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Editorial

Undergraduate Medical Education Should Focus on Problem-Based Rather than Lecture-Based Learning

Farid Uddin Ahmed[1*]

The medical education system in Bangladesh is expanding enormously for the last two decades. In 2023, there are 115 medical colleges (37 are public, 72 are Private, and 6 run by the Bangladesh Armed Forces and are under the Ministry of Defence) in Bangladesh having more than 10,765 seats. The growth of many medical colleges in both the public and private sectors raises concerns about uniformity in Bangladesh's medical education system and the quality of both public and private medical colleges. It is time to re-think whether undergraduate medical curriculum is competent enough to provide quality education with basic principles, methods, and knowledge to practice preventive, curative, and promotive healthcare in the community, which is the Mission of the latest MBBS curriculum developed by Bangladesh Medical and Dental Council, in those constraind set up.

The medical education system of Bangladesh inherited the typical features of colonial education, which is very much on the traditional pattern: lecture-based, teacher-centered, discipline-based, examination-driven, and hospital-oriented. Even in the most recent revised undergraduate medical curriculum(MBBS Curriculum Update-2021), implemented with the 2021-2022 session students, out of the total 3224 academic hours, total lecture hours are 1500 (46.5% of the entire academic hours). Alarmingly, in 3rd phase (Community Medicine, Pathology, and Microbiology), lecture-based learning hours constitute about 70% of the educational hours.

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"Become a doctor, no lectures required" -this headline about the University of Vermont's proposed new approach to medical education generated considerable controversy. Although this proposed change is more drastic than the curriculum reform at other medical schools, the movement away from traditional lecture-based courses has been underway in U.S. medical schools for more than three decades. The transformation began with problem-based learning; more recently, lecture-based teaching has increasingly been replaced by team-based learning, inter-professional education, and exercises integrating clinical medicine and basic science. The central concepts of problem-based learning, self-directed learning, and lifelong learning are supported by assumptions from various learning theories, particularly social constructivism, and pedagogy, in that adult learners are autonomous, self-directed, and goal-oriented.

However, problem-based learning only gains little attention in our curriculum and is rarely addressed in the medical curriculum's first, second, and third phases. During the first phase, a student learns about introductory lessons to medical study and, theoretically, becomes acquainted with theories, definitions, terms, and cases. In the second phase, when students start their clinical ward in the hospital, due to a lack of exposure to problem-based learning and expertise in applying theoretical knowledge, they need help understanding what they need to learn next or further specialize in.

Educators giving a traditional lecture with dozens of content-heavy PowerPoint slides may need clarification on what they teach with what students learn: the fact that a teacher has presented a piece of information does not mean that students have known it. Cognitive load theory suggests that our brains are limited in the amount of information they can process at a time; 60 slides in 45 minutes may seem like an efficient way to teach, but it is unlikely to be an effective way to learn.

How can we most efficiently use 1500 hours of lecture time for our medical students? We should abandon the traditional teaching method in lectures- a teacher standing before and talking to a large group of students passively absorbing information. Instead, the lecture hours could be large-group interactive learning sessions with students who have prepared in advance, with frequent questions directed at the audience, time set aside for group discussion, and use of audience response systems (to poll students on a question to assess for understanding, for example). An interactive lecture-style format should remain an option and can be an effective teaching tool.

Medical students generally need to gain more interest in lectures. The medical lecture can be revived through careful planning and practice. Lectures should be delivered like a story which should have a beginning, middle and end. In the beginning, teacher 'setup' their presentation by sharing learning objectives and telling the audience what teachers are going to tell the learners. This is the time to 'hook' students in with a compelling story, conflict or interesting patient case scenario. By structuring lecture presentation like a story, teacher can draw learners into a conflict that they will want to resolve. Finally, the teacher should create a rough timeline to determine the time to devote for each learning objective, as well as time for pauses and audience engagement. Table 1 is a sample timeline for a 1-hour lecture.

Table I: Sample presentation timeline for a 1-hour lecture (Adopted from Harbell et al.)

Time	Activity	Corresponding slides
03 min	Introduction/disclosures	Slide 1–2
01 min	Objectives or 'Roadmap'	Slide 3
10 min	Learning objective one material	Slide 4-12
04 min	First pause activity: polling	Slide 13
10 min	Learning objective two material	Slide 14-23
08 min	Second pause activity: Think-Pair-Share	Slide 24
10 min	Learning objective three material	Slide 25-34
04 min	Conclusions and summary; maybe time to ask audience to jot down their next steps	Slide 35
10 min	Question & answer	

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Original Aricle

Outcome of Patients with Acquired Aplastic Anemia Treated with Cyclosporine plus Androgen or Androgen Alone

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ABSTRACT

Background : Aplastic anemia (AA) is a rare but severe disorder. Patients with AA may need supportive therapy, immunosuppressive therapy, or bone marrow transplantation, depending on the severity. Cyclosporine A (CsA) and androgens commonly treat AA in Bangladesh. However, whether the combined CsA with androgen therapy was superior to androgen therapy alone in AA is limited and needs to be clarified. This study aimed to assess the efficacy of combined therapy in the treatment of acquired AA compared with androgen therapy alone.

Materials and methods : This prospective observational study was conducted in the Department of Medicine, Chittagong Medical College Hospital, from August 2016 to July 2017. Fifty-two patients with acquired AA were included, where 35 patients received CsA and androgen, and 17 received androgen monotherapy. The patients were followed up for six months to observe hematological response and survival.

Results : Three months after treatment, the total response was 60.6% and 28.6% in the combined group and androgen monotherapy group, respectively. After six months, total response rates were 61.2% and 23.1% in the combined and the androgen monotherapy group, respectively. Six-month mortality rates were 11.4% (n=4) and 11.8% (n=2) in the combined and the androgen monotherapy group, respectively.

Conclusion : This study found that combined CsA with androgen therapy was superior to androgen monotherapy for the patients with acquired AA.

Keywords : Aplastic Anemia, Androgen, Cyclosporine A

INTRODUCTION

AA is a serious hematologic disorder characterized by pancytopenia and hypocellular bone marrow in the absence of abnormal infiltrates and with no increase in reticulin.[1] AA in Asia was reported to be 6-8 per million people annually.[2] Prevalence of AA in Bangladesh was noted in 10.74% of total marrow disorders.[3]

AA can be either inherited or acquired. Most cases with acquired AA have no definite causative agents and are classified as idiopathic. However, AA behaves like an immune-mediated disease.[4] Therapy for AA consists of stem cell transplantation (SCT), immunosuppressive therapy (IST), androgens, and supportive care.[1,4]

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The standard immunosuppressive therapy regimen is antithymocyte globulin (ATG) and CsA. As ATG is not available and economically suitable for most populations, CsA remains the immunosuppressive therapy. CSA alone reported as effective as the current best treatment for AA, then the combination of ATG and CsA.[5,6]

Androgens have an adjuvant effect on CsA. Androgen combined with CsA had better efficacy than that of androgen alone in the treatment of AA.[7-9]

Advanced age, lack of histocompatible sibling donors, and high costs make Stem cell transplantation (SCT) unavailable for patients. Immunosuppressive therapy (IST) is an effective alternative in such patients, resulting in a satisfactory response.[10] The treatment options are more limited due to the socioeconomically disadvantaged status of many patients, which could impact overall survival. Patients with AA have been treated with a combination of CsA and androgen or androgen alone in our country. The clinical outcomes of those patients need to be not beef our knowledge. So far, there has yet to be a study to address the issue in our country. The present study aimed to prospectively evaluate the hematological response and survival at three and six months in acquired AA patients treated with combined CsA and androgen, compared to androgen monotherapy.

MATERIALS AND METHODS

This prospective observational study was conducted in the Department of Medicine, Chittagong Medical College Hospital, Chattogram, from August 2016 to July 2017. The Ethical Review Committee of Chittagong Medical College approved the protocol. Informed written consent was obtained from the patient or legal guardian.

Patients of either sex, above 16 years of age, meeting diagnostic criteria of acquired AA were included in this study. The criteria applied for AA was hypocellular bone marrow with at least two of the following: i) hemoglobin (Hb) <10g/dl, ii) Absolute Neutrophil Count (ANC) <1.5x10^9/L, and iii) Platelet count <50x10^9/L.[12] Patients with congenital AA, known cases of malignancy, taking chemotherapy or radiotherapy, patients with chronic hepatitis, pregnancy, lactating mother, and severely ill patients with other co-morbidities were excluded. Patients with bone marrow infiltration with abnormal cells or fibrosis were also excluded from the study.

Detailed history and physical examination, investigation, complete blood count (CBC), liver function test (LFT), Lipid profile, and renal function were done during recruitment at the end of three and six months.

CsA was given 3-5 mg/kg/day orally twice daily starting on day one, and if no toxicity arose, the dose increased to 100 mg three times daily and continued to at least day 180. CsA was continued at the therapeutic dose until the blood cell count plateau. In responders with a stable blood count, CsA was gradually tapered (1mg/kg every two weeks). The patients were given CsA at a dose of 1–2 mg/kg indefinitely for maintenance therapy.[13] Danazol was administered at 100-200 mg b.i.d orally, started from day one, and if no toxicity arose, the dosage was increased up to 100-200 mg 3 to 4 times daily and was continued for at least six months.

Complete response (CR) was considered as achieving an ANC >1-1.5×10^9/L, Hb level >10-11 gm/dL, and platelet count >100×10^9/L in the absence of transfusion for more than two weeks. Beside, partial response (PR) was defined as decreased transfusion dependence, ANC ≥ 0.5-1x10^9/L, platelet count >30x10^9/L, and Hb% >8gm/dl.[11-13] Patients who showed ANC < 0.5 x 10^9/L, platelets count < 20 x 10^9/L and transfusion dependence were identified as having no response (NR).[14] Total response (TR) was defined as a combination of CR and PR.

The quantitative data were expressed as mean and standard deviation (SD). The qualitative variables (response and death rates) were assessed by number and percentages. Qualitative variables were analyzed using the Chi-squared test, and the quantitative data were analyzed using the unpaired student t-test. A p-value of <0.05 was considered statistical significance. Statistical analysis was done using the computer-based statistical program SPSS (Statistical Package for Social Sciences) Windows version 19.0.

RESULTS

Among the 52 studied patients, 35(63.73%) were treated with CsA and danazol, while 17 (32.69%) received danazol alone. Among them 29(55.8%) were male and 23(44.20%) were female. They showed an age range of 16.5 to 59 years. Baseline Hb level, ANC, and platelet count between two groups are shown in Table I. At three and six month follow-up, the two groups were similar regarding their mean Hb level, ANC, and platelet count (Table II and Table III).

Significantly higher patients treated with CsA and Androgen combination had complete responses than androgen alone after the three and six months of treatment ($p<0.05$). (Tabel IV and Table V). The total response (CR+PR) of the patients treated with the CsA and Androgen combination was 20(60.6%) and 19(61.2%), respectively. Three patients had died within three months, and another three patients had died in the next three months. The groups were similar regarding drop out and mortality after 6 months (Table VI).

Table I : Baseline hemoglobin, absolute neutrophil count and platelet count palpate count

Parameters	Study groups		P value*
	Cyclosporine + Androgen (n=35)	Androgen only (n=17)	
Hb, gm/dl	6.9 ± 2.1	5.8 ± 1.8	0.010
ANC, /mm^3	867.9 ± 122.8	681.8 ± 291.38	0.390
Platelet count, mm^3	27856.0 ±16487.4	22411 ± 19831.75	0.276

ANC : Absolute neutrophil count,
*Independent sample t-test

Table II : Hematological responses of the patients after three months

Parameters	Study groups		P value*
	Cyclosporine + Androgen (n=35)	Androgen only (n=17)	
Hb, gm/dl	8.20 ± 2.77	7.60 ± 2.18	0.380
ANC, /mm^3	1542.41 ± 1455.9	959.21 ±739.88	0.220
Platelet count, mm^3	42272.73 ± 40704.21	34000.00 ± 7179.02	0.250

ANC: Absolute neutrophil count,
*Independent sample t-test

Table III : Hematological responses of the patients after six months

Parameters	Study groups		P value*
	Cyclosporine + Androgen (n=35)	Androgen only (n=17)	
Hb, gm/dl	8.75 ± 2.87	8.28 ± 2.11	0.620
ANC, /mm^3	1879.80 ± 1703.82	2534.75 ± 3672.66	0.621
Platelet count, mm^3	57958.33 ± 58969.95	32375.00 ±20170.26	0.070

ANC: Absolute neutrophil count,
*Independent sample t-test

Table IV : Over all response to treatment of study patients after 3 months (n= 47)

Treatment response	Study groups		P value
	Cyclosporine + Androgen (n=33)	Androgen only (n=14)	
Complete responses	3 (9.09)	0 (0)	0.25†
Partial responses	17 (51.5)	4 (28.57)	0.15*
Total response	20 (60.6)	4 (28.57)	0.04*
No response	13 (39.3)	10 (71.4)	

Data were expressed as frequency (%). †Fisher's exact test. *Chi-square test.

Table V : Over all response to treatment of study patients after 6 months (n= 44)

Treatment response	Study groups		P value
	Cyclosporine + Androgen (n=31)	Androgen only (n=13)	
Complete responses	5 (16.12)	0 (0)	0.59†
Partial responses	14 (45.1)	3 (23.07)	0.17*
Total response	19 (61.2)	3 (23.07)	0.025*
No response	12 (38.7)	10 (76.9)	

Data were expressed as frequency (%). †Fisher's exact test. *Chi-square test.

Table VI : Comparison of treatment outcomes between two groups after six months

Final outcome	Study groups		P value*
	Cyclosporine + Androgen (n=35)	Androgen only (n=17)	
Death	4(11.42)	2(11.76)	0.115
Alive	31(88.57)	13(76.47)	
Dropped out	0(0.0)	2(11.76)	

Data were expressed as frequency (%). *Chi-square test.

DISCUSSION

In this study, the total response in the CsA and androgen group of patients was significantly higher than that of the patients of the androgen monotherapy group. At 3 and 6 months of treatment, the total response was 60.6% and 61.2% in the CsA and androgen groups of patients, respectively, while the total response was 28.57% and 23.07% in the androgen monotherapy group of patients, respectively. Zhou et al. reported that the complete response of androgen combined with CsA (87.9%) was higher than that of androgen alone (57.1%).[7]

Baseline demographic and hematological parameters of the present study was similar to the previous studies.[9,15] The change of Hb level and ANC and palpate count over time in both groups were also in line with previous studies.[7,8,16]

Cyclosporine A and Andogen combination (TR was 61.2%) treatment was better than the androgen alone (TR 23.07%) documented in the present study, while the TR of androgen combined with CsA (87.9%) was higher than that of androgen alone (57.1%) in the study of Zhou et al.[7] Lin Ping et al. reported that a combination of CsA and Androgen was better than androgen alone (p=0.05).[8] Tatsuya Chuhjo et al. showed a partial response of 31.3% with Androgen monotherapy, which is nearer to the present study.[16] Our study reported 23.07%patients was partially responded to Androgen monotherapy; the result was inconsistent (57.1% response) with the Zhou et al. Study.[7]

In the present study, 84.61% study patients were alive, where 88.57% were in the CsA and Androgen combination group and 76.47% in the Androgen group. The overall mortality was 11.53%, out of which infection was the predominant cause.

CONCLUSION :

This study found that combined therapy was significantly associated with improved effective rate, ANC, hemoglobin, and platelet than androgen therapy alone for patients with acquired AA. Further large-scale randomized clinical trials should be conducted to assess other effective treatment strategies for patients with acquired AA.

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Original Aricle

Knowledge Attitude and Practice about Breast Self-Examination among Final Year Female Medical Students of Chattogram city

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Md. Abdus Salam Chowdhury[4] Mohammed Noorul Azim[5] Urmi Ray[6]

ABSTRACT

Background : Breast Self-Examination (BSE) is a simple, non-invasive, cost-free screening technique that involves examining one's breasts regularly to detect any abnormality and seek prompt medical assistance. Healthcare professionals should know about BSE to transmit to their patients and relatives. This study aimed to determine the level of knowledge, attitude, and practice (KAP) regarding BSE among final-year female medical students' of Chattogram City in Bangladesh.

Materials and Methods : This cross-sectional study was conducted from January to December 2022 among the final-year female students of three medical colleges in Chattogram City. Data regarding sociodemographic characteristics and KAP regarding BSE of the respondents were collected using semi-structured, self-administered questionnaires. The total scores for KAP were categorized into good and poor scores based on a 70% cut-off point out of the total expected score for each.

Results : 270 students were approached, and 214 returned the completed questionnaire (response rate 79.3%). Of 214 respondents, 192 (89.7%) heard about BSE. Of these 192 students, 77.1% (n=148) had good knowledge about BSE, 192 (100%) had positive attitudes towards BSE, and 108 (56%) practised BSE in their lives. However, for those practising BSE, the practice could have been better among 22 (20.2%) students.

Conclusion : The present study identified some gaps in knowledge and practices related to BSE among female medical students, which should be addressed by continuing education programmes.

Key words : Breast self-examination, Knowledge, Attitude, Practice, Medical Students.

INTRODUCTION

Breast cancer is a significant public health issue that affects women all over the world. It is the most often diagnosed cancer and the second most important cause of cancer-related deaths among women globally.[1] Breast cancer remains a leading dreadful cancer of women in Bangladesh as well.[2] A recent study demonstrated that breast cancer is increasingly occurring in younger age groups in Bangladesh when compared with Western countries, and a more aggressive nature of the disease strikes in their reproductive period, suggesting the need for change in modalities of early cancer detection and adjusting preventive and therapeutic efforts.[3]

Most successful approach to decrease mortality due to breast cancer is the application of secondary prevention. Breast Self-Examination (BSE), Clinical Breast Examination (CBE) and mammograms are important, traditionally available, and advisable methods used for detecting breast cancer in the early stages.[4-6] Several randomized studies have confirmed the efficacy of breast cancer screening with mammography.[7] But, it is costly and requires considerable economic and human resources. Hence, routine screening mammography is not practicable and is often unavailable in developing countries.[7] BSE is a simple, inexpensive, safe examination method which requires no invasive intervention or any apparatus to protect women's privacy and can be done comfortably alone at home.[8] Experts recommend that women aged over 20 years perform a monthly BSE between the 7thand 10th day of the menstrual cycle, to look for new lumps and other changes, goes a long way in detecting BC at the early stages of growth.[9]

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Currently there is no population-based mammography screening programme in Bangladesh. Despite the advent of modern screening methods, more than 90% of cases of cancers of the breast are detected by women themselves and present late in the advanced stages.[3] Hence, in this study, we assessed the KAP of the female medical students regarding BSE, as we think these students will be future doctors that could be regarded as having a positive attitude towards teaching other women in methods of BSE.

MATERIALS AND METHODS

A descriptive cross-sectional study was conducted among female medical students of Chittagong Medical College, Institute of Applied Health and Science, and Chattogram Maa-O-Shishu Hospital Medical College of Chattogram City from January to December 2022. Ethical approval was obtained from the Ethical Review Committee of Chittagong Medical College. Written consent was obtained from each respondent before the survey was conducted. All final-year female medical students of the three institutes were approached. Those who did not return or returned an incomplete questionnaire were excluded from the study.

A BSE KAP questionnaire was constructed to measure the participants' KAP regarding the BSE technique. It contained 24 items: 10 items related to knowledge, 9 to attitude, and 5 to practice. The questionnaire was piloted on 25 volunteer students out of the primary sample of the study, and few modifications were made. Knowledge and practice scores were calculated by recording the related question and giving 1 point to the correct answer and 0 to the incorrect response. Then, the total scores were converted into percentages. Attitude towards BSE was calculated by recording the 5-point Likert scale from 1 point for strongly disagreeing responses to 5 points for strongly agreeing responses. Then, sum up the points and multiply by 100 over 45. We categorize the knowledge, attitude, and practice scores into two categories: good (if the score is $\geq$70%) and low (if the score is < 70%), which was done in previous studies.[10]

Data processing and analysis were done using Statistical Package for Social Sciences Windows version 23.0. Only descriptive statistics (frequency and percentage) were used to present the results.

RESULTS

A total of 270 final-year female medical students were approached and after cleaning and checking, 214 questionnaires were found completed and included in analysis.Most of the respondents,124(57.9%) were in the 22- 23 years of age group. Respondents were predominantly unmarried (93%) and living in a nuclear family (91.1%). Only 14 (6.5%) respondents had a history of BC in their first and second-degree blood relatives, and 146 (68.2%) belonged to an upper-middle-class family.

Table I : Distribution of the respondents according to their sociodemographic characteristics (n=214)

Characteristics	Frequency	Percentage
Age		
22-23 years	124	57.9
24-25 years	90	42
Marital status		
Single	199	93
Married	15	7
Type of family		
Nuclear	195	91.1
Joint	19	8.9
Family history of breast carcinoma		
Positive	14	6.5
Negative	200	93.5
Socioeconomic status		
Upper middle class	146	68.2
Lower middle class	68	31.8

Out of 214 respondents, 192 (89.7%) heard about BSE before, and 22 (10.3%) didn't know about BSE. Among 192 respondents who had heard about BSE before, 186 (96.9%) correctly knew that the purpose of BSE was early detection of BC, 183 (95.3%) know that the individual performs BSE, and 115 (59.9%) know the steps of BSE. Only 54 (28.1%) respondents know that BSE should be started at 20 years as recommended. Nearly one-third (70.8%) of respondents agree that BSE should be performed once a month which is the correct frequency and 63 (32.8%) respondents know that for regularly menstruating women right time to perform BSE is just after menstruation. Most of the respondents 174 (90.6%) know that BSE includes an armpit examination to check for any lump. All of them 92 (100%) believe that if someone discovers any abnormality during BSE, she should visit a doctor (Table II). Above bar diagram shows that 148 (77.1%) have good knowledge about BSE, while 44 (22.9%) have poor knowledge according to the obtained score.

Table III shows the attitude of the respondents toward BSE. Most of the respondents 159 (82.8%) strongly agreed that BSE is a helpful tool. Also, 140 (72.9%) and 128 (66.7%) respondents strongly believed that BSE should be done regularly and that is not embarrassing. Only 7 (3.6%) respondents think that BSE is uncomfortable, while one-third of the respondents 132 (68.8%), strongly agreed that BSE is not wasting of time. A few 11 (5.7%) respondents did not know they should search for updated information regarding BSE, but 140 (72.9%) respondents strongly believed that publicity or campaign helps motivation for BSE. 141 (73.4%) respondents strongly agreed that BSE is beneficial, and 130 (67.7%) respondents strongly believed that one should discuss with family and friends about BSE.

Table II : Distribution of the respondents according to their responses to the knowledge about BSE (n=192)

Variable	Response	Frequency	Percentage
Purpose of BSE			
	A good breast exercise	6	3.1
	Early detection of BC	186	96.9
BSE is Performed by			
	Doctor	9	4.7
	Individual	183	95.3
Steps of BSE			
	Yes	115	59.9
	No	77	40.1
Starting age of BSE			
	Puberty	115	59.9
	20 Years	54	28.1
	30 Years	17	8.9
	After menopause	6	3.1
Frequency of BSE			
	Every six months	14	7.3
	Weekly	42	21.9
	Monthly	136	70.8
Right Time for regularly menstruating women to perform BSE			
	Before menstruation	24	12.5
	Middle of menstruation (day 3-5)	26	13.5
	After menstruation	63	32.8
	Anytime	79	41.1
Ideal position to perform BSE			
	Lying down	16	8.3
	Standing in front of the mirror	160	83.3
	Showering	16	8.3
Part of hand to palpate during BSE			
	Tip of the fingers	42	21.9
	Pulp of the fingers	150	78.1
BSE includes armpit examination			
	Yes	174	90.6
	No	18	9.4
Seeking support discovering abnormalities during BSE			
	Visit to a doctor	192	100%

Table III : Distribution of the respondents according to their attitude towards BSE (n=192)

Statement	Disagree		Don't know		Agree		Strongly agree	
	n	%	n	%	n	%	n	%
BSE is a helpful tool	0	0	0	0	33	17.2	159	82.8
BSE should be done regularly	0	0	0	0	52	27.1	140	72.9
BSE is not embarrassing	0	0	14	7.3	15	26.0	128	66.7
BSE is comfortable	7	3.6	12	6.3	18	41.7	93	48.4
BSE is not wasting of time	0	0	0	0	16	31.3	132	68.8
Search for updated information regarding BSE	0	0	11	5.7	69	35.9	112	58.3
Publicity or campaign for motivation for BSE	0	0	0	0	52	27.1	140	72.9
BSE is beneficial	0	0	0	0	51	26.6	141	73.4
Discuss with family and friends about BSE	0	0	0	0	62	32.3	130	67.7

Out of 222 participants, 108 (56%) final-year female medical students practice BSE and 84 (44%) respondents never performed BSE.Above table shows that 43 (39.8%) respondents check their breasts at least once a month. 61 (56.5%) respondents started to do BSE at the age of 20 years. One-third of the respondents 79 (73.1%) usually perform BSE in standing in front of a mirror. 87 (80.6%) respondents examined their armpit during BSE, and 93 (86.1%) respondents inspired their family members and friends to practice BSE.The above figure shows that 86 (79.8%) respondents had satisfactory practicing scores, and 22 (20.2%) were unsatisfactory at practicing BSE in their life.

Table IV : Distribution of the respondents according to their responses to the Practice of BSE (n=108)

Variable	Response	n	%
Frequency of practicing BSE			
	Rarely	29	36.9
	Every six months	18	16.7
	Once a month	43	39.8
	Once a week	18	16.7
Starting age of practicing BSE			
	Puberty	23	21.3
	20 Years	61	56.5
	Others	24	22.2
Position of practicing BSE			
	Lying down	11	10.2
	Standing	79	73.1
	Showering	18	16.7
Practicing armpit examination during BSE			
	Yes	87	80.6
	No	21	19.4
Inspiring family members or friends to practice BSE			
	Yes	93	86.1
	No	15	13.9

DISCUSSION

The present study showed that two-thirds (77.1%) of the respondents had good knowledge about BSE; all had a good attitude towards BSE, while 8 in 10 respondents (79.8%) were satisfied with practising BSE. The probable cause of this finding is the survey was conducted on final-year medical students. Hence, the study group might have been better informed about BSE earlier through their curriculum.

Out of 214 respondents, 89.7% had heard about BSE before; among them, 96.9% correctly knew that early detection of BC is the purpose of BSE, and 95.3% knew that the individual performed BSE. Mohamed et al. and Nde et al. describe similar findings (100% and 88.6%, respectively).[11, 12]

Studies conducted in Gazaand Turkey reflects that Medical students have a higher level of correct information about BSE (69.8% and 55.2% respectively).[10-13] But in the present study, a small percentage of the students had an idea about the appropriate time for BSE (32.8%) and starting age of BSE (28.1%). These indicate a knowledge gap among medical students of Bangladesh about BSE.

Regarding the attitude of the respondents towards BSE, most of the respondents (82.8%) strongly agree that BSE is a helpful tool, 48.4% of respondents strongly agree that BSE is comfortable, and 72.9% of respondents strongly believe that publicity or campaign helps motivation for BSE. 73.4% of respondents strongly agree with the fact that BSE is beneficial, and 67.7% of respondents strongly believe that one should discuss with family and friends about BSE. A similar finding (88%) was observed in a study conducted among female undergraduate students in Cameron.[12]

Although a majority of participant (89.7%) knew about BSE, only 56% actually performed the technique. However, only a small number of students were performing BSE monthly (39.8%). These findings revealed that in contrast to the knowledge level of the respondents, the practice is relatively inadequate though the attitude of medical students towards BSE was mostly positive.

Although optimum care was tried in every step of this study, still there were some limitations. The data were collected by self-report, which may be a source of bias. Students were not assessed by face-to-face interview, which may have led to the overestimation of their knowledge of how to perform BSE. Regarding the total number of final-year medical students in Chattogram City, the sample size was relatively small, which may had an effect on the overall study findings.

CONCLUSION

The current study shows that, though most medical students were aware of the importance of BSE, they had gaps in their knowledge and their reported practice was low. Here is a need for continuous education programs as well as awareness programs aimed at improving knowledge of BSE among female medical students. Study findings also indicate the importance of applying a training program to motivate people to practice BSE regularly.

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Original Aricle

Drug Resistance Pattern of *Mycobacterium Tuberculosis* Isolates Causing Pulmonary and Extrapulmonary Tuberculosis in a Tertiary Hospital in Bangladesh

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ABSTRACT

Background : *Mycobacterium tuberculosis* (MTB) is the human pathogen that causes Tuberculosis (TB), a highly infectious and globally pandemic disease. The severity increases when the MTB becomes resistant to anti-TB drugs. The Present study evaluated drug-resistant patterns of *Mycobacterium tuberculosis* in pulmonary tuberculosis (PTB) and extrapulmonary tuberculosis (EPTB) at a public referral center in Bangladesh.

Materials and Methods : The present study comprised clinically suspected cases of TB (both PTB and EPTB) from Chittagong Medical College and Hospital, Chattogram, Bangladesh, from November 2006 to October 2007. Clinical samples from the patients were examined for acid-fast bacilli (AFB). AFB-positive cases were cultured, and drug susceptibility tests were performed.

Results : In total, 612 clinically suspected TB patients were included. Among them, 96 and 13 cases were finally diagnosed as culture-positive PTB and EPTB cases, respectively. Out of 96 PTB cases, 80 were new, and 16 were previously treated. Of 109 isolates, resistance to 1 or more drugs was observed in 40.62% and 30.77% of PTB and EPTB isolates, respectively. Resistance to streptomycin, isoniazid, rifampicin, pyrazinamide, and ethambutol was observed in 33.3%, 17.7%, 8.3%, 3.1%, and 2.1% isolates, respectively, in PTB cases. Among EPTB cases, resistance to streptomycin, isoniazid, and rifampicin was observed in 15.4%, 15.4%, and 7.7% isolates, respectively. Multi-drug resistance (MDR) was observed in 5.21% of PTB isolates and none in EPTB isolates. MDR was higher among PTB cases who previously had received tuberculosis treatment (12.5% vs 3.8%).

Conclusions : The magnitude of anti-TB drug resistance in Bangladesh is high. Further evaluation is needed to explain the high proportion of streptomycin-resistant MTB. Appropriate measures to control and prevent drug-resistant TB in Bangladesh to reduce mortality and transmission are warranted.

Keywords : Anti-TB drugs, Mycobacterium tuberculosis, Drug-resistance rate, Extrapulmonary tuberculosis, Bangladesh.

INTRODUCTON

The issue of drug-resistant TB is a worldwide concern. Nevertheless, the global prevalence of TB has been gradually declining since 2004, mostly due to the concerted efforts of the World Health Organization (WHO) through the implementation of the Stop TB Strategy.[1] However,there is no definitive evidence that the incidence of MDR TB is decreasing, despite this global effort.[2] Although considerable efforts in several countries, including Bangladesh, have led to a slow decrease in the overall incidence of TB, surveillance indicates that the incidence of drug-resistant TB is rising.[3,4]

The population weighted mean of MDR-TB based on all the countries that have reported in the South-East Asian Region is 2.8% among new cases, and 18.8% among previously treated cases.[5] In South-East Asia Region extensively drug resistant tuberculosis, has been isolated in samples from India, Indonesia, Bangladesh, and Thailand.[5] According to the latest data, proportion of MDR-TB among new cases was 3.6% and proportion of MDR-TB among previously treated cases was 19%.4 Study carried out by and Damien Foundation and ICDDRB showed, resistance to any drug ranged in 18.6% to 48.4% and MDR in 2% to 5.5%.[6,7]

Drug-resistance is a critical determinant of treatment success. Thus, to improve treatment success, the MTB drug-resistance pattern in community-based care should be determined. Despite geographical variations, a few studies have reported that drug-resistant TB occurs less often in cases of EPTB than in cases of PTB.[8,9] However, insufficient data are available regarding the current status of anti-TB drug-resistance in Bangladesh. Furthermore, there are no remarkable drug-resistance data

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for EPTB. Therefore, we evaluated the drug-resistance pattern among MTB isolates, as well as differences in the drug-resistance pattern among the MTB isolates that cause PTB or EPTB in a tertiary care hospital in Chattogram, Bangladesh.

MATERIALS AND METHODS

The study was carried out in the department of Microbiology, Chittagong Medical College, during the period of November 2006 to October 2007. Approval from ethical review committee of Chittagong Medical College was duly taken.

A total of 612 clinically suspected TB cases of both sexes were studied, of which 548 were PTB and 64 were EPTB patients. Patients were selected from indoor and outdoor of Chittagong Medical College Hospital, Department of Pathology Chittagong Medical College and DOTS corner at Chittagong Medical College Hospital. Both new and previously treated cases were included in this study. Patient who never had treatment for tuberculosis or who took anti-TB drugs less than one month was grouped as new cases and a patient who has taken anti-TB drugs one month or more as previously treated cases. Severely ill patients, patients who were immunocompromised and unable to produce sputum spontaneously were excluded.

Sputum samples from pulmonary tuberculosis patients and body fluid, lymphnode aspirates, pus, urine and biopsy materials from extra-pulmonary tuberculosis patients were taken. All the clinical specimen were processed by Petroff's method of digestion and decontamination procedure or N-Acetyl-L-Cystein-Sodium Hydroxide (NALC-NaOH) method except those specimens which were normally sterile like plural, ascitic, and synovial fluids

Microscopy positive sputum samples and all samples from extra-pulmonary tuberculosiscases were cultured in conventional Lowenstein-Jensen (L-J) media. The culture tube were examined after 24 hours for any contamination and then weekly for appearance of growth up to 8 weeks.

All the culture isolates were identified by evaluation of phenotypic and biochemical characteristics and subjected to drug susceptibility testing against the first-line anti-tuberculosis drugs by the Proportion Method against isoniazid (0.2 µg/ml), ethambutol (2 µg/ml), streptomycin (SM) (4 µg/ml), and rifampicin (40 µg/ml).[10] The control media were incubated at 37˚C for three weeks. Prior to the growth recording, examination of the media was done at 48 hours, weekly, and the reading for drug susceptibility was done at three weeks.

RESULTS

A total of 612 clinically suspected TB cases were studied, of which 548 were PTB and 64 were EPTB cases. Among the 96 and 13 cases were finally diagnosed as culture positive PTB and EPTB cases, respectively. Table I shows the sensitivity pattern of 109 isolated MTB strains to 5 anti-TB drugs. Out of 96 PTB strains 57 (59.38%) were sensitive to all 5 drugs and 39(40.62%) strains were resistant to one or more drugs. MDR strain was found in 5(5.21%) cases. In EPTB cases, 4 (30.77%) cases were resistant to any drugs.

Table I : Overall sensitivity pattern of MTB isolated from PTB and EPTB cases

Sensitivity pattern to Anti-TB drugs	PTB (n=96)		EPTB (n=13)	
	Frequency	Percentages	Frequency	Percentages
Sensitive to all drugs	57	59.38	9	69.23
Resistant to any drugs	39	40.62	4	30.77
Multidrug-resistant	05	5.21	0	0.00

Highest resistance was found in Streptomycin either alone or in combination with other drugs followed by isoniazid. And rifampicin in both PTB and EPTB cases (Table II).

Table II : Sensitivity pattern of MTB to individual anti-TB drugs isolated from PTB and EPTB cases

Name of drugs	PTB (n=96)		EPTB (n=13)	
	Sensitive	Resistant	Sensitive	Resistant
Isoniazid	79(82.29)	17(17.71)	11(84.62)	02(15.38)
Rifampicin	88(91.67)	08(8.33)	12(92.31)	01(7.69)
Ethambutol	94(97.92)	02(2.08)	13(100)	00(00)
Pyrazinamide	93(96.87)	03(3.13)	13(100)	00(00)
Streptomycin	64(66.67)	32(33.33)	11(84.62)	02(15.38)

Table III shows that 58.14% of MTB strainsisolated from PTB and EPTB cases were resistant to at least one drug, 12(27.91%) were resistant to two drugs and 6(13.95%) strains were resistant to three drugs.

Table III : Resistance pattern of drug resistant strains of MTBisolated from PTB and EPTB cases to 5 anti-TB drugs (n=43)

No. of drugs	Name of drugs	No. of resistant strains	Total
One drug	INH	04(8.89)	25 (58.14)
	RMP	01(2.33)	
	SM	19(44.19)	
	EMB	00(00)	
	PZA	01(2.22)	
Two drugs	INH+SM	09(20.00)	12 (27.91)
	INH+RMP	01(2.22)	
	RMP+SM	01(2.22)	
	RM+PZA	01(2.22)	
Three drugs	INH+RMP+SM	03(6.67)	06 (13.95)
	INH+RMP+PZA	01(2.22)	
	INH+SM+EMB	01(2.22)	
	RMP+SM+EMB	01(2.22)	

In new PTB cases resistance to any drug was 37.5% but in previously treated PTB cases resistance any drug was 56.25%. MDR strain was 3.75% in new cases but it was 12.5% in previously treated cases (Table IV).

Table IV : Distribution of antimicrobial resistance pattern of MTB against new cases and previously treated PTB cases.

Drug	New cases (n=80)	Previously treated cases (n=16)
Isoniazid	12 (15.0)	04 (25.0)
Rifampicin	06 (7.5)	02 (12.5)
Ethambutol	02 (2.5)	00 (00)
Pyrazinamide	02 (2.5)	01 (6.25)
Streptomycin	26 (32.5)	06 (37.5)
MDR	03 (3.7)	02 (12.5)
Any drug	30 (37.5)	09 (56.2)

DISCUSSION

Of the isolated MTB from PTB cases, 40.62% showed resistance to any drug. A higher proportion was reported in other research in Bangladesh and India; 48% and 49% of the isolates were resistant to any drug.[6,11] Comparatively less resistance (21.1% to 29.5%) was observed in Saudi Arabia, Iran, Turkey, and Ethiopia.[12-15] That indicated the threatening extent of misuse of anti-TB drugs in this subcontinent. These differences in the rate of drug resistance may be due to variations in the criteria of selection of patients studied, the extent of misuse of drugs, the quality of the questionnaire used for eliciting history of previous treatment, inadequate laboratory support and reporting system.[16]

In the present study, we found overall 5.21% MDR isolates, which was similar to the study of Zaman et al. (5.5%) in Bangladesh.[6] On the other hand Jain et al. in India found a higher rate of overall 19.8% MDR-TB isolates.[16] In our study, the highest resistance was observed against streptomycin, followed by isoniazid, rifampicin, pyrazinamideand ethambutol. Similarly, Zaman et al. in Bangladesh showed the highest resistance to streptomycin (45.2%) followed by isoniazid (14.2%), ethambutol (7.9%), and rifampicin (6.4%).[6] Joseph et al. and Jain et al. in India also found higher resistance to streptomycin, 17% and 20.1%, respectively.[12,16] The probable reason for this high level could be the indiscriminate use of streptomycin-containing regimens for the treatment of TB in earlier programs under non-DOTS situations. The high prevalence of the Beijing genotype in Bangladesh may also play a role in this regard.

In this study, MTB isolated from EPTB showed resistance to any drug 30.77%, to streptomycin and isoniazid 15.38% followed by rifampicin 7.69%. MDR strain was not found in EPTB cases. That may be due to the small number of cases. Resistance to one, two, and three anti-TB drug was 58.14%, 27.91% and 13.95%, respectively. No strain was resistant to four drugs and five drugs. In our study, we found increased anti-TB drug resistance in MTB isolated from previously treated PTB cases (56.25%) than the new cases (37.5%). MDR strains were observed 3.75% and 12.50% in new and previously treated cases, respectively. Resistance to streptomycin, isoniazid, rifampicin, and pyrazinamide was observed higher in previously treated cases than in the new cases, which agreed with the findings of Zaman et al.[6] According to the fourth global report of WHO, the prevalence of MDR-TB in Bangladesh was 3.6% and 19%, respectively, in new previously treated PTB cases.[5] This higher drug resistance pattern may be due to easy accessibility of the drugs to the patient, indiscriminate use of drugs, inadequate treatment received, poor patient compliance, and improper treatment regimens practiced by medical personnel.

CONCLUSION

In conclusion, the TB drug-resistance rate was high at a public referral hospital in Chattogram, Bangladesh. Drug resistance is higher in MTB isolated from previously treated cases than in new cases. This information would help further plan to control TB and long-term surveillance studies. However, the study was performed in a single tertiary referral center; thus, the results may reflect a different situation in Bangladesh. A national survey of the prevalence of drug-resistant TB should be conducted to obtain the most accurate drug-resistance status in Bangladesh, including the private sector.

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Original Aricle

Proportion of Diabetes Mellitus and Associated Lifestyle among the Tribal Community of Rangamati Sadar

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ABSTRACT

Background: Diabetes Mellitus (DM) has become a primary public concern worldwide. Bangladesh is not an exception. However, data on the burden of diabetes and its associated lifestyle-related factors in the tribal population of Rangamati Hill District, Bangladesh are limited. This study aimed to find the proportion of Diabetes Mellitus (DM) and associated lifestyle among the tribal community of Rangamati Sadar.

Materials and Methods: A descriptive cross-sectional study was conducted among 222 conveniently selected tribal adult people of Rangamati Sadar from January to March 2020. Sociodemographic and lifestyle-related information was collected using a pretested interviewer-administered questionnaire. DM was diagnosed based on self-reported diabetes diagnosed by a physician.

Results: The mean age of the respondents was 45.86 ± 16.25 years (Range: 19 to 90 years), and 59.5% were female. More than half (53.2%) had secondary to higher secondary education; monthly family income was 30,000 Tk or less in 89.2%. The proportion of DM was 19.8%; 95.5% of diabetic patients were receiving anti-diabetic medication, and 34.1% had a positive family history of DM. Among the total population, 36% (n=80), 23.4% (n=52), 10.8% (n =22), and 19.8% (n=44) reported a sedentary lifestyle, smoking tobacco, drinking alcohol currently, and sleeping for <6 hours per day, respectively.

Conclusion: The present study revealed a high proportion of DM among the tribal community of Rangamati Sadar, emphasizing incorporating a specific health management policy.

Key words: Diabetes, Tribal, Rangamati.

INTRODUCTION

DM, a non-communicable disease, is now recognized as a major public health problem throughout the world. It is associated with increased morbidity, mortality, and cost thereby. This disease is becoming an increasing threat to the world's health services.[1-2] Formerly described as a "disease of affluence", it is now evident that diabetes is a problem in developing countries as well as affecting a wide range of ethnic and economic groups.[3] Over the last decades, the prevalence of DM has increased in Bangladesh.[4]

In Bangladesh, about 1% of the population consists of what are locally termed 'tribal groups' and live primarily in the hilly areas of the southeastern region of the country, specifically Rangamati, Khagrachhari and Bandarban districts of the Chittagong Hill Tracts (CHT).[5-6] Bangladeshi tribal populations are experiencing phenomenal changes on the social, cultural, and economic fronts, for the past 30 years.[7] Like all developing countries, large-scale developmental activities and urbanization in Bangladesh have brought significant changes in the lifestyles, occupational patterns, and dietary habits of these tribal communities, once considered outreach groups. Furthermore, new "urban centers" are developing quickly near rural and tribal areas.[8-9] As the health issues of tribal infants and children are increasingly being recognized, few concrete efforts have been made to understand the problems of adult and elderly population with special reference to emerging public health problems of noncommunicable diseases, such as DM.[10-11]

Hence, it is the need of the hour to evaluate the proportion of DM and associated lifestyles among the tribal community of Bangladesh. The present study was conducted to determine the current proportion of DM in the tribal adults of Rangamati Sadar in Bangladesh. The study results would help respond with effective prevention, treatment, and control programs for reducing the future burden of DM in Bangladeshi tribal communities.

MATERIALS AND METHODS

A descriptive cross-sectional study was conducted at

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Rangamati Sadar of Rangamati Hill District between January and March 2020. Prior approval was obtained from the Ethical Review Committee of Rangamati Medical College, and verbal informed consent was taken from each individual before the interview.

Through a non-probability convenience sampling technique, 222 participants were included in the study. Tribal subjects, more than 18 years old, from both genders, mentally sound, and permanently residing in Sadar Upazilla of Rangamati Hill District, were included in this study. Those who refused to participate were excluded from the study.

Self-reported diabetes was defined as diabetes diagnosed by a physician, irrespective of diabetes control status. Persons who remained sedentary in their occupation, transportation and leisure time were considered physically inactive. Subjects who currently smoke tobacco or drink alcohol were categorized as smokers and drinkers, respectively.

After collection, data were tabulated in Microsoft Excel to generate master sheet and for final analysis was done using Statistical Package for Social Sciences windows version 23.0. Descriptive statistics in the form of frequency and percentage was used in the results.

RESULTS

The mean age among the respondents was 45.86 ± 16.25 years SD, and the range was from 19 to 90 years. It was found that 44.6% of respondents were under 40, and about 17% were above 60 years. Among them, 40.5% were males and 59.5% were females. It was identified that more than half of the respondents (53.2%) had finished their secondary and higher secondary education. Only 10.8% of respondents were found to earn more than Taka 30 thousands per month.

Table I: Sociodemographic characteristics of the participants (n=222)

Variables	Frequency	Percentage
Age groups		
□40 years	99	44.6
41 – 60 years	85	38.3
> 60 years	38	17.1
Sex		
Male	90	40.5
female	132	59.5
Education		
Illiterate	20	9.0
Primary	44	19.8
Secondary to higher secondary	118	53.2
Graduate and above	40	18.0
Monthly family income		
< 10000 Tk	90	40.5
10000 – 30000 Tk	108	48.6
> 30000 Tk	24	10.8

Of 222 participants, 44 (19.8%) reported having DM. Among the diabetic respondents, 63.6% had been suffering from DM for about 1 to 10 years, while 18.2% had for more than 10 years, 34.1% of the diabetic respondents had a family history of DM, 4.5% of them had not taken any treatment for DM (Table II).

Table II : Diabetes related information of the participants

Variables	Frequency	Percentage
Self-reported DM (n=222)		
Yes	44	19.8
No	178	80.2
Other comorbid conditions (n=222)		
Hypertension	70	31.5
Ischemic heart disease	14	6.3
Peptic ulcer disease	48	21.6
Family history of DM (n=44)		
Yes	15	34.1
No	29	65.9
Duration of DM (n=44)		
< 1 year	08	18.2
1 -–10 years	28	63.6
> 10 years	08	18.2
On anti-diabetic medication (n=44)		
Yes	42	95.5
No	02	4.5

Table III shows some lifestyles and behavioural characteristics of the participants. It depicted that most respondents (68.5%) ate 2 to 3 rice plates daily. Over one-third (36%) of the respondents reported leading a sedentary lifestyle. Regarding sleeping habits, 78.4% of the respondents sleep 6 to 10 hours daily, while 19.8% sleep for less than 6 hours. The proportion of the respondents who reported smoking tobacco and drinking alcohol was 23.4% and 10.8%, respectively.

Table III: Lifestyle related characteristics of the respondents (n = 222)

Variable	Frequency	Percentage
Amount of rice eaten daily		
< 2 Plates	48	21.6
2 - 3 Plates	152	68.5
> 3 Plates	22	9.9
Physical activity		
Sedentary	80	36.0
Physically active	142	64.0
Daily sleeping duration		
< 6 hours	44	19.8
6 - 10 hours	174	78.4
> 10 hours	04	1.8
Smoking tobacco		
Yes	52	23.4
No	170	76.6
Drink alcohol		
Yes	24	10.8
No	198	89.2

DISCUSSION

DM is one of the most prevalent non-communicable diseases and is becoming a significant health concern for low-to-middle-income countries like Bangladesh.[2-4] The present study was a snapshot of DM among the tribal population in Bangladesh, which demonstrated a high prevalence of self-reported DM among the tribal adults living in Rangamati Sadar of Rangamati Hill District in Bangladesh.

The proportion of participants with self-reported diabetes in the current study was 19.8%. There are lines of evidence that the prevalence of diabetes is rising in Bangladesh. The pooled prevalence of diabetes in the general population was 7.8%, and the prevalence of pre-diabetes was 10.1% in Bangladesh, as reported by a recent meta-analysis.[12] A possible explanation for the higher prevalence in the current study was its convenience sampling design with a small sample size. However, a recent nationally representative survey from Bangladesh found the prevalence of diabetes was 23.4%.[13] In recent years, the tribal population in Bangladesh has undergone a marked lifestyle transition due to socioeconomic growth and there is a high possibility that these communities become affected by chronic diseases, DM in particular, as has been observed in the tribal communities of India, America, and in aborigines ofAustralia.[14-16]

The primary driver of this epidemic of diabetes is the rapid epidemiological transition associated with changes in dietary patterns and decreased physical activity.[17] It was found in the study that most of the respondents (68.5%) had been eating 2 to 3 plates of rice as a staple food daily on an average. More than one third (36%) of the participants were sedentary in their occupation, transportation, or in leisure activities who were used to be active and hard working to survive in the harsh condition in a hill terrain.

The proportion of the respondents who reported smoking tobacco and drinking alcohol was 23.4% and 10.8%, respectively. The prevalence of tobacco consumption was 43.7%, and alcohol consumption was 1.5% in the adult Bangladeshi population, as evidenced by a recent population-based national cross-sectional study.[18] Previous reports published by the Department of Narcotics Control of Bangladesh have consistently described the disproportionately high prevalence of alcohol consumption among tribal communities, owing to regional cultural variations.[19]

CONCLUSION

The present study provided recent epidemiological information about the proportion of DM and associated lifestyle in the tribal community of Rangamati Sadar. The study indicated that one in every five of the participants had DM. Considering the current lack of adequate healthcare facilities in these areas, the magnitude of mortality and morbidity due to diabetes could be pretty high. Programs should be implemented to educate the community regarding the disease, its signs/symptoms, and the importance of early detection and treatment, along with ensuring the availability of trained staff and well-equipped health facilities.

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Occupational Vaccine Coverage of Nursing Students in Four Institutions of Bangladesh

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ABSTRACT

Background: There is no national or institution-based policy for mandatory occupational vaccination of Bangladeshi nursing students. This study aimed to assess occupational vaccination coverage among students of four public nursing training institutes in Bangladesh.

Materials and Methods: In this cross-sectional study, a self-administered questionnaire was delivered to 944 nursing students in four nursing institutes in Bangladesh to obtain information regarding their vaccination coverage against four vaccine-preventable diseases incorporated in EPI schedule (Diphtheria, polio, measles, and tetanus) and eight diseases (hepatitis B, hepatitis A, influenza, varicella, rubella, mumps, typhoid, and meningococcal infections) outside the EPI schedule, recommended by World Health Organization (WHO).

Results: Out of 944 students, 709 students responded by returning a completed questionnaire (Response rate: 75.1%). Among the respondents, 647 (91.3%) were partially vaccinated with with at least one vaccine and none had fully vaccinated against the WHO recommended eight vaccine preventable diseases. On average, each student had coverage with five occupational vaccines. Institution-based vaccination policy did not exist, and occupational vaccination was not mandatory. None of the respondents received official instructions about occupational immunization at recruitment.

Conclusion: Occupational vaccine coverage of Bangladeshi nursing students is suboptimal. They constitute a unique group where the preventive role of vaccination will be influential.

Keywords: Bangladesh, Nurse, Occupational vaccination.

INTRODUCTION

Healthcare workers (HCWs) are at risk of contracting and transmitting infectious diseases while working in hospital settings. The health of the patients they care for and personal safety is a priority issue in such a setting. Most healthcare occupation-related infections are vaccine-preventable. WHO has recommended eight vaccines for HCWs (hepatitis B, polio, diphtheria, measles, rubella, meningococcal, influenza, and varicella).[1] Developed countries have extra vaccines to this list that are considered optional by WHO subject to country policy.[2, 3]

In Bangladesh, the routine vaccination program consists of the extended program on immunization (EPI) for children and tetanus toxoid (TT) schedule for women of child-bearing ages.[4] Further immunization with non-EPI vaccines (NEVs) is personal responsibility. Such vaccines are new to the country, and public awareness is less. Like most HCWs, nursing students learn about the importance of occupational vaccination as a trainee. Their knowledge of vaccine-preventable diseases (VPDs) increases with the academic year of study.[1, 5]

Without an occupational vaccination policy in Bangladesh, responsibility for employees' or trainees' occupational health safety rests on healthcare-related institutions and individual HCWs. The role of Bangladeshi public nursing institutions in this aspect and their students' awareness and personal protection by occupational vaccination is still being determined. This study aimed to obtain information regarding occupational vaccine coverage of Bangladeshi nursing students. Factors associated with NEV coverage were determined.

MATERIALS AND METHODS

Between July and September 2016, we conducted a cross-sectional study among the nursing students of four institutions (Dhaka Nursing College, Chittagong Nursing College, Foujderhat Nursing College, and Rangamati Nursing Institute) in Bangladesh. The study received ethical approval from the Ethical Review Committee of Chittagong Medical College.

There were 1200 students in these institutions during the study period. Expecting a vaccine coverage rate of 57.44%, we calculated at a 95% confidence interval and an accuracy of ± 3%, we would need 560 respondents.6-9 Assuming a response rate of 60%, we needed to approach 944 students from our sample frame of 1200. All students were allocated an individual identification number, and a simple random sample selected 944 students without replacement.

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All students received an invitation to participate. According to the academic year, consenting participants were invited to an introductory session where they were explained and clarified about the parts of the questionnaire. Then, participants were provided with a questionnaire and asked to return the paper after completion. The questionnaire contained questions on their institution, gender, monthly family income, academic course and year, pre-recruitment advice for vaccination and data about personal vaccination coverage for four EPI and eight non-EPI vaccines. Among six vaccines of childhood EPI schedule (diphtheria, polio, measles, tetanus, pertussis, and BCG), the first four are occupational vaccines. Eight selected NEVs (occupational vaccines) were for hepatitis B, hepatitis A, influenza, varicella, rubella, mumps, Typhoid, and meningococcal infections. The selection of these 12 vaccines was based on a review of WHO recommendations, vaccination policy for HCWs in different European countries, and the statement of the Center on Disease Control (CDC), USA. In the case of some specific vaccines (e.g. Typhoid), the national prevalence of the disease was considered.[1-3, 5]

Vaccine coverage was considered complete if there was a history of completion of age-specific primary immunization schedules for EPI and those for hepatitis A, B, mumps, rubella, varicella, and meningococcal vaccines. The administration of yearly influenza vaccine and immunization with typhoid vaccine within the last three years at the interview was considered up-to-date coverage.

SPSS version 20 was used for statistical analysis. Only descriptive statistics in the form of frequency and percentages were used in the results.

RESULTS

Out of 944 nursing students, 709 responded (Response rate: 75.1%). The sociodemographic and academic characteristics of the respondents are available in Table I.

Table I : Sociodemographic characteristics of the respondents (n = 709)

Variables	Frequency	Percenatge
Centre		
Chittagong Nursing College	301	42.5
Dhaka Nursing College	291	41.1
Rangamati Nursing Institute	84	11.8
Foujderhat Nursing Institute	33	4.6
Gender		
Female	686	96.8
Male	23	3.2
Academic course & duration		
Diploma (3 years)	84	11.8
Basic B.Sc. (4 years)	592	83.5
Post basic B.Sc. (2 years)	33	4.6
Family income (Per month)		
< 10000 Taka	327	46.1
10000 - 15000 Taka	187	26.4
> 15000 Taka	109	15.4
Not mentioned	86	12.0

Coverage of different categories of vaccines are shown in (Table II) which depicted that 46.8% (n = 322) received at least a single NEV.

Table II : Vaccination pattern of participants (n=709)

Variables	Frequency	Percenatge
Occupational vaccines coverage		
a) Vaccinated	647	91.3
Complete coverage	-	-
Incomplete coverage	647	100
b) Unvaccinated	62	8.7
Sources of occupational vaccines		
a) EPI and NEVs*	249	38.5
b) EPI only	315	48.7
c) NEV only	83	12.8
EPI vaccines		
Childhood vaccine schedule†		
a) Complete	564	79.5
b) Incomplete	57	8.0
c) Unknown	88	12.4
Adult TT schedule		
a)Complete	444	62.6
b)Receiving	142	20.0
c)Unvaccinated	123	17.4
NEVs*		
a) Vaccinated	332	46.8
b) Not vaccinated	377	53.2

*NEV= non EPI vaccine; †includes BCG, diphtheria, pertussis, tetanus, polio and measles vaccines

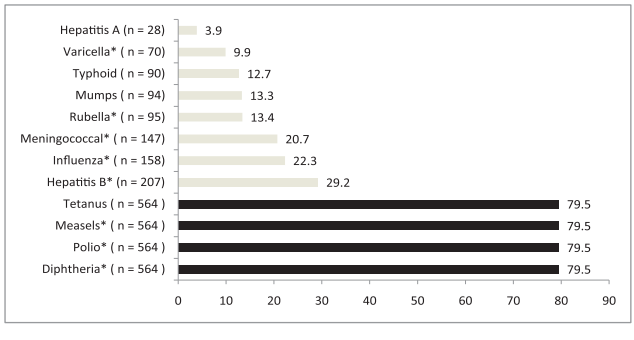

Figure 1: Occupational vaccine coverage of nursing students (%) (Dark column: vaccines available from EPI schedule, Light column: vaccines available from non EPI source, * Vaccines recommended by WHO)

On average, participants received five out of 12 surveyed occupational vaccines.Among participants, 79.5% received polio, diphtheria, and measles vaccines from EPI. Of the other five vaccines, 39.6% (n = 281) received at least one NEV (Fig 1). In the absence of annual administration, coverage of influenza was not up to date. So, actual coverage for these eight vaccines ranged from none to 29.2%.

On inquiry about the sources of awareness on occupational immunization, the students reported that they learned about the importance of occupational vaccines from different sources, like HCWs of different levels (75.9%), family members (12.5%), newspapers (8.7%), and rests from various sources (e.g., peers).

Immunization records were not verified in any of the four studied institutions before admission. Institution-based vaccination policy did not exist, and occupational

vaccination was not mandatory. None of the respondents received official instructions about occupational immunization at recruitment.

DISCUSSION

We found occupational vaccine coverage has remained below the Healthy People 2010 coverage goal of 90% among the nursing students.[10] We observed incomplete coverage for all the eight recommended vaccines. Complete coverage for these vaccines among Greek (7 vaccines) and Brazilian (6 vaccines) nursing students was 61.5% and 29.7% respectively.[11, 12]

Routine EPI and TT vaccines for women of childbearing age had higher coverage than NEVs. One possible reason is that they are available from the government free of cost, and there is a high level of awareness for these vaccines. Access to vaccines through Government channels can be a crucial issue to assure high coverage in developing countries.[13] Bangladesh is polio-free since 2014. However, measles and diphtheria outbreaks are recorded.[14] If the findings of the present study are representative of the country, a significant number of nursing students are susceptible to measles and diphtheria either due to the absence of EPI coverage or possible drop out.

Hepatitis B was the highest-covered disease (29.2%) in our series and only 3.9% reported to be vaccinated against Hepatitis A. In the USA, 90.5% of nurses received the annual influenza vaccine in 2013.[15] Among health care students, the coverage in France, Sweden, Brazil, and the Czech Republic was 4 to 93%.[16] However, 80% of the HCWs should be vaccinated to control influenza through hard immunization. So, coverage against influenza was inadequate. Unvaccinated HCWs play a role in the spread of nosocomial influenza.[16] The reported susceptibility of HCWs to varicella varies from 2 to 10% worldwide.5 High seropositivity (92 to 99%) to varicella reported among HCWs.[16] Varicella vaccine coverage was 9.9% in our series. To our knowledge, this is the first report on meningococcal vaccine coverage (20.7%) of nursing students.[16] CDC recommends typhoid vaccine for HCWs working in the microbiology department and those at risk of contact transmission.[3] Considering the high prevalence of salmonella infection, Bangladeshi HCWs should receive this vaccine.

In none of the surveyed institutions, occupational vaccination was a prerequisite for enrollment. Some respondents reported to receive instruction, but the circulation of messages was not uniform, and sources varied. Globally, institutional vaccination policies seem inadequate for HCWs.[5] Students are often ignored in occupational immunization programs as they are not considered employees. There is no occupational immunization policy for employees, let alone students in Bangladesh.

This study has some limitations. Data on immunization were self-reported, and not verified by vaccination booklets or serological testing.There was a chance of responder or recall bias in the study. As we surveyed only four out of 54 public nursing institutes (total students 8010) due to resource constraints, there may be concern about the generalization of the results.

CONCLUSION

Occupational vaccine coverage of Bangladeshi nursing students is low which justify the need to plan national and institutional policies to vaccinate HCWs. Serological assessment is required to quantify their susceptibility to occupational infections.An effective immunization program can be inaugurated in nursing institutions by formulating an occupational immunization policy at the national level.

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Case Report

Adult Patient with Expanded Dengue Syndrome and Associated Multi-Organ Dysfunction Syndrome Receiving Cytosorb®: A Case Report

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ABSTRACT

Dengue is an arboviral disease which has hepatotoxic effects on multiple organ systems. Cytokine extracorporeal hemoadsorption (Cytosorb®) is a successful adjunctive therapy for adult patients to reduce bilirubin and toxic metabolites. Here, we present a case of a 25-year-old male patient who was admitted to a private hospital in Chattogram, Bangladesh, with dengue hemorrhagic fever (DHF) and associated Acute respiratory distress syndrome (ARDS), acute hepatic failure with acute kidney injury, and myocarditis. Given the Multi-Organ Dysfunction Syndrome (MODS), adjunctive therapy with Cytosorb® was initiated on day 9 of his illness. After a 14-hour procedure, patients improved clinically and biochemically. The patient was extubated on day 9 of admission and was later discharged in an active, afebrile, and hemodynamically stable condition. Cytosorb®, along with standard care, can be a safe and advantageous extracorporeal therapy option to treat dengue patients with MODS.

Key words: Dengue fever, Multi organ dysfunction syndrome, fulminant liver failure, Hemoadsorption, Cytosorb®.

INTRODUCTION

Dengue fever (DF) is a rapidly emerging acute febrile disease, with potentially fatal complications, of public health concern worldwide, mainly in tropical and subtropical regions.1Dengue virus has an incubation period of 3–7 days, followed by symptoms that can appear in three distinct phases; a febrile phase (2–7 days and persists throughout the illness), a critical phase (3–7 days when the disease may disseminate and involve different organ systems), and finally the convalescent, or recovery phase.[1, 2] In Bangladesh statistics show an increase in dengue cases every day, and the year 2023 will be marked as the peak of the disease's death prevalence.[3]

DHF is associated with hepatomegaly in 30% of patients, and its magnitude has no relationship with the severity of the disease.[4] On the other hand, 90% of people with dengue infection presented with an increase in aminotransferase, with levels of erum glutamic oxaloacetic transaminase (SGOT) higher than those of serum glutamic pyruvic transaminase (SGPT). Acute liver failure is a severe complicating factor in dengue infection, predisposing to life-threatening hemorrhage, disseminated intravascular coagulation and encephalopathy.[5] Here we present a case of a adult male patient who was with DHF and subsequently MODS, treated with standard of care and adjuvant extracorporeal cytokine elimination therapy using Cytosorb®.

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CASE REPORT

A 25-year old, male presented to a private hospital in Chattogram, Bangladesh, with a history of fever for 5 days associated with severe body ache, persistent vomiting and severe abdominal pain.

On examination, the patient was found to be febrile, normotensive, and mildly dehydrated with normal sensorium. Dengue serology was NS1 and IgM reactive. Along with thrombocytopenia (platelet count 15,000 /µL) and a modest increase of hematocrit (47.6%), the patient was diagnosed as DHF and admitted and treated accordingly. On the course of treatment, the next day, the patient was found conscious and hemodynamically stable. His platelet count dropped to 10,000/µL, and his hematocrit was 49.4%. Subsequently, he received two units of apheresis platelet. After 48 hours, patients developed disorientation and restlessness. They found a bit of icteric and diagnosed as hepatic encephalopathy, which was supported by serum bilirubin 2.80 mg/dl, serum SGOT-2248 (IU/L), serum SGPT-3194 (IU/L), albumin-2.7gm/dl. Prothrombin time with internationalized normalized ratio (INR): control-13.4 seconds, patient-27.[6] seconds, INR=2.41. Immediately, the patient was transferred to the ICU and labeled with Expanded Dengue Syndrome (EDS).

After 24 hours of ICU admission, the patient developed myocarditis and ARDS, which was evidenced by severe chest pain, palpitation, shortness of breath, and low

SpO2 (65% at room air). Investigation showed Troponin I-9200 ng/ml (reference value <47 ng/ml), NT Pro-BNP-841 pg/ml, serum creatinine 1.5 mg/dl, and bilaterally almost opaque a chest x-ray. His IL-6 level was 79 (Reference value <7), and procalcitonin was 3.5 ng/ml. A highly potent steroid (Methylprednisolone) was added, and 20% albumin was infused. The patient was on oxygen therapy through a high-flow nasal cannula and continuous positive airway pressure. The patient's condition deteriorated despite the above measures, and his Glasgow Coma Scale score was 4.

On the 4th day, the decision was made to commence hemoadsorption with a cytokine adsorber (Cytosorb®). The adsorber was placed in a post-dialyzer position. Due to the lack of recommendations in the literature and the fact that a flow of only 60 ml/min – 1/5 of the recommended flow for hemoadsorption of 200 ml/min - could be maintained throughout the Hemodiafiltration (HDF) process, the procedure was held for 14 hours. A single Cytosorb® adsorber was used.

After 14 hours of the adsorber, patient LFTs were improved and normalized over five days. Similarly, significant improvements in the platelet counts were also achieved. Gradually, biochemical parameters returned to normal, and the patient was discharged.

DISCUSSION

Dengue viral infections are known for presenting a diverse clinical spectrum, ranging from asymptomatic illness to detrimental DHF.1 The degree of liver dysfunction in patients with dengue infection varies from mild injury with elevation of transaminase activity, hepatomegaly, to jaundice and fulminant hepatic failure.6 Hemoadsorption using Cytosorb® has proven to be a safe and efficacious extracorporeal treatment modality in adults for treating complications of liver failure such as hepatic encephalopathy, hemodynamic instability and progressive hyperbilirubinemia.[7] Recently, few case reports described on the successful clinical application of extracorporeal Cytosorb® hemoadsorption in cases of DF with MODS treated with standard care along with extracorporeal assist device (Cytosorb®).[7, 8]

The pathophysiology involving a cytokine storm leading to endothelial cell leakage is well established with DF, DHF, and DSS. Cytosorb® therapy modulates the immune response by eliminating excessive cytokine levels.[9] Hemoadsorption using Cytosorb® is intended as an adjunctive treatment for patients with increased cytokine levels in SIRS and septic shock. Additionally, it reduces various other endogenous and exogenous compounds from the blood, such as myoglobin and bilirubin.[10] In the present case report, despite the standard treatment for thrombocytopenia, hyperbilirubinemia, and elevated liver enzymes, 14 hours of hemoadsorption using Cytosorb® was deemed successful.

CONCLUSIONS

Cytosorb®, along with standard care, can be a safe and advantageous extracorporeal therapy option for dengue patients with MODS. However, since the literature regarding hemoadsorption in dengue patients is limited, more extensive prospective studies are required to evaluate the advantages and possible adverse effects.

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