a serious, chronic disease that occurs either when the pancreas does not produce enough insulin (A hormone that regulates blood sugar, or glucose), or when the body cannot effectively use the insulin it produces. Diabetes is an important public health problem, one of four priority Non-Communicable Diseases (NCDs) targeted for action by world leaders. Both the number of cases and the prevalence of diabetes have been steadily increasing over the past few decades.

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In 2012, there were 1.5 million deaths worldwide directly caused by diabetes. It was the eighth leading cause of death among both sexes and the fifth leading cause of death in women in 2012. The total burden of deaths from high blood glucose in 2012 has been estimated to amount to 3.7 million[1]. This number includes 1.5 million diabetes deaths, and an additional 2.2 million deaths from cardiovascular diseases, chronic kidney disease, and tuberculosis related to higher-than-optimal blood glucose. Its magnitude highlights that high blood glucose causes a large burden of mortality beyond those deaths directly caused by diabetes. The burden of diabetes is increasing globally, particularly in developing countries. There were 7.1 million diabetic patients in Bangladesh in 2015[2].

Diabetic patients in rural area has limitation in receiving quality care. First, rural patient may be less willing to seek medical care for chronic conditions, either because of their cultural attitudes or inability to pay for care & medications. Second, there are fewer physicians in rural areas. Third, the relative lack of specialists in rural areas may make difficult to get some specialized services to patient if they need. Fourth, knowledge about advances in diabetic care may diffuse more slowly to rural areas. However diabetes is also a disease where treatment makes difference. Good quality care and adherence to generally accepted standards results in better outcomes and longer life.

The incidence of Type 2 Diabetes Mellitus (DM) is increasing worldwide, mostly affecting people in developing countries in Asia with the prevalence of 8.6%[2]. The incidence is related to urbanization with longevity and changes of lifestyle, from a traditional active way of life to a modern sedentary style with unhealthy diets and obesity, combined with genetic susceptibility development. Many are unaware of the disease and the healthcare system receives people at the hospitals with DM at very late stages when they have unknowingly had the disease for years. Therefore, the number of people with diabetes registered in hospitals is not an indicator of the real disease burden in the community. DM is a chronic, progressive disease with micro and macro-vascular complications (affecting eye, kidney, lower extremity, heart) likely to develop over time in relation to glycaemic control[3].

Health services in Bangladesh are provided by the public and private sector. The healthcare infrastructure under the DGHS comprises six tiers: national, divisional, district, Upazila (Sub-district) union, and ward. At the national level, there are institutions both for public health functions as well as for postgraduate medical education/training and specialized treatment to patients[4].

Services are of minimum charge with the exception of private wings. The private system includes private not for profit organizations and private health practitioners which charge user fees. Also the traditional and complementary medicine practitioners (e.g Traditional healers, herbalists etc.) can be found but are not fully integrated in the health care system. Diabetes care in Bangladesh is run within the public and private healthcare system. Out-patient care have been developed in some diabetes clinics.

Limited information has been found about health care seeking behaviour among patients with DM, and none focusing primarily on developing countries. The relation between treatment-seeking behaviour and compliance of diabetic patients in a rural area showed that both government and private clinics were used by a large proportion of patients. A switch between these two sectors might interrupt their glycaemic control and negatively affect health. Thus, it is important to explore where patients seek healthcare the first and second time, and the reason why they go for help. This study or baseline survey to determine the current status of intervention being operated for control of Diabetes mellitus in rural areas and to make future plan of action to be taken to reduce morbidity and mortality of diabetic patients due to this illness.

Material and methods

The study was a cross sectional study. The health care seeking pattern of diabetic patients in a selected community was assessed. The study was conducted among the type 2 diabetic patients from 1st January 2016 to 31st December 2016 in villages named Horarbag, Shakpura, Kodhurkhil under Boalkhali thana under Chattogram district, Bangladesh, who were selected conveniently. Diagnosed type 2 diabetic patients were included for study. Type 1 diabetic patients, patients not willing to participate and mentally retarded or seriously ill patients were excluded from the study. The sample size was 250. Data were collected by face to face interview method using a pretested mixed questionnaire and convenience sampling technique was followed. Then, data were analyzed with the help of SPSS Version 20 software.

Results

Regarding socio-demographic status of the respondents, majority of the respondents i.e. 93 (37.2%) were within 41 to 50 years age group, 76 (30.4%) were within 51 to 60 years and 36 (14.4%) were within 61 to 70 years, 31 (12.4%) were within 31 to 40 years and 13 (5.2%) were within 71 to 80 years and rest 1 (.4%) were within 81 to 90 years age group. Here mean (±SD) age was 52.08 (±10.409) years. Female (62.8%) were predominant than male (37.2%). Majority respondents 195 (78%) were practicing Islam, 50 (20%) were practicing Sanatan and 5 (2%) were practicing Buddism. Majority 216 (86.4%) respondents were married, 33 (13.2%) were widow and 1 (0.4%) was divorced. Among 250 respondents, majority 97 (38.8%) had primary education, 93 (37.2%) had secondary education, 38 (15.2 %) had higher secondary education. 13 (5.2%) were illiterate, while 9 (3.6%) were graduate. In context of occupation, 112 (44.8%) were housewife, 46 (18.4%) were in agriculture, 34 (13.6%) were in business, 31 (12.4%) were in other different occupation. 26 (10.4%) respondents were service holder while 1 (0.4%) was day laborer. Less than 10000 taka income group was maximum (78.4%) followed by 50 (20.0%) respondents earning 10001 to 20000 taka. In this study mean (±SD) income was 9732.00 (±5183.788) taka [Table I].

Figure 1 illustrates the family history of diabetes where 177 (70.8%) of the respondents had no family history, 55 (22%) had positive family history, 18 (7.2%) respondents had no information about family history.

Regarding information of lifestyle and healthcare seeking pattern, 218 (87.2%) of the respondents had been detected diabetes by physician, while 32 (12.8%) had been detected in pharmacy. Majority 138 (55.2%) were suffering for 1 to 5 years, 94 (37.6%) were for 6 to 10 years, 16 (6.4%) were suffering for 11 to 15 years and 2 (0.8%) were suffering for 16-20 years. Majority 249 (99.6%) did not follow calculated calorie based diet. Among them 222 (88.2%) used to do only daily activities while 28 (11.2%) did daily walk in addition. Smoking history was negative among 220 (88%) respondents. Drinking alcohol was negative among most (99.6%). Among 250 respondents, 189 (75.6%) of the respondents were receiving health care from allopathy/MBBS doctor currently, 23(9.2%) were receiving health care from pallichikitshok, 21 (8.4%) were receiving health care from pharmacy, 13 (5.2%) respondents were receiving health care from homeopathy, while 4 (1.6%) were receiving from kabiraj. Among those receiving health care from allopathy/MBBS doctor, majority 107 (56.6%) were receiving from

Govt. health care center while rest 82 (43.4%) were getting health care privately [Table II].

Figure 2 demonstrates that majority 117 (46.8%) respondents were seeking current health care because of cost-effectiveness, 74 (29.6%) were seeking for easy availability, 48 (19.2%) were seeking for choice of specific doctor and 11 (4.4%) were seeking for facility and environment.

Figure 3 illustrates 61 respondents who had non-compliance to receive allopathic health care. The cause among majority (42.62%) of the respondents was the cost. About 27.87% did not get satisfactory outcome, 12 (19.67%) had belief on other health care and 6 (9.84%) had lack of information.

Table I : Socio-demographic characteristics of the study respondents

Characteristics	Frequency (n=250)	Percentage (%)
Age (In Years)		
31-40	31	12.4
41-50	93	37.2
51-60	76	30.4
61-70	36	14.4
71-80	13	5.2
81-90	1	.4
Gender of the Respondents		
Female	157	62.8
Male	93	37.2
Religion		
Islam	195	78
Hindu	50	20
Buddism	5	2
Marital Status		
Married	216	86.4
Widow	33	13.2
Divorced	1	0.4
Level of Education		
Primary level	97	38.8
Secondary level	93	37.2
Higher secondary level	38	15.2
Illiterate	13	5.2
Graduate	9	3.6
Occupation of the Respondents		
Housewife	112	44.8
agriculture	46	18.4
Business	34	13.6
service holder	26	10.4
day laborer	1	0.4
other	31	12.4
Monthly Family Income (In taka)		
≤10000	196	78.4
10001-20000	50	20.0
20001-30000	2	.8
>40001	2	.8

Table II : Information regardinglifestyleand healthcare seeking pattern

| Characteristics	Frequency (n=250)	Percentage (%)
Place of detection of diabetes of the respondent		
Physician	218	87.2
Pharmacy	32	12.8
Years of suffering of the respondents		
≤5	138	55.2
6-10	94	37.6
11-15	16	6.4
16-20	2	.8
Calculated calorie based diet		
Yes	1	0.4
No	249	99.6
Physical activity		
Usual daily activities	222	88.8
Daily walk in addition	28	11.2
Smoking status		
Yes	30	12
No	220	88
Alcohol drinking status		
Yes	1	0.4
No	249	99.6
Current health care receiving status of the respondent		
Allopathy	189	75.6
Homeopathy	13	5.2
Pharmacy	21	8.4
Village doctor	23	9.2
Others (kabiraj, local healer)	4	1.6
Place of getting allopathic treatment (n=189)		
Govt. Health care	107	56.6
Private service	82	43.4
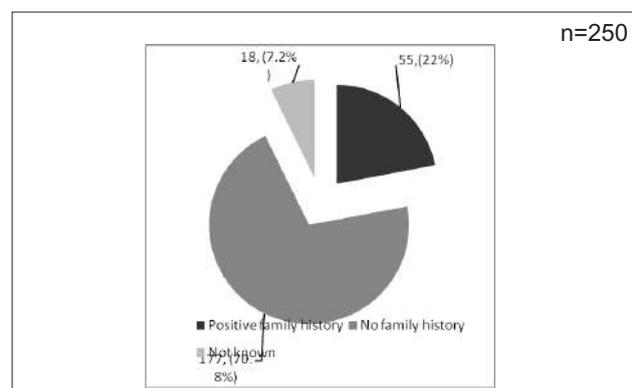
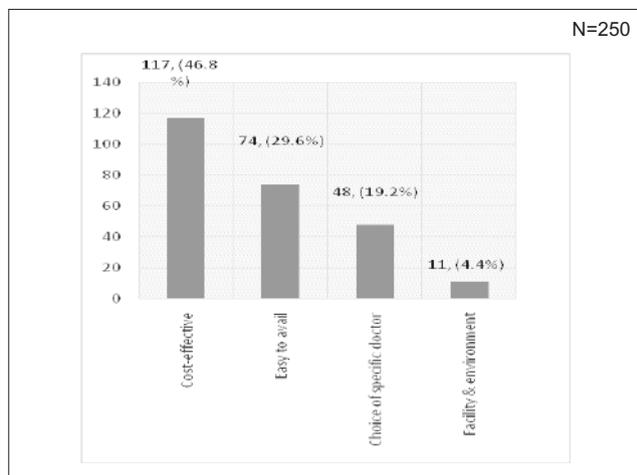**Figure 1 :** Distribution of the respondents by family history

Figure 2 : Distribution of the respondents by reason to receive current healthcare
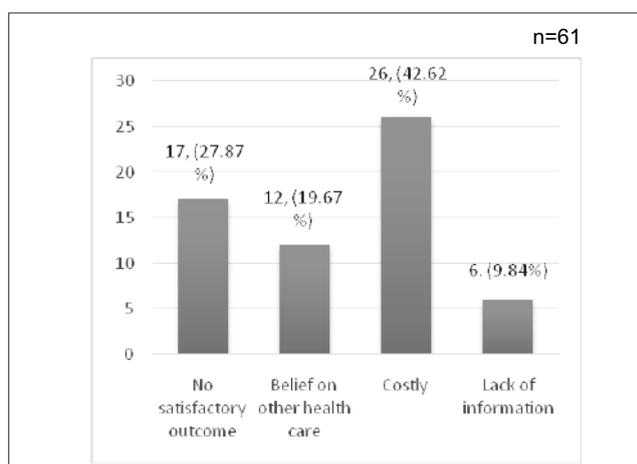

Figure 3 : Distribution of the respondents by cause of noncompliance with allopathic healthcare

The difference of health care seeking pattern by educational qualifications of the respondents was not statistically significant (χ^2 =0.879, p >0.05). There was significant association between health care seeking pattern and age of the respondents (χ^2 =5.161, p< 0.05) and total monthly family income of the respondents (χ^2 =4.884, p< 0.05) [Table III].

Table III : Association between health care seeking pattern and socio-demographic factors

Factors	Health care seeking pattern		χ^2	p value
	Allopathy	Others		
Age group				
< 50 years	77	35	5.161	.023
≥50 years	112	26		
Education group				
Below primary level	80	30	.879	.349
Above primary level	109	31		
Monthly family Income				
Upto 10000 Taka	142	54	4.884	.027
Above 10000 Taka	47	7		

*Significance level at 5%, df=1.

Discussion

Bangladesh is the one of the developing countries in the world. The country has enormous potential for rapid development in the new world economy. The quality of life of the population in Bangladesh appears to have improved very significantly in recent years. But unfortunately in some sectors Bangladesh is far from the expected development, health sector is one of them. In recent years, the government and non-governmental organizations are working together to ensure basic health care services to all and to expand their health services in rural Bangladesh.

Diabetes has reached all the corners of the world, where there is human being. It afflicts all categories of people irrespective of age, sex, social status, religion and residence. Considering this view, the present study was conducted at some villages of Boalkhali thana under Chattogram district with a view to assess the health care seeking pattern of the diabetic patients in rural community.

The present study revealed that the mean (±SD) age was 52.08 (±10.409) years which is consistent with previous study conducted by Abidin SIZ et al. Where mean age of respondent was 53.5 ± 13 years[5]. More than one third of the respondents (37.2%) were within 41 to 50 years age group, about one third (30.4%) were within 51 to 60 years and 14.4% were within 61 to 70 years. 12.4% were within 31 to 40 years and 15.2% were within 71 to 80 years. Only 0.4% was within 81 to 90 years age group. In a study D'Souza et al reported that most of the Diabetics were in the age group 40-50 (about 33.3%) and 33.3% of the respondents in the 61-70 years[6]. None of the study depicts the similar picture, however, it may be concluded that everywhere the affected people belongs to 40-60 years and this is consistent with some previous studies conducted in rural community.

In the current study, it was found that among 250 respondents, 62.8% were female and 37.2% were male type 2 diabetes mellitus patients which is consistent with the study conducted in Malda[7].

As regards to education, it indicates that majority, 38.8% of the respondents had primary level of education followed by good number, 37.2% had secondary education and 15.2 % had higher secondary education. Regarding education, as per BBS statistics in rural area, 49.62% did not pass class I and the rate of primary and secondary completions were 22.01% and 19.50%, respectively[8].

Regarding monthly family income of the respondents, it is noted that the mean income of each family is 9732.00 (±5183.788) taka. More than two thirds (78.4%) income were blow 10000 taka, followed by one fifth (20.0%) income in the range of 10001 to 20000 taka. Siddique et al studied on "Socioeconomic Status & Health Seeking Behavior of Rural People: A Cross Sectional Study in Fatikchhari, Chittagong" which seems to be similar where 62% of the respondents' income was 10000 to 29999 and 11% had 30000 to 59999 monthly family income[9].

In this study, majority 70.8% of the respondents did not have the positive family history of diabetes, where 22% had positive family history and 7.2% do not know whether any family history present or not. Abidin SIZ et al., 2013 showed 54.3% positive family history. The difference may be due to the fact that health care set up was not so organized for the rural people. So, probably many of them remain undiagnosed.

The study represents variation in duration of suffering of the respondents but mean (±SD) duration was 5.58 (±3.064) years. More than half of the respondents 55.2% were suffering for 1 to 5 years followed by 37.6% of the respondents were suffering for 6 to 10 years and 6.4% were suffering for 11 to 15 years, which is consistent with previous study where 78.6% respondents were suffering for more than 5 years[1].

Health seeking behavior depends on socioeconomic status as well as availability and accessibility of health facility. We know in Bangladesh pharmacy both registered or unregistered are available in here and there and in rural area there is still existence of traditional healer/kabiraj. The study by Siddique et al on "Socioeconomic Status & Health Seeking Behavior of Rural People: A Cross Sectional Study in Fatikchhari, Chittagong" found that two-third respondents seek health care from village doctor (Quack) and one-third visits registered doctor/physiotherapist/dentist and very rare percentage went to homeopathic practitioner which is relevant to our study result[9].

The present study stated that 56.6% were receiving health care from Govt. health care center while rest 43.4% were getting health care from private doctors. Similar scenario was observed by Abidin SIZ et al where 57.2% of the respondents were visiting Government hospital followed by 24.8% were visiting clinic[5].

Conclusion

The health care seeking pattern revealed that care was sought from homeopathy, kabiraj, pharmacy salesperson, pallichikitshok in the rural community as a complement to care from allopathy from government hospitals or privately, where all had been diagnosed, because of perceived ill-health due to symptoms related to the disease, being signs of poor glycaemic control or complications, lack of blood sugar estimation facility properly, wishes for a cure for diabetes, lack of relief, not getting expected result, cost or come to know about merits of the other health care.

There is a urgent need for an increase in the awareness of diabetes management and its complications in the primary healthcare sector. Continuing education on diabetes and its complications for primary healthcare providers is crucial and this should be accompanied by a regular assessment of their diabetic knowledge. Screening for diabetes is important, but equally crucial is patient education and counseling. Knowledge of diabetes is therefore essential for primary healthcare and other diabetic patients in order to prevent comorbidities, which may compromise their lifestyles as well as increase the burden on public health care.

Disclosure
All the authors declared no competing interest.

References
1. WHO Mortality Database Geneva: World Health Organization. 2016. http://apps.who.int/healthinfo/statistics/ mortality/causeofdeathquery (Accessed 12 January 2016).

2. International diabetes federation south-east asia. 2016. http:// www.idf.org/membership/sea/bangladesh (Accessed 27 July 2016).

3. International diabetes federation. 2008. http:// www.idf.org/

4. Health bulletin Bangladesh. Healthcare network under MOHFW of Bangladesh. 2015; 19.

5. Abidin, S I Z, Sutan, R B, Shamsuddin, K. Prevalence and determinants of appropriate health seeking behaviour among known diabetics: results from a community-based survey, Advances in Epidemiology. 2014; 1-7.

6. D'Souza, A M P, Kundapur, R. and Kiran, N U. A Cross sectional study to determine the prevalence of Diabetes Mellitus and its household awareness in the rural field practice areas of a medical college in Mangalore-A Pilot Study', Nitte University Journal of Health Science. 2015; 5(3):43-46.

7. Kanungo, S., Mahapatra, T., Bhowmik, K., Mahapatra, S., Saha. J., Pal, D et al. Diabetes Scenario in a Backward Rural District Population of India and Need for Restructuring of Health Care Delivery Services. Epidemiol. 2016; 6:224. doi:10.4172/2161-1165.1000224.

8. Bangladesh Bureau of Statistics (BBS), Household income and expenditure survey-2010, BBS, Dhaka, Bangladesh. 2012b.

9. Siddique MKB, Khan, S, Haque, MS, Sizear, MI, Alam, A. et al. Socioeconomic Status & Health Seeking Behavior of Rural People: A Cross Sectional Study in Fatikchhari, Chittagong', MOJ Public Health. 2016; 4(4):90-94.

Musculoskeletal Disorders of Social Media Users among University Students in Dhaka City: A Comparison between Public and Private Universities

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ABSTRACT

Background: Intensive use of social media impair musculoskeletal health of the users. A cross-sectional analytical study was conducted to identify the musculoskeletal disorders of social media users among students of both public and private universities in Dhaka city.

Materials and methods: A pretested, semi structured questionnaire and randomized sampling technique was used to collect the information. Study period was of three years duration from 1st January 2017 to 31st December 2019 and the number of calculated sample size was 726.

Results: Study revealed that mean age of the respondents of both public and private universities was 21.55±1.93 years and 21.14±1.62 years. Study revealed that 16.80%, 15.20%, 14.30%, 1.90%, 9.10%, 8.80%, 5.80%, 4.70%, 6.90%, 1.40%, 3.00%, and 2.80% of the students of public university complained musculoskeletal pain of posterior aspect of head, neck, shoulder, elbow, wrist & hand, thumb, upper back, chest, lower back, hip & thigh, knee and ankle & foot respectively, and that of the students of private university 30.30%, 27.30%, 20.40%, 3.00%, 14.60%, 18.50%, 6.60%, 8.00%, 10.20%, 2.80%, 3.90% and 5.20% complained musculoskeletal pain of posterior aspect of head, neck, shoulder, elbow, wrist & hand, thumb, upper back, chest, lower back, hip & thigh, knee and ankle & foot respectively. Over use of social media influenced significantly on musculoskeletal disorders among students of both public (Odds = 2.119) and private (Odds=1.968) universities.

Conclusion: Over use of social media was associated with different types of musculoskeletal disorders among the students of both public and private universities in Dhaka city.

Key words: Social Media; Visual Analogue Scale; Musculoskeletal disorders.

Introduction

Social media is a part of the internet based activity that has created greater opportunity for people around the world to communicate. It has both positive and negative consequences. The positive effects of social media are making friends, reducing communication barriers creating business opportunities and getting educational materials. Negative aspects are media addiction, isolation, affecting productivity, cyberbulling, poor concentration and health risk of both adolescents and adults. Excessive use of social media is harmful for both physical and mental health of the user, musculoskeletal disorders is one of them. The prevalence of social media addiction is high among students[1]. Student users suffer from different types of disorders including back pain, shoulder pain, holding urine, defecation, postponing meal, skipping meal, using social networking sites until midnight[2]. Students experience severe musculoskeletal problems due to excessive use of social networking sites[3].

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University students are isolated from their family and society when Facebook activity is done. Excessive Facebook use had both psychological and musculoskeletal health effects of the students[4]. Malaysian medical students isolated from family members and community due to Facebook use[5]. Association between texting messages with pain of hand, fingers, neck, upper back were found[6]. Pain of thumb and forearm associated with burning, numbness and tingling around the thinner aspect of hand, and stiffness of wrist and hand are common complaints. Extensive texting of message were responsible for tendinosis of extensor pollicies longus and myofascial pain syndrome affecting 1st interossei, thinner and extensor group of muscles[7].

The most painful body regions were shoulders, neck and back[8]. However, upper back, neck, trunk, leg and postural abnormality were found among the users[9]. Of the respondents 46% complained headache, 41.3% complained neck pain, 16% suffered wrist pain and 44.7% suffered overall musculoskeletal disorders[10]. 49.9% of the respondents complained upper limb musculoskeletal symptoms, particularly neck and shoulder region. Of them 61.8% of the respondents notice that their discomfort were related to electronic device[11]. High school female students had higher risk to develop musculoskeletal pain[12]. It was found that 55.19% of the digital device users suffered neck pain, 49.55% suffered lower back problem, 31.16% suffered upper back pain, 31.10% suffered shoulder and 12.53% knee pain[13].

Problematic networking sites use is an emerging public health problem that severely disrupts people's lives[14]. The long term use of devices would be the risk factors of musculoskeletal disorders, early neck pain, neck problems and poor work habits[15]. The amount, features, tasks, and positions of the mobile touch screen devices are associated with musculoskeletal symptoms and musculoskeletal exposure[16]. Overuse of digital devices enlarge the median nerve, causes pain in the thumb and disorders of hand function[17]. Excessive use of networking sites in children causes musculoskeletal pain, ocular symptoms, migraine or headache and neurological symptoms[18].

Muscle activity, joint movement in the neck, wrist and finger were associated with smart phone use[19]. The most painful body area of the users were neck and shoulder region[20]. Physiotherapy students using digital devices experienced neck pain (24%) upper back pain (16%) shoulder pain (16%) elbow pain (16%) wrist pain (20%) finger pain (14%) thumb (16%) and lower limbs pain (10%)[21].

Materials and methods

A cross-sectional analytical study was conducted to explore the musculoskeletal disorders of social media users. The study subject was students of both public and private universities in Dhaka. Sample size was 726. A pretested, semi structured questionnaire was used to collect the data on the basis of objective and variables. The study periods were three years duration from 1st January 2017 to 31st December 2019. This study sites were Dhaka University and Daffodil International University. Data were collected from Hazi Muhammad Mohsin Hall, Fazlul Huq Hall, Jagannath Hall and Ruquyyah Hall from Dhaka University. Students of Daffodil International University from different faculty including Faculty of Health Science, Faculty of Business Studies, Facility of Social Science, Faculty of Humanities, Faculty of Engineering participated to the study. Data were collected from students of 2nd year/2nd semester and above. After collection of data, it was checked and rechecked with competently. The data were analyzed by using Statistical Packages for Social Sciences (SPSS) software, version 20. After analyzed the data set, all findings were interpreted by tables and figures. Univariate, bivariate, multivariate analysis were done and diagrams were prepared by use of SPSS and Microsoft Office Excel.

Results

Table I : Distribution of respondents by socio-demographic variables (n=726)

	Group	Public University		Private University	
		Frequency	Percentage	Frequency	Percentage
Age in years	≤ 20	120	33.10	148	40.80
	21-25	232	63.90	209	57.60
	≥ 26	11	3.00	6	1.70
	Total	363	100	363	100
Mean ±SD		21.55 ±1.93		21.14 ±1.62	
Gender	Male	243	66.90	228	62.80
	Female	120	33.10	135	37.20
	Total	363	100	363	100
Year of Education	1st year	61	16.80	156	43.00
	2nd Year	81	22.30	89	24.50
	3rd Year	88	24.20	66	18.20
	4th Year	73	20.10	44	12.10
	Post Graduate and above	60	16.50	8	2.20
	Total	363	100	363	100

Table I shows that 33.10%, 63.90% and 3.00% of the respondents belonged to their age group are ≤20 years, 21-25 years and ≥ 26 years respectively with their mean age 21.55±1.93 years of the respondents of public university. Compared to the respondents of private university, 40.80%, 57.60% and 1.70% of the respondents are belonged to their age group are ≤ 20 years, 21-25 years and ≥26 years respectively with their mean age 21.14±1.62 years. It is found that 66.90% of the respondents are male students and 33.10% of the respondents are female students of public university. 62.80% of the respondents are male students and 37.2% of the respondents are female students of private university. Study shows that 16.80%, 22.30%, 24.20%, 20.10% and 16.50% of the students are 1st year, 2nd year, 3rd year, 4th year, post graduate and above respectively of the public university, compare to private university 43.00%, 24.50%, 18.20%, 12.10% and 2.20% of the students are 1st year, 2nd year, 3rd year, 4th year, post graduate and above respectively.
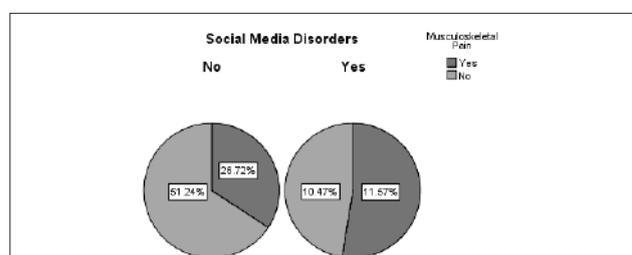

Figure 1a : Distribution of the study subjects by social media disorders and musculoskeletal pain (Public University)
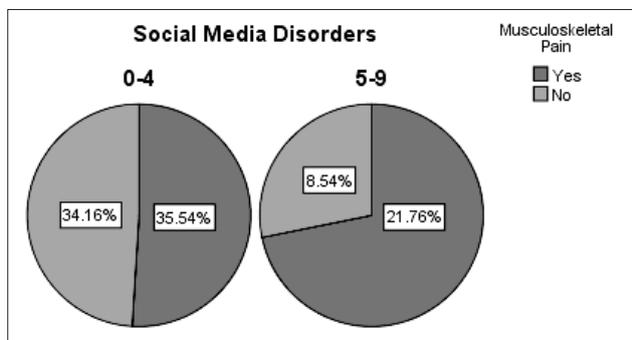
Figure 1b: Distribution of the study subjects by social media disorders and musculoskeletal pain (Private University)

Figure 1a shows that 11.57% of the respondents has social media disorders and they suffer musculoskeletal pain and 10.47% of the students do not suffer musculoskeletal pain. 26.72% of the students have no social media disorders but they have been suffering musculoskeletal pain and 51.24% of the student do not suffer musculoskeletal pain. Compared to private university figure 1b reveals that 21.76% of the study subjects had social media disorders, they suffer musculoskeletal pain and 8.54% of the student do not suffer musculoskeletal pain, 35.54% of the students has no social media disorders but they have been suffering musculoskeletal pain and 34.16% of the respondent do not suffer musculoskeletal pain.

Table II : Distribution of respondents by area of pain (n=726) (Multiple responses)

Area of pain	Public University		Private University	
	Frequency	Percentage	Frequency	Percentage
Headache (Posterior aspect of head)	61	16.80	110	30.30
Neck	55	15.20	99	27.30
Shoulder	52	14.30	74	20.40
Elbow	7	1.90	11	3.00
Wrist & hand	33	9.10	53	14.60
Thumb	32	8.80	67	18.50
Upper back	21	5.80	24	6.60
Chest	17	4.70	29	8.00
Lower back	25	6.90	37	10.20
Hip & thigh	5	1.40	10	2.80
Knee	11	3.00	14	3.90
Ankle & foot	10	2.80	19	5.20

Table II reveals that 16.80%, 15.20%, 14.30%, 1.90%, 9.10%, 8.80%, 5.80%, 4.70%, 6.90%, 1.40%, 3.00%, and 2.80% of the students of public university complain musculoskeletal pain of posterior aspect of head, neck, shoulder, elbow, wrist & hand, thumb, upper back, chest, lower back, hip & thigh, knee and ankle & foot respectively. On the other hand students of private university, table 2 shows that 30.30%, 27.30%, 20.40%, 3.00%, 14.60%, 18.50%, 6.60%, 8.00%, 10.20%, 2.80%, 3.90% and 5.20% complain musculoskeletal pain of posterior aspect of head, neck, shoulder, elbow, wrist & hand, thumb, upper back, chest, lower back, hip & thigh, knee and ankle & foot respectively.

Table III : Distribution of the respondents by severity of pain (n=726)

Severity of pain	Public University		Private University	
	Frequency	Percentage	Frequency	Percentage
0 (No pain)	224	61.70	156	43.00
1-3 (Mild pain)	77	21.20	100	27.50
4-6 (Moderate pain)	57	15.70	99	27.30
7-10 (Severe pain)	5	1.40	8	2.20
Total	363	100	363	100
Mean±SD	3.91±3.07		3.83±1.49	

Table III shows that 61.7%, 21.20%, 15.70% and 1.40% of the students of public university have no pain, mild pain, moderate pain and severe pain respectively with their mean pain score are 3.91±3.07. Contrast to the student of private university, Table III shows that 43.00%, 27.50%, 27.30%, and 2.20% have no pain, mild pain, moderate pain and severe pain respectively with their mean pain score are 3.83±1.49. It is measured by Visual Analogue Scale (VAS).
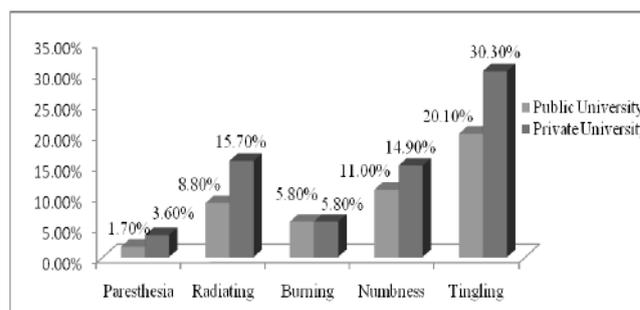
Figure 2 : Distribution of the study subjects by characteristic of musculoskeletal pain

It is found from figure 2 that 20.10%, 11.00%, 5.80%, 8.80% and 1.70% of the students of public university have complained tingling, numbness, burning, radiating and paresthesia respectively. Contrast to the respondents of private university, figure 2 shows that 30.30%, 14.90%, 5.80%, 15.70% and 3.60% complain tingling, numbness, burning, radiating, and paresthesia respectively.

Table IV : Distribution of the study subjects by Spearman's correlation of social media with musculoskeletal disorders

Universities	Variables	Variables	r-value	p-value
Public	Imo	Headache	0.103	0.050
	MySpace		0.117	0.026
	MySpace	Neck	0.124	0.018
	Twitter	Hip & thigh	0.173	0.001
Private	Messenger	Headache	0.123	0.019
	LinkedIn	Lower back	0.104	0.048
	Vigo		0.139	0.008
	Tango	Hip and thigh	0.134	0.010
	Vigo		0.143	0.006
	RingID		0.141	0.007

p-value obtained from Spearman's rank correlation test.

Table IV finds that there are positive correlations of Imo and MySpace with headache (p= 0.050<0.05, p= 0.026<0.05), MySpace with neck pain (p= 0.018<0.05), Twitter with hip & thigh pain (p= 0.001<0.05) of the students of public university. Contrast to the students of private university, there are positive correlation of Messenger with headache (p= 0.019<0.05), LinkedIn and Vigo with lower back pain (p= 0.048<0.05, 0.008<0.05),Tango, Vigo and RingID with hip & thigh pain (p= 0.010<0.05, p= 0.006<0.05, p= 0.007<0.05). These findings are statistically significant. Study revealed that Imo My Space, Twitter, Messenger, LinkedIn, Vigo, Tango, RingID positively influences the different types of musculoskeletal disorders of both public and private universities.

Table V : Distribution of the study subjects by binary logistic regression of musculoskeletal disorders with social media disorders and Facebook addiction

Universities	Dependent Variables	Covariates	p-value	Exp(B)/Odds
Public	Musculoskeletal disorders	Social media disorders	0.006	2.119
	Elbow	Social media disorders	0.007	32.742
		Facebook addiction	0.043	0.080
Private	Musculoskeletal disorders	Social media disorders	0.020	1.968
		Facebook addiction	0.004	2.114
	Headache	Facebook addiction	0.001	2.483
	Neck	Social media disorders	0.001	2.651
	Wrist and hand		0.041	2.149
	Thumb	Facebook addiction	0.023	2.091
	Upper back		0.041	2.930

Table V shows that social media disorders influence significantly on musculoskeletal disorders (p= 0.006 and Odds = 2.119), social media disorders and Facebook addiction influence significantly on elbow pain (p= 0.007 and Odds = 32.749, p=0.043 and Odds =0.080) of the students of public university. On the other hand students of private university, social media disorders and Facebook addiction influenced significantly on musculoskeletal disorders (p=0.020 and Odds=1.968, p=0.004 and Odds=2.114) Facebook addiction significantly on headache (p= 0.001 and Odds =2.483). Students of private university, social media disorders influence significantly on neck, wrist and hand (p= 0.001 and Odds=2.651, p=0.041 and Odds=2.149) Facebook addiction influence significantly on thumb and upper back (p= 0.023 and Odds =2.091, p=0.041 and Odds=2.930).

Discussion
Students of both public and private universities complain musculoskeletal pain of posterior aspect of head, neck, shoulder, elbow, wrist & hand, thumb, upper back, chest, lower back, hip & thigh, knee and ankle & foot. The prevalence of musculoskeletal disorders is higher in the students of private university. Vahedi et al conducted a similar type of study in the year of 2019[19,2]. Another study was conducted by Woo et al and 49.9% of the respondents complained upper limb musculoskeletal symptoms particularly of neck and shoulder region[11]. Study found that 20.10%, 11.00%, 5.80%, 8.80% and 1.70% of the students of public university had complained tingling, numbness, burning, radiating and paresthesia respectively and private university students had 30.30%, 14.90%, 5.80%, 15.70% and 3.60% respectively. Similar types of study conducted by Sharma in the year of 2018[7,22].

Social media disorders and Facebook addiction influenced significantly on musculoskeletal disorders of the students of both public and private universities. Similar type of study was conducted by Tang and Koh at Singapore in the year of 2017 and found that co-morbidity of addiction disorders of social media were psychological and musculoskeletal disorders[23]. Social media disorders influenced significantly on musculoskeletal disorders and Facebook addiction influenced significantly on elbow pain of the students of public university. Similar type of study was conducted by Borhany et al in the year of 2018[10]. It was also found that Facebook addiction influenced significantly on headache, thumb and upper back of the students of private university and social media disorders influenced significantly on neck, wrist and hand of the students of private university. Similar type of study conducted by Karkusha et al in the year of 2019 found that long-term use of smart phone would be risk factors of musculoskeletal disorders[1].

Conclusion
Study reveals that respondents of both public and private universities have been suffering musculoskeletal pain of posterior aspect of head, neck, shoulder, elbow, wrist & hand, thumb, upper back, chest, lower back, hip & thigh, knee and ankle & foot due to over use of social media. However, the prevalence of musculoskeletal disorders is higher in the students of private university than the students of public university.

Disclosure
All the authors declared no competing interest.

References
1. Babamiri M, Haidari MM, Ghasemi F, et al. Addiction to Social Networks and Online Games: A Wrist Pain Survey in Students. J Ergon. 2018; 6(3):32-41.

2. Deogade SC, Saxena S, Mishra P. Adverse Health Effects and Unhealthy Behaviors among Dental Undergraduates Suffering Social Networking Sites. Ind PsychiatryJ. 2017; 26(2): 207-214.

3. Meena PS, Mittal PK, Solanki RK. Problematic use of Social Networking Sites among Urban School Going Teenagers. Ind Psychiatry J. 2012; 21(2):94-97.

4. Asante KO, Nyarko J. The Physical and Behavioral Consequences of Facebook Use among University Students. Mediterranean Journal of Social Sciences. 2014; 5(27):774-781.

5. Al-Dubai SAR, Ganasegeran K, Al-Shagga MAM, Yadev H, Arokiasamy JT. Adverse health effects and Unhealthy Behaviors among Medical Students Using Facebook. Scientific World Journal. 2013; (465161):01-05.

6. Gustafsson E, Thomee S, Grimby-Ekman A. Texting on Mobile Phone and Musculoskeletal Disorders in Young Adults: A Five Years Cohort Study. Applied Ergonomics. 2017; 58(2017):208-214.

7. Sharma D, Mohandoss M, Ranganathan R, Jose, J. Musculoskeletal Disorders of Upper Extrimities Due to Extensive Usage of Hand held Devices. Annals of Occupational and environmental Medicine. 2014; 26(22):01-04.

8. Kim HJ, Kim JS. The Relationship between Smartphone Use and Subjective Musculoskeletal Symptoms of University Students. J Phys Ther Sci. 2015; 27(3): 575-579.

9. Namwongsa S, Puntunetakul R, Neubert MS, Chaiklieng S, Boucaut R. Ergonomic Risk Assesment of Smartphone Users Using the Rapid Upper Limb Assessment (RULA) Tool. PLOs ONE. 2018; 13(8):01-16.

10. Borhany T, Shahid E, Siddique WA, Ali H. (2018). Musculoskeletal Problems in Frequent Computer and Internet Users. J Family Med Prim Care. 2018;7(2):337-339.

11. Woo EHC, White P, Lai CWK. Musculoskeletal Impact of the Use of Various Types of Electronic Devices on University Students in Hong Kong: An evaluation by Means of Self –reported Questionnaire. Musculoskeletal Science & Practice, 2016;(26):47-53.

12. Saueressig IB, Oliveira VMA, Xavier MKA, Santos LRA, Silva KMA, Araujo de RC. Prevalence of Musculoskeletal Pain in Adolescents and its Association with the Use of Electronic Devices. Rev Dor.Sao Paulo. 2015; 16(2):129-135.

13. Tomar A, Banerjee B, Ingle GK. Association of Duration of Digital Device Use with Common Reported Physical Health Symptoms among Medical Undergraduates, Int J Pub Health. 2017; 2(1):01-04.

14. Velthoven MHV, Powell J, Powell G. Problematic Smartphone Use: Digital Approaches to an Emerging Public health problem. Digital Health. 2018; 4:1-9.

15. Karkusha RN, Mosaad DM, Kader BSA. Effect of Smartphone Addiction on Neck Function among Undergraduate Physical Therapist Students. The Egyptian Journal of Hospital Medicine. 2019; 76(4):4034-4038.

16. Toh SH, Coenen P, Howie EK, Straker LM. The Association of Mobile Touch Screen Device Use with Musculoskeletal Symptoms and Exposure: A Systematic Review. PLoS ONE. 2017; 12(8):01-22.

17. Inal EE, Demirci K, Cetinturk A, Akgonul M, Savas S. Effect of Smartphone Overuse on Hand Function, Pinch Strength, and the Median Nerve. Muscle & Nerve. 2015; 52(2):183-188.

18. Domoff SE, Borgen AL, Foley RP, Maffet A. Excessive Use of Mobile Devices and Children,s Physical Health. Hguman Behabior and Emergin Technology. 2019; 1(2):169-175.

19. Vahedi Z, Hajizadeh L, Garosi E. Smart phone and Musculoskeletal Risk Factors: A Systematic Review. Ergonomics Int J. 2019; 3(1):01-11

20. Kim HJ, DH, Kim JS. The Relationship between Smartphone Use and Subjective Musculoskeletal Symptoms of University Students. J Phys Ther Sci. 2015; 27(3): 575-579.

21. Ganu SS and Nair S. Prevalence of Musculoskeletal Pain in Physiotherapy Students Using Smartphone. International Journal of Medicine and Health Profession Research. 2017; 4(1):23-26.

22. Korpinen L, Paakkonen R, Gobba F. Self-reported Wrist and Finger Symptoms Associated with other Physical/ Mental Symptoms and Use Of Computers / Mobile Phones. International Journal of Occupational safety and Ergonomics. 2018; 24(1):82-90.

23. Tang CS and Koh YY. Online Social Networking Addiction among College Students in Singapore: Comorbidity with Behavioral Addiction and Affective Disorders. Asian J Psychiatr. 2017; 25:175-178.

Comparative Study of Serum Potassium Level in Diabetic and Non-Diabetic Pre-Dialytic Chronic Kidney Disease Patients on Angiotensin Receptor Blockers Treatment

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ABSTRACT

Background: Angiotensin Receptor Blocker (ARB) drugs are widely used to reduce blood pressure among the predialytic diabetic and nondiabetic CKD (Chronic Kidney Diseases) patients. ARB usually increases serum K^+ level. The aim of the present study is to compare the changes of serum potassium level in diabetic CKD patients to that of non-diabetic CKD patients who are on ARB treatment.

Materials and methods: This cross sectional comparative study was done on 100 patients of diabetic and non diabetic CKD (50 in each group) admitted in the Nephrology and Medicine wards of Chittagong Medical College Hospital, over a period of 6 months from 1st January 2012 to 30th June 2012. Inclusion criteria was all the CKD patients admitted in ward who gave consent for study. Exclusion criteria was patients who were on renal replacement therapy (Dialysis or Renal transplantation) Pattern of serum potassium level were analyzed in relation to different doses and formulation of ARB in both diabetic and non diabetic CKD patients. Data was analyzed by SPSS-15.

Results: Among the 100 patients, three types of ARB were used by both groups Losartan (70%), Olmesartan (22%) and Valsartan (8%). Maximum patients were found in stage 5 (77%) of CKD, 11% were in each stage 4 and 3 and 1 patient in stage 2. Losartan users had low serum potassium (4.79 mg/dl) than Valsartan users (5.56 mg/dl). Higher serum potassium was found in higher different stages of CKD patients. In both diabetic and non diabetic groups Valsartan users had more serum potassium than Losartan or Olmesartan users. Non diabetic (Stage 5) CKD patients had higher serum potassium than diabetic (Stage 5) patients. In all three ARB groups, serum potassium is higher in Losartan and Valsartan group but lower in Olmesartan in diabetic subject. Progressive increase of CKD stages shows progressive increase of serum potassium level. Higher serum potassium level was found among the higher dose of ARB users in both groups. Increase of dose grading was associated with increase level of serum potassium in Losartan and Valsartan users and it was not true for Olmesartan.

Conclusion: ARB is related to changes in serum potassium level with diabetic patients than the non-diabetic patients with CKD. Moreover, different types of ARB have influence on serum potassium in different way.

Key word: ARB (Angiotensin Receptor Blocker); CKD (Chronic Kidney Diseases); DM (Diabetes Mellitus).

Introduction

Hyperkalemia is an established complication of reduced renal function in patients suffering from either CKD or acute renal failure and it is long considered a potentially life-threatening condition because of the risk of ventricular arrhythmias and cardiac arrest when serum K+ is severely elevated[1,2]. Although decreasing renal function and the associated interference with potassium excretion is a major cause for potassium elevation, in clinical practice, the development of hyperkalaemia is usually the result of a combination of factors superimposed on renal dysfunction, such as diabetes mellitus with high glucose levels or hyporeninemic hypoaldosteronism, advanced stages of heart failure with accompanying reductions in renal perfusion, concurrent high-potassium diet, use of potassium-based salt substitutes, and use of medications interfering with potassium homeostasis like Angiotensin-Converting Enzyme Inhibitors (ACEIs) Angiotensin Receptor Blockers (ARBs). Aldosterone receptor antagonists, β-blockers and others[3,4].

For several years, one of the main concerns of physicians treating patients with CKD was to balance between the undisputed benefits of ACEIs and ARBs toward renal function preservation in proteinuric nephropathies and the associated risk of hyperkalaemia with these agents[4,5]. This issue became even more important because of the accumulating evidence suggesting the potential benefits of the ACEI/ARB combination or adjunct Aldosterone blockade toward renoprotection as well as the data suggesting beneficial effects of medications that interfere with potassium homeostasis on other conditions commonly present in patients with CKD, such as the effect of Aldosterone blockers on chronic heart failure or resistant hypertension or the use of β-blockers for cardio-protection and effective hypertension control[6-8].

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ARB or ACEIs are commonly used in hypertension with diabetes to reduce the blood pressure, also to reduce the renal protein loss. ARB/ACEIs have established influence on potassium homeostasis. So the present study will estimated either the potassium levels and prevalence of hyperkalaemia (among other CKD complications) with decreasing levels of renal function or the incidence of hyperkalaemia associated with CKD stage, medication use, and other hyperkalaemia factors[9-10].

Thus, the aim of this study was to examine the prevalence and potential determinants of different levels of potassium in a population of predialytic CKD patients who are grouped into diabetic and non diabetic groups on ARB treatment.

Materials and methods

Present study was conducted in the Department of Nephrology and Medicine, Chittagong Medical College Hospital (CMCH) and the duration of the study was 6 (six) months. Sample size of the study was 100 (Diabetic 50, Non-diabetic 50) and patients were selected purposively. Inclusion criteria were all chronic kidney disease patient admitted during the period of study and patients or attendants giving written consent to take part under study. Exclusion criteria were patients on renal replacement therapy (Transplantation or Dialysis). Diagnosed patients of diabetic and non diabetic predialytic CKD patients were thoroughly informed about the aims, objectives and detail procedure of the study before examination. He/She were encouraged for voluntary participation and allowed freedom to withdraw from the study whenever he/she liked even after participation. Patients were screened for whether they were taking ARB or not. Those who are on ARB treatment consent were taken from them. Clinical history were taken and clinical examination were done to elicit findings related to chronic renal diseases, DM and their complication. Related investigations like urine and blood examination were also be done. Blood sample were collected with proper aseptic technique as per direction of the laboratory and were sent for analysis before starting of hemolysis which might have some impact on the serum potassium results. All relevant data were noted in the pre tested data sheet. All data were checked and rechecked to avoid error. The urine and blood were collected by researcher himself. All relevant investigations were done in the Clinical Pathology Departments of CMCH or if needed in modern laboratory of Chattogram. Cost were beard by the researcher himself. Data were processed and analyzed by using computer bases software SPSS-15 (Statistical Package for Social Science). Different statistical method were applied for data analysis. Qualitative variable will be analyzed by frequency, percentage and chi squared test and quantitative variables were analyzed by mean, standard deviation, t test and ANOVA etc. p value were considered as statistically significant when it was less than 0.05. Before commence the study ethical clearance was obtained from the proper authority.

Results

Table I : Serum potassium level and ARB type

ARB type	Mean (Serum potassium in mg/dl)	No. of patients	Std. Deviation
Losartan	4.79	70	.79271
Olmesartan	4.58	22	1.03877
Valsartan	5.57	8	.41582
Total	4.81	100	.85879

Table I showing patients who were using Losartan had low serum potassium level (4.79 mg/dl) than patients who were using Valsartan (5.57 mg/dl).

Table II: Mean serum potassium in both groups with different ARB

	Losartan Mean (mg/dl)	Olmesartan Mean (mg/dl)	Valsartan Mean (mg/dl)
Mean (mg/dl) Serum potassium in Diabetic group (n=50)	4.81	4.43	5.64
Mean Serum potassium in Non Diabetic group (n=50)	4.79	4.69	5.10

Table II showing in both diabetic and non diabetic groups of patients who were using Valsartan had more serum potassium level (5.64 vs 5.10) than others who were using Losartan (4.81 vs 4.79) or Olmesartan (4.43 vs 4.69).

Table III : Comparison of serum potassium in both groups with ARB

	Serum Potassium		p value
	Diabetic group Mean (mg/dl)	Non diabetic group Mean (mg/dl)	
Losartan	4.81	4.79	>0.05
Olmesartan	4.43	4.69	>0.050
Valsartan	5.64	5.10	<0.05

Table III showing in all three ARB drugs serum potassium is higher in Losartan and Valsartan group but lower in Olmesartan group in diabetic subject.

Table IV : ARBs and stages of CKD

	Losartan		Olmesartan		Valsartan	
	Type of subject		Type of subject		Type of subject	
	Diabetic group	Non Diabetic group	Diabetic group	Non Diabetic group	Diabetic group	Non Diabetic group
	Mean (mg/dl)	Mean (mg/dl)	Mean (mg/dl)	Mean (mg/dl)	Mean (mg/dl)	Mean (mg/dl)
Stage 2			4.20			
Stage 3	3.80	4.33		4.22		
Stage 4	4.92	4.13				
Stage 5	4.83	5.07	4.46	4.90	5.64	5.10
p value	>0.05	<0.05		>0.05		

Table IV showing increasing stages was related with increasing of serum potassium in non diabetic CKD patients.

Table V : Relation of serum potassium and dose of ARB

Grading of dose					
Low dose		Medium dose		High dose	
Type of subject		Type of subject		Type of subject	
Diabetic group	Non diabetic group	Diabetic group	Non diabetic group	Diabetic group	Non diabetic group
Serum potassium	Serum potassium	Serum potassium	Serum potassium	Serum potassium	Serum potassium
Mean (mg/dl)	Mean (mg/dl)	Mean (mg/dl)	Mean (mg/dl)	Mean (mg/dl)	Mean (mg/dl)
4.56	4.56	4.79	4.81	5.06	5.17

Table V showing higher serum potassium level was found among the patients who were on higher dose of ARB in both diabetic and non diabetic groups.

Table VI : Serum potassium in low dose of ARB

	Grading of dose			
	Low dose			
	ARB type			
	Losartan	Olmesartan	Valsartan	p value
	Mean (mg/dl)	Mean (mg/dl)	Mean (mg/dl)	
Low dose	4.30	4.57	.	>0.05.
Medium dose	4.82	4.63		>0.05
High dose	4.75	.	5.57	<0.05

Table VI showing increase of dose grading was associated with increase level of serum potassium in Losartan and Valsartan where it was not true for Olmesartan.

Discussion

There are different traditional and non-traditional risk factors for chronic kidney disease. Different traditional cardiovascular risk factors like physical inactivity, diabetes mellitus, hypertension, dyslipidemia, smoking and left ventricular hypertrophy are more predominant in the stage 5 CKD patients[11]. For hypertensive patient with CKD, with or without diabetes different types of anti-hypertensive drugs are used among which Angiotensin Receptor Blocker (ARB) are common.

Staging of the chronic kidney disease was done by estimating eGFR with CKD-EPI equation where most of the patients were found in stage 5(77%) of CKD, but for stage 4 and stage 3 percentage were 11% for each stage and 1 patient were found in stage 2. As Chittagong Medical College Hospital is a tertiary care hospital and patients admitted here at terminal stages, for that reason most of the patients were found at stage 5 of CKD. This finding is consistent with the previous study[11].

Three types of ARB were used by both groups Losartan (70%) Olmesartan (22%) and Valsartan (8%). These three are most commonly prescribed ARB antihypertensive in Bangladesh.

Patients who were using Losartan had low serum potassium level (4.79 mg/dl) than patients who were using Valsartan (5.56 mg/dl). Progressive increase of serum potassium

was observed as CKD progresses to end stage. A few studies that examined the prevalence of various CKD complications with decreasing renal function also provided some data on hyperkalemia. In a cross-sectional analysis of retrospectively collected electronic medical records of 1216 individuals with various levels of renal function, the prevalence of potassium > 5 meq/L rose from about 10% to 18% and 22%, and the actual levels of potassium rose from 5.2 to 5.3 and 5.5 meq/L for subjects with eGFR=30–60, 15–30, and <15 ml/min per 1.73 m^2, respectively[12]. In this study, however, patients with renal function<15 ml/min per 1.73 m^2 were a very small percentage of the study population (5.7%).

In both diabetic and non diabetic groups patient who were using Valsartan had more serum potassium level than others though there was limitation due to small size patient. Non diabetic stage 5 CKD patients had more serum potassium level than diabetic stage 5 patients. Higher serum potassium level was found among the patients who were on higher dose of ARB in both diabetic and non diabetic groups. Increase of dose grading was associated with increase level of serum potassium in Losartan and Valsartan where it was not seen for Olmesartan.

Taka chi et al observed serum potassium levels to be higher in patients with diabetes and patients using an ACEI/ARB up to serum creatinine of 2 mg/dl and not for groups with lower renal function. This study, however, is limited by the use of only creatinine values[13]. In the aforementioned French study, the odds ratio of hyperkalaemia in multivariate analysis was significantly higher for males and subjects using an ACEI/ARB, it was lower with increasing eGFR, and it was marginally lower for black individuals. Age, cause of CKD, diabetes, body mass index and BP control did not show independent associations. Despite the lack of clear evidence some authors have stated that the increase in serum potassium is less pronounced during therapy with ARBs and that the risk of hyperkalemia is higher in patients treated with ACEIs[14]. Hypertension is a well known risk factor for coronary heart disease, stroke, transient ischaemic attack, and diabetes-induced chronic kidney disease[15]. Few guidelines for hypertension recommend Angiotensin II Receptor Blockers (ARBs) as the first drug of choice for treating hypertension[16].

Conclusion

This study shows that serum potassium level gradually increases as CKD also progress to end stages. Antihypertensive like ARB types and their dose influence the level of serum potassium among both diabetic and non-diabetic CKD patients. Fluctuation of serum potassium is more among the patients with CKD with DM then CKD without DM.

Disclosure

All the authors declared no competing interests.

References

1. Allon M. Hyperkalemia in end-stage renal disease: Mechanisms and management. J Am Soc Nephrol. 1999; 6: 1134–1142.

2. Weiner ID, Wingo CS. Hyperkalemia: A potential silent killer. J Am Soc Nephrol. 1998; 9: 1535–1543.

3. Siamopoulos KC, Elisaf M, Katopodis K. Iatrogenic hyperkalaemia—points to consider in diagnosis and management. Nephrol Dial Transplant. 1998; 13: 2402–2406.

4. Sarafidis PA, Khosla N, Bakris GL. Antihypertensive therapy in the presence of proteinuria. Am J Kidney Dis. 2007; 49: 12–26.

5. Weir MR. Are drugs that block the renin-angiotensin system effective and safe in patients with renal insufficiency? Am J Hypertens. 1999; 12: 195–203.

6. Kunz R, Friedrich C, Wolbers M, Mann JF. Meta-analysis: Effect of monotherapy and combination therapy with inhibitors of the renin angiotensin system on proteinuria in renal disease. Ann Intern Med. 2008; 148: 30–48.

7. Sica DA, Hess M. Pharmacotherapy in congestive heart failure: Aldosterone receptor antagonism: Interface with hyperkalemia in heart failure. Congest Heart Fail. 2004; 10: 259–264.

8. Bakris GL, Hart P, Ritz E. Beta blockers in the management of chronic kidney disease. Kidney Int. 2006;70: 1905–1913.

9. Takaichi K, Takemoto F, Ubara Y, Mori Y. The clinically significant estimated glomerular filtration rate for hyperkalemia. Intern Med. 2008; 47: 1315–1323.

10. Apple LJ, Bakris G, Gasman JJ, Greene T, Kendrick CA. Risk of hyperkalemia in nondiabetic patients with chronic kidney disease receiving antihypertensive therapy. Arch Intern Med. 2009; 169: 1587–1594.

11. Das S, Dutta PK. Chronic kidney disease prevalence among health care providers in Bangladesh. Mymensingh Med J. 2010l; 19(3):415-421.

12. Hermida RC, Ayala DE. Chronotherapy with the angiotensin-converting enzyme inhibitor ramipril in essential hypertension: improved blood pressure control with bedtime dosing. Hypertension. 2009; 54:40–46.

13. Hermida RC, Calvo C, Ayala DE. Administration time-dependent effects of valsartan on ambulatory blood pressure in hypertensive subjects. Hypertension. 2003; 42:283–290.

14. ACE inhibition or angiotensin receptor blockade: Impact on potassium in renal failure. VAL-K Study Group. Bakris GL, Siomos M, Richardson D, Janssen I, Bolton WK, Hebert L, Agarwal R, Catanzaro D Kidney Int. 2000; 58(5):2084-2089.

15. Kokubo Y, Matsumoto C Hypertension is a risk factor for several types of heart disease: Review of prospective studies. Adv Exp Med Biol. 2017;956:41926. doi:10.1007/5584_2016_99pmid:http://www.ncbi.nlm.nih.gov/pubmed/27815926 PubMedGoogle Scholar.

16. Umemura S, Arima H, Arima S et al. The Japanese Society of hypertension guidelines for the management of hypertension (JSH 2019). Hypertens Res. 2019; 42:1235–1481. doi:10.1038/s41440-019-0284-9pmid:http://www.ncbi.nlm.nih.gov/pubmed/31375757 CrossRefPubMedGoogle Scholar.

An Overview on Multisystem Inflammatory Syndrome in Children Associated with COVID 19: A Rare but Alarming Paediatric Syndrome

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ABSTRACT

Background : Although COVID-19 causing rare severe illness and minimal mortality in children, a rare pediatric syndrome called Multisystem Inflammatory Syndrome in Children (MIS-C) associated with SARS-CoV-2 infection has evolved with potentially severe outcomes. MIS-C presents potentially life-threatening medical sequelae due to lack of information regarding its etiology, pathophysiology and long-term outcomes. In this article, we aimed to describe the epidemiology, pathophysiology, case definition, diagnosis and treatment of MIS-C cases.

Methodology : A literature search was done using PubMed and Medline data bases. We used the termsCOVID-19 in children, MIS-C and PMISto identify publications since December 2019 that address the epidemiology, pathophysiology, case definition or clinical features and lab parameters of MIS-C in children. Most of the publications were case reports, case series, original articles or literature reviews. Publications, from China, Italy, UK and the United States, describe multisystem inflammatory symptoms in children associated with COVID-19.

Conclusion : Current knowledge on MIS-C is discussed and the potential significance of this syndrome are reviewed from a public health aspect. The severity of MIS-C demands the need for increased awareness and continued COVID-19 remission efforts. Particularlyidentification of potential predisposing factors for MIS-C through extensive research and long-term follow-up of complications are vital.

Key words: COVID-19; Multisystem Inflammatory Syndrome in Children (MIS-C); Pediatric Multisystem Inflammatory Syndrome (PMIS); SARS-CoV-2.

Introduction

The pandemic of Severe Acute Respiratory Syndrome Co-ronavirus 2 (SARS-CoV-2) causing COVID-19, has rapidly spread worldwide, which can affect individuals of all ages in most of the country in the world[1]. Epidemiological data from many countries reflected that children are a small portion of those who are affected. According to UNICEF report, about 12 million children and adolescents are affected by COVID-19 which is 13% of total infected cases in 100 countries from January 2020 to present[2]. In the United States children represented 14.2% of total cumulated COVID-19 cases, as of June 17,2021 according to American Academy of Pediatrics. COVID-19 was generally described as relatively asymptomatic or mild in children than adult and causing few pediatric hospitalizations, rare severe illness and minimal mortality[3]. Though the greater number of

infected children appear to be saved from severe illness, a rare pediatric syndrome called Multisystem Inflammatory Syndrome in Children (MIS-C) is believed to be associated with prior SARS-CoV-2 infection and presents a new challenge in this ongoing health crisis. Several countries affected by the COVID-19 pandemic recently documented cases of children hospitalized in the intensive care unit due to an unusual Paediatric Multisystem Inflammatory Syndrome (PMIS).

The number of patients meeting the case definition for MIS-C in the United States is 3,742 and total MIS-C deaths meeting case definition is35, reported to CDC as of May 3, 2021[4].

In April of 2020, the United Kingdom reported a presentation in children similar to incomplete Kawasaki Disease (KD) or toxic shock syndrome. Since then, there have been documents of similar type of affected children in other parts of the world. The syndrome has been termed Multisystem Inflammatory Syndrome in Children (MIS-C) also referred to as Pediatric Multisystem Inflammatory Syndrome (PMIS) pediatric inflammatory multisystem syndrome temporally associated with SARS-CoV-2 (PIMS-TS) pediatric hyperinflammatory syndrome[5].

MIS-C is a systemic inflammation, involving persistent fever, inflammation and organ dysfunction, which may be temporarily associated with exposure to COVID-19[6]. Onset may be delayed or current with ongoing SARS-CoV-2 infection. It may occur several weeks after the initial infection[7]. It was noticed that arapid rise of this inflammatory syndrome after the COVID- 19 curves has plateaued in the pandemic region.

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At present, while clinicians initially faced challenges identifying MIS-C, it is crucial to shape up the clinical, epidemiological characterization, the diagnostic criteria and treatment outline of this inflammatory syndrome related to COVID-19 in children. Hence, we performed a review to describe evidence-based approach to the clinical and laboratory characteristics of patients of MIS-C and to manage such patients.

Search Strategy
Available studies and abstracts were identified through Pubmed, Medline data bases (2020-2021) and Cochrane data bases. Key search topic were "An Overview on Multisystem Inflammatory Syndrome in Children Associated with COVID 19: A Rare but Alarming Paediatric Syndrome" and relevant articles.The reference list of overview articles was also searched. The search term following key words used in various combinations: COVID-19, MIS-C, PMIS, SARS-CoV-2.

Discussion

Epidemiology:
MIS-C appears to be a relatively rare complication of COVID19 in children and 70 percent of affected children were previously healthy. Obesity and asthma were the most common comorbidities and the median age was 8 to 11 years (Range 1 to 20 years)[5]. There has been no clear sex bias noticed in MIS-C patients. The fatality rate of MISC has been approximated at 1–2%[8].

Cases of MIS-C appear to vary by race and ethnicity, with Black and Hispanic children were found a disproportionally higher in number and Asian children accounting for a small in number. In most studies, there was a gap of several weeks between the peak of COVID-19 cases within communities and the rise of MIS-C cases. This three- to four-week gap coincides with the timing of acquired immunity and suggests that MIS-C may show a post-infectious complication of the virus rather than acute infection[5]. Environmental factors may add to the geographic distribution of MIS-C, but social determinants of health discrepancy also put particular ethnic minority populations at higher risk of SARS-CoV-2 exposure and associated disease. The contributions of viral, host genetic, and other biological factors to this higher risk remain uncertain. It has been recommended that viral factors have contributed to geographic differences in the incidence of MIS-C[8].

Pathophysiology
The pathophysiology of MIS-C is not well known[5]. SARS-CoV-2 could have one of various roles, directly or indirectly, it could be a triggering factor for the conditinon[9]. Another suggested that the syndrome results from an abnormal immune response to the virus, with some clinical similarities to Kawasaki Disease (KD) macrophage activation syndrome (MAS) and cytokine release syndrome[5].

It suggests that Kawasaki-like disease mechanism represents post-infectious inflammatory syndrome, which might be antibody or immune-complex mediated[5,10,11]. It is hypothesized that an acquired immune response to COVID 19 activates an inflammatory process in genetically vulnerable children. Another possible mechanism is antibody-dependent enhancement, whereby the development of antibodies promotes viral entry into host cells[12]. It has also been recommended that the cytokine storms induced by COVID-19 may cause the condition. The characteristic ability of coronaviruses to block type I and type III interferon responses might help to explain a delayed cytokine storm in children whose immune systems compete to control SARS-CoV-2 viral replication, or are devastated by a high initial viral load[13].

Another study suggests that patients with severe MIS-C have persistent Immunoglobulin G (IgG) antibodies with increased ability to activate monocytes, persistent cytopenias (Particularly T cell lymphopenia) and higher activation of CD8+ T cells that differ from findings in acute COVID-19 infection. The acceptance of these findings is limited due to the small number of patients in these studies. Realizing the mechanisms of the exaggerated immune response in MIS-C requires active investigation[5].

Mechanisms of myocardial injury – The mechanisms of myocardial injury in MIS-C are not well established. In various clinical presentation, it is likely that different mechanisms are liable in different patients. Probable etiologies include systemic inflammation injury, acute viral myocarditis, hypoxia, stress cardiomyopathy and rarely, ischemia caused by Coronary Artery (CA) involvement. Cardiac dysfunction may be due to a combination of these mechanisms in some patients[5].

The frequent gastrointestinal presentation, along with mesenteric lymph node inflammation, recommends dominant replication in the gastrointestinal tract by a virus with a known propensity for enterocytes[14]. Linkage of Kawasaki-like disease with COVID-19 could support that SARS-CoV-2 can cause systemic vasculitis by aiming endothelial tissue via Angiotensin-Converting Enzyme 2 (ACE2) receptor[15]. A leading explanation for the pathogenesis of KD also involves a hyperinflammatory response to viral infection in some genetically susceptible children, and that SARS-CoV-2 is now included in the list of suspected viral triggers[16].

Case Definition
The criteria used for case definition vary slightly between different health organizations[6,12,17,18]. The Centers for Disease Control and Prevention (CDC) case definition requires that the child have severe symptoms requiring hospitalization, whereas the World Health Organization (WHO) case does not. An advantage of the WHO definition is that it provides more detail regarding clinical signs of multisystem involvement.

Table I : Case definitions for emerging inflammatory condition during COVID-19 pandemic from the World Health Organization, Royal College of Paediatrics and Child Health and Centers for Disease Control and Prevention

World Health Organization (WHO)[17]	Royal College of Paediatrics and Child Health (RPCH)[6]	Centers for Disease Control and Prevention (CDC)[18]
Children and adolescents 0-19 y of age with fever >3 d **AND** 2 of the following: i) Rash or bilateral nonpurulent conjunctivitis or mucocutaneous inflammation signs (Oral, hands, or feet). ii) Hypotension or shock. iii) Features of myocardial dysfunction, pericarditis, valvulitis, or coronary abnormalities (Including ECHO findings or elevated troponin/NT-proBNP). iv) Evidence of coagulopathy (By PT, APTT, elevated D-dimers). **AND** Elevated markers of inflammation such as ESR, CRP, orprocalcitonin. **AND** No other obvious microbial cause of inflammation, including bacterial sepsis, staphylococcal or streptococcal shock syndromes. **AND** Evidence of COVID-19 (RT-PCR, antigen test, or serology positive) or likely contact with patients with COVID-19. Consider this syndrome in children with featuresof typical or atypical Kawasaki disease or toxic shock syndrome.	i) Child presenting with persistent fever, inflammation (Neutrophilia, elevated CRP and lymphopenia) and evidence of single or multiorgandysfunction (Shock, cardiac, respiratory, kidney, gastrointestinal or neurological disorder). This may include children fulfilling full or partial criteria for Kawasaki disease. ii) Exclusion of any other microbial cause, including bacterial sepsis, staphylococcal or streptococcal shock syndromes, infections associated with myocarditis such as enterovirus. iii) SARS-CoV-2 PCR test results may be positive or negative.	-An individual aged <21 years presenting with fever*, laboratory evidence of inflammation** and evidence of clinically severe illness requiring hospitalization, with multisystem (>2) organ involvement (Cardiac, kidney, respiratory, hematologic, gastrointestinal, dermatologic or neurological) AND -No alternative plausible diagnoses **AND** -Positive for current or recent SARS-CoV-2 infection by RT-PCR, serology or antigen test; or COVID-19 exposure within the 4 weeks prior to the onset of symptoms. *Fever >38.0°C for ≥ 24 hours, or report of subjective fever lasting ≥ 24 hours **Including, but not limited to, one or more of the following: an elevated C-Reactive protein (CRP), Erythrocyte Sedimentation Rate (ESR), fibrinogen, procalcitonin, d-dimer, ferritin, Lactic Acid Fehydrogenase (LDH) or interleukin 6 (IL-6), elevated neutrophils, reduced lymphocytes and low albumin. **Additional comments** -Some individuals may fulfill full or partial criteria for Kawasaki disease but should be reported if they meet the case definition for MIS-C. -Consider MIS-C in any pediatric deathwith evidence of SARS-CoV-2 infection.

Table II: Clinical and laboratory features[6]

Clinical

All:
- Persistent fever >38.5°C

Most:
- Oxygen requirement
- Hypotension

Some:
- Abdominal pain
- Confusion
- Conjunctivitis
- Cough
- Diarrhoea
- Headache
- Lymphadenopathy
- Mucus membrane changes
- Neck swelling
- Rash
- Respiratory symptoms
- Sore throat
- Swollen hands and feet
- Syncope
- Vomiting.

Laboratory

All:
- Abnormal Fibrinogen
- Absence of potential causative organisms (Other than SARS-CoV-2).
- High CRP
- High D-Dimers
- High ferritin
- Hypoalbuminaemia
- Lymphopenia
- Neutrophilia in most – normal neutrophils in some

Some:
- Acute kidney injury
- Anaemia
- Coagulopathy
- High IL-10 (If available)*
- High IL-6 (If available)*
- Neutrophilia
- Proteinuria
- Raised CK
- Raised LDH
- Raised triglycerides
- Raised troponin
- Thrombocytopenia
- Transaminitis

*These assays are not widely available. CRP can be used as a surrogate marker for IL-6.

Imaging and ECG

- Echo and ECG – myocarditis, valvulitis, pericardial effusion, coronary artery dilatation
- CXR – Patchy symmetrical infiltrates, pleural effusion.
- Abdominal USG– colitis, ileitis, lymphadenopathy, ascites, hepatosplenomegaly.
- CT chest – as for CXR – may demonstrate coronary artery abnormalities if with contrast.

Differential Diagnosis

Children present with signs and symptoms consistent with MIS-C, the differential diagnosis is vast and includes other infectious and inflammatory conditions:

i) Bacterial Sepsis: In children who present with fever, shock and elevated inflammatory markers, sepsis is an important consideration. Certain clinical presentations like cardiac involvement differentiate MIS-C from bacterial sepsis[6,12].

ii) Kawsaki Disease (KD): Some children along the PMIS/MIS-C spectrum fulfill the criteria for complete or incomplete KD. However, there appear to be some key differences:

a) MIS-C appears to affect older children and adolescents, whereas classic KD typically affects infants and young children usually less than 5 years.

b) Gastrointestinal symptoms (Particularly abdominal pain) are very common in MIS-C whereas these symptoms are less common in classic KD.

c) Moreover, myocardial dysfunction and shock occur more commonly in MIS-C compared with classic KD.

d) Inflammatory markers likely to be more raised in MIS-C than KD[19].

iii) Toxic Shock Syndrome: Staphylococcal and streptococcal toxic shock syndromes poses many similarities with MIS-C. Microbiologic tests (SARS-CoV-2 testing, bacterial cultures) are essential to make the distinction. [6,12]

iv) Other Viral infections: Presentation with multisystem involvement and/or myocarditis include Epstein-Barr virus, cytomegalovirus, adenovirus, and enteroviruses. Serology and PCR testing can differentiate these from COVID-19-related MIS-C[7].

Treatment:

Children with moderate to severe signs and symptoms should get admission to the hospital. Hemodynamic instability (Shock, arrhythmia) significant respiratory compromise, neurologic deficit or other potentially life-threatening complications are the criteria for admission in the pediatric intensive care unit[20].

MIS-C is a multisystem disease, and care for affected children requires multidisciplinary approach. This may include:

- Pediatric infectious disease specialists
- Pediatric rheumatologists
- Pediatric cardiologists
- Pediatric intensivists
- Pediatric hematologists

Antibiotic Therapy: MIS-C can present with signs and symptoms that resemble sepsis and toxic shock syndrome. Thus, patients should get prompt empiric broad-spectrum antibiotic therapy. An appropriate empiric regimen consists of ceftriaxone plus vancomycin and Ceftaroline plus piperacillin-tazobactam is an alternative regimen. Clindamycin - can be added if there are features consistent with toxin-mediated illness[21].

Antiviral Therapy: Use of antiviral agents is generally limited to children with severe MIS-C manifestations with evidence of active infection[21].

Shock: Children presenting with shock must be resuscitated according to standard protocols. Epinephrine or norepinephrine are the preferred vasoactive agents for the fluid-refractory shock. In children presenting with severe ventricular dysfunction, the addition of milrinone can be helpful[21].

Features of Kawasaki Disease: Patients who meet criteria for KD should receive IVIG and aspirin. Glucocorticoids may also be considered in patients with KD who have persistent signs of inflammation or Coronary Artery (CA) dilation and myocarditis[21].

Myocardial Dysfunction: Management concentrate on supportive care to maintain hemodynamic stability and ensure adequate systemic perfusion. IVIG is often used in severe cases when the clinical picture is consistent with myocarditis. Patients with significant ventricular dysfunction are managed with intravenous diuretics and inotropic agents, such as milrinone, dopamine, and dobutamine. Extracorporeal Membrane Oxygenation (ECMO) or a ventricular assist device may be necessary, in cases of fulminant disease.[21]

Thrombotic Complications: Patients with MIS-C are at a higher risk of experiencing thrombotic complications. All patients who meet the criteria for KD should receive antithrombotic therapy, including low-dose aspirin (3 to 5 mg/kg daily). Therapeutic anticoagulation (Typically with Low Molecular Weight Heparin [LMWH] must be given to patients with current or prior VTE. Therapeutic anticoagulation is advised for patients with severe LV dysfunction, if the patient is not at increased risk of bleeding. Therapeutic anticoagulation in addition to aspirin, should be advised inpatients with giant CA aneurysms.[21]

Adjunctive Immune-Modifying Therapies: The benefits and risks of adjunctive therapies (Glucocorticoids, interleukin-1 inhibitors [eg, Anakinra, canakinumab] IL-6 inhibitors [eg, Tocilizumab]) are uncertain. According to disease severity and markers of inflammation, use of the adjunctive therapies depends on case-by-case basis). For patients with cytokine release syndrome in addition of KD glucocorticoids can be considered. Anakinra, canakinumab, and tocilizumab might be the alternative options for treatment of CRS in patients who cannot receive glucocorticoids and those who are refractory to glucocorticoids[6,11,19,21].

Conclusion
The global outbreak of MIS-C is a challenge associated with the COVID-19 pandemic. A similar outbreak in children, affected by COVID 19 pandemic is expected in Bangladesh. Children with COVID-19 associated MIS-C can deteriorate quickly, so increased index of suspicion followed by prompt admission to hospital for specialist attention is necessary.

Recomendation
The prognosis MIS-C is uncertain, so further epidemiological, immunological, clinical and genetic research is needed, as well as long-term follow-up studies of MIS-C patients.

Disclosure
All the authors declared no competing interests.

References
1. Verdoni L, Mazza A, Gervasoni A, et al. An outbreak of severe Kawasakilike disease at the Italian epicentre of the SARS-CoV-2 epidemic: an observational cohort study. The Lancet. 2020; 395: 1771–1778. doi:10.1016/ S0140-6736(20)31103-X.

2. COVID-19 and children. UNICEF data hub. 2019. https://data.unicef.org/covid-19-and-children/.

3. Jones VG, Mills M, Suarez D, Hogan CA et al. COVID-19 and Kawasaki disease: novel virus and novel case. Hosp Pediatr. 2020; 10(6):537-540. doi:10.1542/hpeds.2020-0123.

4. Health Department-Reported Cases of Multisystem Inflammatory Syndrome in Children (MIS-C) in the United States. Last reviewed: June 4, 2021. https://www.cdc.gov/mis/cases/index.html?CDC_AA_refVal =https%3A%2F%2Fwww.cdc.gov%2Fmis-c%2Fcases%2Findex.html.

5. Son MBF, Friedman K. Coronavirus disease 2019 (COVID-19): Multisystem inflammatory syndrome in children. @ 2021 Uptodate (COVID-19)_Multisystem inflammatory syndrome in children UpToDate.pdf.

6. Royal College of Paediatrics and Child Health Guidance: Paediatric multisystem inflammatory syndrome temporally associated with COVID-19. https://www.rcpch.ac.uk/sites/default/files/2020-05/COVID-19-Paediatric-multisystem-inflammatory syndrome -20200501.pdf.

7. Walker DM, Tolentino VR. COVID-19: The impact on pediatric emergency care. Pediatric Emergency Medicine Practice. 2020; 17: 1–27. PMID 32496723.

8. Sancho-Shimizu V, Brodin P, Cobat A et al. SARS-CoV-2–related MIS-C: A key to the viral and genetic causes of Kawasaki disease? J Exp Med. 2021; 218(6):e20210446. https://doi.org/10.1084/jem.20210446.

9. Brogan P, Burns JC, Cornish J, Divakar V et al."Lifetime cardiovascular management of patients with previous Kawasaki disease". Heart 2020; 106 (6): 411-420. doi: 10.1136/heartjnl-2019-315925. PMC 7057818. PMID 3184387.

10. Riphagen S, Gomez X, Gonzalez-Martinez C, Wilkinson N, et al. Hyperinflammatory shock in children during COVID-19 pandemic. Lancet. 2020; 355:1607-1608. doi.org/10.1016/ S0140-6736(20)31094-1.

11. Verdoni L, Mazza A, Gervasoni A et al. An outbreak of severe Kawasaki like disease at the Italian epicentre of the SARS-CoV-2 epidemic: An observational cohort study. The Lancet.2020;1771-1778.
doi:10.1016/ S0140-6736(20)31103-X.

12. Rapid risk assessment: Paediatric inflammatory multisystem syndrome and SARS-CoV-2 infection in children". European Centre for Disease Prevention and Control. 2020. https://www.ecdc.europa.eu/sites/default/files/documents/covid-19-risk-assessment-paediatric-inflammatory-multisystem-syndrome-15-May-2020.pdf.

13. Alunno A, Carubbi F, Rodríguez-Carrio J. Storm, typhoon, cyclone or hurricane in patients with COVID-19? Beware of the same storm that has a different origin. RMD Open. 2020;6(1): e001295.
doi:10.1136/rmdopen-2020-001295. PMID 32423970.

14. Galeotti C, Bayry J. Autoimmune and inflammatory diseases following COVID-19. Nature Reviews. Rheumatology. 2020; 4: 1–2.
doi: 10.1038/s41584-020-0448-7PMID 32499548.

15. Sardu C, Gambardella J, Morelli MB, Wang X et al. Hypertension, Thrombosis, Kidney Failure, and Diabetes: Is COVID-19 an Endothelial Disease? A Comprehensive Evaluation of Clinical and Basic Evidence. Journal of Clinical Medicine. 2020;9 (5):1417.
doi:10.3390/jcm9051417. PMID 32403217.

16. Loomba RS, Villarreal E, Flores S. Covid-19 and Kawasaki syndrome: should we really be surprised?" Cardiology in the Young. 2020; 1059–1060.
doi:10.1017/S1047951120001432. PMID 32412400.

17. Multisystem inflammatory syndrome in children and adolescents with COVID-19: Scientific brief". www.who.int. World Health Organization. Archived from the original on 15 May 2020.

18. Health Alert Network (HAN): Multisystem Inflammatory Syndrome in Children (MIS-C) Associated with Coronavirus Disease 2019 (COVID-19).
https://emergency.cdc.gov/han/2020/han00432.asp 15 May 2020.

19. Whittaker E, Bamford A, Kenny J et al. Clinical Characteristics of 58 Children With a Pediatric Inflammatory Multisystem Syndrome Temporally Associated With SARS-CoV-2. JAMA. 2020; 324(3):259-269. doi: 10.1001/jama. 2020.10369.

20. Clinical Guidance for Pediatric Patients with Multisystem Inflammatory Syndrome in Children (MIS-C) Associated with SARS-CoV-2 and Hyperinflammation in COVID-19. https://www.rheumatology.org/Portals/0/Files/ACR-COVID-19-Clinical-Guidance-Summary-MIS-C-Hyperinflammation.pdf.

21. Son MBF, Friedman K.COVID-19: Multisystem inflammatory syndrome in children (MIS-C) management and outcome ©2021 Up To Date.

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(List is not according to Seniority)

Guidelines for Authors

Journal of Army Medical College Chattogram (JAMCC)

Army Medical College Chattogram (AMCC) has established in the year 2014. It is located in Chattogram Cantonment, Bangladesh, affiliated with Bangladesh University of Professionals.

AMCC started its academic journey on 11 January 2015 with 50 students and 13 faculty members, which is recognised by Bangladesh Medical and Dental Council (BMDC).

Army Medical College Chattogram inaugurated to publish a double blinded, peer reviewed scientific journal from June 2018, which is recognized by Bangladesh Medical and Dental Council (BMDC) and having International Standard Serial Number (ISSN)- 2663-778X. Journal of Army Medical College Chattogram (JAMCC) is published twice in a year (June and December). The theme of JAMCC is :

"Transforming Health Care Through Research".

The journal intends to publish article of authors from any part of the globe, but has a special interest in publishing original, research article, special articles, review articles, case report, meta analysis, editorial, letter to the editors. While preparing the manuscript authors are requested to follow the uniform requirements for manuscript submitted to Biomedical Journals prepared by International committee of Medical Journal Editor (ICMJE) which is available at http://www.icmje.org.

Conditions for Submission of Manuscript

Manuscript should be submitted to the concerned person or submitted by email. **Email :** jamcc.ctg.bd@gmail.com at any time.

Manuscripts accepted for the publications are subjected to peer-review and editorial revision. Submitted manuscripts should not be previously published or being considered for publication in a different journal. The manuscript should be prepared using MS Word (2003 or 2007). All text (title page, abstract, body, references) should be submitted as one document and should be prepared in accordance with the Vancouver style. Authors must submit two copies of the paper written in English (A4 size white blond paper, font size 12 and Style: Arial, double space, Margin 5 cm for the header and 2.5 cm for the remainder). Acceptance is based on originality, clarity, fulfillment of the criteria of the publication policy of this journal. Submission of manuscript through email with all file attachment of documents is welcome.

A cover letter should be addressed to the Editor-In-Chief of the journal. It should contain a declaration that this manuscript has not been published anywhere.

Preparation of Manuscript

Title Page

The title page should contain the title of the article as well as name of all authors with their designation, institutional affiliation, cell no and email ID. The correspondent author's name and address should be mentioned with cell no. and email ID.

Abstracts

Abstract should be structured with background, methods, results and conclusion. Abstract should not be more than 250 words. There will be a single paragraph. Avoid abbreviations, diagrams, p-values and references in the abstract.

Key words: Appropriate and short. 3 to 10 key words may be provided.

Text

The main body of the text should be divided into introduction, materials and methods, results, discussion, conclusion, disclosure and references.

Introduction should not exceed more than 500 words. Methods should be including type of study, time and place of the study, population, procedure and statistical procedure for data analysis and approval of the study by the Ethical Review Committee. Results should be presented in logical sequence in the text, tables and illustrations. The whole body of the text should not exceed 6000 words (Excluding abstract, table, figure, reference). The total number of references will not be more than 25 and less than 15 for the original article.

Tables

All tables should be in result section. It should be simple and self explanatory. It also should be using roman numerical which numbered consecutively using roman numerical (eg. Table I, II). A short descriptive title should appear above each table with a clear legend and any footnotes suitably identified below. Captions should be typed, double-spaced, on a separate sheet.

Figures/Graphs

Should be submitted in original as brief as possible. Figure should be numbered in Arabic numerical (eg. Fig 1, 2) followed by the legend on the bottom of the figure. Its noted that maximum numbers of table and figure 5/6 nos.

Illustrations

All illustrations must be numbered and cited in the text. Print photograph, B2 size with good contrast (600 pixels) should be submitted. Figure number and name of the 1st author should be written on the back of each photograph marking the top edge. For case report only 3 photographs are allowed.

Abbreviations

Standard abbreviation should be used. The full form for which the abbreviation stands followed by the abbreviation in parenthesis should be preceded the use of the abbreviation in the text except the standard ones.

References

References are to be numbered consecutively and cited at the end of the sentences in the order in which they appear in the text. Cited references should not be 10-15 years back.

References from Journals

References should be written according to the following sequence: authors(s) name, subject, name of journal with years of publication, volume number, page number. If there are six authors or less, names of all the authors should be written, when there are seven authors or more the first three names will be listed and then word "et al" to be added. Name of journals may be abbreviated but that must be according to style used in Index Medicus.

Example
Standard Journal Article

Abraham W, Wertz PW, Downing DT. Linoleate-rich acylglucosylceramides of pig epidermis: Structure determination by proton magnetic resonance. J Lipid Res. 1985; 26:761-766.

Agarwall P, Datta S, Garg SK et al. Multiple dose pharmacokinetics of ciprofloxacin in preterm babies. Indian pediatr. 2004; 4:1001-1007.

Organization as Author

The TIME Investigator. Trial of invasive versus medical therapy in elderly patients with chronic symptomatic coronary artery diseases (TIME): A randomized trial. The Lancet. 2001; 358(9286):951-957.

No Issue and No Volume

Browell DA, Lennard TW. Immunologic status of the cancer patient and the effects of blood transfusion on antitumour responses. Curr Opin Gen Surg. 1993;325-333.

Journal Article on the Internet

Kafuko JM, Zirabumuzaale,C. Bagenda D.Rational drug use in rural health units of Uganda: Effect of National Standard Treatment guidelines on rational drug use (Unpublished report). 1994. available at http://archives. who.int/icium/icium1997/posters/2f3_text.html accessed on 27th September 2013.

References from Books and Monograph

Personal author
Haque M.M. abc of research methodology and biostatistics, Department of Biochemistry, 2009. BSMMU, Dhaka.

Editor (s) as author
Basmajian JV, Slonecker CE, editors. Grant's method of anatomy. A clinical problem-solving approach. 11th ed. New Delhi : BI Waverly Pvt Ltd. 1997;180-183.

Organization as author and publisher
World Health Organization. Revised 1990 estimates of maternal mortality : A new approach by WHO and UNICEF. Geneva: World Health Organization. 2003;132-151.

Chapter in a book
Ford HL, Sclafani RA, Degregori J. Cell cycle regulatory cascades. In: Stein GS, Pardee AB, editors. Cell cycle and growth control: Biomolecular regulation and cancer. 2nd ed. Hoboken (NJ): Wiley-Liss. 2004; 42-67.

Article from an encyclopedia: No author
Mental disorders and their treatment. In: The new encyclopaedia Britannica. 5th ed. Chicago (IL): Encyclopaedia Britannica. 1987;23:956-975.

Conference proceedings
Khalifa ME, Elmessiry HM, ElBahnasy KM, Ramadan HMM. Medical image registration using mutual information similarity measure. In: Lim CT, Goh JCH, editors. Icbme 2008: Proceedings of the 13th International Conference on Biomedical Engineering. 2008 Dec 3-6; Singapore. Dordrecht: Springer. 2009;151-155.

Conference paper
Yamane Y. The effect of spirulina on nephrotoxicity in rats. Presented at Annual Symposium of the Pharmaceutical Society of Japan at Chiba University. 1988 April 15; Japan.

Reference from dissertation or thesis
Siddika AN. Does Antimicrobial Prescribing of BSMMU Hospital comply to its' Antibiotic Guideline? MPhil. Thesis, Dhaka: Bangabandhu Sheikh Mujib Medical University. 2012.

Newspaper Article
O'Leary C. Vitamin C does little to prevent winter cold. The West Australian. 2005 Jun 29.

Acknowledgements

This section may be used to acknowledge the help of those who (Individuals, organizations or bodies) do not qualify for authorship or to acknowledge funding, donated resources, or significant material contributions to the research. It should be limited to not more than 50 words.

Conflict of Interest

All authors of the submitted manuscript are requested to disclose any actual or potential conflict of interest including any financial, personal or other relationships with other people or organizations within two years of beginning the submitted work that could inappropriately influence, or be perceived to influence, their work. Please collect the form, fill and submit by each author separately.

Editorial: It's an invited article based on current affairs of medical science with any discipline. Maximum length of editorial may be within 1500- 1200 words.

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Review Article: It is a prestigious article, which is divided into following sections with headings (introduction, search strategy, discussion, conclusion, and disclosure). Review article should not generally exceed 8500 words.

Case Report: Text of the case report is divided into following sections (introduction, case report, images, discussion, figure/legend, conclusion, and disclosure). Maximum length of text may be within 2000- 2500 words (Excluding abstract, reference).

Letter to the Editor: Should be brief and to the point with 500-600 word only.

Authorship: The corresponding author is responsible for all the information of these forms. He/she will confirm that all the authors have read the manuscript before submission. The following person(s) will be authors:

- Concept research question and study design
- Data collection or processing

Any person only involved in writing the manuscript or analyzing the data will not be the author or corresponding author particularly in research article.

Manuscript Submission

The manuscript should be accompanied by a cover letter, a declaration signed by author and other co-authors include a statement of financial or other relationships that might lead to a conflict of interests, a declaration that the work has not been published or submitted for publication elsewhere. It should be clearly mentioned if manuscript is a whole or part of thesis or dissertation. The declaration must be collected from the office of Editor-In-Chief or AMCC's website.

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I/We the undersigned, solemnly affirm that I/We have read and approved the article under the title

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