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If any query please correspond with
The Chief Editor, Mugda Medical College Journal (MuMc Journal)
Mugda Medical College, Dhaka, Bangladesh
E-mail: mumcjournal@gmail.com

Editorial

Histopathological Diagnosis and its Pitfall: Bangladesh Perspective

Histopathological diagnosis and knowledge of pathogenic process is the key to modern medicine. Despite histopathology being the gold standard in available diagnostic techniques, considerable variability exists between different laboratories. This culminates in confusion and distress for patients and clinicians alike. It is of utmost importance to address the issue underlying the diagnostic dilemma to overcome the situation.

In Bangladesh, the errors start from the operation theatre which have persistent consequences. Lack of awareness of health service providers about the importance of fixation in histopathology majorly contributes to diagnostic difficulties. In a large number of cases, specimens are sent in normal saline. Use of improper or inadequate amount of fixative, sending large specimen without slicing results in autolysis of tissue. Especially the hospitals and clinics outside Dhaka can't provide proper fixation due to scarcity of material and expertise.

Provision of proper clinical information regarding age, sex, clinical history, relevant investigations and provisional diagnosis can reduce the diagnostic dilemma in a majority of cases.

Absence of reliability results in dependence of clinicians on few selective laboratories and overburdens those. On the other hand, sending specimen in the laboratory without proper setup also contributes to the diagnostic errors. They provides histopathological reports in extremely low costing. As a compromise, they practice inadequate grossing and prepares only a few blocks. This results in missing the representative areas in the sections and subsequent errors. Even if the histopathologist provides proper diagnosis, commenting on pathological staging or involvement of resection margins is not possible in malignant tumors.

To avoid the diagnostic dilemma, some clinicians prefer to divide the specimen and send it to different laboratories which further aggravates the situation. In many cases different laboratories receives different type of tissue from the same specimen manifesting in different and often conflicting diagnosis. It results in both psychological and financial sufferings to the patients and their family members. As slides and blocks are available to review in any laboratory in Bangladesh or abroad; it is wise to report the whole specimen in one laboratory and avail further consultation if necessary.

Role of histopathology is crucial in the diagnosis and treatment of disease. A combined, cordial and communicative approach between both clinician and histopathologist can produce credible results that aid in the therapeutic process.

Mugda Med Coll J. 2022; 5(2): 54

Naila Huq
Professor and Head, Department of Pathology, Mugda Medical College, Dhaka.

Original Article

Adolescent Pregnancy Outcome in a District Hospital of Bangladesh

Chowdhury N[1], Rahim R[2], Khan LN[3], Sweety K[4], Akther P[5]

ABSTRACT

Background: *Adolescent pregnancy is universally accepted as high risk pregnancy. Bangladesh has the highest (1 in 10) adolescent fertility rate in South Asia.*

Objective: *The study was conducted to find out the common problems of adolescent pregnancy.*

Methodology: *A comparative cross-sectional study was carried out among 100 respondents (50 adolescents and 50 adults) in Munshigonj General Hospital from 1st January to 31st December 2018. Respondents were admitted patients who have delivered either vaginally or by caesarian section. Women aged 15 to 19 years selected as adolescent and those aged 20 to 40 years selected as adult. Socio-demographic characteristics, past obstetric history, antenatal checkup, antenatal and intrapartum complications, and clinical state on admission were recorded in a semi structured questionnaire. Obstetrical parameters of adolescent and adult groups were compared.*

Results: *Among total admitted patients 11% were adolescent. 70% were from rural area, 68% were poor, 50% didn't have even primary education, 92% adolescent never use contraceptive, 56% had no ANC. Anemia (62%) and hypertension (24%) were prevalent among the pregnant adolescents. Complication rate were more in adolescent group, like preeclampsia (12%), eclampsia (14%), preterm labor (12%), prolonged labor (14%), obstructed labor (8%). Caesarean rate was higher (66%) in adolescent pregnancy.*

Conclusion: *Majority of the adolescents had no ANC, complication rate were more prevalent in adolescent group. Adverse perinatal outcome was found in adolescent pregnancy.*

Key words: *Adolescent pregnancy, Pregnancy outcome.*

Mugda Med Coll J. 2022; 5(2): 55-59

INTRODUCTION

Adolescent pregnancy is a major global problem due to the wide range of health effects and socioeconomic consequences both for mothers and their children. Globally about 17 million adolescent girls give birth each year comprising 11.0% of all births worldwide. Majority of these births (95.0%) occur in low and middle income countries[1]. The prevalence of adolescent motherhood is much higher in low income countries as compared to high income countries[1]. Half of all adolescent births occur in just seven countries: Bangladesh, Brazil, the Democratic Republic of the Congo, Ethiopia, India, Nigeria and the United States[1]. Bangladesh has the highest adolescent fertility rate in South Asia where 1 girl in 10, has a child before the age of 15, whereas 1 in 3 adolescent becomes mother or pregnant by the age of 19[2-4]. Despite remarkable progress in human development adolescent childbearing is highly persistent in Bangladesh mostly due to the comparatively higher prevalence of child marriage[5,6].

To a vast majority of adolescent in the developing world, family planning information and services are

1. Dr. Nowshafreen Chowdhury, Assistant Professor, Gynae & Obstetric Department, Mugda Medical College, Dhaka.
2. Dr. Riffat Rahim, Assistant Professor, Gynae & Obstetric Department Mugda Medical College, Dhaka
3. Dr. Laila Nazneen Khan, Assistant Professor, Gynae & Obstetric Department, Mugda Medical College, Dhaka
4. Dr. Kamrunnahar Sweety, Assistant Professor, Gynae & Obstetric Department, Mugda Medical College, Dhaka
5. Dr. Pervin Akther, Assistant Professor, Gynae & Obstetric Department, Mugda Medical College, Dhaka

Address of correspondence: Dr. Nowshafreen Chowdhury, Assistant Professor, Gynae & Obstetric Department, Mugda Medical College, Dhaka, Phone: 01771468699, Email: dr.nowshafreen@gmail.com

not accessible. The effect of time on adolescent motherhood can be attributed to the increasing trend of female education, labor force participation, women empowerment and knowledge dissemination in Bangladesh. In connection with this it is worthwhile to mention that Bangladesh is one of the few developing countries that has achieved most of the Millennium Development Goals including reducing poverty, increasing female education, and reducing gender inequality[7,8].

The study was conducted to find out the common problems of adolescent pregnancy which would help to develop appropriate measures to reduce these and eventually contribute to ensure quality life of adolescents and healthy life of mothers and children in particular in Bangladesh.

MATERIALS AND METHODS

This comparative cross-sectional study was carried out in Munshigonj General Hospital, Munshigonj from 1st January to 31st December, 2018. Respondents were admitted patients who had delivered either vaginally or by caesarian section. Women aged 15 to 19 years selected as adolescent and those aged 20 to 40 years selected as adult. A purposive and convenient sampling method was done to obtain the samples, 50 adolescents and 50 adults. After formulation of aims and objectives of the study, semi-structured questionnaire was made for recording all relevant parameters. Information were recorded by face to face interview of the respondents and from patient's hospital file about socio-demographic condition, contraceptive method, antenatal checkup, antenatal and intrapartum complications, mode of delivery, perinatal outcome and clinical state on admission. Antenatal complication like abortion, molar pregnancy, hyperemesis gravidarum, preterm labor, prelabor rupture of membrane, preeclampsia, eclampsia, antepartum hemorrhage, malpresentation were recorded. Intrapartum complication like eclampsia, prolonged labor, obstructed labor or postpartum hemorrhage were also recorded. Mode of delivery whether by normal vaginal delivery or by caesarian section and perinatal outcome whether baby was normal, cried well just after birth or asphyxiated or stillborn were also noted. After obtaining the data statistical analysis of the results was performed using SPSS (Statistical Package for the Social Sciences) version 20 software. The obstetrical parameters of the adolescent and adult groups were compared using the z score test. Statistical significance was set at ≤0.05 level and confidence interval at 95% level.

RESULTS

Total admitted pregnant women were 780. Among them 86 (11.03%) were adolescent and rest 694 (88.97%) were adult.

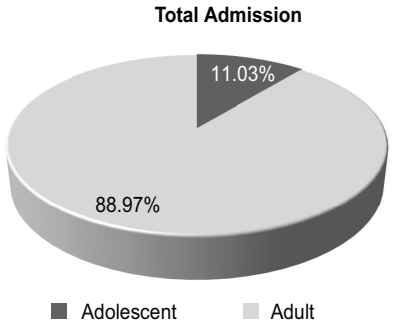

Fig.-1: *Percentage of adolescent pregnancy in total admission*

Table I: *Distribution of habitancy*

Resident	Adolescent		Adult	
	n=50	%	n=50	%
Urban	15	30	40	80
Rural	35	70	10	20

Adolescent pregnancy was higher (70%) in rural habitants.

Table II: *Educational status*

Education	Adolescent		Adult	
	n=50	%	n=50	%
Illiterate	17	34	13	26
Can sign only	8	16	9	18
Primary	21	42	12	24
Secondary	4	8	16	32

Less literacy rate was observed in adolescent group.

Table III: *Distribution of family income per month*

Income (Taka)	Adolescent		Adult	
	n=50	%	n=50	%
<10000	34	68	25	50
10000-15000	9	18	12	24
>15000	7	14	13	26

Most of the adolescent (68%) come from low income group.

Table IV: *Use of contraceptives*

Use	Adolescent		Adult		Test of significance	
	n=50	%	n=50	%	Z	P
Don't use	46	92	21	42	9.4071	.00
Irregular	2	4	9	18	3.2323	.00
Regular	2	4	20	40	7.1291	.00

92% adolescent never use contraceptive.

Table V: *Antenatal checkup*

ANC	Adolescent		Adult		Test of significance	
	n=50	%	n=50	%	Z	P
Regular	14	28	23	46	2.4425	0.0146
Irregular	8	16	7	14	0.3960	0.6892
No ANC	28	56	20	40	2.8486	0.0044

Most of the adolescent (56%) had no ANC.

Table VI: *Clinical state on admission*

Parameter	Adolescent		Adult		Test of significance	
	n=50	%	n=50	%	Z	P
Anemia	31	62	19	38	3.6449	.00
Edema	12	24	11	22	-	-
Hypertension	12	24	2	4	9.0011	.00
Proteinurea	6	12	2	4	4.4915	.00

Anemia (62%) and hypertension (24%) were prevalent among the pregnant adolescents.

Table VII: *Antepartum and Intrapartum complications*

Complication	Adolescent		Adult		Test of significance	
	n=50	%	n=50	%	Z	P
Hyperemesis	1	2	1	2	-	-
Preeclampsia	6	12	1	2	4.5001	-
Eclampsia	7	14	0	0	-	-
IUD	1	2	1	2	-	-
Preterm labor	6	12	2	4	3.8065	0.423
Malpresentation	5	10	0	0	-	-
Prolonged labor	7	14	2	4	4.605	0.424
Obstructed labor	4	8	2	4	1.1533	0.2460
Scar tenderness	0	0	8	16	-	-
APH	0	0	0	0	-	-
Oligohydramnios	2	4	1	2	1.1533	0.2460
No complication	13	26	31	62	1.1533	0.2460

Complication rate were more in adolescent group, like preeclampsia (12%), eclampsia (14%), preterm labor (12%), prolonged labor (14%), obstructed labor (8%).

Table VIII: *Mode of delivery*

Mode	Adolescent		Adult		Test of significance	
	n=50	%	n=50	%	Z	P
NVD	22	44	29	58	4.6162	0.00
LSCS	28	56	21	42	3.5714	-

Caesarean rate was higher (56%) in adolescent pregnancy.

Table IX: *Perinatal outcome*

Condition	Adolescent	Adult	Test of significance			
	n=50	%	n=50	%	Z	P
Healthy	28	56	36	72	1.4286	0.1528
Asphyxiated	18	36	10	20	1.5523	0.1212
Stillborn	4	8	4	8	-	-

Better perinatal outcome found in adult group.

DISCUSSION

Study revealed that most of the adolescent pregnant women were hailing from rural area (70%) and of low socio-economic condition (68%) with poor literacy rate (92%). Similar features were also observed in Islam M.M. et al study[9] showed teenage girls in the poorest wealth quintile were more likely to experience adolescent motherhood than the richest wealth quintile. Adolescents who had no education were found to have 2.76 times higher odds of adolescent motherhood than their counterparts who had higher than secondary education. Consistent with the prevalence of adolescent motherhood among teenage girls, the rate of childbearing before age 20 was found to be lower in urban areas than in rural areas. Similarly, the rate of adolescent motherhood among women was substantially higher among lower educated women. The inverse association between wealth index and the rate of adolescent motherhood is also clearly evident among adult women as well[9].

Acceptance of contraceptives is very low in adolescent. In this present study 92% never use any contraceptive, while in adult group this number was 42% only. A study conducted by United Nations Children's Fund[10] mentioned that though Bangladesh has made considerable progress in increasing overall contraceptive prevalence rate (44.6% in 1993–94 to 62.4% in 2014) it was still much lower among married teenage girls compared to adult women. For instance, in 2014 the prevalence of contraceptive use (any method) among teenage girls was only 51.2% compared to 67.7% among adult women. Part of the reason was that in most cases teenage girls take their desired number of children at younger ages to fulfill the expectation of husband and in-laws or family members despite higher risk of having children before age of 20 yrs[10].

Adolescents are not fully physically developed, at menarche a young girls pelvis has not finished growing. Therefore, pregnancy and birth at a young age pose serious risks for both mother and child. The present study revealed that 62% adolescent were anemic whereas only 38% were anemic in adult group. 24% adolescent became hypertensive during pregnancy, 12% developed preeclampsia, 14% suffered from eclampsia while in adult group only 2% were hypertensive, 2% developed preeclampsia and no one suffered from eclampsia. Adolescent pregnancy culminated in preterm labor in 12%, prolonged labor in 14% and obstructed labor in 8% cases. Adult group showed 4%, 4% and 2% respectively. Study conducted by Rahman M. et al[11] found that maximum adolescents suffered from anemia during the time of pregnancy. About 98% adolescent suffered delivery complications like eclampsia, prolonged labour, excess hemorrhage, and delay in delivery of placenta whereas only 16% suffered these complications that were pregnant at

age 20 years and later. More than fifty percent adolescent undergo prolonged delivery and very few (2%) adolescent delivered babies safely[11]. Several other studies also observed the pregnancy complications like hypertension, eclampsia, iron deficiency anemia were common among adolescent[12-16].

Phuong Hong Nguyen[17] study in Bangladesh showed greater risk of anemia, low birth weight affecting the lifelong well-being of a young mother and her child. Economic risks also weighed heavily on younger mothers, who demonstrated higher rates of early school dropout which leaves them less empowered in the long term and thus more vulnerable to sustained poverty[17].

CONCLUSION

Adolescent pregnancy is universally accepted as high risk pregnancy. Majority of the adolescents had no antenatal care & complication rate were more prevalent in adolescent group. Adverse perinatal outcome was also observed in adolescent pregnancy. To reduce this problem multiple programme should be undertaken on national level targeting firstly the adolescents and secondly their parents as well as community and social leaders.

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Original Article

Causes of Graft Dysfunction in Live Related Kidney Transplantation in a Tertiary Care Hospital

Chowdhury MFH[1], Alam MR[2], Khan MF[3], Rahman MM[4], Khanam A[5], Anwar MR[6], Nath PKD[7], Hossain M[8], Saha SK[9]

ABSTRACT

Introduction: *Renal transplantation remains the treatment of choice for end-stage renal disease (ESRD). Graft dysfunction or adverse events following renal transplantation are associated not only with short & long term graft outcome, but also with patient survival. Living kidney donation is a scheduled event that offers the advantage of optimal preparation for the recipient and donor. Restoration & preservation of renal function post transplant depends on many factors. Attempts should therefore been made to improve early graft function by a variety of mechanical, pharmacological and organ allocation strategies.*

Objectives: *To identify the causes of graft dysfunction in renal allograft recipients.*

Method: *In this prospective study, a total of 40 renal allograft recipients as well as 40 donors were evaluated. ESRD patients and kidney donors preoperative details and clinical parameters were recorded in structured questionnaire. Peroperative variables like induction with antibody, cold ischemia time, warm ischemia time, peroperative hypotension, peroperative blood transfusion, peroperative urine production were recorded. Early postoperative clinical variables like BP, hourly urine production, temperature were monitored and biochemical Hb%, Tc, Dc, ESR, blood urea, serum creatinine, s. electrolytes, cyclosporin level (C_2 level), urine RME & CS and imaging USG of transplanted kidney and duplex study of renal vessels were done. On the basis of creatinine reduction ratio(CRR) on post transplant day 7, renal allograft recipients were divided into IGF and RGF/graft dysfunction group respectively and evaluation and causes of graft dysfunction were recorded. Data were processed and analyzed using computer software SPSS (Statistical package for social science) version 12.*

Results: *The mean age of donors was 39.15±10.09 years with a male female ratio 1:1.7. The mean age of renal allograft recipients was 32.30±8.85 years with a male to female ratio of 3.5:1. Among 40 patients, 52.5% recipients had IGF and 47.5% had RGF. At day 7 posttransplantation period mean serum creatinine in IGF group was 130.10±14.45 ìmol/L and in RGF group was 237.32±123.85 ìmol/L which was statistically strongly significant (p value <0.0001). Regarding causes of graft dysfunction at day 7 post transplant period, cold ischemia time (p value 0.043) and postoperative urine production within 6 hours (p value 0.0001) were found statistically significant.*

Conclusion: *This study showed that 52.5% renal allograft recipient had IGF and 47.5 % renal allograft recipient had graft dysfunction(RGF). Significant causes of graft dysfunction were long cold ischemia time in minute and peroperative urine production in ml within 6 hours after anastomosis of vessels.*

Keywords: *Kidney transplantation, Immediate graft function (IGF), Reduced graft function (RGF), Graft dysfunction.*

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1. Dr. Md. Farhad Hasan Chowdhury, Assistant Professor, Department of Nephrology, Mugda Medical College, Dhaka, Bangladesh.
2. Professor (Dr.) Muhammad Rafiqul Alam, Chairman and Head, Department of Nephrology, Bangabandhu sheikh Mujib Medical University, Dhaka, Bangladesh.
3. Professor (Dr.) Md. Firoz Khan, Professor and Head, Department of Nephrology, Dhaka Medical College, Dhaka.
4. Professor (Dr.) M. Muhibur Rahman, Professor and Head, Department of Nephrology, National Institute of Kidney Disease and Urology, Dhaka.
5. Professor (Dr.) Asia Khanam, Professor, Department of Nephrology, Bangabandhu sheikh Mujib Medical University, Dhaka, Bangladesh.
6. Dr. Mohammed Rashed Anwar, Associate Professor, Department of Nephrology, Mugda Medical College, Dhaka, Bangladesh.
7. Dr. Palash Kumar Deb Nath, Assistant Professor, Department of Nephrology, Mugda Medical College, Dhaka, Bangladesh
8. Dr. Momtaz Hossain, Assistant Professor, Department of Nephrology, Mugda Medical College, Dhaka, Bangladesh.
9. Dr. Satyajit Kumar Saha, Assistant Director, Mugda Medical College Hospital, Dhaka, Bangladesh.

Address of correspondence: Dr. Md. Farhad Hasan Chowdhury, Assistant Professor, Department of Nephrology, Mugda Medical College, Dhaka, Bangladesh. email. hasanfarhad75@gmail.com

INTRODUCTION:

Renal transplantation remains the treatment of choice for end-stage renal disease (ESRD) in regards to patient survival[1]. Marked improvements in early graft survival, short-term and long-term graft function have translated into kidney transplantation being a more cost-effective alternative to dialysis. Post-transplantation graft function usually divided into immediate graft function (IGF) and poor early graft function or delayed graft function (DGF) or reduced function group(RGF). **Olwyn Johnston** *et al.* 2006[2] in their study divide graft function in reduced graft function (with or without dialysis) and immediate graft function. 7 days' creatinine reduction ratio (CRR) marked as cut point of difference between immediate graft function (IGF) & reduced graft function (RGF) group. Recipients with a CRR between time 0 of transplantation and day 7 post-transplantation of e"70% had IGF and CRR <70% with or without dialysis had RGF. RGF may subdivided into DGF where CRR <70% with dialysis and SGF where CRR <70% without dialysis.

Restoration & Preservation of renal function post-transplant depends on many factors. Long- term success of renal transplantation depends upon the quality of the donor organ, avoidance of peritransplant and early posttransplant damage and optimal maintenance of graft function after the first 6-12 months[3]. Living donation is a scheduled event that offers the advantage of optimal preparation for the recipient and donor. This situation allows for control of logistics that minimize the organ preservation time. Risk factors for DGF in the recipient include male gender, black race, longer dialysis duration, high panel-reactive antibody (PRA) titer, CMV status, number of grafts received and greater degree of HLA mismatching. Donor related risk factors include use of cadaveric donors, older donor age and longer cold ischemia time[4]. Most of these variables affect the graft through ischemia-reperfusion injury and immunologic mechanisms. High dosage of calcineurin inhibitors (CNIs) could also prolong or worsen DGF[5]. Humar A *et al*.2002[6] in their study showed that initial function of the graft significantly influenced the subsequent risk of acute rejection (at 12 months' post-transplant, the incidence of AR was 28% for those with IGF, 38% for those with SGF, and 44% for those with DGF) and graft survival (the 5-yr death-censored graft survival rate was 89% for recipients with IGF, 72% for those with SGF, and 67% for those with DGF). Attempts should therefore been made to improve early graft function by a variety of mechanical, pharmacological and organ allocation strategies[7]. If suboptimal early graft function could be accurately predicted, the success of these strategies may be improved. Hence, the present study was proposed to identify the causes of graft dysfunction in renal allograft recipients.

METHODS:

This prospective observational study was done in department of Nephrology, Bangabandhu Sheikh Mujib Medical University (BSMMU) over a period of 36 months from January 2010 to December 2012. A total of 40 renal allograft recipients as well as 40 kidney donors were included in this study. ESRD patients and kidney donors preoperative details and clinical parameters were recorded in structured questionnaire. All patients (except preemptive transplantation) received hemodialysis on the day before transplantation. Immunosuppressive drugs Cyclosporin and MMF were started 2 days before transplantation. Inj. Basiliximab 20 mg peroperatively and Day 4 posttransplantation – if indicated. Peroperative variables like induction with antibody, cold ischemia time, warm ischemia time, peroperative hypotension, peroperative blood transfusion, peroperative urine production were recorded.

All vital signs including BP, hourly urine production, temperature were monitored hourly and intake-output chart was maintained according to protocol in post-operative period on the day of operation in KT-ICU. During 1-7 days post-operative period, all vital signs were monitored at regular interval, intake-output chart and fluid balance were maintained according, I.V Methyl prednisolone – 1st & 2nd POD, oral Cyclosporin , oral MMF and oral prednisolone were used as immunosuppressive agents. Any symptoms of fever, burning sensation during micturation, cough etc. were noted. Foleys cather removed on 3rd POD. Laboratory investigations were daily Urine routine and microscopic examination, Hb%, TC, DC, ESR, B. Urea, S. Creatinine, S. Elecrolytes. Urine C/S- 3rd POD, Duplex study of the anastomotic vessels on 5th day, C_2 level (Blood level of cyclosporine 2 hours after ingestion) on 7th day. Other investigations were done according to need like blood C/S, USG of the transplanted kidney etc. On the basis of creatinine reduction ratio(CRR) on post transplant day 7, renal allograft recipients were divided into IGF and RGF group respectively and evaluation and causes of graft dysfunction were recorded.

RESULT:

Table I: *Preoperative characteristics of donors (n=40)*

Parameters	Mean±SD	Frequency	Percentage
Age (years)	39.15±10.09		
Sex			
Male		15	37.5
Female		25	62.5
Creatinine clearance rate (ml/min)	84.03±17.61		
Anti CMV (IgM)			
Positive		0	0.0
Negative		40	100.0
Anti CMV (IgG)			
Positive		35	87.5
Negative		5	12.5

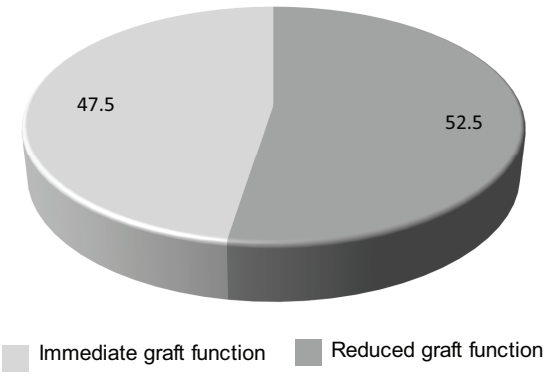

Fig.1 *Recipients graft status at 7th post transplant day*

Table II: *Preoperative characteristics of recipients (n=40)*

Parameters	Mean±SD	Frequency	Percentage
Age (years)	32.30±8.85		
Sex			
Male		31	77.5
Female		9	22.5
Pretransplant serum creatinine (μmol/L)	523.23±109.77		
HLA typing (class I)			
4 mismatch		6	15.0
2 mismatch		33	82.5
0 mismatch		1	2.5
Anti CMV (IgM)			
Positive		2	5.0
Negative		38	95.0
Anti CMV (IgG)			
Positive		36	90.0
Negative		4	10.0

Fig.1 shows recipients graft status at 7th posttransplant day. 52.5% recipients had immediate graft function and 47.5% had graft dysfunction or reduced graft function.

Table III: *Comparison of postoperative serum creatinine level between reduced and immediate graft function groups*

Serum creatinine (μmol/L)	Reduced graft function (n=19) (Mean±SD)	Immediate graft function (n=21) (Mean±SD)	p value[a]
At day 7	237.32±123.85	130.10±14.45	0.0001***

[a]Unpaired Student's 't' test
ns = Not significant
* = Significant at P<0.05
** = Significant at P<0.01
*** = Significant at P<0.001

Table IV: *Comparison of recipient peroperative risk factors between reduced and immediate graft function groups*

Risk factors	Reduced graft function (n=19)	Immediate graft function (n=21)	p value
[a]Induction with antibody			0.301[ns]
Yes (No./%)	6 (31.6)	10 (47.6)	
No (No./%)	13 (68.4)	11 (52.4)	
[b]Cold ischaemic time(min)			
(Mean±SD)	108.11±123.45	51.57±11.68	0.043[*]
[b]Warm ischaemic time(sec)			
(Mean±SD)	13.68±3.13	13.76±2.41	0.930[ns]
[c]Peroperative hypotension			0.0001[***]
Yes (No./%)	10 (52.6)	0	
No (No./%)	9 (47.4)	21 (100.0)	
[c]Peroperative blood transfusion		0.005[**]	
Yes (No./%)	11 (57.9)	3 (14.3)	
No	8 (42.1)	18 (85.7)	
[b]Urine production(ml)			
(Mean±SD)	83.84±112.62	354.52±215.84	0.0001[***]

[a]Chi square test ns = Not significant [b]Unpaired Student's 't' test
* = Significant at P<0.05 [c]Fisher's exact test ** = Significant at P<0.01
*** = Significant at P<0.001

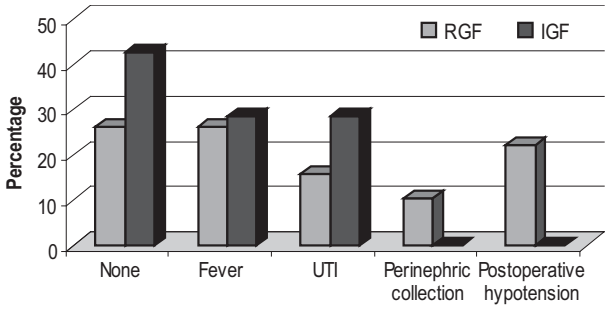

Fig. 2: *Adverse events at day 7*

Figure 2 shows adverse events at day 7. In RGF group, 21.1% patients suffered from postoperative hypotension. Fever was found in one quarter (26.3%), UTI in 15.8% and perinephric collection in 10.5% of patients. 26.3% patients of RGF group had no adverse events. In IGF group, about half of the patients had no adverse events whereas fever and UTI was observed equally in 28.6% patients.

Table V *Analysis of risk factors for reduced graft function (n=19) vs immediate (n=21) graft function groups*

Variables	Reduced graft function (n=19) No.(%)	Immediate graft function (n=21) No.(%)	RR (95% CI)	p value
[a]Donor age	41.05±9.8	37.43±10.26	36.02 42.46	0.262[ns]
[a]Recipient age	31.16±8.13	33.33±9.54	29.39 35.10	0.445[ns]
[a]Donor creatinine clearance rate	83.47±17.29	84.53±18.31	78.29 89.72	0.851[ns]
[a]Recipient pretreatment s. creatinine	513.47±115.72	532.05±106.18	487.25 558.27	0.600[ns]
[a]Cold ischaemic time	108.11±123.45	51.57±11.68	52.47 107.20	0.043[*]
[a]Warm ischaemic time	13.68±3.13	13.76±2.41	12.84 14.61	0.930[ns]
[a]Urine production(ml)	83.84±112.62	354.52±215.84	163.19 275.18	0.0001[***]
[b]Well matched kidney	18(94.6)	16(76.2)	0.333 (0.025 4.401)	0.404[ns]
[b]Induction with antibody	6 (31.6)	10(47.6)	0.625 (0.089 4.400)	0.637[ns]
[b]Peroperative hypotension	10(52.6)	0	0.0001 (0.000 0.032)	0.759[ns]
[b]Peroperative blood transfusion	11(57.9)	3(14.3)	0.563 (0.061 5.217)	0.613[ns]

[a]Multivariate analysis ns = Not significant
[b]Logistic regression * = Significant at P<0.05
*** = Significant at P<0.001

DISCUSSION:

Renal transplantation improves the patient's quality of life to a greater extent than hemodialysis and peritoneal dialysis[8]. Reduced Graft Function (RGF) is a well-known complication that can affect the kidney allograft in the immediate post-transplant period. Excellent organ quality and ideal transplant conditions contribute to immediate graft function (IGF) in a vast majority of living donor kidney transplantations (LDKT). However, poor early graft function still occurs after LDKT, although less frequently than after deceased donor kidney transplantation[9]. Poor EGF following LDKT has a large impact on long-term graft survival.[10]

For the purpose of the study, immediate graft function (IGF) was defined as return of normal renal function within 7 days after transplantation or creatinine reduction ratio (CRR)e" 70% on day 7 after transplantation, delayed graft function (DGF) as the requirement for dialysis within the first week after renal transplantation and slow graft function (SGF) as CRR< 70% on day 7 after transplantation without dialysis. Graft dysfunction or reduced graft function was defined as occurrence of DGF or SGF. In this study, at 7 days posttransplantation period mean serum creatinine in IGF group was 130.10±14.45 ìmol/L and in RGF group was 237.32±123.85 ìmol/L which was statistically strongly significant (p value <0.0001). Among 40 patients, 52.5% recipients had immediate graft function and 47.5% had reduced graft function.

Comparing the demographic characteristics between the study groups, age of both donor and recipient were found not significant. This is because most of the donors and recipients in our study were young adult. Mean age of donor was <40 years (39.15±10.09 years, range 22-60 yrs) and recipient was <33 years (32.30±8.85 years, range 15-50 yrs). It has been showed in different studies that older donor age is a risk factor for decrease graft survival. Senel FM *et al.*1998[11] and Cecka JM 1998[12] in their studies identified donor age >60 years as a risk factor. Fuggle SV *et al*.2010[13] described the association between donor age older than 59 years with poorer outcome after live donor kidney transplantation. But H.S. Park *et al*. 2012[14] showed there was no significant effect of donor age and recipient age on early graft function. In their study donor mean age was <42 years and recipient mean age<37 years which were almost similar to our study.

Regarding sex of donor and recipient, among the donors, 37.5% were male and 62.5% were female and the ratio of male and female was 1:1.7. In case of recipient, 77.5% of them were male and 22.5% were female. The ratio of male and female was about 3.5:1. Senel FM *et al.*1998 in their study[11], identified recipient sex as a risk factor for DGF. But some large studies showed that sex of both donor and recipient had no effect on graft function[14-15]. In our study, we did not find any significant effect of sex on graft function (p value in case of donor was 0.597 and in recipient was 0.431) which supports the recent studies.

In our study, regarding HLA matching between donor and recipient, 0 mismatch was found in 2.5% cases, 2 mismatch in 82.5% and 4 mismatch found in 15% cases. Univariate analysis between RGF and IGF groups showed no significant difference (p value 0.600). Logistic regression showed HLA mismatching was not a significant cause of RGF (p value 0.404). HLA matching was thought to be very important for living donors, given that two-haplotype–matched sibling donors have the best outcome. However, in the mid-1990s, results from a large registry analysis found that transplants from two-haplotype–mismatched siblings or spouses had outcomes similar to one haplotype– mismatched sibling or parental donor transplants. H.S. Park *et al*. 2012[14] showed there was no significant effect of HLA matching on early graft function.

Duration of cold ischemia time is a significant risk factor in the etiology of ATN and an increased ischemia time in cadaver transplantation is the cause of high incidence of ATN[16]. The anastamosis time has also been strongly correlated with de-layed graft function and was identified as the strongest independent predictor of delayed graft function in some studies.[17] In our study, cold ischemia time was defined as starting of cold solution perfusion after organ procurement and ends after establishment of recirculation after anastomosis of vessels in recipient which by definition includes the anastomosis time. Mean cold ischemia time in RGF group was 108.11±123.45 min and in IGF group was 51.57±11.68 which were statistically significant in univariate analysis (p value 0.043). Multivariate analysis showed cold ischemia time was an important risk factor for RGF (p value 0.043). In a study by Olwyn Johnston *et al*.2006[2] revealed that longer CIT are important risk factors for reduced graft function. Other

centres have also shown that longer CIT has an inûuence on graft survival.[18-20] Our result supported all of these study result.

Intraoperative hypotension and prolonged operative time are independent risk factors for SGF in kidney transplant patients.[21] For good graft function recovery, proper blood pressure (10-20mmHg (1mmHg= 0.133kPa) above the basic blood pressure) that ensures oxygenated blood is necessary. G. Bacchi, *et al*. 2010[22] also reported that reduced intraoperative perfusion as measured using CVP monitoring might increase DGF risk. In our study, peroperative hypotension and peroperative blood transfusion was significant in univariate analysis (p value 0.0001 and 0.005 respectively). But in logistic regression analysis both of these factors were not significant (p value 0.759 and 0.613 respectively). This was because preoperative hypotension was reversed immediately with blood transfusion and other measures.

KDIGO clinical practice guideline for the care of kidney transplant recipients stated that increased urine volume represents the ûrst sign of progressive recovery of kidney function, ahead of a decrease in serum creatinine or blood urea nitrogen. High urine volume during the first posttransplant days is a useful parameter to predict graft outcome.[23,24] Matteucci *et al*. 1998[23] also demonstrated a direct relation between serum creatinine and diuresis volume and urine creatinine after kidney transplantation. According to urine output criteria and relation with s. creatinine DGF was defined as rise in serum Cr at 6–8 h post-operatively or <300 ml of urine despite adequate volume and diuretics.[25] Or Urine output <1 L in 24 h and <25% fall in serum creatinine from baseline in first 24 h post-transplant.[26] In our study, mean urine output within 6 hours after anastomosis of renal vessels was 83.84±112.62 ml in RGF group and 354.52±215.84 ml in IGF group which was statistically highly significant (p value 0.0001). Lai Q *et al*.2010 in their study also showed UO had significant role in graft function. In that study, urine output was <500 ml / 24 hrs in 40% of patients of DGF group and only in 3% patients of IGF group.

CONCLUSION:

Graft dysfunction or adverse events following renal transplantation are associated not only with short & long term graft outcome, but also with patient survival. This study showed that 52.5% renal allograft recipient had IGF and 47.5 % renal allograft recipient had graft dysfunction(SGF). Significant causes of graft dysfunction were long cold ischemia time in minute and peroperative urine production in ml within 6 hours after anastomosis of vessels.

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Original Article

A Study on Clinicodemographic Pattern of Infertility of Male Partner of Infertile Couple Attending For Infertility Treatment in Sylhet, Bangladesh

Laila NK[1], Chowdhury N[2], Riffat R[3], Sweety K[4], Razia B[5]

ABSTRACTS

Background*: Male infertility is influenced by the environment, occupation, socioeconomic condition, and lifestyle.*

Objective*: The purpose of the present study was to see the demographic profiles and clinical characteristics of an infertile couple who attended at the OPD of a tertiary hospital in Sylhet city.*

Methodology: *This prospective longitudinal study was carried out in OPD of SOMCH, from June 2004 to December 2004. All data were taken in the performed questionnaire. Male partners of the 100 infertile couples attending the above-mentioned places at Sylhet. The study population was included with the criteria of the male partners of the infertile couples who had tried unsuccessfully for at least one year. The Exclusion criteria were men who had undergone a vasectomy. Proper history including occupational, sexual, personal, as well as medical, and surgical history, was recorded on a predesigned data collection sheet.*

Result: *In this study, the Majority (66%) of male partners of the infertile couples were between 30-40 years of age%) and almost98% of couples had primary infertility and the proportion between primary & secondary infertility is highly significant, among them 45% of couples reported within 3-5 y rs. of marriage and 80 % of couples had regular coitus (4-5 times /wk.). In this study, the majority of the male partners had the habits of. cigarette smoking 8% had the habit of alcohol intake, and most (42%) of the male partners were a businessman.*

Conclusion*: In conclusion, there is a significant number of young middle-aged males had primary infertility which related with life style.*

Keywords: *Infertility, Primary Infertility, Secondary Infertility.*

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INTRODUCTION

Infertility suggests factors that create, absolute inability to conceive whereas subfertility describes factors due to relative inability to conceive. For the purpose of. brevity, the guideline developers use the term "infertility" but assume that most fertility problems are relative in severity. This condition may be further classified as-primary infertility, in which no previous pregnancy has occurred, and secondary, in which a prior pregnancy, although not necessarily a live birth, has occurred.

In a study done by Ladimi in 1987, primary infertility was found to be more frequent due to male involvement and secondary Infertility due to female involvement.[1] Infertility is a significant & common problem, affecting perhaps one couple in six[2]. The reported incidence of male infertility varies widely,

1. Dr. Laila Nazneen Khan, Assistant Professor, Gynae & Obsterric Departmant, Mugda Medical College, Dhaka.
2. Dr. Nowshafreen chowdhury, Assistant Professor, Gynae & Obsterric Departmant, Mugda Medical College, Dhaka.
3. Dr.Riffat Rahim, Assistant Professor, Gynae & Obsterric Departmant, Mugda Medical College, Dhaka.
4. Dr. Kamrunnahar Sweety, Assistant Professor, Gynae & Obsterric Departmant, Mugda Medical College, Dhaka.
5. Dr. Razia Begum, Sinior Consultant, Gynae & Obsterric Departmant, Mugda Medical College, Dhaka.

Address of correspondence: Dr. Laila Nazneen Khan, Assistant Professor, Gynae & Obsterric Departmant, Mugda Medical College, Dhaka,Tel: 01709395039, Email: lnazneen17@gmail.com

and the overall incidence is estimated to be 30-50% of sub fertile couptes[3]. In a study done by WHO in 1989 over 1000 infertile couples from 33 centers in 25 countries, a possible cause in a male partner was found in a third of the cases, in a female partner in 25% of cases & in both partners in 25% cases. The In remaining cases, neither partner had a detectable cause of infertility[4].

The male infertility is influenced by the environment, occupation, socioeconomic condition, stress, sexual behavior, smoking, and drinking habit, as well as consumption of illicit drugs Other important factors that seems to be occurring is the decline in male fertility, is environmental pollution, unfavorable working habit & job in middle-east in the hot environment seems to be likely cause. According to a study done by china. in Singapore in 2000, smoking, density of sperm and the viability of sperm were found. to be significant predictors for infertility among men[5].

The duration of infertility also provides one of the most significant prognostic indicators of male infertility[6, 7]. It perhaps surprising that most studies published recently are in broad agreement on the prevalence of infertility with a figure of 14% of all couples. There is currently no reliable data available regarding the prevalence of infertility in Bangladesh.

Finally, people's expectations for infertility treatment are steadily rising because of media coverage of newer techniques like IVF with ICSI. So, there is a marked increase in infertility clinic attendance even in developing countries like Bangladesh.

METHODS:

This prospective longitudinal study was carried out in OPD of SOMCH from June 2004 to December 2004. All data were collected in the performed questionnaire. Male partners of the 100 infertile couples attending the above-mentioned places at Sylhet. The study population was included with the criteria of the male partners of the infertile couples who had tried for at least one year. The Exclusion criteria were men who had undergone a vasectomy. Proper history including occupational, sexual, personal, as well as medical, and surgical history, was recorded on a predesigned data collection sheet. Data collected for each individual subject were compiled and analyzed using computer-based software, statistical package for social science (SPSS) for Windows. A, P value <0,05 was considered a minimum level of significance.

RESULTS

This study was done to determine male infertility in infertile couples coming for treatment. It was a prospective longitudinal study where the factors associated with male infertility were sought out. The study population was the male partners of 100 infertile couples attending outdoor of Sylhet Osmani Medical College Hospital. The data was collected from the private chamber and gynae outdoor of SOMCH, during the period of July 2004 to December 2004.

The majority (66%) of male partners of the infertile couples were between 30-40 years of age, followed by >20 years (22%) When >40 years (12%). The distribution is not statistically significant. (Table I)

Table-I : *Age distribution of male partner. (n=100)*

Age group (yrs)	Primary infertility No.(%) n-98	2ndary infertility No. (%) n-2	Total no. (%) no: 100
20-29	22(22.44%)	0	22(22%)
30-39	60(61.22%)	0	60(60%)
40-49	14(14.28%)	1(50%)	16(15%)
50-59	2 (2.04%)	1(50%)	3(3%)

X2=248 df=2 P value= <0.5

In this study, 98% of couples had primary & 2% of couples had secondary infertility. Statistically, the proportion between primary & secondary infertility is highly significant(P<0.0001). In this study, most of the couples (45%) reported within 3-5 y rs. of marriage. In this study, 80 % of couples had regular coitus (4-5 times /wk.). (Table No II)

Table II. *Infertility type, duration, and frequency of coitus*

Type	Male partners (%) No.	P value
Primary	98(98%)	<0.0001
Secondary	2(2%)	
Duration(years)	Number of pt	Percentage
1-2	21	21%
3-5	45	45%
6- 1.0	32	32%
> 10yrs.	2	2%
Frequency	No. of male participants	Percentage
Adequate. (4-5, times/wk)	80	80%
Inadequate (<1 time/wk)	20	20%

X^2=68.42, df=1

In this study,.38% of the male partners had the habits of. cigarette smoking 8% had the habit of alcohol intake. In this study, most (42%) of the male partners were a businessman. (Table no-3)

Table -III: *Particulars of the male partners of infertile couple*

Smoking	Male partner	Percentage
Yes	38	38%
No	62	62%'
Alcohol intake		
Yes	8	8%
No	92	92%
Occupation		
Service	25	25%
Business	42	**42%**
Teacher	8	8%
Abroad,management, labors)	17	17%
Others	8	8%

DISCUSSION

Data were obtained from selected male partners of 100 infertile couples attending the outpatient department of Sylhet MAG Osmani Medical College. hospital, and private chambers of gynecologists and obstetricians. Out of 100 infertile couples, 98% had primary infertility and 2% had secondary infertility. Kamal in her study showed that 60% had primary and 40% had secondary infertility[8]. Shamin also observed that the majority (69%) had primary and only 31% had secondary infertility. In this study, the majority of the men were businessmen (42%) only 25% were in service and the rest were abroad or in other professions. Regarding the duration of infertility, most couples (45%) reported to doctors within 2-5 years of marriage. This early reporting may be due to increased awareness among the infertile couples regarding the treatment options available now a days.62% of the men had no habit of smoking[9]. On the other hand, only 8% of men admitted to taking alcohol regularly 'and the majority denied (92%) taking alcohol. This result may be biased due to social and religious barriers in our country regarding alcohol intake. Many persons would deny taking alcohol even if they are social drinkers or regular alcohol takers Eskenazi et al[10] A convenience sample of 97 non smoking men (aged 22–80 years) without known fertility problems was recruited from a national government laboratory. Regarding age distribution majority of the men with both primary (98%) and secondary infertility (2%) were between 30-39 years of age. Rest were either below the age of 30 or above 40 years. Regarding coital frequency, the majority (80%) of the couples had regular coitus 4 to 5 times a week Kamal and Shamim also observed similar frequency. Regarding past medical history, the majority. of men (73%) had no significant past medical history[8-9]. Rochebrochard et al[11] found that when paternal age was <40 years, with an adjusted odds ratio of 2.21 (95% CI, 1.13, 4.33) for delay in pregnancy onset (failure to conceive within 12 months) and of 3.02 (95% CI, 1.56, 5.85) for difficulties in having a baby (failure to conceive within 12 months or pregnancy not resulting in a live birth).[11]

CONCLUSION

Under conclusion, this study gives an insight into male partners in of the infertile couples in the Sylhet region. The study indicates that most primary infertility reported in the early years of marriage. The male partners are mostly young middle-aged, predominantly businessmen by profession, and of middle to high socioeconomic status. Further large-scale studies should be conducted.

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Original Article

Serum Lactate Variability as Predictor of Mortality in Septic Shock: An Experience of Intensive Care Unit of Dhaka Medical College Hospital, Bangladesh

Akter S[1], Mohammad T[2], Rahman MS[3], Miah MAK[4], Zunaid M[5], Yasmin R[6]

ABSTRACT

Background: *Observation of variability of lactate levels instead of mean lactate level in critically ill patients with sepsis act as more efficient mortality factor.*

Objective: *To determine whether lactate levels measured at different intervals can predict mortality more effectively than that of mean lactate level for septic patients in intensive care unit (ICU).*

Methods: *This cross-sectional study was done in the Department of Anaesthesia, Analgesia, Palliative and Intensive Care Medicine, Dhaka Medical College Hospital, Bangladesh, between July and December of 2019. Purposively selected 147 septic patients with multiple organ failure in Intensive Care Unit were observed prospectively. Serum lactate levels at different intervals were assessed within the first twenty-four hours of recruitment of septic patients. The assigned patients were divided into three lactate variable groups: Group I (mild variable group) – when less than 2 values were not within the target lactate level; Group II (moderate variable group) – when 2-3 values were not within the range; Group III (more variable group) – when more than 3 values were not within the range.*

Results: *The mean age of the study participants was 48.3±12.5years. Among them, 82 (55.78%) were male and 65 (44.22%) were female. Number of survivors and non-survivors in Group I (mild) were 37(84.09%) and 7(15.91%) respectively, while in Group II (moderate) 48(71.64%) and 19(28.36%) respectively and in Group III (more) 13(36.11%) and 23(63.89%) respectively. A highly significant difference (P=0.001) was existed between three blood lactate variability groups with respect to mortality. Logistic regression analysis demonstrated that more lactate variability group had predicted higher mortality rate with a P value of 0.007 and an odds ratio of 16.0. Result is significant. On the other hand, significant effect of moderate lactate variability group on mortality was not found with a P value of 0.665 and an odds ratio of 0.667.*

Conclusion: *The septic patients having more serum lactate variability were reported to have higher mortality rate than that of moderate and less lactate variability in Intensive Care Unit. Our study suggests that serum lactate variability should be included as a future approach to see prognosis and predict mortality in septic patients.*

Keywords: *Serum lactate variability, septic shock, multi-organ failure, intensive care unit, mortality.*

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1. Dr. Shamima Akter, Assistant Professor, Department of Anaesthesia, Analgesia, Palliative and Intensive Care Medicine, Dhaka Medical College Hospital, Dhaka-1000.
2. Dr. Taneem Mohammad, Assistant Professor, Department of Anaesthesia, Analgesia, Palliative and Intensive Care Medicine, Dhaka Medical College Hospital, Dhaka-1000.
3. Dr. Md. Siddiqur Rahman, Assistant Professor, Department of Anaesthesia, Analgesia, Palliative and Intensive Care Medicine, Dhaka Medical College Hospital, Dhaka-1000.
4. Dr. Mohammad Abdul Karim Miah, Assistant Professor, Department of Anaesthesia, Analgesia, Palliative and Intensive Care Medicine, Dhaka Medical College Hospital, Dhaka-1000.
5. Dr. Md. Zunaid, Registrar, Department of Anaesthesia, Analgesia, Palliative and Intensive Care Medicine, Dhaka Medical College Hospital, Dhaka-1000.
6. Dr. Rubina Yasmin, Curator, Department of Pathology, Mymensingh Medical College, Mymensingh-2206.

Address of correspondence: Dr. Shamima Akter, Assistant Professor, Department of Anaesthesia, Analgesia, Palliative and Intensive Care Medicine, Dhaka Medical College Hospital, Dhaka-1000. Email: shamima2005dmc@gmail.com

INTRODUCTION

Sepsis is very common worldwide resulting in an estimated 8 million deaths annually; however, a rapid detection and treatment can reduce the number of deaths[1]. Sepsis is defined as life-threatening organ dysfunction caused by a dysregulated host response to infection, as described in the Sepsis-3 definition[2]. The mortality rate of patients with sepsis has decreased during the past several decades; unfortunately, the incidence of sepsis has steadily increased, and the mortality rate remains e"20%[3-5]. The situation is worse in low-income countries.[6] Sepsis syndromes span a clinical continuum with variable prognoses. Septic shock, the most severe complication of sepsis, carries high mortality[7]. The etiopathogenesis of the syndromes is complex – a dysregulated host response to infection. In response to any inciting agent, e.g. various viral/bacterial components, including LPS, peptidoglycans, lipoteichoic acid and sometimes exotoxins, an intense, potentially lethal host response occurs; pro-inflammatory and anti-inflammatory arms of the immune system are activated in concert with the activation of monocytes, macrophages, neutrophils and/or T cells that interact with the endothelium through pathogen recognition receptors to release high levels of inflammatory response mediators e.g. cytokines, proteases, kinins, reactive oxygen species, and nitric oxide[8,9]. Those cells play important roles in the cascade of events leading to this condition. Until recently, septic shock was diagnosed as of three components together: systemic arterial hypotension, tissue hypoperfusion associated with organ dysfunction, and hyperlactatemia[10]. However, in newer definition, patients with septic shock can be clinically identified by a vasopressor requirement to maintain a mean arterial pressure (MAP) e"65mmHg and serum lactate level >2 mmol/L (or >18mg/dL) in the absence of hypovolemia[2].

The efficacy of serum lactate as a marker for diagnosis of sepsis and response to resuscitative therapies in septic patients has demonstrated a clear association with clinical outcomes including mortality[11]. As per recommendation of the Surviving Sepsis Campaign guidelines, serum lactate levels should be measured within 3 hours of admission in the hospital and if elevated repeated within 6 hours[12]. That allows for the implementation and evaluation of effective hemodynamic management of the septic patient as early as possible, increasing the chances of survival and better prognosis. However, in other literature, it was stated that lactate measurements beyond 24h from the initiation of resuscitation continue to have predictive and prognostic utility[13]. Thus, controversies prevail in literature. Moreover, in our country, only few reports are available on utility of lactate levels in prognosis and mortality in sepsis. Hence, we proposed this study to measure serum lactate levels at different duration and evaluate the impact of serum lactate variability as predictor of mortality for septic patients in one of the largest Intensive Care Unit (ICU) facilities in the country.

METHODS

This cross-sectional study was done in the Department of Anaesthesia, Analgesia, Palliative and Intensive Care Medicine, Dhaka Medical College Hospital, Bangladesh, between July and December of 2019. Purposively selected 147 septic patients with multiple organ failure in Intensive Care Unit were observed prospectively. Serum lactate levels at different intervals were assessed within the first twenty-four hours of recruitment of septic patients. A detailed history of the patient's current illness, previous history of surgery, drug allergy, other comorbid illnesses (if present, treatment they are taking and the severity of the comorbidity) were recorded along with baseline vitals. Investigations including complete hemogram, serum electrolytes, renal function test and coagulation parameters were recorded as per standard institute protocol. Sequential Organ Failure Assessment score (SOFA) and Acute Physiology And Chronic Health Evaluation II (APACHE II) were calculated for each patients. ICU monitoring consisted of electrocardiogram (ECG), oxyhemoglobin saturation (SpO2), systolic and diastolic blood pressure (IBP) and temperature. Arterial blood gas analysis was done to establish baseline and subsequent lactate levels in each patient. The assigned patients were divided into three lactate variable groups: Group I (mild variable group) – when less than 2 values were not within the target lactate level; Group II (moderate variable group) – when 2-3 values were not within the range; Group III (more variable group) – when more than 3 values were not within the range. Fluid and vasopressor management was guided by invasive arterial, central venous pressure, blood gas with lactate and point of care ultrasound monitoring. Broad spectrum antibiotics were initiated at presentation as per institute protocol and appropriate cultures (blood, urine, abdominal fluid and tracheal aspirate whenever suitable) were sent. Patients were followed up daily till 28 days or death or discharge from the hospital, whichever was earlier. Following parameters were collected daily for all patients: urine output, serum

creatinine, requirement of renal replacement therapy, development of acute respiratory failure, need for mechanical ventilation, vasopressor requirement, type of nutritional support, and the length of ICU stay.

Student's t-test, Chi-square test, and multiple logistic regression analysis were performed. The level of significance was at 95% confidence interval and a P-value <0.05 was considered as significant. Data were analyzed using SPSS (Statistical package for Social Sciences) version 22.0. The study was approved by the Ethical Review Committee of Dhaka Medical College, Dhaka, Bangladesh.

RESULTS

The mean age of the study participants (n=147) was 48.3±12.5years. Among them, 82 (55.78%) were male and 65 (44.22%) were female. However, there is no difference in age and sex of the participants (P>0.05) (Table-I). Among survivors (n=98) and non-survivors (n=49), systolic blood pressure were found 106.1±30.8 and 107.4±33.4 mmHg and diastolic blood pressure 65.6±51.6 and 65.9±23.2 mmHg respectively. Mean respiratory rates were 21.3±2.1 and 22.7±3.4 per minute respectively, while pulse rates were 103.8±30.3 and 108.0±34.2 per minute respectively. Body temperatures were found 37.1±1.4°C and 37.5±1.3°C respectively. SOFA scores were 10.0 (8.0–13.0) and 13.0 (11.0–16.0), while APACHE II scores were 2.0 (1.0-2.0) and 6.0 (5.0-6.0) respectively. Lactate area scores were 38.8 (22.7–58.0) and 57.0 (33.9–98.0) respectively (Table-II). Number of survivors and non-survivors in Group I (mild) were 37(84.09%) and 7(15.91%) respectively, while in Group II (moderate) 48(71.64%) and 19(28.36%) respectively and in Group III (more) 13(36.11%) and 23(63.89%) respectively. A highly significant difference (P=0.001) was existed between three blood lactate variability groups with respect to mortality (Table-III). Logistic regression analysis demonstrated that more lactate variability group had predicted higher mortality rate with a P value of 0.007 and an odds ratio of 16.0. Result is significant. On the other hand, significant effect of moderate lactate variability group on mortality was not found with a P value of 0.665 and an odds ratio of 0.667 (Table-IV).

Table I: *Demographic characteristics of the study population (n=147)*

Characteristics	Survivor (n=98)	Non-survivor (n=49)	P value
Age group			
18-30 years	12 (66.67%)	6 (33.33%))	>0.05
31-45 years	31 (77.5%)	9 (22.5%))	
46-60 years	29 (64.44%)	16 (35.56%)	
61 years and above	26 (59.09%)	18 (40.91%)	
Mean±SD	48.3±12.5		
Sex			
Male	56 (66.4)	26 (67.8)	>0.05
Female			
	42	23	

Values were presented as mean±SD, and number (%) as applicable.
P value reached from Student's t-test and Chi-square test respectively.

Table II: *Baseline characteristics of the study population (n=147)*

Vital signs	Survivor (n=98)	Non-survivor (n=49)	P value
Systolic blood pressure (mmHg)	106.1±30.8	107.4±33.4	>0.05
Diastolic blood pressure (mmHg)	65.6±51.6	65.9±23.2	>0.05
Respiratory rate (rates/min)	21.3±2.1	22.7±3.4	>0.05
Pulse rate (beats/min)	103.8±30.3	108.0±34.2	>0.05
Body temperature (°C)	37.1±1.4	37.5±1.3	>0.05
SOFA score	10.0 (8.0–13.0)	13.0 (11.0–16.0)	<0.001
APACHE II	2.0 (1.0-2.0)	6.0 (5.0-6.0)	<.0001
Lactate area score	38.8 (22.7–58.0)	57.0 (33.9–98.0)	<0.001

Values were presented as mean±SD or median (interquartile range) as applicable.
SOFA: Sequential Organ Failure Assessment. P value reached from Chi-square test.

Table III: *Status of the patients among lactate variability groups*

Lactate variability group	Survivor	Non-survivor	X^2	P value
Group I (mild)	37(84.09%)	7(15.91%)	14.56	0.001
Group II (moderate)	48(71.64%)	19(28.36%)		
Group III (more)	13(36.11%)	23(63.89%)		
Total	98(66.67%)	49(33.33%)		

Values were presented as mean±SD, number (%), or median (interquartile range) as applicable.
P value reached from Chi-square test.

Table IV: *Effect of Blood lactate variability on mortality*

Lactate variability groups	OR	P value
Group I (mild) (Reference)		0.004
Group II (moderate)	0.667	0.665
Group III (more)	16.000	0.007

Multiple logistic regression analysis was done.

DISCUSSION

Severe sepsis and septic shock are the biggest cause of mortality in critically ill patients[3-6]. A simple infection can rapidly develop into sepsis a life-threatening condition which requires on-the-spot diagnosis and treatment while the condition is still in its early stages. The major pathways that lead to sepsis-induced coagulopathy and DIC include activation of coagulation, platelets, and other inflammatory cells (e.g., neutrophils, lymphocytes) and vascular endothelial injury[8,9]. Traditionally, lactic acidosis in sepsis is attributed to anaerobic glycolysis due to inadequate oxygen delivery. However, it has become clear that the mechanism of hyperlactatemia in sepsis is multifactorial and due to factors beyond hypoxic tissue injury alone[15-18]. Evidence have shown that lactate levels are known to be predictors of survival or mortality in patients of sepsis in ICU settings[19-23]. A normalization of serum lactate with aggressive treatment within the first 24 hours of the diagnosis has a favourable outcome, as shown in several studies[19,21]. Aggressive treatment includes timely resuscitation, antibiotics, surgical management, vasopressor and inotropic drugs, ventilatory support, and dialysis as deemed fit. The aim of all interventions remains patient survival. However, the patient presents with a pre-existing set of variables of morbidity that affect his response to an insult and hence the result of these interventions differs between patients.

Our study demonstrated that more lactate variability had predicted higher mortality in septic patients. Several evidence demonstrated serial serum lactate measurements at different intervals for >72h in ICU patients and concluded that the duration of hyperlactemia is a reliable indicator of morbidity and mortality following trauma, which is in congruence with our study.[21-23] However, Krishna et al. suggested that lactate values probably need to be followed for longer periods of time in critical patients even when they have tided over the present crisis. The utility of regular lactate analysis in those patients depends on factors such as availability and cost of tests as well, especially in resource-poor settings[21].

Our study has several limitations. It belongs to observational study design and lacks randomization. Our sample size is small and a single centre study; therefore, the findings derived from this study hardly generalize to the reference population. Moreover, the selective biomarker used in this study was only able to show the picture of an adult ICU, as we spared paediatric group.

CONCLUSION

Our data suggest that variability of lactate levels at different intervals instead of mean lactate level in critically ill patients with sepsis act as more efficient mortality factor. The septic patients having less lactate clearance predicted mortality more than that of drastic lactate clearance therapy in ICU setting. When we know about the propensity of death from the serum lactate clearance of septic patients within the first 24 hours of detection of sepsis, it will be easy to treat the patient and easily improve the outcome of sepsis. However, further studies with larger sample and

multi-centre trials along with combination of more biomarkers are recommended.

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Original Article

Efficacy of Bath PUVA in the treatment of Palmoplantar Hyperkeratosis

Ahmed MI[1], Hoq AJMS[2], Alam AKMM[3], Ahamed ARS[4], Snigdha KSR[5], Hamid MA[6],Sayem AS[7]

ABSTRACT

Background: *Palmoplantar hyperkeratosis, or palmoplantar keratoderma, is a combination of skin conditions that are characterized by excessive thickening of the skin, mainly on the soles and palms. There are various treatment methods for keratoderma, and one of those methods are treatment through bathwater PUVA. It is a type of photochemotherapy.*

Objective of the study: *The aim of the study was to observe the efficacy of bath PUVA treatment for palmoplantar hyperkeratosis.*

Methodology: *This randomized clinical trial study was conducted at the Department of Dermatology and Venereology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh. The study duration was 6 months, from September 2007 to February 2008. A total of 30 patients presented with with palmoplantar hyperkeratosis were enrolled in this study through random sampling method following the inclusion and exclusion criteria.*

Results: M*ajority of participant (33.3%) were from the age group of 31-40 years. The mean ±SD age was 38.40±10.89 years, and the age range of the participants was 20-58 years. 70% of the participants were male, 83.3% were from low socioeconomic class, and 36.7% were businessmen respectively. Histopathological diagnosis revealed that 52% patients had psoriasis, 33% had nonspecific dermatitis, and 10% patients had chronic inflammatory dermatitis. Gradual improvement was observed from baseline to 8 weeks follow-up in regards to palmoplantar surface area involvement, erythema, and hyperkeratosis. 46.7% of the participants reported skin tenderness, and 93.3% have a burning sensation and no other side effects.*

Conclusion: *Bath PUVA may be an effective option in the treatment palmoplantar keratosis particularly of psoriatic patients. A mild form of nonspecific dermatitis may be treated with bath PUVA.*

Keywords: *Hyperkeratosis, Keratosis, Keratoderma,PUVA*

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1. Dr. Md. Iqbal Ahmed, Assistant Professor, Department of Dermatology and Venereology, Mugda Medical College Hospital, Dhaka, Bangladesh
2. Dr. Abu Jafar Md. Shahidul Hoq, Assistant Professor, Department of Dermatology and Venereology, Mugda Medical College Hospital, Dhaka, Bangladesh
3. Dr. AKM Mahbubul Alam, Assistant Professor, Department of Dermatology and Venereology, Mugda Medical College Hospital, Dhaka, Bangladesh
4. Dr. Abu Reza Sayem Ahamed, Assistant Professor, Department of Dermatology and Venereology, Mugda Medical College Hospital, Dhaka, Bangladesh
5. Dr. Kaniz Shahali Reza Snigdha, Assistant Professor, Department of Dermatology and Venereology, Mugda Medical College Hospital, Dhaka, Bangladesh
6. Dr. Md. Abdul Hamid, Assistant Professor, Department of Dermatology and Venereology, Mugda Medical College Hospital, Dhaka, Bangladesh
7. Dr Abu Sayed Sayem, Junior consultant, Department of Dermatology and Venereology, Mugda Medical College Hospital, Dhaka, Bangladesh

Address of correspondence: Dr. Md. Iqbal Ahmed, Assistant Professor, Department of Dermatology and Venereology, Mugda Medical College Hospital, Dhaka, Bangladesh. E-mail: drshahidulhoq@gmail.com

INTRODUCTION

Palmoplantar hyperkeratosis is a condition in which the palms and soles produce an excessive amount of keratin. It is a collection of conditions marked by abnormal thickening of the skin on the palms and soles, rather than a single disorder. They have traditionally been classified as either hereditary or acquired, and they were distinguished by mode of inheritance, presence of transgradiens (defined as a continuous extension of hyperkeratosis beyond the palmar and/or plantar skin), co-morbidities with other symptoms, and epidermal involvement, which can be diffuse, focal, or punctate[1],[2].

Palmoplantar hyperkeratosis is a common disease in dermatological practice. There are three clinical patterns of palmoplantar hyperkeratosis; diffuse, focal, and punctate. The palms and soles undergo a high level of physical stress in everyday use. To resist

the mechanical traumas, the palmoplantar region is equipped with highly specialized proteins such as keratin[3],[4]. Keratins are a group of proteins that form the intermediate filament cytoskeleton of epithelial cells which are important for structural integrity. In keratoderma, excessive production of normal or altered keratin on the palms and soles is found. This excessive production of keratin leads to palmoplantar hyperkeratosis (PPH). Palmoplantar hyperkeratosis (PPH) and palmoplantar keratoderma (PPK) are often used interchangeably in many works of literature, but some authors define keratoderma as the non-hereditary and non-frictional hyperkeratosis.[1] Both hereditary and non-hereditary hyperkeratosis or keratoderma are caused by abnormal gene mutation, specifically in the keratin genes[5]. Keratin 1 mutations have been documented in patients with epidermolytic and non-epidermolytic keratodermas. It is a common problem in dermatology.

A great number of people in Bangladesh are suffering from Palmoplantar hyperkeratosis produced by various kinds of disturbance in the daily activities of an individual. PPH is prevalent globally, but the incidence is higher in third-world countries. PPH may develop in anyone irrespective of age and gender. An exact cause of palmoplantar hyperkeratosis is unknown. It may be associated with many cutaneous and systemic diseases. The treatment modalities of palmoplantar hyperkeratosis are topical (like salicylic acid, steroid etc.) and systemic (like retinoid, PUVA etc.). But little effect is achieved by topical preparation and systemic therapy. Though effective in some cases, they need long-time therapy and have various side effects like hepatotoxicity, bone marrow suppression etc. For these unsatisfactory outcomes, we choose bath PUVA (psoralen plus ultraviolet-A radiation), a photo-chemotherapy used as a treatment regimen for palmoplantar hyperkeratosis. Fischer and Alsins developed the Bath PUVA, in which psoralen derivatives such as trimethoxypsoralen or methoxsalen are dissolved in a warm water bath.[6]. Delivery of psoralens by bath prevents systemic adverse effects associated with oral PUVA like hepatotoxicity, photocarcinogenesis, cataract formation and a generalized photosensitization, lasting for 24 hrs requiring photoprotection[6]. Bath PUVA has the advantage of selective and shorter photosensitization leading to a significantly lower cumulative UVA exposure. Furthermore, it avoids typical variation in large inter-individual differences in the gastrointestinal tract absorption of psoralens. A Large Scandinavian study demonstrated that bath PUVA with trimethoxypsoralen bears only a low risk after a long time of usage[7] .The present study was to determine the efficacy of Bath PUVA in the treatment of Palmoplantar hyperkeratosis, which would provide another treatment option for palmoplanter hyperkeratosis.

METHODS

This study was conducted at the Department of Dermatology and Venereology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh. The study duration was 6 months, from September 2007 to February 2008. A total of 30 patients clinically diagnosed with palmoplantar hyperkeratosis were selected through a random sampling method following the inclusion and exclusion criteria. Informed written consent was obtained from each participant, and ethical approval was obtained from the ethical review committee of the study hospital. The diagnosis was made on a clinical basis and the severity of PPH was measured by assessing the percentage of the involved body surface, degree of erythema, scaling, and induration of the lesion. Patient data were recorded in a predesigned structured questionnaire. Information was collected by taking a clinical history and clinical examination. At the baseline visit, a complete clinical history was taken. Patients were instructed to report every 14 days interval for 8 weeks to observe the efficacy and side effects of bath PUVA.

Inclusion Criteria

- All patients diagnosed with palmoplantar hyperkeratosis irrespective of etiology.
- Patients between the age of 10 to 60 years.

Exclusion Criteria

- Pregnancy
- Patients with known hypersensitivity to ultraviolet rays.
- Patients following other medications for PPH
- Affected with other chronic diseases like hypothyroidism.

RESULTS

Among the participants of this study, majority (33.3%) were from the age group of 31-40 years. The mean ±SD age of the participants was 38.40±10.89 years, and the age range of the participants was 20-58 years.

Table I: *Distribution of the participants by Age (n=30)*

Age(year)	Frequency	Percent	Mean± SD(Range)
20-30	8	26.7	38.40±10.89(20-58)
31-40	10	33.3	
41-50	8	26.7	
51-60	4	13.3	
Total	30	100.0	

Table II: *Distribution of the participants by various demographic characteristics (n=30)*

Demographical characteristics	Frequency	Percent
Sex		
Male	21	70.0
Female	9	30.0
Socioeconomic status		
High	4	13.3
Middle	25	83.3
Low	1	3.3
Occupation		
Service	6	20.0
Housewife	9	30.0
Student	3	10.0
Retired	1	3.3
Business	11	36.7

Table III: *Distribution of participants by palmoplantar surface area involvement at different follow-up periods (n=30)*

Observation	Period	Palmoplantar surface area involvement		
	None	25-50%	50-75%	75-100%
Baseline	-	-	24(80.0)	6(20.0)
2 weeks	-	-	24(86.7)	4(13.326)
4 weeks	-	13(43.3)	17(56.7)	-
6 weeks	-	29(96.7)	1(3.3)	-
8 weeks	4(13.3)	26(86.7)	-	-

At baseline, 80% of the participants had 50-75% of palmoplantar surface area involvement, and 20% had 75-100% involvement. After the start of treatment, gradual improvement was observed among the participants, and by the 8th week, 86.7% of the participants had <50% of surface area involvement, and 13.3% had no palmoplantar surface area involvement.

Table IV : *Distribution of participants by erythema at different follow-up periods (n=30)*

Observation	Period	Erythema		
	None	Mild	Moderate	Severe
Baseline	-	-	28(93.3)	2(6.7)
2 weeks	-	3(10.0)	26(86.7)	1(3.3)
4 weeks	-	23(76.6)	7(23.3)	
6 weeks	1(3.3)	29(96.7)	-	-
8 weeks	28(93.3)	2(6.7)		-

At baseline, most of the participants (93.3%) had moderate erythema levels, and 6.7% had severe erythema. This improved gradually, and week 4, 76.6% had mild erythema, 23.3% had moderate erythema and none had severe erythema. By week 8, most of the participants (93.3%) had no erythema, and only 6.7% (n=2) had mild erythema. 38.40±10.89

Table V : *Distribution of participants by hyperkeratosis at different follow-up periods (n=30)*

Observation Period	Hyperkeratosis			
	None	Mild	Moderate	Severe
Baseline			26(86.7)	4(13.3)
2 weeks		1(3.3)	26(86.7)	3(10.0)
4 weeks		19(63.3)	10(33.3)	1(3.3)
6 weeks		29(96.7)	1(3.3)	
8 weeks	12(40.0)	18(60.0)		

At baseline, 13.3% had severe and 86.7% had moderate hyperkeratosis. At week 2, 10% had severe, 86.7% had moderate and 3.3% had mild hyperkeratosis. By week 8, no participants had moderate or severe hyperkeratosis, only 60% had mild hyperkeratosis, and 40% had no hyperkeratosis at all.

Table VI : *Distribution of the patients by histopathologic types and final prognosis of participants (n=30)*

Prognosis	Histopathological types		
	Psoriasis (n=16)	Nonspecific Dermatitis (n=11)	Chronic inflammatory Dermatitis (n=3)
Excellent	3(18.8)	1(9.1)	0(.0)
Good	6(37.5)	0(.0)	0(.0)
Poor	7(43.8)	10(90.0%)	3(100.0)

Histopathological diagnosis revealed that 52% patients had psoriasis, 33% had non-specific dermatitis, and 10% had chronic inflammatory dermatitis. Among the psoriasis cases, 43.5% had a poor outcome, 37.5% had good outcome and 18.8% had excellent outcome at cessation of the study. Among the 11 non-specific dermatitis cases, 1 had excellent and 90% had poor outcomes. All 3 patients with chronic inflammatory dermatitis revealed poor outcomes at the cessation of the study.

Table VII: *Distribution of the patients by side effects (n=30)*

Side effect	Frequency	Percent
Skin tenderness	14	46.7
Burning	28	93.3

The present study participants were observed with side effects like marked erythema, pruritus, or blistering. 93.3% of the participants reported of burning sensation after completion of the medication, and 46.7% had skin tenderness.

DISCUSSION

This clinical trial was conducted to observe the efficacy of bath PUVA in the treatment of palmoplantar keratosis. Thirty patients with palmoplantar keratosis were treated with Bath PUVA in this study. Out of all patients 21 (70.0%) were male and 9 (30.0%) were female. Male and female ratio was 7:3. Our finding of sex distribution was comparable with a 1997 study.[10] Eight (33.3%) respondents of series were within 31 to 40 years age range followed by 26.7% within 20-30 years, 26.7% within 41-50 years and 13.3% within 51 to 60 years age range. Mean age of the patients was 38.4 years with a standard deviation of +10.89 years. All patients were within 20-58 years' age range. The mean age of the study was almost similar to the mean age of Wahab et al., which was 35.06 years.[11] Within socioeconomic groups, 25 (83.3%) patients were from middle class families, followed by 4 (13.3%) from upper class and 1 (3.3%) from lower class families. Maximum (36.7%) patients of the present study group were businessman, followed by 9 (30.0%) housewives, 6 (20.0%) service holders, 3 (10.0%) students and 1 (3.3%) retired. At baseline 24 (80.0%) patients had 50 to 75% involvement in palmoplantar surface area and

the remaining 6 (20.0%) had 75 to 100.0% involvement. After start of bath PUVA treatment, gradual improvement was observed from baseline to 8 weeks onward. At the first follow-up after 2 weeks of being given bath PUVA, 26 (86.7%) patients had 50-75% involved surface area and 4 (13.3%) had 75-100% involvement. By the follow-up at 8 weeks, no palmoplantar surface area involvement was observed in 4 (13.3%) patients, followed by 26 (86.7%) who had only 25-50% involvement. At baseline 28 (93.3%) patients had moderate erythema, and the remaining 2 (6.7%) had severe erythema. After 8 weeks of treatment, 28 (93.3%) patients had no erythema and only 2 (6.7%) had mild erythema. In regards to hyperkeratosis, at baseline, 26 (86.7%) patients had moderate hyperkeratosis and rests 4 (13.3%) had severe hyperkeratosis. After 8 weeks of treatment, 12 (40.0%) patients had no hyperkeratosis and 18 (60.0%) had mild hyperkeratosis. Histopathological diagnosis was done to determine the histo-pathological types of hyperkeratosis. It was observed that 16 had psoriasis, 11 had nonspecific dermatitis, and 3 had chronic inflammatory dermatitis. Ultimate improvement was calculated by taking baseline and final follow-up scores. By considering clinical assesment only four (13.3%) patients had excellent improvement (3 psoriatic and I nonspecific dermatitis patient), six (20.0%) had good (all were psoriatic patients) and 20 (66.7%) (7 psoriatic, 10 nonspecific dermatitis, and 3 chronic inflammatory dermatitis patient) had poor improvement. These findings were much different from the findings of other studies, where bath PUVA treatment led to much higher rates of excellent outcomes.[10],[12],[13] Hyperkeratotic dermatitis displayed the poorest responding rates in this study. Unwanted side effects such as erythema, pain, blistering or patchy hyperpigmentation were not observed in any of the patients. Among the 30 patients, 28 (93.3%) had complained of burning sensation, and 14 (46.7%) complained of skin tenderness during the treatment period. No gross side effects such as erythema, tanning, etc. were observed in the study, which was similar to by Wahab et al.[11]

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

The treatment with bath PUVA may be an effective option in the treatment palmoplantar keratosis particularly of psoriatic patients. A mild form of nonspecific dermatitis may be treated with bath PUVA. Although improvement was observed in this study after bath PUVA treatment, this improvement was much slower than other global studies' findings.

Considering the findings of this study compared to other similar studies further longitudinal studies with large sample sizes may be conducted.

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Original Article

Association of serum vitamin-D level with renal function in a rural population of Bangladesh

Saha SK[1], Iqbal MM[2], Nath PKD[3], Chowdhury MFH[4]

Abstract

Background: *Vitamin D deficiency is an emerging global health problem. Recent studies have indicated that the prevalence of vitamin D deficiency even in tropical countries is as high as that observed in Western populations. Vitamin D deficiency has high impact on renal disorders which are leading causes of death in humans.*

Methods: *This was a cross sectional analytical study. According to inclusion criteria of the study total 259 participants were recruited from a rural area, Baidyerbazar union of Narayanganj district. After taking history and clinical examination, relevant investigations were done. Serum 25(OH)D was measured using chemiluminescent immunoassay (CLIA) technology (DiaSorin Inc, Stillwater, MN). Renal functions of the study population were assessed by e-GFR (calculated by CKD-EPI equation), urinary ACR and urine microscopy.*

Results: *In this study out of 259 study subjects on vitamin-D status 6.2%, 33.6% and 60.2% had vitamin-D sufficiency, insufficiency and deficiency respectively. Among participated female (133) 78.2% had vitamin-D deficiency and among participated male (126) 41.3% had vitamin-D deficiency. Among vitamin-D sufficiency, insufficiency and deficiency group the mean eGFR was 102.94, 104.87 and 109.33 ml/min/1.73 m^2 respectively. The mean uACR level was 6.97, 22.89 and 37.29 mg/gm respectively.*

Conclusion: *The findings of the study suggest that 93.8% of study population had either vitamin-D insufficiency or deficiency. Vitamin-D deficiency was more prevalent in females than males. Serum 25- hydroxyvitamin D level was negatively associated with urinary ACR level.*

Keywords: *25-hydroxyvitamin D, eGFR, uACR*

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INTRODUCTION

The American guideline for evaluation, prevention, and treatment of vitamin D deficiency establishes that vitamin D should be determined by measurement of serum 25(OH)D with the following cutoff points: (i) deficiency when <20 ng/mL (<50 nmol/L), (ii) insufficiency when between 20 to 30 ng/mL (50 to 75 nmol/L) and (iii) sufficiency when >30 ng/mL (>75 nmol/L)[1]. Based on these cutoffs, it has been estimated that about one billion people, worldwide, have 25(OH)D deficiency or insufficiency. The prevalence of serum 25(OH)D deficiency and insufficiency reportedly varies between 30% and 93%. The highest prevalence of hypovitaminosis D has been reported in temperate climate regions that receive limited sunlight, especially during winter[2]. It is our general belief that vitamin D deficiency is prevalent only in western countries, but actual condition is reverse. It is surprising that in South Asia, 80% of the apparently healthy population is deficient in vitamin D (<20 ng/mL) and up to 40% of the population is severely deficient (<5 ng/mL)[3]. In the adult population, 35% of adults in the United States are vitamin D deficient

1. Dr. Satyajit Kumar Saha, Assistant Director, Mugda Medical College Hospital, Dhaka, Bangladesh.
2. Prof. M. Masud Iqbal, Professor of Nephrology, National Institute of Kidney Diseases & Urology, Dhaka.
3. Dr. Palash Kumar Deb Nath, Assistant Professor of Nephrology, Mugda Medical College, Dhaka.
4. Dr. Md. Farhad Hasan Chowdhury, Assistant Professor of Nephrology, Mugda Medical College, Dhaka.

Address of correspondence: Dr. Satyajit Kumar Saha, Assistant Director, Mugda Medical College Hospital, Dhaka, Bangladesh. E-mail: dr.satyaks@gmail.com

whereas over 80% of adults in Pakistan, India, and Bangladesh are Vitamin D deficient[4].

Some of the associated risk factors of vitamin D deficiency are age, sex, race, body mass index, use of medications known to affect vitamin D metabolism, inadequate amount of vitamin D in food, low sun exposure, use of sunscreens, distance from the Equator, black skin, smoking, poor food absorption, and kidney and liver disease[2]. By cross-sectional analysis of the NHANES III (1988–1994) and NHANES 2001–2004 databases that are representative of the US adult population, a number of studies consistently demonstrated an association of low serum 25(OH) D levels with increased prevalence of renal risk factors. It showed a correlation between low serum 25(OH) D and the risk of all-cause mortality in the general population[5,6].

Vitamin D levels significantly decrease with increasing age. This is expected, because the skin thickness decreases with age and thus, the production of 7-dehydrocholesterol is also compromised. The decreased level could be due to the fact that, a more sedentary and indoor lifestyle is easily adopted with advancing age[2].

Vitamin D deficiency is more common in female than male. This is due to many women stay at home and perform indoor activity. There are little exposure to sunlight. The other conditions: Covering the entire body with clothing as customary in women in some religions, use of sunscreen may significantly reduce the production of vitamin D3 in the skin[7].

The color of skin of South Asian populations varies from light brown to almost dark. Dark color skin has been found to decrease skin synthesis of vitamin D because UV light cannot reach the appropriate layer of the skin due to presence of melanin[3]. Melanin acts as an effective natural sunscreen and, therefore, increased skin pigment can greatly reduce the solar UVB mediated cutaneous synthesis of vitamin D3[7]. Vitamin D binding protein (DBP) levels in blacks are significantly lower compared to whites to compensate for lower total serum 25(OH)D in blacks[6].

Impaired GFR is a cardinal manifestation of kidney disease. Lower GFR, even within its normal range, is associated with markedly increased risk of cardiovascular death[8]. The relationship between eGFR and vitamin-D is debated. Some studies have shown that eGFR increased as vitamin-D level increased, some have shown that eGFR increased as vitamin-D level decreased and others found no association. The exact reason for these discrepancies is not clear, however the findings differed depending on whether the subjects were patients with CKD or individuals with normal or mildly decreased eGFR[9].

Vitamin-D is known to suppress the renin gene transcription. In vitamin-D deficiency renin is synthesized which activate RAAS. Angiotensin- II is a key mediator to raise efferent glomerular arteriole resistance which raises the glomerular filtration pressure and leads to increased GFR[10]. However in CKD patients there is positive association between eGFR and vitamin-D level. It occurs as CKD patients are lack of outdoor activities and dietary sources. Besides this, in the circulation 25(OH)D complexes with vitamin D binding protein (DBP). Following glomerular filtration the 25(OH)D-DBP complex is reabsorbed via megalin-mediated endocytosis in the proximal tubules, where 25(OH)D is converted to 1,25(OH)2D3 by renal 1α- hydroxylase (CYP27B1). In renal insufficiency, the decline in megalin-mediated endocytotic activity and renal 1α-hydroxylase activity and the loss of 25(OH)D-DBP into the urine because of proteinuria contribute to the development of 25(OH)D and 1,25(OH)2D3 deficiency[5].

Albuminuria is a major risk factor for renal disease progression. A cross-sectional analysis of the NHANES III data showed that the prevalence of albuminuria increased in a progressive fashion with decreasing vitamin D level. It suggest that vitamin D has an intrinsic anti-proteinuric activity[5]. Hypovitaminosis D causes albuminuria through a number of mechanisms. First, lower circulating vitamin D level causes activation of the renin-angiotensin- aldosterone system and lead to albuminuria through both hemodynamic and nonhemodynamic mechanisms. Second, vitamin D deficiency reduces pancreatic beta cell function and is associated with reduced peripheral insulin sensitivity. Diabetes and insulin resistance are established risk factors for albuminuria. Third, vitamin D has direct effects on cell proliferation, differentiation, and apoptosis of podocytes. Insufficient vitamin D may contribute to albuminuria by podocyte loss and glomerulosclerosis through

direct cellular effects[8]. It is also possible that albuminuria leads to low levels of vitamin D. In the kidney, vitamin D is filtered at the glomerulus and actively reabsorbed in the proximal tubule by a process facilitated by the luminal receptors megalin and cubulin. It is possible that increased filtration of albumin into the urinary space interferes with vitamin D reabsorption, leading to greater losses of vitamin D in urine[11].

METHODS

This was a cross sectional analytical study. The study was conducted for six months from July to December of 2019. According to inclusion and exclusion criteria of the study total 259 participants were recruited from a rural area, Baidyerbazar union of Narayanganj district, where CKD screening program is going on. After taking history and clinical examination, relevant investigations were done. Serum 25(OH)D was measured using chemilumin-escent immunoassay (CLIA) technology (DiaSorin Inc, Stillwater, MN). Renal functions of the study population were assessed by e-GFR (calculated by CKD-EPI equation), urinary ACR and urine microscopy.

Selection criteria: At first people with age ≥18 years living in rural area were included in this study. Then pregnant women; patient with cognitive impairment; patient who are on medication known to affect vitamin D absorption or metabolism such as anticonvulsant, glucocorticoids, calcium, vitamin D supplements were excluded from this study.

RESULTS

Table I. shows the distribution of the total 259 study populations according to different catagories. Maximum study populations were in age group 31 – 40 years (31.3%). Females (51.4%) were slightly predominant than males (48.6%). Maximum study populations had vitamin-D deficiency (60.2%) followed by vitamin-D insufficiency (33.6%), vitamin-D sufficiency (6.2%). The eGFR value ≥90 ml/min/m^2 was maximum in 87.3% and uACR value <30 mg/gm was maximum in 91.9% of the study populations.

Table I: *Distribution of the study population (N=259)*

	Frequency(n)	Percentage(%)
Age		
≤30	65	25.1
31 – 40	81	31.3
41 – 50	49	18.9
51 – 60	27	10.4
>60	37	14.3
Gender		
Male	126	48.6
Female	133	51.4
Vitamin-D status		
Sufficiency	16	6.2
Insufficiency	87	33.6
Deficiency	156	60.2
eGFR (ml/min/m^2)		
≥90	226	87.3
60 – 89	31	11.9
<60	2	0.8
uACR (mg/gm)		
<30	237	91.9
≥30	21	8.1

Table II shows the association of vitamin-D status with gender and renal risk factors. Females (78.2%) were significantly more affected than males (41.3%) in case of vitamin-D deficiency group. High uACR value were found in vitamin- D deficiency group (90.5%) and the results were statistically significant. Table III shows the comparison of renal risk factors in relation to vitamin-D status. Fasting blood glucose, HbA1c, BMI levels were significantly increased in case of vitamin-D deficiency group.

Table II: *Association of vitamin-D status with gender and renal risk factors*

	Total (n=259)	Vitamin-D Sufficiency	Vitamin-D Insufficiency	Vitamin-D Deficiency	P value
Gender					0.0001
Male	126	14 (11.1%)	60 (47.6%)	52 (41.3%)	
Female	133	2 (1.5%)	27 (20.3%)	104 (78.2%)	
uACR (mg/gm)					0.012
<30	238	16 (6.7%)	85 (35.7%)	137 (57.6%)	
≥30	21	0 (0.0%)	2 (9.5%)	19 (90.5%)	

Chi square test was done.

Table III: *Comparison of Renal factors in relation to vitamin-D status*

	Total (n=259)	Vitamin-D Sufficiency (n=16)	Vitamin-D Insufficiency (n=87)	Vitamin-D Deficiency (n=156)	P value
BP (mm of Hg)					
SBP	129.85 ± 19.62	125.50 ± 18.87	130.17 ± 15.91	130.12 ± 21.53	0.648
DBP	79.43 ± 11.01	74.88 ± 6.32	78.48 ± 10.72	80.43 ± 11.43	0.149
FBG (mmol/l)	5.96 ± 2.27	5.18 ± 0.63	5.59 ± 1.27	6.24 ± 2.73	0.036
HbA1c (%)	6.06 ± 1.53	5.43 ± 0.24	5.87 ± 1.16	6.23 ± 1.75	0.049
BMI (kg/m2)	25.20 ± 4.34	21.51 ± 3.49	24.44 ± 4.13	25.99 ± 4.27	0.034
eGFR(ml/min/m^2)	107.44 ± 17.44	102.94 ± 16.91	104.87 ± 16.51	109.33 ± 17.83	0.091
Creatinine (mg/dl)	0.76 ± 0.21	0.86 ± 0.16	0.80 ± 0.16	0.72 ± 0.23	0.003
uACR (mg/gm)	30.55 ± 79.18	6.97 ± 4.65	22.89 ± 50.25	37.29 ± 94.42	0.279
Calcium (mg/dl)	10.82 ± 1.73	10.07 ± 1.37	10.99 ± 1.57	10.80 ± 1.83	0.142
Phosphate (mg/dl)	4.17 ± 0.78	3.76 ± 0.54	4.22 ± 0.74	4.19 ± 0.82	0.092
ALP (u/l)	102.77 ± 36.12	84.63 ± 21.77	104.57 ± 34.26	103.62 ± 37.92	0.114

Data were expressed as mean ± SD. ANOVA test were done

DISCUSSION

Growing scientific evidence has implicated vitamin D deficiency in a multitude of chronic conditions, including diabetes mellitus, hypertension, cardiovascular disease, renal disease and among others. With the growing prevalence of vitamin D deficiency and its association with these leading causes of mortality, it has become more important than ever to delineate vitamin D's role in the pathogenesis of these diseases and use data to pinpoint established risk factors for vitamin D deficiency[12].

This study was conducted among 259 rural population. Mean age of the study subjects was 41.62 ± 14.74 years within a range of 18 to 88 years. Females (51.4%) were slightly predominant than males (48.6%).

In this study, serum 25-OH-vitamin-D was assayed by DiaSorin, Stillwater, MN. Kit which uses chemiluminescent immunoassay (CLIA) technology The internal QC test value was 13.9 ng/ml with range 9.73 to 18.1 ng/ml. In this study ivD QC result was 14.6 ng/ml. 93.8% subjects was found either vitamin-D insufficiency or deficiency. According to Mayo Clin Proc. July 2013 the vitamin-D deficiency scenario in South East Asia (78 – 98%), Middle East (90%) and Europe (57 – 64%). High prevalence of vitamin- D deficiency of this study may be due to culture of people and seasonal variation. About half of the samples were collected during winter season.

In this study vitamin-D deficiency is more common in female (98.5%) than male (88.9%). It is due to less sun exposure of female as they perform more indoor activity and in outside their whole body is covered by clothing like borkha. This finding is similar to Jeon et al, 2011; Martins et al, 2007 study[11,13].

In this study, uACR showed negative correlation with serum vitamin-D level. The uACR was 6.97 ± 4.65, 22.89 ± 50.25, 37.29 ± 94.42 in vitamin- D sufficiency, insufficiency and deficiency group respectively. This finding is similar to Boer et al, 2011; Kim et al, 2018 study[8,10]. Adjustment for hypertension and diabetes resulted in some attenuation of this association, suggesting that these factors may mediate or confound

a portion of the relationship of vitamin-D with albuminuria.

In this study, when eGFR is ≥60 ml/min/m2 it is negatively associated with serum vitamin-D level and when eGFR <60 ml/min/m2 it is positively associated with serum vitamin-D level. Several studies have investigated the association between renal function and vitamin D levels. However, the relationship between eGFR and vitamin-D is debated. Although some studies have shown that eGFR decreased as vitamin-D levels increased[9,14] and some studies have shown that eGFR increased as vitamin-D levels increased[15], others found no association between vitamin D and GFR[16,17]. The exact reason for these discrepancies is not clear; however, it may be that most studies in patients with CKD have found a positive association between eGFR and vitamin D levels, whereas those conducted in the general population typically found no association.

CONCLUSION

The prevalence of serum 25(OH) D sufficiency, insufficiency and deficiency in a rural population of Bangladesh is 6.2%, 33.6% and 60.2% respectively. Vitamin-D deficiency is more prevalent in females. Low serum level of 25(OH) D is associated with the declining eGFR and increasing urinary albumin excreation.

LIMITATION OF THE STUDY

This study carried out at a short period of time, more time is needed for such study. As this was a cross-sectional study, so it was impossible to infer causal or temporal relationship. The study did not evaluate use of medications known to affect the blood pressure and blood glucose level.

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Original Article

Visceral Adiposity Index: An Effective Tool for Predicting Metabolic Syndrome in Bangladeshi Adult Population

Tabassum M[1], Mozaffor M[2], Muna FZ[3], Rahman MM[4], Khan MTI[5], Naznen F[6], Chowdhury MA[7], Sharmin S[8]

ABSTRACT

Background: *Obesity induces adipocyte dysfunction with secretion of adipokines, which results in a cascade of chemical reaction which triggers the atherogenic process and insulin resistance leading to a set of metabolic abnormalities i.e., metabolic syndrome. The Visceral Adiposity Index (VAI) is a simple, gender-based obesity index and has been proposed to be a predictor of metabolic syndrome.*

Objective: *Our study aims to evaluate the effectiveness of the Visceral Adiposity Index (VAI) in prediction metabolic syndrome in Bangladeshi adult population.*

Methods: *This cross-sectional study was carried out in Department of Biochemistry and Molecular Biology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, from January to June of 2017. A total of 200 apparently healthy subjects (108 men and 92 women) were selected for the study, who attended the out-patient-departments of the same institution. Anthropometric measurements were recorded, e.g., height, weight, waist circumference (WC). Body mass index (BMI) was calculated. Overnight fasting blood samples were collected to estimate plasma glucose and serum lipid profile. Then VAI was calculated for men and women separately and evaluated as a tool in diagnosis of metabolic syndrome among the participants. Receiver operating characteristic (ROC) curves were plotted to assess the performance of VAI in metabolic syndrome prediction by gender. The power of metabolic syndrome prediction was quantified by the area under the curve (AUC) with 95% confidence intervals.*

Results: *The mean age of the study participants was 42.4±5.2 years. Among 108 men, 63 had metabolic syndrome, while among 92 women, 31 had metabolic syndrome. Sensitivity and specificity of VAI in predicting metabolic syndrome in male study subjects were 83.2% and 70.3%, respectively, while in female study subjects 80.1% and 70.5% respectively. Receiver operating characteristic (ROC) curve analysis showed that the optimal cutoff value of VAI in male study subjects was 2.16 and area under the curve (AUC) value was 0.907, while in female study subjects, the values were 2.25 and 0.918 respectively (P<0.001).*

Conclusion: *The Visceral Adiposity Index (VAI) was found simple, accessible, and effective obesity index to predict metabolic syndrome in apparently healthy adults.*

Keywords: *Visceral Adiposity Index, Metabolic Obesity, Metabolic Syndrome, Bangladesh*

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1. Dr. Mariya Tabassum, Associate Professor & Head, Department of Biochemistry, Abdul Malek Ukil Medical College, Begumganj, Noakhali.
2. Dr. Miliva Mozaffor, Assistant Professor, Department of Biochemistry, Medical College for Women & Hospital, Uttara, Dhaka.
3. Dr. Farzana Zaman Muna, Assistant Professor, Department of Biochemistry, Abdul Malek Ukil Medical College, Begumganj, Noakhali.
4. Prof. Md. Matiur Rahman, Professor & Chairman, Department of Biochemistry and Molecular Biology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka.
5. Dr. Md. Tariqul Islam Khan, Registrar, Department of Cardiology, Mymensingh Medical College Hospital, Mymensingh.
6. Dr. Farhana Naznen, Lecturer, Department of Physiology, Community Based Medical College, Bangladesh (CBMC,B), Winnerpar, Mymensingh.
7. Dr. Mehdi Ashik Chowdhury, Associate Professor & Head, Department of Pathology, Tairunnessa Memorial Medical College, Gazipur
8. Dr. Shegufta Sharmin, Associate Professor, Department of Pathology, Shaheed Monsur Ali Medical College, Uttara, Dhaka

Address of Correspondence: Dr. Mariya Tabassum, Associate Professor & Head, Department of Biochemistry, Abdul Malek Ukil Medical College, Begumganj, Noakhali-3823. Email: drmariyatabassum@gmail.com

INTRODUCTION

Excess accumulation of intra-abdominal adipose tissue, which is often termed as 'visceral obesity', is part of a phenotype including dysfunctional subcutaneous adipose tissue expansion and lipid storage closely related to clustering cardiometabolic risk factors that results in some negative impacts on health.[1] Obesity induces adipocyte dysfunction with secretion of adipokines. This results in a cascade of chemical reaction which triggers the atherogenic process and insulin resistance leading to a set of metabolic abnormalities.[2]

Body Mass Index (BMI) is the most commonly used tool to classify obesity. However, BMI-based classification is no longer reliable because it does not take visceral fat distribution and adipocyte dysfunction into account. Some normal-weight adults are also found to have increased insulin resistance, atherogenic lipid profiles and hence are prone to suffer from Type 2 diabetes mellitus, cardiovascular and cerebrovascular disease.[3-5] Therefore, a newer term "metabolic obesity" has been coined to address this issue. Metabolic obesity can be defined as the presence of metabolic syndrome in an individual, irrespective of his/her BMI. This implies that a person could be metabolically obese, in spite of having a normal BMI or being normal-weight.[6-9]

In clinical practice, such metabolically obese but normal-weight people seem to be the most challenging one to deal with. People who are metabolically obese but have normal weights stay out of the focus of clinicians and researchers. They are often thought to remain free from obesity-related complications due to their normal BMIs. In contrast, being metabolically unhealthy, they are definitely prone to an increased risk of Type 2 diabetes mellitus, cardiovascular diseases and stroke.[6-9] Therefore, early and accurate detection of patients with this phenotype has immense medical, social and economic significance.

Very recently, a number of studies have validated the Visceral Adiposity Index (VAI) to be a reliable and valuable indicator of visceral fat distribution and function. It also correlates well with the degree of insulin resistance.[10] The Visceral Adiposity Index (VAI) is a simple, gender-based mathematical formula comprising both anthropometric (body mass index, i.e., BMI and waist circumference) and biochemical parameters (serum triglycerides and HDL cholesterol levels). It does not require any complex investigation. There are several studies done in different regions of the globe; however, to date, there is no published report on VAI in our population. Hence, we proposed this study to evaluate the effectiveness of the Visceral Adiposity Index (VAI) in prediction metabolic syndrome in Bangladeshi adult population.

METHODS

This cross-sectional study was carried out in Department of Biochemistry and Molecular Biology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, from January to June of 2017. A total of 200 apparently healthy subjects (108 men and 92 women) were selected for the study, who attended the out-patient-departments of the same institution. The study subjects were selected aged between 18 and 60 years through purposive and convenient sampling method (after exclusion of subjects who were pregnant, diabetic, or having history of kidney, liver, endocrine or malignant disease or any type of infection). The purpose and procedures were explained to them in details and written informed consent was taken. They were evaluated by history, clinical examination, and laboratory investigations as per data collection sheet. Anthropometric measurements were recorded, e.g., height, weight, waist circumference (WC). Then body mass index (BMI) was calculated i.e., weight in kilograms divided by the square of height in meters (Kg/m^2), for each of them. In sitting position, systolic and diastolic blood pressure were recorded. Overnight fasting blood samples were collected to estimate plasma glucose and serum lipid profile. Fasting plasma glucose was estimated by using hexokinase method (in AU680 Clinical Chemistry Analyzer – Beckman Coulter, Inc., made in USA). Serum total cholesterol (TC), triglycerides (TG) and High-Density Lipoprotein cholesterol (HDLC) were estimated by using by enzymatic method (in ARCHITECT c4000 Clinical Chemistry Analyzer – Abbott Diagnostics Inc., made in USA). Low-Density Lipoprotein cholesterol (LDL-C) was calculated using the 'Friedewald formula'. Individuals were considered to have metabolic syndrome having at least three or more of the criteria (as determined by the American Heart Association/National Heart, Lung, and Blood Institute Scientific Statement)[11], and were categorized.

Visceral Adiposity Index (VAI) was calculated by the following formula:[10]

For males:
VAI = [WC/39.68 + (1.88 × BMI) × (TG/1.03) × (1.31/HDL-C)]

For females:
VAI = [WC/36.58 + (1.89 × BMI) × (TG/0.81) × (1.52/HDL-C)]

Here, WC or waist circumference is expressed in cm, BMI in kg/m^2, serum TG and HDL-C in mg/dl.

Then VAI was evaluated as a tool to predict metabolic syndrome for each study subject. Receiver operating characteristic (ROC) curves were plotted to assess the performance of (VAI) in prediction of metabolic syndrome by gender. The power of metabolic syndrome prediction was quantified by the area under the curve (AUC) with 95% confidence intervals, i.e., a larger AUC reflecting better predictive accuracy.

All statistical analyses were conducted using SPSS version 22.0. for Windows (SPSS, Chicago, IL, USA). The difference was considered statistically significant at P value <0.05 based on a 2-sided probability. This study was approved by the Institutional Review Board (IRB) of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh.

RESULTS

The mean age of the study participants was 42.4±5.2 years. Among 108 men, 63 had metabolic syndrome, while among 92 women, 31 had metabolic syndrome (Table-I), as determined by the anthropometric and biochemical parameters, based on the criteria of the American Heart Association/National Heart, Lung, and Blood Institute Scientific Statement.[11] Then study subjects were further evaluated by VAI. Sensitivity and specificity of VAI in detection of metabolic syndrome in male study subjects were 83.2% and 70.3%, respectively, while in female study subjects 80.1% and 70.5% respectively (Table-II). Receiver operating characteristic (ROC) curve analysis showed that the optimal cutoff value of VAI in male study subjects was 2.16, and area under the curve (AUC) value was 0.907; those indicated that VAI is a good predictor of metabolic syndrome in adult males. (Table-II, Fig. 1). Similarly, in female study subjects, the optimal cutoff value was 2.25, and area under the curve (AUC) value was 0.918; those also indicated that VAI is a good tool for prediction of metabolic syndrome in adult females (Table-II, Fig. 2).

Table-I: *Presence of metabolic syndrome among the study subjects (n=200)*

Sex	Metabolic Syndrome		
	Yes (%)	No (%)	Total
Male	63 (31.5%)	45 (22.5%)	108
Female	31 (15.5%)	61 (30.5%)	92
Total	94 (47%)	106 (53%)	200

Table-II: *Performance of Visceral Adiposity Index (VAI) to predict metabolic syndrome*

Cut-off Points		Sensitivity (%)		Specificity (%)		AUC (95% CI)		P value	
Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
2.16	2.25	83.2	80.1	70.3	70.5	0.907	0.912	<0.001[S]	<0.001[S]

S=significant

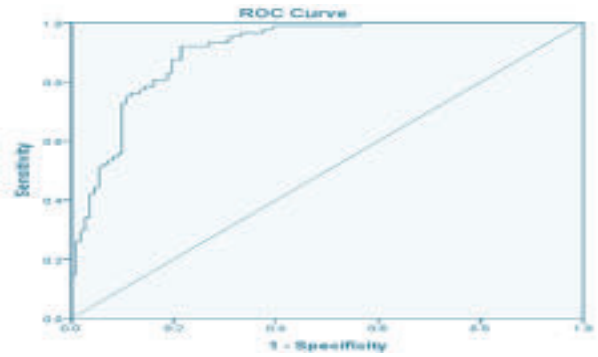

Fig. 1: *Receiver Operating Characteristic (ROC) Curve for Visceral Adiposity Index (VAI) in men.*

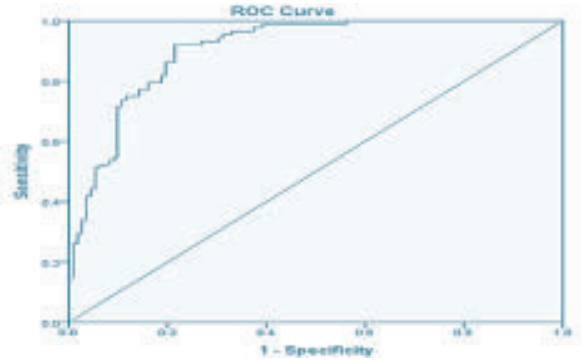

Fig. 2: *Receiver Operating Characteristic (ROC) Curve for Visceral Adiposity Index (VAI) in women.*

DISCUSSION

The present study demonstrated the utility of VAI as a simple but effective marker in detection of metabolically obese but normal-weight phenotype among Bangladeshi adults. To our knowledge, this is the first report on VAI that it has a high rate of accuracy for prediction of metabolic syndrome in Bangladeshi healthy men and women.

Amato et al. studied on 1,764 Italian patients and reported optimal VAI cut-off points ranging from 1.92 to 2.52 based on different age group,[12] while Baveicy et al. found the optimal cut-off points for VAI 4.11 (AUC: 0.82; 95% CI: 0.81–0.84) in men and 4.28 (AUC: 0.86; 95% CI: 0.85–0.87) in women to prediction of metabolic syndrome in 10,000 Iranian people.[13] Pekgor et al. reported a cut-off value of VAI in predicting metabolic syndrome 2.2 as they studied on 92 overweight and obese Turkish individuals.[14] Roriz et al. studied on 191 adults and elderly Brazilians and found the cut-off value 1.24 to 1.45 (sensitivity e"76.9%, specificity e"61.1) in men and 1.46 to 1.84 (sensitivity and specificity e"66.7) in women as well as a higher AUC i.e., 0.83 (CI: 0.705–0.955) and 0.71 (CI: 0.566–0.856) in men and women respectively.[15] Joshi et al. investigated 3,329 asymptomatic and healthy Gujarati Indian adults and the results reported that VAI had the best AUC (0.856) for metabolic syndrome.[16] According to Li et al., VAI showed the best diagnostic value for metabolic syndrome in men (ATPIII criterion: AUC 0.849, 95% CI 0.812–0.886; IDF criterion: AUC 0.792, 95% CI 0.739–0.844) in a Chinese population.[17] Štìpánek et al. reported a cut-off value of 2.37, with a sensitivity of 0.86 and a specificity of 0.78, as they studied on 783 Czech individuals and concluded that VAI may provide a better estimation of subclinical atherosclerosis.[18]

The result of our study was compared and found more or less in agreement with that of above-mentioned studies. However, we found only few studies to support our results as because very limited number of studies have been conducted across the globe. Since no previous studies were found in our country to compare with our findings, it is still convincible with our results that the study was an appropriate one because of its simple mathematical calculations for clinical use, cost-effectiveness, and accessibility (with minimum laboratory facilities of a resource-poor country like Bangladesh). The result of the present study is expected to help clinicians diagnose metabolic obesity even in normal-weight individuals quickly and conveniently.

It may be mentioned that similar studies were done in the same hospital setting to predict metabolic syndrome using 'lipid accumulation product' and 'triglycerides and glucose index', which showed that people having normal weights could be metabolically obese and are at risk of diabetes mellitus or cardiovascular diseases or other related complications.[19,20] Our present study reinforces that individuals should be assessed early and periodically and by using VAI, clinicians can detect metabolic syndrome in a simple way, counsel their patients to consider lifestyle interventions, and thereby prevent a significant amount of morbidity and mortality.

One of the limitations of the present study was its small sample size, due to time constraint and limited budget; another one was being a single-centre study in an urban area. Besides, selection of the study subjects was purposive following convenient sampling technique. Therefore, drawing conclusion for a general population from the study results would be challenging. Moreover, the study design (cross-sectional) limits observation on the mechanism of visceral adiposity in metabolic syndrome or assessment of the outcomes, which could be obtained from a prospective cohort study.

CONCLUSION

Our data suggest that there is a significant prevalence of metabolic syndrome in apparently healthy Bangladeshi people and the Visceral Adiposity Index (VAI) is a simple, accessible, and effective tool to predict metabolic syndrome in those apparently healthy adults. However, a large-scale study involving multicentre both in rural and urban settings is recommended to reproduce the findings of this study and make it generalizable to the reference population.

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Original Article

Risk Assessment of Coronavirus Disease (COVID-19) Transmission among Physicians Working at a COVID-dedicated Tertiary-care Hospital

Choudhury AY[1], Sarkar NK[2], Sobuj MR[3], Biswas S[4], Roy M[5], Uddin JM[6], Hamid MA[7]

ABSTRACT

Background and aims: *In the earlier stage of pandemic, a sizeable number of physicians and other healthcare workers were infected with SARS-CoV-2. The aim of this study was to assess the factors associated with the risk of SARS-CoV-2 infection among physicians working at a COVID-dedicated tertiary care hospital, within and outside the medical workplace.*

Methods: *This case control study was conducted among the physicians and surgeons working at different departments of Mugda Medical College and Hospital and undergone different pattern of exposure to COVID patients within the period of 20 April, 2020 and 20 July, 2020. Respondents were queried regarding job description, workplace exposures, respiratory protection, hospital policy of disease prevention, and extra-occupational activities during duty period. Chi-square test was done and odds ratios for physicians' infection were calculated. A p-value <0.05 was considered as statistical significant.*

Results: *Increased risk of SARS-CoV-2 infection in physicians was associated with the use of mobile phone during duty hour (OR, 15, 95% confidence interval 1.971 to 121.905, p=0.001), and breech of PPE during doffing (OR, 2.52, 95% confidence interval 0.821 to 7.76, p=0.099). Extra-occupational risk factors included contact with known COVID patient (OR, 5.735, 95% confidence interval 2.072 to 15.872, p=<0.001), and visit any gathering (OR, 1.076, 95% confidence interval 0.412 to 2.81, p=0.881). Physicians worked in roster group (50%) and round group (34.38%) were mostly infected than other facilities.*

Conclusion: *COVID-19 transmissions to physicians was associated with exposure at workplace, breech in PPE during doffing, use of device during round/roster period, extra-occupational exposure to known COVID patients outside the hospital, and visit any gathering. Close monitoring of infection control measures in workplace and increase awareness of the risks of outdoor activities in pandemic situation, may reduce the incidence of infection among physicians.*

Keyword*: COVID, Transmission Risk, Physicians, Tertiary-care Hospital.*

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1. Dr. Adnan Yusuf Choudhury, Associate Professor, Department of Respiratory Medicine, Mugda Medical College, Dhaka
2. Dr. Nirmal Kanti Sarkar, Assistant Professor, Department of Respiratory Medicine, Mugda Medical College, Dhaka
3. Dr. Mofizur Rahman Sobuj, Medical Officer, Department of Anesthesiology, Mugda Medical College Hospital, Dhaka
4. Dr. Sushanta Biswas, Medical Officer, Department of Paediatrics, Mugda Medical College Hospital, Dhaka
5. Dr. Moumita Roy, Junior Consultant, Department of Obstetrics & Gynaecology,Shaheed Suhrawardy Medical College Hospital, Dhaka
6. Dr. Jalal Mohsin Uddin, Assistant Professor, Department of Respiratory Medicine,National Institute of Diseases of the Chest and Hospital, Dhaka
7. Dr. Md. Abdul Hamid, Assistant Professor, Department of Dermatology, Mugda Medical College, Dhaka

Address of correspondence: Dr. Adnan Yusuf Choudhury, Associate Professor, Department of Respiratory Medicine, Mugda Medical College, Dhaka. E-mail: choudhury adnanchest@gmail.com

INTRODUCTION

While the COVID-19 pandemic continues unabated, healthcare workers (HCW) at the forefront are in contact with and caring for COVID patients are among the high risk groups in terms of disease transmission. [1-3] Nosocomial transmission remains to cause anxiety in healthcare professionals who are struggling with many factors as excessive working hour, psychological stress, extreme fatigue, occupational burnout and stigma.[4] Direct contact and aerosol generating procedures constitute the highest risk in terms of contamination, especially in departments with confirmed or suspected COVID-19 patients. [5] The protection of HCW's is one of the most critical points in dealing with the pandemic. Therefore, determining the dynamics of nosocomial transmission within the group of HCW's is of great

importance in preventing nosocomial outbreaks and protecting HCW's from infection.

The study aimed to investigate the incidence of nosocomial transmission and the factors affecting the transmission in physicians working in a COVID dedicated tertiary care hospital in Bangladesh.

METHODS

This case control study was conducted among the physicians and surgeons working at different departments of Mugda Medical College and Hospital and undergone exposure to COVID patients while delivering treatment at the same hospital setting from 20th April 2020 (date of operating as a COVID-dedicated hospital) to 20th July 2020. Data were collected using a semi-structured questionnaire which was filled-up by the individual respondent.

Respondents were categorized into three groups – (1) diagnosed with laboratory confirmed COVID-19 ("cases"), (2) had experienced an illness suspicious for COVID-19 that was not laboratory-confirmed ("possible cases"), and (3) had remained healthy while continuing to work ("controls"). Laboratory confirmed COVID-19 was defined as report of a polymerase chain reaction (PCR) test detecting severe acute respiratory coronavirus virus 2 (SARS-CoV-2). Cases and possible cases were asked the date of symptom onset and requested to report their exposures during the 14 days prior to symptom onset. Controls were asked to complete the questionnaire with respect to the 14 days prior to survey completion. A 14-day exposure window was chosen to correspond with the incubation period of SARS-CoV-2.We collected demographic data followed by questions about exposures to different healthcare settings (cabin/ward round, cabin/ward roster, ICU/HDU, emergency department, triage room, laboratory, radiology department, and medical college/hospital control room), activities outside the workplace, and institutional policies regarding the use of PPE. Respondents were asked about specific exposures and respiratory protection used during the care of such patients. Disposable surgical mask, KN95, N95, N99, FFP2, and FFP3respirators (new or reused), powered air-purifying respirators (PAPRs), and reusable elastomeric respirators were considered respirator-level protection.

Descriptive statistics included mean and standard deviation for age, and percentage and frequencies for categorical variables. Pearson χ^2 test was done for calculation of continuous and categorical variables. Odds ratios with 95% confidence intervals with respect to respondents infected with COVID-19 were calculated for all exposures. Statistical package of social sciences (SPSS) version 23.0 was used for statistical analysis of data.

Ethical clearance was obtained from Institutional Review Board (IRB) of Mugda Medical College to undertake the current study. According to Helsinki Declaration for Medical Research involving Human Subjects 1964, all the participants were informed about the study design and the right of the participants to withdraw themselves from the research at any time, for any reason.

RESULTS

This case-control study included total 92 physicians worked at Mugda Medical College Hospital between the period from 20 April, 2020 (date of operating as a COVID-dedicated hospital) and 20 July, 2020. Among them, 32 were case, and 60 control. Case and control were similar demographically. Overall, the mean age of the case was 38.28 years and that of control was 40.35 years. Sixty eight percent respondents were male in case group and 63% in control group (Table-1). Most of them had no comorbidities (65.63% in case group and 83.33% in control group). Half of the cases were from roster group, followed by round group (34.38%). Those who were engaged in cabin round and emergency department, were most commonly infected (31.25% and 28.13% respectively)

Table-I: *Demography*

Characteristics	Cases (n=32)	Control (n=60)
Age, mean (±SD)	38.28 (±7.52)	40.35 (±7.76)
Sex		
Male	22 (68.75%)	38 (63.33%)
Female	10 (31.25%)	22 (36.66%)
Type of job		
Round group	11 (34.38%)	24 (40.00%)
Roster group	16 (50.00%)	28 (46.67%)
Administrative	1 (3.13%)	6 (10.00%)
Others	4 (12.50%)	2 (3.33%)
Place of work		
Cabin	10 (31.25%)	25 (41.67%)
Ward	4 (12.5%)	14 (23.33%)
Emergency	9 (28.13%)	12 (20.00%)
Triage room	1 (3.13%)	3 (5.00%)
ICU	3 (9.38%)	6 (10.00%)
Operation theatre	1 (3.13%)	0
Radiology	2(6.25%)	0
Pathology/Microbiology	2(6.25%)	0
Comorbidities		
Yes	11 (34.38%)	10 (16.67%)
No	21 (65.63%)	50 (83.33%)

Most of the respondents used reused mask (75% in case group and 81.6% in control group). In case group, KN95 was the most commonly used respirator (46.88%), followed by N95 (40.63%). In control group, N95 and N99 was mostly used (38.33%). In both groups, respondents used double masks i.e. respirator plus surgical mask .

Table-II : *Respiratory protection utilized*

	Cases n=32	Control n=60
Mask type (Respirators)		
KN95	15 (46.88%)	13 (21.67%)
N95	13 (40.63%)	23 (38.33%)
N99	3 (9.38)	23 (38.33%)
Surgical mask+ respirators	23 (71.87)	47 (78.33%)
Surgical mask only	0	1 (1.67%)
Pattern of mask used		
Single time	8 (25.00%)	11 (18.33%)
Reused	24 (75%)	49 (81.67%)

Most of the cases were symptomatic (73.3%), only 4 cases (12.5%) needed hospitalization .

Table-III: *Clinical presentation and hospitalization status*

	Cases (n=32)	
	Number	Percent
Clinical presentation		
Symptomatic	22	73.3
Asymptomatic	8	26.7
Hospitalization status		
Hospitalized	4	12.5
Not hospitalized	28	87.5

Use of mobile phone during duty hour was associated with increased rate of COVID infection (odds ratio 15,95% confidence interval 1.971 to 121.905,p = 0.001). Those who notified any breech of PPE during doffing were mostly infected (odds ratio 2.524,95% confidence interval 0.821 to 7.76,p=0.099). Institutional training on donning and doffing was protective against acquiring disease (Table-IV).

Contact with known COVID patient was the most common factor of infection outside the healthcare setting (odds ratio 5.735, 95% confidence interval 2.072 to 15.872,p =<0.001). Visiting any gathering was another factor of infection outside hospital (odds ratio 1.076, 95% confidence interval 0.412 to 2.81,p= 0.881).

Table-IV: *Odds Ratios associated with occupational factors and extra-occupational exposures*

Variables	OR all cases (n=32)	P value
Occupational factors		
Occupational factors		
Institutional training on donning/doffing	0.429	0.058*
(95% CI)	(0.177-1.039)	
Use of full PPE on duty	0.925	0.907
(95% CI)	(0.249-3.430)	
Any breech of PPE during doffing	2.524	0.099
(95% CI)	(0.821-7.760)	
Use of mobile phone on duty time	15.00	0.001*
(95% CI)	(1.971-121.9)	
Extra-occupational exposure		
Contact with known COVID patient	5.735	0.000*
(95% CI)	(2.072-15.872)	
Visit any gathering	1.076	0.881
(95% CI)	(0.412-2.81)	
Use of public transport	0.714	0.596
(95% CI)	(0.205-2.489)	

DISCUSSION

This case control study conducted at a COVID-dedicated tertiary-care hospital may put some valuable inputs for risk assessment of SARS-CoV-2 infection among physicians and other healthcare workers at workplace and outside of hospital setting. This may also help policymakers to formulate guidelines to reduce infection in healthcare workers in different healthcare settings during COVID pandemic.

We observed that physician infection was more common among those who did their duty in cabin block and emergency department of our hospital.

Relatively lower incidence of infection was noted among those who worked in ICU, which is a potential place of aerosol generating procedures (e.g. high flow nasal cannula, CPAP, BiPAP, mechanical ventilators etc.). This is probably due to more cautious practice of mask and PPE in this area. Round and roster group doctors were mostly infected, probably due to prolonged contact with COVID patients. Lentz R et al. in their study also observed that nosocomial transmission to healthcare professionals were more common during routine contact with COVID-19 patients than during aerosol generating procedures.[6]

Use of medical mask is paramount in infection prevention.[7-9] The World Health Organization recommends medical masks for respiratory protection during non-aerosol generating procedures, whereas the US CDC advised for respirators.[10,11] In our study, we observed that most of the respondents (both case and control) used respirator and surgical mask for better protection. KN95 and N95 was the most commonly used in case group, whereas N95 and N99 in control group. As we have institutional policy on reusing masks, it was commonly practiced by all.

We also observed that institutional training on donning/doffing and use of full PPE during duty hour was associated with lower odds of nosocomial infection. At the outset of the pandemic, Directorate General of Health Services (DGHS) arranged a training program for the healthcare workers at Mugda Medical College Hospital on infection control and donning/doffing. This had tremendous impact on infection prevention among physicians at workplace. This type of training has a great impact in lowering transmission of infection among healthcare workers.[7]Physicians, who noted any breech in PPE during doffing, got infected. Though the hospital authority arranged training for all, a large bulk of physicians, especially who were deputed on later period, could not be trained and they were infected more. Many centers in different countries recruit PPE observers, whonotify any breech during doffing. This can reduce the rate of contamination. Studies showed that appropriate PPE, familiarity with it's use, and dedicated PPE observers may reduce infection rate at workplace.[6]

Many physicians, especially junior doctors, use mobile phone during duty hour to communicate with others. They are often bound to do this as the senior colleagues and administrative persons ask them regarding individual patient's condition. It is also used to follow health-related news, following updated guidelines, photography, sharing medical documents, conducting telecommunications etc. In this study, it was observed that the use of mobile phone in duty hour was associated with higher odds of infection among physicians. They carry the device during ward or cabin round, make phone calls while close to COVID positive patients, may often bring it to the duty room without proper disinfection. Mobile phone is a particular high risk object, which can directly come in contact with the face and mouth, while talking over phone, and a potential vehicle of transmission of infection, even if hands are properly disinfected. Breech in mobile phone hygiene is a potential source of SARS-CoV-2 transmission.[13-16]

In our study, it was observed that some physicians contacted the disease outside the workplace. There were higher odds of disease acquisition among those who gave history of contact with known COVID patients at home or elsewhere (e.g. sick relatives). Visiting gathering i.e. grocery, market, mosque etc. was another factor of extra-workplace infection. Same observation was found in other study.[6] Surprisingly lower odds of infection were observed among those who used public transport, although most of the respondents used hospital arranged service or personal transportation.

Our study had several limitations. First, the sample size was too small; hence the result may not depict the real scenario. Second, the cohort included the physicians only. If sample design could include all the healthcare professionals (i.e. nurses, technicians, ward boy etc.) we could estimate the risk factors more precisely. Third, the study duration was only three months at the earlier period of pandemic. Extending the study period with prolonged vigilance might clarify the risk factors. Fourth, we may have many asymptomatic cases that were undiagnosed and may underscore the total cases and risk factors.

The strength of this study is that we recruited the subjects in the earlier phase of disease in our country to evaluate the risk factors of infection in hospital setting and to alleviate the further risk by implementing the study result. Controls were matched as closely as possible to cases. Data on exposure and respiratory protection were collected in detailed manner.

CONCLUSION

This study enlightens our knowledge regarding various factors associated with physician infection with SARS-CoV-2 in hospital as well as outside of workplace settings. It was observed that physicians not exposed to potential aerosol-generating procedures were equally or more infected and a big portion of them acquired disease from outside of hospital environment. Mobile phone using is an important risk factor. Proper uses of PPE, careful practice of hand hygiene, vigilance during outside works are all

important measures to mitigate physician infection. The results of this study have an impact on healthcare workers and public health policy makers to reduce infection now and in future.

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Review Article

Transforming Health Professions Education for Universal Health Coverage: Challenges and Recommendations for Low-Resource Countries

Mozaffor M[1], Nurunnabi ASM[2], Haseen F[3], Sultan MT[4], Saha S[5]

ABSTRACT

Health workforce challenge persists as a critical issue in achieving universal health coverage (UHC) goals globally, especially in resource-poor countries. Evidence shows that health professions education and training is primarily clinical and curricular; however, it is somewhat deviated from the needs of the health system. In low-resource countries like Bangladesh, in the context of limited financial realities, to achieve global health goals and maximize opportunities for employment and economic development a paradigm shift is needed in health professions education, workforce development and healthcare services of the country from its primary to the tertiary level of health care respectively. There is a critical need to shift towards fair, equitable, need-based employment policy that is compatible with the overall growth of the health economy, and that acknowledges the role of both public and private sector in education and training. This review paper tried to emphasize the importance and implications of a paradigm shift in the sector. It argues the need for a 21st century framework for health professions education. This framework should represent a more satisfactory interface between supply and demand for health professionals, in line with the current need to meet the targets of universal health coverage, rational employment in healthy sector and economic development.

Keywords: *Health workforce, universal health coverage, health professions education*

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INTRODUCTION

Universal health coverage (UHC) is included in the Sustainable Development Goals (SDGs) as one of the targets and is being advanced by the World Health Organization (WHO) as an important concept.[1] However, around the world, health systems, and the populations they serve are facing the same growing challenge of lack of access to comprehensive, appropriate, timely, quality health services.[2] Low-income countries with larger populations are especially experiencing serious shortages in meeting health workforce requirements for universal health coverage.[2-5] The current demand shortage of millions of health workers is expected to double by 2030, with the largest shortages predicted to occur in the regions of East Asia and the Pacific (8.3 million) and South Asia (3.2 million), accentuating the global imbalances in the distribution of health workers. In low-income countries (LICs), for example, both the demand for and the supply of health workers are projected to remain significantly below the needs-based threshold. As a result, these countries will likely face shortages of health workers needed to provide basic health services and unemployment of health workers due to the limited capacity to employ the available supply

1. Dr. Miliva Mozaffor, Assistant Professor, Department of Biochemistry, Medical College for Women & Hospital, Uttara, Dhaka-1230.
2. Dr. Abu Sadat Mohammad Nurunnabi, Assistant Professor, Department of Anatomy, OSD, Directorate General of Health Services (DGHS), Dhaka-1212.
3. Dr. Fariha Haseen, Associate Professor, Department of Public Health and Informatics, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka-1000.
4. Dr. Mohammad Tipu Sultan, Medical Officer, Department of Forensic Medicine & Toxicology, Dhaka Medical College, Dhaka-1000.
5. Dr. Shilpi Saha, Associate Professor, Department of Obstetrics & Gynaecology, Medical College for Women & Hospital, Uttara, Dhaka-1230.

Address of correspondence: Dr. Miliva Mozaffor, Assistant Professor, Department of Biochemistry, Medical College for Women & Hospital, Uttara, Dhaka-1230. Email: miliva17@yahoo.com

of workers (insufficient demand).[5-7] Compared to the health workers' needs-based projections, the scenario is even more troublesome for our country, Bangladesh.[5,7]

The Government of Bangladesh (GoB) aspires to achieve Sustainable Development Goals (SDGs) by 2030. This means that the government is aiming to reach the targets set for SDG 3 (Ensure healthy lives and promote wellbeing for all at all ages) by 2030 that includes the attainment of universal health coverage (UHC).[5,7] To pave the way, GoB has approved the 4th Health, Population and Nutrition Sector Support Programme (HPNSP) (2017–2022) to ensure access to quality and equitable health care in a healthy environment for all that necessitates a competent and committed health workforce, for which quality and standard health professional education and training is required.[5,7,8] In this context, a new paradigm around the idea of transformative health professions education is emerging and promotes the need for transformation in health care systems, in the roles of health professionals and in the design of health professions education. This review paper tried to emphasize the importance and implications of a paradigm shift in the sector.

HEALTH PROFESSIONS EDUCATION ON MOVE

The UHC agenda, with the underlying goal that everyone should have access to the quality health services they need, without financial compromise, brings attention to three universal needs of all health systems: financing; services; and populations. UHC offers a compelling opportunity to better align the demand for health services and the demand for health workers with population health needs. However, the alignment of demand and need around UHC must find a tangible link to the supply of health workers.[5-7,9-11]

There has been significant increase of the number of health professional education institutions along with number of seats in 50 years (between 1971 and 2021). Approximately 31 times increase of the total health professional education institutions (of the seven professional's categories) under the MOHFW has been observed.[8] The increase has been rapid since 2010, especially in the number of the private health professional education institutions, mainly in the capital city (e.g., about 67% increase in the number of the private sector medical colleges and about 275% increase in the number of private sector nursing institutes).[8] This has resulted in an increasing trend of the production of the health professionals every year. However, several demerits were also observed relating to this mushroom growth. Such mushroom growth of medical, dental, nursing and other health institutions in the country has undermined the quality of health professions education to a great extent.[8,12-14] Concerned authorities are taking steps to improve the situation; however, the owners of these institutions also need to put in their efforts to improve qualities in terms of infrastructure development, enhancement of teaching and training facilities.[8,12]

CHALLENGES IN HEALTH PROFESSIONS EDUCATION

The education system is an indispensable component of the health system, and the provision of educational services ensures the constant supply of an educated and motivated workforce. Countries (including Bangladesh) that are aiming for universal health coverage (UHC) for all at an affordable cost need to ensure adequate supply of the right categories of workforce in the right places at the right time.[9,15-17] However, low-resource countries encounter many problems in relation to health workforce development through health professions education. Some of the issues are dynamic and interrelated. We tried to categorize these problems under following headings:

1. *Balancing between shortage in health workforce and selecting appropriate candidates for health professions education:* Like many other countries, Bangladesh is also experiencing a health workforce crisis. The recent COVID-19 pandemic is recognized as the breaking point for many health workers who were already in short supply. Healthcare workers called for urgent mobilization to address shortages, burnout, and backlog issues, which became a focus of concern in the health sector. However, this is also important that healthcare workers must have the profile, skills, and behaviour that are able to create trust and confidence in the population and promotes demand for quality services.[9,17] Hence, to meet the shortage in a short time frame, quality in education and training should not be compromised. In most countries the selection of students is done based on previous academic grades and a selection test. Bangladesh is also not an exception to this. This might be a good predictor of future academic performance; however, it does guarantee a future professional

performance in the sector.[9,17-20] Many countries have changed their admission process for the selection of medical, dental and nursing applicants to assess their mental attitude and behavioural characteristics that might be consistent with the demands of clinical practice in near future.[9,10,17]

2. *Ensuring competency-based education in health professions:* Calls have been made from different stakeholders to transform current curriculum, teaching and learning strategies to ensure that future healthcare workers have the required competencies for the changing burden of diseases and technological environment.[17] For educators and policy makers in the field, desirable competencies must be identified and aligned with population health priorities and any identified skills gaps.[9,17] In many countries, this means a shift in focus towards education and training that prepares the workforce to deliver effective primary care and meet the increasing challenge of noncommunicable diseases, which is also true for Bangladesh.[18-20]

3. *Lack of proper investment in health professions education:* A primary constraint to the development of health workforces in low- and middle-income countries is that the prevailing investment model for educating healthcare workers is not aligned with universal health coverage goals.[17] In many of those countries, like Bangladesh, insufficient, inefficient, and socially unaccountable investment in health professions education is a primary barrier to building a competent health workforce that meets population needs.[17,21-23] Moreover mushrooming growth of public and private institution without proper financial, logistic and manpower support as well quality education and training may only increase the number rather than achieving the real goals.[12]

4. *Proper distribution of health graduates and continuing professional development:* There is a notable gap in their rural retention. Most graduates relocate to urban areas following their period of mandatory service[24,25] to undertake specialty training or move into more lucrative private practice. Thus, doctors, nurses and other healthcare workers serving rural areas tend to be less experienced, and turnover rates are high. Some countries have launched targeted campaigns to attract students to occupations with unmet needs, for example, in the fields of primary care nursing, radiography and medical laboratory technology focusing on supply chain to rural health services.[25,26] In some contexts, increased remuneration and CPD training facilities are important. For community-based and mid-level health workers when adequately supported by the health system bring about changes and effective results in expanding coverage and improving health service equity (e.g., in remote rural areas or for low-income or vulnerable groups).[24-26] As we have already experienced in our country that upazila (sub-district) hospitals and community clinics have shown extraordinary performances in the health sector.[7,8]

5. *Regulating education and practice:* The development and activation of a regulatory framework that upholds accepted standards of education and practice is crucial at the moment. Strengthening of Bangladesh Medical & Dental Council (BM&DC), Bangladesh Nursing Council (BNC), State Medical Faculty (for paramedics) is essential step towards this. National health policy and a regulatory framework should cover the regulation of work in both public and private sectors, including education institutions, mechanisms of surveillance of professional practice and the exercise of discipline in cases of malpractice or unethical behaviour by the healthcare professionals.[27]

6. *Discrimination in health professions:* Literature on gender and human resources for healthcare has demonstrated that gender discrimination and inequality also remain as barriers to entry, reentry, and retention in employment systems, especially for female health workers in health services. Moreover, families and communities resist some of the changes required to address discrimination based on caregiver responsibilities, because the interventions challenge longstanding gender norms, expectations, and divisions of labour between men and women especially in our South Asian perspective.[5,7,19,28]

RECOMMENDATIONS

Evidence showed that health professions education and training is primarily clinical and curricular; however, it is somewhat deviated from the needs of

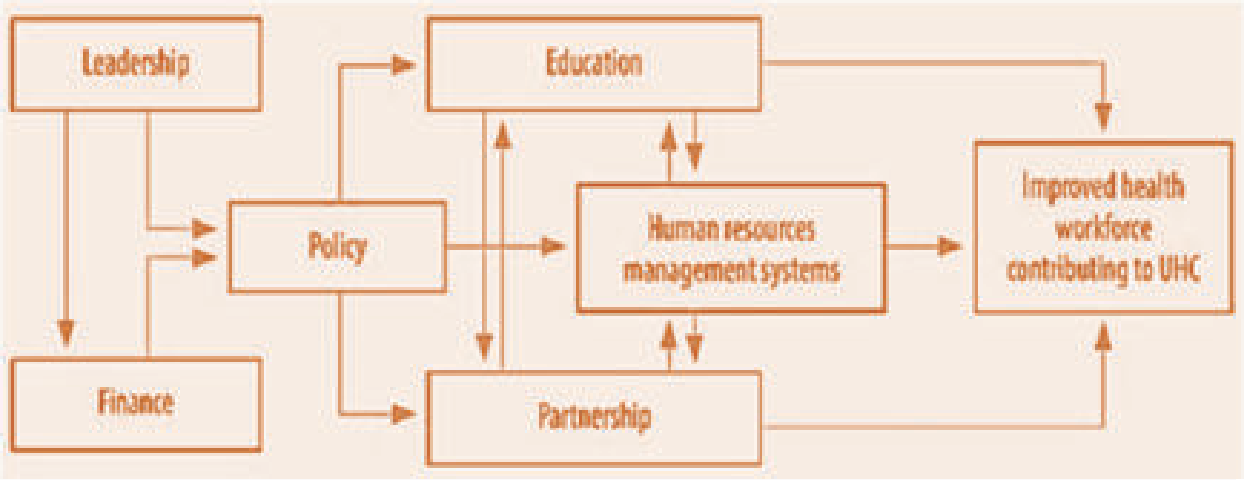

Fig. 1: *Factors associated to improvement of health professions education aligned with heath workforce management to ensure UHC (Source: Cometto, Buchan & Dussault, 2020)*[9]

the health system.[9,10] In low-resource countries like Bangladesh, in the context of limited financial realities, to achieve global health goals and maximize opportunities for employment and economic development a paradigm shift is needed in health professions education, workforce development and healthcare services of the country from its primary to the tertiary level of health care respectively.[9,17] There is a critical need to shift towards fair, equitable, need-based employment policy that is compatible with the overall growth of the health economy, and that acknowledges the role of both public and private sector in education and training.[8,17,21] Now coinciding with falling public health investment, emergence of non-communicable diseases, and a spiraling demand, there has been a steady growth in the corporatization of healthcare in recent years.[8,12] We are not against it; however, we argue for proper monitoring and quality assurance by the health watch authorities of the country.

In order to transform population health outcomes, the current efforts to scale up health professions education must increase not only the quantity, but also the quality and the relevance of the providers of the future. A transformative approach to medical education is needed – one that is defined by a commitment to social responsibility and insists on inter-sectoral engagement to determine how students are recruited, educated, and deployed as health professionals.[8,17,22]

The pursuit of knowledge, understanding and personal development will be encouraged across all stages of a health care worker's career. This includes strengthening of regional and national capacity in knowledge generation and management. Quality improvement of pre-service training will be encouraged while ensuring adequate opportunities for systematic in-service training. The need to carry out research to bridge the knowledge gaps in areas related to health workforce will be given more emphasis.[18,21,28]

Moreover, we need to develop gender equality, equal opportunity, or affirmative action policies to address multiple forms of gender discrimination and inequality in healthcare sector – in recruitment, education and training, employment, and workplaces.[8,28]

Reforms and paradigm shift in health professions education is not all to solve the problems in health sector. The effective management of the health workforce is also essential, as it includes the planning and regulation of the supplying health workers and maintenance its stock in the pipeline, as well as health professions education, recruitment, employment, performance optimization and retention.[9,17,28] A logical hierarchy and links among different action fields have been identified and described (Fig. 1) to show the pathways of health workforce development to provide the universal health coverage in a specified population as well as the role, status, and interdependence of health professions education with other factors.[9]

Finally, we would like to say mere availability of health workforce is not sufficient to provide UHC and meeting SDGs by 2030. Only when this available healthcare workers are equitably distributed and accessible by the population, when they possess the required competency, and are motivated and empowered to deliver quality healthcare that is appropriate and acceptable to the sociocultural expectations of the population, and when they are adequately supported by the health system, we may succeed theoretical coverage translate into effective service coverage.[15,17]

CONCLUSION

Addressing population needs for the SDGs and UHC requires making the best possible use of limited resources, and ensuring they are employed strategically through adoption and implementation of evidence-based health workforce policies tailored to the national health system context at all levels, as to reach the targets of SDGs by 2030. However, further research is needed to assess the impact of such initiatives on the long-term retention of workers – particularly doctors – and the adequacy of the training offered to lower-skilled workers to effectively plug medical personnel gaps. Last but not the least, systematic monitoring of program affordability and cost-effectiveness over time must be prioritized, alongside efforts to disseminate all the lessons learned to inform better practice and policy in the health sector.

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Review Article

Quality Assurance Scheme of Undergraduate Medical Education in Medical Colleges of Bangladesh: Past, Present and Future

Nurunnabi ASM[1], Parvin S[2], Rahim R[3], Begum M[4], Ghosh S[5], Sweety AA[6], Sultana D[7], Jahan N[8], Muqueet MA[9], Islam MM[10]

ABSTRACT

Improving quality of medical education is a key contributing factor to improving the quality of healthcare. The rapid increase in number of medical colleges in Bangladesh, especially in the private sector, makes its vital to have effective quality assurance system in place. Quality assurance resembles a state in which medical colleges take on challenges to address different aspects of quality in undergraduate medical education through check and balance in a methodical approach. In 1998, the World Health Organization (WHO) supported the Center for Medical Education (CME) and the Directorate General of Health Service (DGHS) to develop and publish the National Guidelines & Tools for the Quality Assurance Scheme (QAS) for medical colleges in Bangladesh. Since then that guideline has been serving as resource material and guide for institutionalization of the QAS based on the three principles of accountability, self-evaluation, and external peer review, with the latest revision done in 2012. At the institutional level, the scheme was proposed to be managed by the Academic Council, Academic Coordination Committee, the four (previously three) Phase Coordination Groups, Subject Coordinators, and Faculty Review & Development Committee. The operational framework is based on course appraisal, faculty development and review scheme and external review. A model of "pair of medical colleges" was also proposed as to oversee the QAS activities of each other and report to the National Quality Assurance Body (NQAB). This review paper aims to highlight the history of QAS in our medical colleges, their achievements to date and challenges as well as scopes for future improvement to enhance the quality of medical education in Bangladesh.

Keywords: *Quality assurance, medical education, MBBS programme, Bangladesh*

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INTRODUCTION

Quality has been part of the healthcare and policy discourse for nearly half a century. Improving quality in healthcare is a complex endeavour; in modern medicine quality care means "safe, timely, effective, efficient, equitable and patient-centred" measures taken by a healthcare institution to its consumers.[1] Improving quality of medical education is a key contributing factor to improving the quality of health care.[2,3] Undergraduate medical education system in

1. Dr. Abu Sadat Mohammad Nurunnabi, Assistant Professor, Department of Anatomy, OSD, Directorate General of Health Services (DGHS), Dhaka.
2. Prof. Shamima Parvin, Professor and Head, Department of Biochemistry & Vice-Principal, Mugda Medical College, Dhaka.
3. Dr. Riffat Rahim, Assistant Professor, Department of Obstetrics & Gynaecology, Mugda Medical College & Hospital, Dhaka.
4. Dr. Munira Begum, Assistant Professor, Department of Community Medicine, Rangpur Medical College, Rangpur.
5. Dr. Subrata Ghosh, Assistant Professor, Department of ENT and Head-Neck Surgery, Rajshahi Medical College & Hospital, Rajshahi.
6. Dr. Afroza Akbar Sweety, Assistant Professor, Department of Virology, Dhaka Medical College, Dhaka.
7. Dr. Dahlia Sultana, Assistant Professor, Department of Endocrinology, Sir Salimullah Medical College & Mitford Hospital, Dhaka.
8. Dr. Neelima Jahan, Assistant Professor, Department of Surgery, Shaheed Suhrawardy Medical College & Hospital, Dhaka.
9. Dr. Md. Abdul Muqueet, Assistant Professor and Head, Department of Nephrology, Pabna Medical College & Hospital, Pabna.
10. Dr. Md. Mozaharul Islam, Assistant Professor and Head, Department of Forensic Medicine & Toxicology, Shaheed Syed Nazrul Islam Medical College, Kishoreganj.

Address of correspondence: Dr. Abu Sadat Mohammad Nurunnabi, Assistant Professor, Department of Anatomy, OSD, Directorate General of Health Services (DGHS), Dhaka. Email: shekhor19@yahoo.com

Bangladesh inherited the typical features of British colonial education, which is still in very much on that traditional pattern. The Bachelor of Medicine and Bachelor of Surgery (MBBS) degree is a 5-year programme followed by a 1-year compulsory logbook-based internship training.[4,5] At present, there are total 113 recognized medical colleges in Bangladesh, 37 of which are public and 70 private. 6 medical colleges are run by the Bangladesh Armed Forces and are under the Ministry of Defence.[6]

Quality assurance resembles a state in which medical colleges take on challenges to address different aspects of quality through check and balance in a methodical approach.[7] Depending on the perspective of a stakeholder, educational quality can be understood as fitness for purpose (educating capable future physicians), value for money (a return on investment in education), perfection (focusing on zero defects), exceptional (standing out as the best program), or transformative (focusing on the educational learning effect).[2,7-9] In the UK perspective, quality assurance is defined as "the totality of systems, resources, and information devoted to maintaining and improving the quality and standards of teaching, scholarship, and research and of students' learning experience".[10] Moreover, it involves "the systematic monitoring and evaluation of learning and teaching, and the processes that support them, to make sure that the standards of academic awards meet the Expectations set out in the Quality Code, and that the quality of the student learning experience is being safeguarded and improved."[11] The Quality Assurance Scheme (QAS) in medical education review the way how a medical college implements its MBBS programme ensuring its optimum quality and standard. Several authors emphasized on the need to manage the ever increasing medical knowledge domains and increased recognition of the importance of imparting students with independent learning skills, and demonstrate the application of knowledge, skills, and attitudes in the ever changing local and global scenarios,[3,4,12-15] which are inherent in the practice of medicine. Many of our short comings in those aspects have been experienced since the beginning of the COVID-19 pandemics, which signify gaps in quality of medical education and training in the country. Besides, from an accreditation standpoint, many researchers have emphasized on lifelong learning opportunities for the students, as well as cultural and social competencies required for the doctors of tomorrow which can be achieved by demonstrating continuous review of the curriculum.[2,4,12-15] Thus, quality assurance has become an integral part of medical education all over the world and Bangladesh is also not an exception to it. This review paper aims to highlight the history of QAS in our medical colleges, their achievements to date and challenges as well as scopes for future improvement to enhance the quality of medical education in Bangladesh.

HISTORY

The World Health Organization (WHO) has been actively advocating reform and improved medical education to meet the changing needs of healthcare over decades.[3] In response to the increasing health workforce needs of the country, the number of government and private medical colleges have increased in recent years. The rapid increase in number of medical colleges in Bangladesh, especially in the private sector, makes its vital to have effective quality assurance system in place.[5,16] Towards that end, the WHO Bangladesh office started to support the Center for Medical Education (CME) and the Directorate General of Health Service (DGHS) to develop and publish the National Guidelines & Tools for the Quality Assurance Scheme (QAS) for medical colleges in Bangladesh in 1998 looking at the future of medical education in a low resource setting. Since then, the above-mentioned published guideline has been serving as resource material and guide for institutionalization of the QAS based on the three principles of accountability, self-evaluation, and external peer review.[4,5,16,17] The scheme has both national and institutional organizational framework. The National Quality Assurance Body (NQAB) is chaired by the Director General, DGHS and the Director for Center for Medical Education (CME) is the Member Secretary.[5,17,18] At the institutional level, the scheme was proposed to be managed by the Academic Council, Academic Coordination Committee, the four (previously three) Phase Coordination Groups, Subject Coordinators, and Faculty Review & Development Committee. The academic coordinator is supposed to act as an honorary member of Faculty of Medicine of the respective universities as per approval and consent of the Dean of the Faculty of Medicine of the university governing the Professional MBBS Examinations.[5,16,18] Proposed model of "pair of medical colleges" will be selected for each college to oversee the QAS activities

of each other and report to the NQAB. The operational framework is based on course appraisal, faculty development and review scheme and external review.[5,16,18] Besides, the student evaluation will be conducted phase wise rather than subject wise,[5,16-18] as it was previously implemented through three phases (Phase I, II, III)[19] and currently undergraduate medical education is of four phases (Phase I, II, III, IV).[20,21] The curriculum, teaching and learning, assessment and evaluation as well as reporting procedure are following that guideline to date. Addressing the necessity of quality medical education, a National Quality Assurance Scheme (NQAS) was established in 1998 in Bangladesh. National guidelines and tools for quality assurance were revised and published in 2012 with support from the World Health Organization (WHO).[22] Subsequently, the Government urged all medical colleges in Bangladesh to follow and practice NQAS framework and guidelines in their respective institutions (Fig.1).

Fig. 1: *Conceptual Framework of Quality Assurance and Accreditation in Medical Education in Bangladesh*

ACHIEVEMENTS

Since 1998 different medical colleges have been practicing QAS for the improvement of medical education in Bangladesh; however, to date one time pilot Quality Assessment & Audit Review (QAAR) has been done in three government medical colleges (i.e., Dhaka Medical College, Chittagong Medical College, Rangpur Medical College) under the leadership of national quality assurance body (NQAB) in 2010.[5] Therefore, we feel that there is a lack of annual formal auditing of QA activities, the informal yearly reporting on QA activities by the medical colleges are in place though. A latest publication from the World Health Organization (WHO) has described an overview of the NQAS and the assessment of its implementation in medical colleges in Bangladesh in 2017.[22] Despite limited resources and manpower and expertise in the field, all government and most of the private medical colleges have come out with the success of creating quality assurance bodies in the respective institutions. The QAS bodies have succeeded in functioning in the following areas:[5,15,16,22]

1. Making academic calendar to run academic activities and achieve phase wise target of teaching and assessment to reach completion of syllabus much ahead of the Professional Examination conducted under the Faculty of Medicine of different Universities of the country;
2. Regular Meetings of the Subject Coordination Committee, Phase Coordination Committee, Academic Coordination Committee, Academic Council and Faculty Development & Review Committee;
3. Arrangement of central seminars (fortnightly) and conferences locally and if possible, by inviting international faculties and experts in different disciplines;
4. Provision of Phase wise evaluation and feedback by the students to evaluate course works and faculties involved to enhance overall teaching-learning experience as well as the entire environment of medical colleges;
5. Provision of evaluation and feedback by the faculty members through the prescribed personal review form to adopt policies on continuous professional development (CPD) activities;
6. Arrangement of workshops and training on teaching methodology, assessment and evaluation, research methodology, quality improvement, scientific writing etc. under faculty development scheme;
7. Meetings among pair medical colleges (or regional meeting), as per convenience [for an example, meetings have been arranged participated by the representatives from Shaheed Ziaur Rahman Medical College (SZMC), TMSS Medical College and Army Medical College, Bogura];

8. Formation of Counseling Committee (academic support) to counsels the irregular and low performance students and address stress and mental health issues among students; and
9. Formation of Examination Review Committee to evaluate both internal and external (Professional MBBS Examinations) examinations.

CHALLENGES

Bangladesh Medical & Dental Council (BM&DC) is the sole authority for accrediting undergraduate medical and dental education in the country. It is a statutory body with the responsibility of establishing and maintaining high standards of medical education and recognition of medical qualifications in Bangladesh. For an accreditation institution like BM&DC, its responsibilities include to maintain the quality of medical education is in line with the evolving needs of the healthcare delivery system and expectations of society as well as international standards.[5,22] However, medical educators are showing increasing concerns about the nature of current BM&DC accreditation standards, the accreditation processes, lingering operations of improvement/upgradation of MBBS curriculum and the limited technical capacity to fulfill its administrative duties to ensure the quality of medical education and medical practice in the country.[5,22,23] Evidence showed that an inherent bias exists in the evaluation process between public- and private-sector institutions. Many medical colleges adopted several unethical and even illegal ad-hoc practices to get through the process of accreditation and recognition. Once their target is achieved, they fall back to their original sub-standard practices in terms of required infrastructure, faculty-student ratio, regular academic activities and social responsibility.[5,17,23] BM&DC and DGHS have already suspended the academic activities and admission process in some of the private medical colleges due to lack of required infrastructure, poor management, and violation of regulatory rules.[6,17] Surprisingly, recently founded government medical colleges have even worse conditions (in terms of shortage of medical teachers, infrastructure, teaching hospital and other essential facilities), as most of them were established in line with the political sweet will of the government.[16,17]

Moreover, we observed several limitations to the curriculum review process. It relies on the participation of a large number of faculty, students, and administrators from public and private sectors.[24-26] Although this widespread participation allows for a comprehensive review, it remains a difficult task for CME, BM&DC and other bodies to coordinate and manage. Lack of willingness, shortage of logistics and financial support have been in the list for decades. Moreover, lack of expertise in the sector to coordinate the curriculum design, evaluation, and integration process, and manage the quality assurance committees both at institutional and national level are also evident in Bangladesh, which is quite similar to other low-resource countries of South Asia.[23,26-35]

At medical college level, internal quality assurance team in all medical colleges are not equally competent and active. It is evident that politically influenced committees are not always capable enough to perform well.[5,23,26,27] Regular meetings of the Subject Coordination Committee, Phase Coordination Committee, Academic Coordination Committee, Academic Council and Faculty Development & Review Committee as well as meetings among pair medical colleges (or regional meeting) are not held years after years.[5,16,26] There is also a scarcity of reports of medical curriculum research, policy dialogue, public meeting, publication of the yearbook and formal auditing of QA activities in the country. Besides, integrated teaching, problem based learning (PBL), evidence-based medicine have been discussed widely; however, in the practical field, those are hardly practiced by the medical colleges.[16,17,26]

Individual institution committed to training future generations of physicians should recognize the importance of quality in undergraduate medical education and the need to regularly examine, reflect, and improve upon these efforts.[15,16,36-39] Both faculty members and students should come up to run academic activities smoothly and achieve phase wise target of teaching and assessment to reach completion of syllabus much ahead of the professional examination, while administration should take the role to nurture free and fair educational environment as well as monitor overall standards and strive for excellence in every aspect.[16,36-39] Besides, strengthening of the committees and monitoring of their activities are time-demanding,[22,25,38,39] which should be done by the medical college authorities internally as well as BM&DC, DGME and DGHS externally.[22,24] Last but not the least, it is worthy noticing that quality of medical education does not

solely depend on measurement instruments and tools, rather it revolves on how much quality awareness is present among medical faculty, students, and regulatory authorities.[38]

CONCLUSION

Global changes are happening in medical education in accordance and conformity with the advancement of science and technology. Besides, communities are increasingly demanding more accountability in healthcare from their public institutions including medical colleges and hospitals. We believe that a student centric, teacher guided, parent supported, community oriented and values driven medical education programme can produce competence based medical graduates capable of 'taking charge of the future'. At this stage, every medical college in the country (both public and private) must ensure its quality assurance activities through respective institutional QAS, which needs to be overviewed by the NQAB of the country. Besides, regulatory authorities like BM&DC, DGME, DGHS, Medical faculties of respective universities should strengthen their capacities to monitor and guide the medical colleges to achieve an optimum standard to build a better future in medical education, which will help build a modern, efficient, and patient-centred healthcare in the country.

ABBREVIATIONS

BM&DC: Bangladesh Medical & Dental Council
CME: Centre for Medical Education
DGHS: Directorate General of Health Services
DGME: Directorate General of Medical Education
MBBS: Bachelor of Medicine and Bachelor of Surgery
NQAB: National Quality Assurance Body
NQAS: National Quality Assurance Scheme
PBL: Problem Based Learning
QAAR: Quality Assessment & Audit Review
QAS: Quality Assurance Scheme
WHO: World Health Organization

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CASE REPORT

Pycnodysostosis: Report of A Rare Case

Sultana F[1], Ahmed L[2], Chatterjee S[3], Farzana MN[4], Ahmed R[5], Deepa ZS[6]

ABSTRACT

A 20-year old male patient reported in the outpatient department of Shaheed Suhrawardy Medical College Hospital, Dhaka, Bangladesh, with the complaints of body aches along with pain in the upper and lower limbs for several years. He also gave history of previous hospitalization for the same reason. He also had complaints of failure to thrive in his adolescence. However, he was treated as a case of polyarthritis in his previous admission in the district hospital. On clinical examination, he was found to have short stature, low-weight, peculiar face, prominent forehead, receding jaw and partial dysplasia of the terminal phalanges. He was sent for radiological investigations in the Department of Radiology & Imaging of the same hospital. Plain radiograph of his skull showed brachycephaly with wide sutures and persistent fontanelles with sclerotic changes in the base of skull and orbital rims. The angle of the mandible was obtuse, and the maxilla was found hypoplastic. Lumbar region showed 'spool-shaped' vertebral bodies with quite prominent anterior defects; bones had sclerotic changes. Both hands had acro-osteolysis of distal phalanges of thumb, index, middle and ring fingers (both right and left sides) along with irregular distal fragments; bones were sclerotic, too. Those features were consistent with pycnodysostosis. The patient was kept admitted into the hospital and treated accordingly. After obtaining a written informed consent, he was presented as a special case in clinical seminar.

Keywords: *Pycnodysostosis, osteosclerosis, bone fragility, radiological investigation*

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INTRODUCTION

Pycnodysostosis (also spelled as 'pyknodysostosis'), or osteopetrosis acro-osteolytica (often termed as Toulouse-Lautrec syndrome), is a rare autosomal recessive bone dysplasia, characterized by osteosclerosis and short stature.[1,2] The patients are usually short (below 150 cm) and the skeleton is susceptible to fracture.[2] The disease is found in all races, incidence is rare though. The incidence of pycnodysostosis has been estimated to be 1.0 to 1.7 per million live births, with an equal sex distribution.[3] 30% of the cases are offsprings of consanguineous unions.[4] The principal characteristics of this syndrome are short stature, cranial dysplasia, obtuse angle of mandible, clavicular dysplasia, total or partial dysplasia of the terminal phalanges and generally increased bone density.[5,6] The exfoliation of deciduous teeth is usually altered, as well as the eruption of the permanent dentition.[6] Here we have presented a case of pycnodysostosis (in a young male patient reported with complaints of body aches and pain in the limbs for several years) for academic and clinical interest.

CASE SUMMARY

A 20-year old male patient reported in the outpatient department of Shaheed Suhrawardy

1. Dr. Farhana Sultana, Assistant Professor, Department of Radiology & Imaging, Shaheed Suhrawardy Medical College & Hospital, Dhaka-1207.
2. Dr. Luna Ahmed, Medical Officer, Department of Radiology & Imaging, Shaheed Suhrawardy Medical College Hospital, Dhaka-1207.
3. Dr. Sutapa Chatterjee, Assistant Professor, Department of Radiology & Imaging, Satkhira Medical College & Hospital, Satkhira-9400.
4. Dr. Mst. Nilufar Farzana, Assistant Professor, Department of Radiology & Imaging, Shaheed Suhrawardy Medical College Hospital, Dhaka-1207.
5. Dr. Rokshana Ahmed, Assistant Professor, Department of Radiology & Imaging, National Institute of Neurosciences & Hospital, Dhaka-1207.
6. Dr. Zereen Sultana Deepa, Medical Officer, Department of Radiology & Imaging, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka-1000.

Address of correspondence: Dr. Farhana Sultana, Assistant Professor, Department of Radiology & Imaging, Shaheed Suhrawardy Medical College & Hospital, Dhaka-1207. Email: farhana09_sultana@yahoo.com

Medical College Hospital, Dhaka, Bangladesh, with the complaints of bodyache along with pain in the upper and lower limbs for several years. He also gave history of previous hospitalization for the same reason. He was born to unrelated parents. He gave a history of failure to thrive in his adolescence. However, he denied any history of intellectual disability and currently is attending a vocational college. He remains a mouth and nasal breather. However, he was treated as a case of polyarthritis in his previous admission in the district hospital. He was on NSAIDs drugs. On clinical examination, he was found to have short stature, low-weight, peculiar face, prominent forehead, receding jaw and partial dysplasia of the terminal phalanges. He was sent for radiological investigations in the Department of Radiology & Imaging of the same hospital. X-ray of his skull showed brachycephaly with wide open cranial sutures and persistent fontanelles with sclerotic changes in the base of skull and orbital rims. The angle of the mandible was obtuse, and the maxilla was found hypoplastic (Fig. 1), while lumbar region showed 'spool-shaped' vertebral bodies with quite prominent anterior defects; bones had sclerotic changes (Fig. 2). X-ray of both hands revealed acro-osteolysis of distal phalanges of thumb, index, middle and ring fingers (both right and left sides) along with irregular distal fragments; bones were sclerotic, too (Fig. 3). Those features were consistent with pycnodysostosis. The patient was then admitted under the Department of Orthopaedic Surgery and treated accordingly.

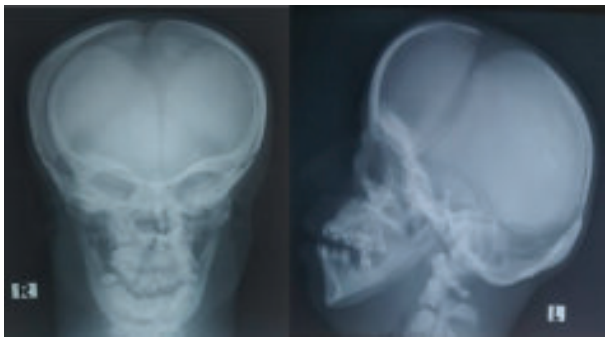

Fig. 1: *X-ray of skull (anteroposterior and lateral views) showing brachycephaly with wide open cranial sutures and persistence of open fontanelles, sclerosis of the base of skull and the orbital rims. The angle of the mandible is obtuse, and the maxilla is hypoplastic.*

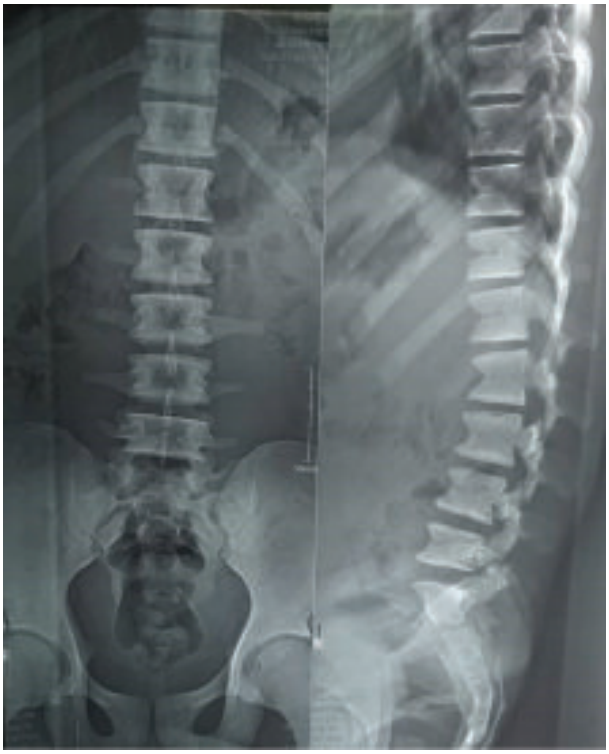

Fig. 2: *X-ray of lumbar region (anteroposterior and lateral views) showing spool shaped vertebral bodies with quite prominent anterior defects; bones have sclerotic changes.*

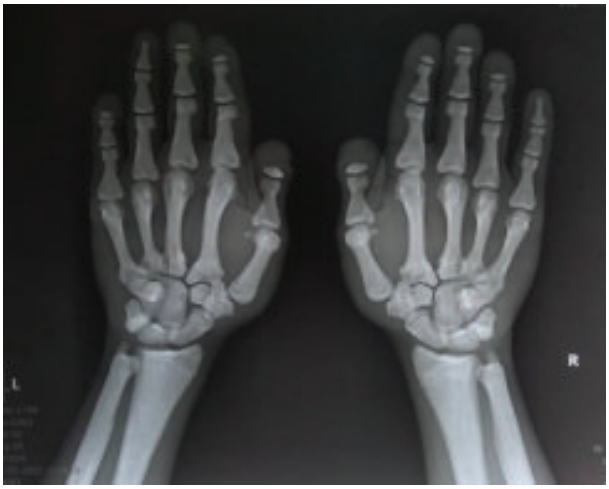

Fig. 3: *X-ray of both hands (anteroposterior view) showing acro-osteolysis of distal phalanges of thumb, index, middle and ring fingers (both right and left sides) along with irregular distal fragments; bones are sclerotic, too.*

DISCUSSION

Our patient had typical imaging findings which include "spool shaped" vertebrae, acro-osteolysis of distal phalanges of hands, obtuse mandibular angles, wide open cranial sutures and persistent fontanelles.

However, pycnodysostosis can be confused with other similar diseases, such as osteopetrosis and cleidocranial dysostosis, because they present some clinical and radiographic similar signs.[7,8] Differentiation from osteopetrosis solely on the basis of plain radiograph is not often possible.[7] Hence, it is important that the physician knows how to make the differential diagnosis in order to indicate the best treatment for each patient. Several studies supported that the most common finding in patients with pycnodysostosis is obtuse mandibular angle.[2-6,8-11] The presence of diffuse sclerosis, cortical thickening of bones, and acro-osteolysis on plain radiographs in the setting of other common clinical features is often sufficient to make the diagnosis.[2,3,8-10] If the disease is not diagnosed in infancy, fractures resulting from trauma due to fragility of bones usually lead to the diagnosis of this disease.[11] However, in our case it was an incidental diagnosis.

Several evidence suggest surgical management of these patients with bone grafting, fixation screws and bone plates.[12] Dental, maxillofacial and orthopaedic surgeons have managed such patients based on suitability of surgery and stability of reconstruction procedures.[12] Besides, looking at relevant biomarkers and evaluation of hormonal status have roles in such cases.[3] Thus, a team of specialists is often involved in treatment that include a paediatrician, an internist, an orthopaedic or dental surgeon, and perhaps an endocrinologist.

CONCLUSION

Patients with pyknodysostosis come to medical attention for a variety of reasons but often go undiagnosed even when presenting with classic features due to the rarity of the condition and the overlap with other skeletal dysplasias. Diagnosis of this condition is strongly implied by clinical and radiographic findings, but genetic testing can confirm the diagnosis. However, treatment should consist of a multidisciplinary approach to address concerning symptoms to improve the patient's quality of life.

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Diabetic Myonecrosis Involving Both Lower Limbs in Hemodialysis Patient: A Rare Complication of Diabetes

Chowdhury MFH[1], Anwar MMR[2], Hossain M[3], Nath PKD[4], Nargis T[5]

Abstract:

Diabetic myonecrosis (DMN) is the term used for spontaneous ischemic necrosis of skeletal muscle, unrelated to atheroembolism or occlusion of major arteries. DMN is a rare microangiopathic disorder that can present as an acutely painful and swollen limb in patients with established diabetes mellitus. Muscles of the thighs are commonly affected in DMN. The condition can be diagnosed noninvasively with magnetic resonance imaging and resolves with analgesia, bed rest, and glycemic control. The majority of patients with DMN have diabetic nephropathy, yet this condition is not widely recognized. Due to uncommon presentation, lack of specific marker of investigation, diagnosis is often missed, resulting in unnecessary and deleterious interventions such as antibiotics, muscle biopsies, and surgery; the latter two of which can prolong recovery. Here, we report a patient on hemodialysis who is ultimately diagnosed as DMN affecting both lower limb and treated successfully.

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INTRODUCTION:

Diabetes mellitus is associated with microvascular and macrovascular complications like diabetic nephropathy, retinopathy and neuropathy. Less well-known complications are equally important, for diagnosis and treatment to decrease morbidity. Diabetic myonecrosis (DMN), also known as diabetic muscle infarction (DMI), causes spontaneous ischemic necrosis of skeletal muscle most commonly in the thigh or calf. DMN is usually unilateral and affects the lower limbs. It was first described in 1965 by Angervall and Sterner as "tumoriform focal muscular degeneration".[1] Concomitant diabetic nephropathy is present in 75% (95/126) of cases.[2] The pathophysiology is currently unclear, although thought to relate to microvascular dysfunction, with hypotheses including atheromatous occlusion, thrombus formation, endothelial damage, and dysfunction of local coagulation mechanisms.[3] It presents clinically as sudden pain, swelling and tenderness of the involved muscle.[4] Painful swelling may be acute or evolve over days to weeks. There is no specific marker for the disease. Diagnosis is based on clinical presentation, laboratory investigations and imaging, for which MRI is the modality of choice. Muscle biopsy should be reserved for atypical presentation, uncertain diagnosis, or when treatment fails to improve symptoms.

Bed rest, analgesia, and intense glycemic control are the cornerstones of diabetic myonecrosis therapy. It is important to note that a large majority have concomitant kidney disease with renal replacement therapy. With accurate and timely diagnosis and

1. Dr. Md. Farhad Hasan Chowdhury, Assistant Professor, Department of Nephrology, Mugda Medical College, Dhaka, Bangladesh.
2. Dr. Mohammed Rashed Anwar, Associate Professor, Department of Nephrology, Mugda Medical College, Dhaka, Bangladesh.
3. Dr. Momtaz Hossain, Assistant Professor, Department of Nephrology, Mugda Medical College, Dhaka, Bangladesh.
4. Dr. Palash Kumar Deb Nath, Assistant Professor, Department of Nephrology, Mugda Medical College, Dhaka, Bangladesh.
5. Dr. Tania Nargis, Medical Officer, Department of Nephrology, Mugda Medical College Hospital, Dhaka, Bangladesh.

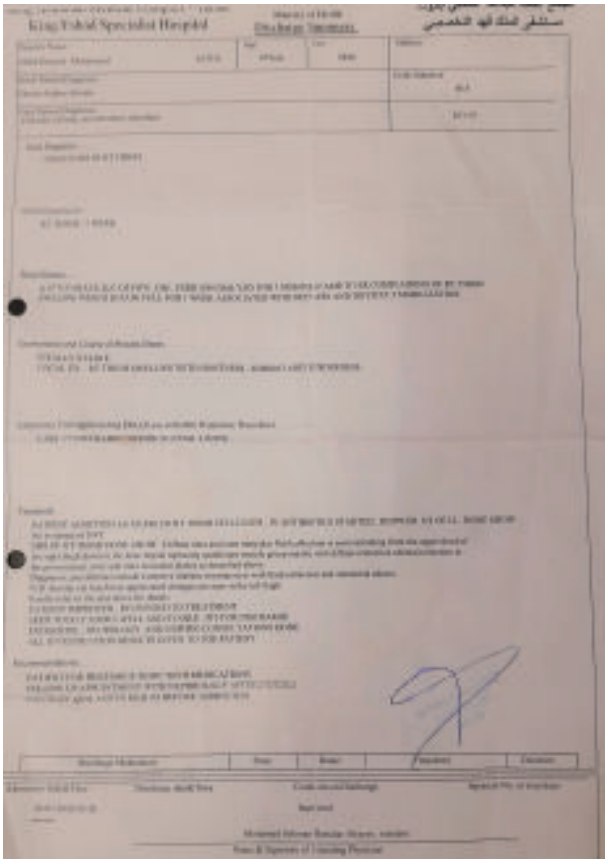
Address of correspondence: Dr. Md. Farhad Hasan Chowdhury, Assistant Professor, Department of Nephrology, Mugda Medical College, Dhaka, Bangladesh. email. hasanfarhad75@gmail.com

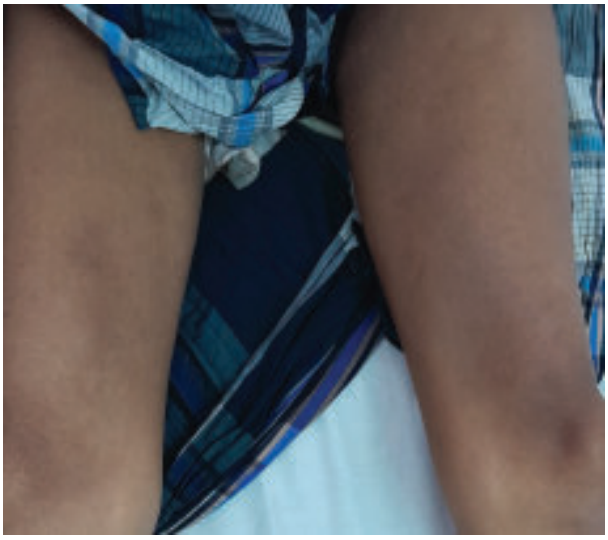
initiation of treatment, diabetic myonecrosis resolves spontaneously over a few weeks to months. Average recovery times were 5.5 weeks with aspirin and/or NSAID use, 8 weeks with bed rest and analgesics, and 13 weeks with surgical resection.[10] Even with treatment, diabetic myonecrosis carries a high recurrence rate of 34.9 to 47.8% usually involving a contralateral limb within 6 months.[4,11] Differential diagnoses include infection (pyomyositis, soft tissue abscess, osteomyelitis, cellulitis), tumors (lymphoma, sarcoma),and vascular pathologies (thromboses, compartment syndrome, calciphylaxis). Due to a relative lack of awareness regarding the condition, avoidable interventions such as muscle biopsies and even surgery are sometimes pursued, which have been associated with prolonged recovery times.[4,12] A higher index of suspicion should be reserved for poorly controlled, longstanding diabetes patients with coexisting complications. Here we report a rare case of DMN affecting both thighs in patients on hemodialysis.

CASE SUMMURY:

A 45-year-old male presented to the emergency department (ED) with painful Rt. thigh swelling for 3 weeks. He has type 2 Diabetes Mellitus for more than 10 years, Hypertension for 1 year, End-stage renal disease (ESRD) on hemodialysis for 1 month. He complained redness and swelling of his rt. thigh and described his thigh pain as constant, aching, stabbing pain in the rt. posteriolateral mid-thigh with radiation distally to the calf. He denied any trauma or falls and reported worsening pain with weight-bearing and ambulation. With these complains, he admitted in King Fahad Specialist Hospital, Saudi Arabia on 30.07.22 and initially diagnosed as Cellulitis of Rt. thigh and treated with IV antibiotics and analgesics. X-ray of the right thigh, knee and lumbar spine, venous Doppler of the right lower extremity were normal. As improvement of his condition was not satisfactory, MRI of both thighs done. MRI of rt. thigh showed diffuse intra and inter muscular fluid collection seen extending from the upper third of the right thigh down to the knee region replacing quadriceps muscle group mainly with diffuse interstitial edema in the periosseous, inter and intra muscular plane and comment about possibilities of diabetes myonecrosis. MRI of lt. thigh showed similar yet much less appreciated changes. After 15 days with some improvement of rt. thigh, pt. complained of pain in lt. thigh. The pt. discharged on 23.08.2022 and pt. returned to Bangladesh and admitted in Mugda medical college hospital.

On admission, he was afebrile with a pulse rate of 90 beats/min and blood pressure of 130/90 mm Hg. He had a swollen left thigh, tender to palpation. The overlying skin was palpably indurated with erythema and warmth with no evidence of discharge. Active and passive movements at the left hip and knee were limited due to pain. Lower extremity pulses were palpable bilaterally. Laboratory studies were remarkable for leukocytosis 20200/cumm, Hb 6.8 gm/dl, elevated creatinine kinase (CK) 436 U/L (42–196 U/L), C-reactive protein (CRP) 18 mg/dL (N<6 mg/dL), and erythrocyte sedimentation rate (ESR) 110 mm/hr (N 0–10 mm/hr). Additionally, poor glycemic control was confirmed with random blood glucose of 11 mmol/L and hemoglobin A1c 10.8%. Serology was negative for HIV and hepatitis B and C. Altogether, with these findings, previous MRI report and treatment history, a diagnosis of diabetic myonecrosis of lt. thigh was made. Patient condition improved with analgesics, with optimization of glycemia, regular thrice weekly hemodialysis via JVC.





DISCUSSION:

Diabetic myonecrosis is one of rare complication of diabetes. The first case of diabetic myonecrosis was described as 'tumoriform focal muscular degeneration' in 1965 by Angervall and Stener. They reported two patients, both underwent excision of a painful swelling in the proximal part of lower limbs, which showed ischaemic muscular necrosis.[1] Since then, around 200 cases have been described. It has been reported in both type 1 and type 2 diabetes. A systematic analysis of the available literature showed DMN was found in 54% in women, 50% had type 2 DM, mean age of presentation was 44.6 years, mean duration of diabetes at the time of DMN diagnosis was 18.9 years for T1DM and 11.0 years for T2DM. There was a preponderance of patients with other microvascular complications (65.8% had other microvascular complications) commonly renal failure (75% had nephropathy) reflecting poor glycaemic control, evident by mean HbA1c of 9.3%.[4] Another study by Yong and Khow analysed 24 publications with 41 patients having DMI.[5] Of these, 53.7% were women, 41.5% had type 1 diabetes, 53.7% had type 2 diabetes, mean duration of DM at the time of DMI diagnosis was 17.3 years for type 1 diabetes and 15.7 years for type 2 diabetes, 29 patients were receiving renal replacement therapy in the form of haemodialysis (60.1%), peritoneal dialysis (21%) and renal transplant (12.2%) and the average HbA1c value was 7.2%, which is high considering the effect of renal failure on insulin metabolism. Our pt. was 45 years old male, suffered from Type 2 DM for 10 years, had ESRD on hemodialysis with uncontrolled DM (HbA1c 10.8%) which supports these data.

DMN is usually unilateral and affects the lower limb. The most commonly affected muscles are quadriceps, hip adductors, and hamstrings.[6] Yong and Khow in their study showed the muscle groups affected in diabetic ESRD patients on hemodialysis were thighs in 82% (22 cases), calves in 11% (3 cases), and upper limbs in 7% (2 cases) respectively.[5] In our pt. both thigh muscles were affected. Bilateral limb involvement is uncommon.[7] Bilateral involvement has been reported in 8.4% cases.[9]

Regarding diagnosis of diabetic myonecrosis routine laboratory investigations are relatively nonspecific. There may be leukocytosis and serum creatine kinase levels may remain normal or slightly elevated. MRI is the most sensitive diagnostic modality, and in the appropriate clinical setting muscle biopsy is not required. The characteristic MRI feature is an increased signal from the affected muscle area (intramuscular and perimuscular tissues), isointense or hypointense areas on T1-weighted images secondary to increased water content from edema and inflammatory changes that accompany the infarction.[13] In our pt. there was leukocytosis, raised CK, ESR and CRP with characteristic MRI changes like diffuse intra and inter muscular fluid collection extending from the upper third of the right thigh down to the knee region replacing quadriceps muscle group mainly with diffuse interstitial edema in the periosseous, inter and intra muscular planewhich supports the diagnosis of DMN.

The most accurate diagnostic modality is by tissue biopsy. On biopsy it grossly appears as nonhemorrhagic pale muscle tissue. Histologically, there are large areas of muscle necrosis and edema, phagocytosis of necrotic muscle fibres, granular tissue, and collagen.[14] As muscle biopsies are more hazardous in HD patients as they got regular heparin during dialysis procedure, muscle biopsy was not done in our case. Muscle biopsy usually not done regularly in DMN as it is associated with poor wound healing and a higher risk of infection, seroma and haematoma. Therefore, currently it is recommended to make the diagnosis of DMN on the basis of clinical presentation and radiological findings; open muscle biopsy should be limited to atypical cases only.[15]

Treatment is conservative with supportive measures aimed at pain control with analgesics along with maintaining target glycemic control. Non-weight-bearing activity and physical rehabilitation may be

useful after the acute phase. Those who underwent surgery had an average recovery period of 13 weeks compared to 5.5 weeks for those only received conservative treatment[11]. Our pt. was treated with regular thrice weekly hemodialysis with adequate control of DM (HbA1c 6.5% after a week of treatment), bed rest and paracetamol. 6 weeks after initial presentation, pt. condition improved markedly. Although diabetic myonecrosis has a good prognosis, it is an indicator of poor long-term outcome. However, recurrence rate are reported to be high (40%) with a 2 year mortality rate of 10%.[16]

CONCLUSION:

Diabetic myonecrosis is a rare and underreported complication of longstanding, poorly controlled diabetes mellitus. It can occur in diabetic renal patients with or without hemodialysis. Diagnosis requires clinically a higher index of suspicion for poorly controlled, longstanding diabetes patients with coexisting complications supported by MRI findings. Muscle biopsy is not routinely indicated and treatment is mainly conservative with analgesia and rest. However, the recurrence rate remains high, and long-term prognosis is poor. Awareness and early diagnosis of this condition will help to improve treatment, patient care, and prevent unnecessary invasive interventions or antibiotics.

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