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Bangladesh does not have the Zika virus, but has the vector (*Aedes Aegypti*) of Zika. Bangladesh should be prepared to address the risk of Zika virus out break.

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Asclepiades, sometimes called Asclepiades of Bithynia or Asclepiades of Prusa, was a Greek physician born at Prusa in Bithynia in Asia Minor and flourished at Rome, where he established Greek medicine near the end of the 2nd century BC.

Asclepiades opposed the humoral doctrine of Hippocrates. And he attempted to build a new theory of disease, the atomic or corpuscular theory, according to which disease results from an irregular or inharmonious motion of the corpuscles of the body based on the flow of atoms through pores in the body. He believed that harmony would be restored through fresh air, light, appropriate diet, hydrotherapy, massage, and exercise. He is a pioneer in the humane treatment of mental disorders.

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Barind Medical College Journal (BMCJ)

The Emerging Zika Pandemic and Bangladesh

Md. Anayet Ullah

Zika virus infection is a recent explosive pandemic occurring throughout South America, Central America, and the Caribbean.¹ It is potentially threatening the rest of the world, because there is no cure and no vaccination. World Health Organization (WHO) projected that the virus is likely to spread throughout most of the Americas by the end of the year.² It is a Public Health Emergency of International Concern.³ Zika virus is an arbovirus (transmitted by arthropod) originated in the Zika forest in Uganda and was discovered incidentally in a rhesus monkey in 1947 through a monitoring network of sylvatic yellow fever.⁴ It was subsequently identified in humans in 1952 in Uganda and the United Republic of Tanzania.⁵ Since the 1950s, it has been known to occur within a narrow equatorial belt from Africa to Asia. The virus spread eastward across the Pacific Ocean between 2013 and 2014 to French Polynesia, New Caledonia, the Cook Islands, and Easter Island, and in 2015 to Mexico, Central America, the Caribbean, and South America, where the Zika outbreak has reached pandemic levels.⁶

The ongoing pandemic confirms that Zika is predominantly asymptomatic or causes mild illness like dengue (fever, rash, muscle/joint pain, and conjunctivitis), severe disease and fatalities are uncommon. However, the recent rise in the spread of Zika virus in Brazil has been accompanied by an unprecedented rise in the number of children being born with unusually small heads—identified as microcephaly. In addition, several countries, including Brazil, Yap and French Polynesia reported a steep increase in Guillain-Barré syndrome—a neurological disorder that could lead to paralysis and death. Evidence is growing that Zika virus causes both microcephaly and Guillain-Barré syndrome.⁷ The arboviruses, like Zika, dengue, chikungunya, yellow fever and West Nile, have

been transmitted by *Aedes* mosquitoes, especially *A. aegypti*. These viruses started to emerge millennia ago, when North African villagers began to store water in their dwellings. Arboreal *A. aegypti* then adapted to deposit their eggs in domestic water-containing vessels and to feed on humans, which led to adaptation of arboreal viruses to infect humans. The dengue, chikungunya, yellow fever and West Nile viruses evolved entirely new maintenance cycles of human-*A. aegypti*-human transmission. Now, 5000 years later, the worst effects of this evolutionary cascade are being seen in the repeated emergence of arboviruses into new ecosystems involving humans.¹

The Zika virus is of concern in the WHO South-East Asia Region as the *Aedes aegypti*, responsible for its spread, is found in many countries of this region. WHO also urged countries in the region to build capacity of their laboratories to detect the virus and strengthen surveillance for cases of fever and rash, neurological syndromes and birth defects while recommending intensifying vector control programme measures.³

Bangladesh does not have the Zika virus, but has the vector (*Aedes Aegypti*) of Zika, which is also responsible for the transmission of dengue, widely prevalent disease in Bangladesh. The first and large epidemic of dengue in 2000 was likely due to introduction of a dengue virus strain from a nearby endemic country, probably Thailand.⁸ Wherever there is dengue, you are likely - in time - to get Zika too. It anticipates that Zika virus will continue to spread and will likely reach all countries and territories of the region where *Aedes* mosquitoes are found. There is a real chance *Aedes aegypti* will re-infect Asia with the virus. The World Health Organization (WHO) believes that the Zika virus is more common in Southeast Asia than the sprinkling of cases

*Department of Community Medicine, Barind Medical College, Rajshahi, Bangladesh.

Correspondence to :
M A Ullah
md.anayet_u@yahoo.com

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reported in the region in the past several years. In India, Zika virus infection was identified in 1950s. Sporadic Zika virus cases were reported from Thailand, Maldives, Indonesia, Malaysia and Philippine in the recent past.⁹ So definitely Bangladesh is at risk of Zika virus outbreak at any moment. Bangladesh's rapidly growing urban areas, tropical climate, and often poor waste management are factors that increase the risk of a Zika epidemic. Bangladesh is also susceptible to monsoon season that increase breeding sites for the *Aedes aegypti* mosquito. Countries like India, Thailand, Philippine, Singapore and Malaysia have stepped up a series of measures to curb the outbreak of an epidemic of Zika virus infection. Bangladesh should be prepared to address the risk of Zika virus outbreak and should build up facilities for managing the disease. To reach this goal adequate steps should be taken for early detection of the disease and to intensifying the vector control program. At the same time all the sectors of Bangladesh Health Services should be engaged to enhance public awareness in this regards.

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The effects of a community based interviewing skills training program on primary health care level doctors of Bangladesh

Md. Anayet Ullah^a, Md. Jawadul Haque^b

Abstract

Background: The ability to communicate with a patient effectively has been described not only as an artistic aspect of clinical care but also as a central clinical function that cannot be ignored. Communication problem in medical practice is very common in Bangladesh. **Objective:** To develop and conduct a short term training program on interviewing skills among the primary health care level doctors of Rajshahi district with a view to evaluate its effects on doctors' interviewing skills. **Methods:** This study was conducted among the primary health care level government doctors of Rajshahi district at Puthia Upazila health Complex. All the doctors working at the 9 Upazilas of Rajshahi district constituted the study population. Total 36 participants were selected by stratified random sampling. This course was scheduled over 5 sessions of 25 hours, 5 hours in each day for 5 days. The effectiveness of this training program was evaluated by analyses of the pre and post assessments of participants' behaviors / techniques of interview and also by analyzing participants' self assessment of the program. Data were analyzed by computer using SPSS 16.0. Paired t test was applied to find out any significance difference between the pre and post assessment score of the participants' performance. **Results:** Overall mean score for the beginning, managing and ending of the interview were significantly improved from 2.30 ± 1.11 , 9.63 ± 3.70 and 0.72 ± 0.70 to 6.38 ± 1.46 , 22.63 ± 2.46 and 4.36 ± 0.54 due to this training. The grand total mean score of the interview was also significantly ($p < 0.000$) improved from 12.72 ± 4.60 to 32.91 ± 4.67 after this training. Most (94.44%) of the participants strongly agreed that this type of teaching course should be included in the curriculum of undergraduate medical students. **Conclusion:** This type of short training program may be one of the best way to develop communication skills of the present and future doctors.

Key words: interviewing skills, doctors, Bangladesh.

Introduction

Communication skills are those with which (1) the doctor-patient relationship is created and maintained; (2) verbal information and clarification relevant to the solution of the patient's problem, is gathered; and (3) the solution to the problem is negotiated.^{1,2} The ability to communicate with a patient effectively has been described not only as an artistic aspect of clinical care but also as a central clinical function that cannot be ignored.^{3,4} Most of the essential diagnostic information's arise from the doctor-patient interaction during the consultation, and the physician's interpersonal skills also largely determines the patient's satisfaction and compliance, diagnostic efficiency and positively influences health outcomes.^{3,5,6} Explaining and understanding patient concerns, even when they cannot be resolved, results in a significant fall in anxiety.⁷ Patients are most satisfied with the health provider who is warm, friendly, concerned, and empathetic.⁸ Communication problems in medical practice are very common. For example, in a study (Stewart et al 1979)⁹ in England, 54% of patient complaints and 45% of patient concerns are not elicited by physicians. In another study (Backman & Frankel 1984)¹⁰ patients were interrupted by physicians so

soon after they began describing their presenting problems(on average within 18 seconds) that they failed to disclose other significant concerns. Most complaints by the public about physicians deal not with clinical competency problems, but with communication problems.¹¹

In Bangladesh there is also serious communication problems in medical practice. 45% patients, attended at the government primary health care level facilities, don't know how and when to take their medicines.¹² A poor level of comprehension among the patients might have been expected due to this. These type of communication gaps might lead to patients' dissatisfaction. Ullah et al. in a study,¹³ it was found that dissatisfaction of the rural people on government health care facilities due to non-cordial behavior of providers is an important obstacle in obtaining ANC by them. only 37% people are satisfied with the government health care facilities in Bangladesh.¹⁴ Increasing public dissatisfaction with the medical profession is, in good part, related to deficiencies in clinical communication.¹⁵ Communication failures / problems of health care providers in their clinical practice specially doctors is one of the important reason which is responsible for this situation.

^aDepartment of Community Medicine, Barind Medical College, Rajshahi, Bangladesh.

^bDepartment of Community Medicine, Rajshahi Medical College, Rajshahi, Bangladesh.

Correspondence to :
M A Ullah
md.anayet_u@yahoo.com

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The reasons for communication failures are complex and include characteristics of both patients and doctors, and the system of health care delivery. However, one of the primary reasons for the sorry state of affairs is the inadequacy of the most doctors in communication skills to interview the patient during their consultation.¹⁶ So a formal training course of the health care providers on communication skills needed to interview (interviewing skills (behaviors/techniques)) a patient during their consultation may improve the unwanted situation.

In this study researchers attempted to develop and conduct a short term training program on interviewing skills (communication skills needed during interviewing a patient) among the doctors working at the primary health care level of Rajshahi district with a view to evaluate its effects on doctors' communication skills during interviewing a patient.

Methods

This study was conducted among the government doctors working at the primary health care level (Upazila and below) of Rajshahi district. All the doctors working at Upazila Health Complexes (UHCs), Union Sub-Centers (USCs) and Health & Family Welfare Centers (H&FWCs) of 9 Upazilas in Rajshahi constituted the study population. Total 36 participants were selected by stratified random sampling 4 from each Upazila of Rajshahi: two from UHC and two from either USC or H&FWCs.

Teaching program

The total 36 participants were trained into three phases, 12 doctors of 3 Upazilas in each phase. The teaching program was conducted in a rural setting at Puttia Upazila Health Complex (UHC). It includes inpatient, outpatient and emergency services. This UHC acts as a field site training center for the students of all the Medical colleges in Rajshahi district. All types of educational facilities are available there. There are excellent accommodation facilities for the participants and the teachers in this institution. This program focused on the development of doctors' interview behavior and their ability to conduct a good interview. This training program was designed to allow the doctors to gain theoretical concepts and to develop skills through lectures, tutorials, practices with real patients and feedback. This course was scheduled over 5 sessions of 25 hours, 5 hours in each day for 5 days. The first day lecture session addressed the concepts of the medical interview and the interview behaviors/ techniques needed to perform these tasks. In 2nd day session participants observe an

ideal doctor-patient interview on video and discuss this with the tutorial group. Then participants were divided into 6 pairs. Every participant took turns to play the role of doctor and patient. The participants who played the patient role gave feedback immediately to their peer after the interview. The facilitators monitored the practice and gave feedback to the participants. Three practice and feedback sessions were conducted on the 3rd, 4th and 5th day with real patients at the out patients' department.

Evaluation

The effectiveness of this pilot program was evaluated by analyses of the pre and post assessments of participants' behaviors / techniques of interview and also by analyzing participants' self assessment of the program.

The pre- and post- assessments of the participants' behaviors / techniques of interview were done by watching the previously recorded videotape of a real patient's consultation by each participant, with the help of interview rating scale (IRS). IRS included 25 interview behaviors / techniques which were divided into three sections: beginning, managing and ending the interview. The items in the rating scale were selected from two sources Maguire et al.(1978)¹⁷ & Cormier et al. (1984)¹⁸. The behaviors/techniques of the beginning and ending of the interview, were noted as being either present (scored as 1) or absent (scored as 0). The techniques/behaviors included in the section of managing the interview were more complex, in that case, a 5-point frequency scale was used. Participants' self assessment was done by Self Assessment Rating Scale (SARS). SARS was designed for the participants to evaluate the relevancy, adequacy / appropriateness and effectiveness of this course. It included 9 statements regarding the program. A Five point scale was used for each item with the following designation: 1'strongly agreed(SA)', 2'agreed(A)', 3'undecided(UD)', 4'disagreed(DA)', and 5'strongly disagreed(SDA)'. Participants responded according to their judgment. There was a provision for participants' detailed comments in this scale in which he expressed his additional opinions if necessary.

The videotape recording of the real patient's consultation was done within 15 days before and after the teaching program in the same situations with her prior permission of them. The participants' self assessment was done at the end of the program.

Data analysis

Data were entered in the computer and processed using SPSS for windows. Descriptive analytical

techniques involving frequency distribution, computation of percentage, mean and SD were calculated for both pre and post situations. Paired t test was applied to find out any significance difference between the pre and post assessment score of the participants' performance.

Results

Before this training, none of the rural doctors assured the patient about the confidentiality of their interview, elicit the patient's expectation and settled the agenda in the beginning of their interview. But after the training they significantly improved these skills. The doctors scored high mean score (0.92, SD±0.28) for the opening question in the beginning of their interview initially. After the training, every doctor used open question (mean score 1.00) in the beginning of their interview. Overall mean score for the beginning of the interview was significantly improved from 2.30 (SD±1.11) to 6.38 (SD±1.46) due to this training (Table 1).

Table 1. Comparing the mean scores of the individual skill / technique used by doctors for the beginning of the interview in the pre- and post-training assessment sessions. N = 36

Skill/technique	Pre-training mean score (±SD)	Post-training mean score (±SD)	t	df	P
Give a verbal greeting to patient	0.19 (0.40)	0.89 (0.32)	7.94	35	.000
Establish direct eye contact	0.44 (.50)	1.00 (0.00)	6.61	35	.000
Give a verbal / nonverbal indication where to sit	0.50 (0.51)	0.83 (0.38)	3.41	35	.002
Assure the patient that the interview contact is confidential	0.00 (0.00)	0.19 (0.40)	2.90	35	.006
Opening question	0.92 (0.28)	1.00 (0.00)	1.78	35	.083
Encouraging to complete & expanding the open question	0.11 (0.32)	0.64 (0.49)	5.20	35	.000
Elicit the patient's expectation	0.00 (0.00)	0.36 (0.49)	4.44	35	.000
Screening for other symptoms and problems	0.08 (0.28)	0.83 (0.38)	10.24	35	.000
Agenda setting	0.00 (0.00)	0.25 (0.44)	3.41	35	.002
Describing higher expectation for the patient	0.05 (0.23)	0.39 (0.49)	3.76	35	.001
Overall score*	2.30 (1.11)	6.38 (1.46)	14.89	35	.000

* Maximum score 10.0 (10 items)

During managing the interview, the doctors scored lowest mean score (0.19 ± 0.57) for showing empathy before the training comparing with other items. After training the mean score was significantly improve to 2.33 (± 0.63). Pre-training mean scores of all the techniques for managing the interview were significantly improved after training. Overall doctors' pre-training mean score for managing the clinical interview was 9.63 (± 3.70). It became more than double (22.63 ± 2.46) in post-training assessment (Table 2).

Table 2. Comparison of the doctors' performance for the managing the interview on the basis of the interview rating Scale in the pre- and post-training assessment sessions. N = 36

Skill/technique	Pre-training mean score (±SD)	Post-training mean score (±SD)	t	df	P
Open question	1.44 (0.73)	3.0 (0.33)	12.08	35	.000
Silence	0.91 (0.64)	2.52 (0.50)	12.61	35	.000
Facilitating	0.36 (0.63)	3.38 (0.69)	17.67	35	.000
Clarifying	1.22 (0.95)	1.79 (0.55)	3.74	35	.001
Putting up verbal & non-verbal leads	0.08 (0.36)	1.06 (0.50)	12.55	35	.000
Simple language	1.88 (0.70)	2.72 (0.45)	6.18	35	.000
Avoid jargon	1.97 (0.89)	2.63 (0.54)	5.04	35	.000
Showing empathy	0.19 (0.57)	2.33 (0.63)	17.74	35	.000
Provide sufficient and appropriate information	1.05 (1.14)	2.41 (0.87)	8.01	35	.000
Shared decision making	0.47 (0.87)	1.72 (0.88)	9.30	35	.000
Overall score*	9.63 (3.70)	22.63 (2.46)	21.90	35	.000

* Maximum score 40.0 (10 items)

At the ending of the interview, none of the doctors did not sincere wish for the future welfare of the consulting patients. The pre-training mean score of this item was 0.00 (± 0.00), it was increase to 0.94 (± 0.23) after training. Give the patient final opportunity to disclose any problem, and Give support and reassurance were the second and third lowest mean scored techniques. The post-training mean scores of both the techniques were significantly increased to 0.97. Overall mean score was significantly improved from 0.72 (SD± 0.70) to 4.36 (SD± 0.54) after the training (Table 3).

Table 3. Comparing the mean scores of the individual skill / technique used by doctors for the ending of the interview in the pre- and post-training assessment sessions. N = 36

Skill/technique	Pre-training mean score (±SD)	Post-training mean score (±SD)	t	df	P
Give the patient final opportunity to disclose any problem	0.05 (0.23)	0.97 (0.16)	19.62	35	.000
Review of whole consultation in short	0.083 (0.28)	0.47 (0.50)	4.71	35	.000
Give support and reassurance	0.16 (0.37)	0.97 (0.16)	12.04	35	.000
Scheduling of follow up	0.41 (0.50)	1.0 (0.00)	7.00	35	.000
Sincere wish for the future welfare	0.00 (0.00)	0.94 (0.23)	24.39	35	.000
Overall score*	0.72 (0.70)	4.36 (0.54)	26.20	35	.000

* Maximum score 5.0 (5 items)

Of the total 36 doctors, 34 (94.44%) doctors strongly agreed that this type of teaching course should be included in the curriculum of undergraduate medical students. More than 88% of the doctors strongly agreed that this course experience was relevant to the training of future physicians and increased their awareness about the importance of interviewing skills.

Most (80.56%) of the doctors strongly agreed that Opportunities to practice interviewing patients were not sufficient in this course (Table 4).

Table 4. Distribution of the doctors' responses to the different statement regarding this teaching program. N= 36

Statement	Strongly agree (SA) n (%)	Agree (A) n (%)	Undecided (UD) n (%)	Disagree (DA) n (%)	Strongly disagree (SDA) n (%)
1. The objectives of the teaching course have been clearly stated.	21 (58.33)	15 (41.67)	00 (00.00)	00 (00.00)	00 (00.00)
2. The content covered by this course was relevant to the objectives	22 (61.11)	14 (38.89)	00 (00.00)	00 (00.00)	00 (00.00)
3. The course experience was relevant to the training of future physicians	32 (88.88)	04 (11.12)	00 (00.00)	00 (00.00)	00 (00.00)
4. Total time of the course was sufficient	00 (00.00)	00 (00.00)	03 (8.33)	13 (36.11)	20 (55.56)
5. Opportunities to practice interviewing patients were not sufficient in this course.	29 (80.56)	07 (19.44)	00 (00.00)	00 (00.00)	00 (00.00)
6. The course was enjoyable	16 (44.44)	20 (55.56)	00 (00.00)	00 (00.00)	00 (00.00)
7. This course increases my awareness about the importance of interviewing skills.	32 (88.88)	04 (11.12)	00 (00.00)	00 (00.00)	00 (00.00)
8. I think that now I am able to interview a patient more effectively than before.	10 (27.78)	26 (72.22)	06 (16.66)	00 (00.00)	00 (00.00)
9. This teaching course should be included in the curriculum of undergraduate medical students	34 (94.44)	02 (5.56)	00 (00.00)	00 (00.00)	00 (00.00)

Discussion

All the participating doctors in this course were rural primary health care level doctors. They were working at the rural health clinics which are the first contact points for the rural patients who present a wide variety of problems, physical, psychological as well as social. The pre-training data in this study has clearly shown that the rural doctors had failed to effectively communicate with the patients. It reflects the failing of traditional history taking training of the doctors during their studentship at tertiary level hospital to develop skills to communicate effectively with rural patients. There is also an important myth "that merely leaving students / doctors around patients for a time is likely to be good for them and they are bound to pick up all sorts of balanced social view-points from exposure to the 'splendid animals' by some sort of intellectual osmosis".¹⁹ However, this myth has been also seriously questioned by this study. Because the doctors in this study has been working with rural patients for the long time at least more than 5 years.

The quality of the doctor-patient relationship is a major determinant of whether or not patients' expectations will be met and favorable health outcomes achieved. Current thinking on models of health care reflects an ever-growing shift away from the traditional paternalistic models of the doctor-patient relationship, towards more patient-centered models that involve patients in decision-making and focus on the wider psychosocial issues, which influence the illness experience.²⁰ According to WHO, the number of mentally ill people in Bangladesh is about 8.4 million i.e., 7% of the total population. In the different sources of data in Bangladesh, it was noted that about 30% of patients, who visit the general practitioners, have psychosocial, not biomedical problems.²¹ Clearly, then, physicians must give emphasis the biomedical, as well as the psychosocial domains, in order to provide optimum care for their patients. The psychosocial domain encompasses a patient-centered, as opposed to purely physician-centered, medical consultation with interviewing skills including elicit the patient expectation, agenda setting, listening, showing empathy, shared decision making, give support and reassurance, sincere future wish for the well-being, etc.²² This bio-psychosocial approach, combination of biomedical and psychosocial domains, was nearly or completely absent among the rural doctors in this study. Researches show that

physicians, who use a bio-psychosocial approach to patient care, have more patient satisfaction.^{22,23} So the interviewing skills of the rural primary health care level doctors should be improved.

Comparisons of the mean scores of the doctors' interviewing behaviors between pre and post communication skills training program has clearly shown that communication skills training program significantly improved the doctors' interviewing skills. This finding supports previous studies.²⁴⁻²⁶ This short term training program consisted of a series of participatory experiential techniques like small group discussion, role play, practice and feedback. This program also facilitated the doctors to discover the socio-cultural and psychological factors, which have been demonstrated to be so important in patient care,²⁷ through experience with real patients in the rural community setting and from the inevitable variations in individual styles of interview. Others studies have also demonstrated significant improvement in the interview skills of the participants due to such type of training program in which participants were firstly informed about these skills by handout with demonstration video tape recording of real consultations. They were then given opportunities to practice interviewing real patient, followed by feedback and discussion with a tutor.^{17,28} Similar findings were also obtained by Kendrick & Freeling (1993)²⁹ and Armstrong et al. (1979)³⁰ when they used this type of training program in the setting of general practice. This reflects the consistent finding in educational and training literature that experiential / active learning formats (group discussion, role play, practice and feedback etc.) are the effective learning situation.^{25,31} The results of this study also suggest that it is effective and fruitful within the context of a busy outpatient setting in rural community based hospitals / clinics for the primary health care level doctors.

There was a strong approval for this training program from the participating rural health care level doctors. They considered that this type of short training course was very useful and effective to them. Since Bangladesh government now urgently searching the strategy to improve the communication skills of the present and future doctors, this type of short training program may be one of the best way to develop communication skills of the present doctors (already passed). For the future doctors, Bangladesh Medical & Dental Council already incorporated the teaching of communication skills through the department of Community Medicine in

present undergraduate medical curriculum, but unfortunately it is not still implemented. there are so many factors responsible for this sorry and unfortunate situation. Important one of them may be the bioengineering ideology in medical care. Much of the resistance to training in communication skills seems to stem from the dominance of the bioengineering ideology. This approach stresses the present signs & symptoms, diagnosis and physical intervention. This approach usually ignores patient's emotion, satisfaction and compliance. It encourages doctors to maintain a physician-centered patient consultation.³² This ideology is firmly established in medical practice in Bangladesh and adhered to by the more powerful departments within medical college. So, now it is necessary to motivate the concerning stockholders specially medical teachers specially of this particular powerful departments and students to develop positive attitude regarding this.

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Tri-iodothyronine (T3), Thyroxine (T4), and Thyroid- Stimulating Hormone (TSH) in preeclampsia and normal pregnancy

Nasrin Rahman^a, Hasina Akhter^a, Gopa Sarker^a, Md. Anayet Ullah^b

Abstract

Background: In most developing countries like Bangladesh, the incidence of preeclampsia is much higher in comparison to the developed nations. More than 70% of the preeclamptic pregnant mothers have high thyroid-stimulating hormone (TSH) concentration than that of the normal pregnant mothers. **Objective:** To compare free triiodothyronine (FT₃), free thyroxine (FT₄) and thyroid-stimulating hormone (TSH) status of preeclamptic as compared to normal pregnant mothers. **Methods:** This was a cross-sectional comparative study conducted at Department of Obstetrics and Gynecology, Rajshahi Medical College Hospital, Rajshahi, Bangladesh. A total number of 134 pregnant women consisting of 66 preeclamptic (cases) and 68 normal pregnant women (control) were enrolled in the study on the basis of some inclusion and exclusion criteria. Data on back ground characteristics and biochemical parameters of the cases and control were collected by a preformed data collection sheet. **Result:** The mean ages of the cases and control group were 27.45±3.88 years (range 19-35 years) and 26.45±4.16 years (range 19-35 years) respectively. The mean free triiodothyronine (FT₃) and free thyroxine (FT₄) of the control group were 2.89±0.20 pg/ml and 1.39±0.09 ng/d respectively. These mean thyroid hormones were slightly higher in preeclamptic group but within the normal range and not statistically significant. The mean Thyroid Stimulating Hormone (TSH) in control group was 1.80±0.08 µIU/ml. It was 6.16±0.85 µIU/ml in preeclamptic group, significantly (p<0.001) higher than that of control group. **Conclusion:** A significantly higher serum TSH level was observed in preeclamptic as compared to normal pregnant mothers. But there was no significant difference in serum FT₃ and FT₄ between them and were within normal limits. This study findings suggested that subclinical hypothyroidism may be associated with preeclampsia and may reflect the severity of preeclampsia.

Key words: free triiodothyronine (FT₃), free thyroxine (FT₄), TSH, hypothyroidism, preeclampsia.

Introduction

In most developing countries like Bangladesh, due to the lack of proper antenatal checkup, poverty, ignorance and poor education, the incidence of preeclampsia is much higher in comparison to the developed nations.

Preeclampsia is a leading cause of maternal and foetal morbidity and mortality throughout the world and still is one of the most complex problems in Obstetrics.¹ Preeclampsia is a multi-system disorder in pregnancy of unknown etiology characterized by development of hypertension to the extent of 140/90 mm Hg or more with proteinuria (greater than 0.3 gm/l in 24-hour urine collection or greater than 1 gm/l in a random sample) after the 20th week in a previously normotensive and non-proteinuric woman.^{2,3} Edema has been abandoned as a diagnostic criterion because it occurs in more than 80% of normal pregnant women.⁴

During pregnancy women with preeclampsia are more likely to develop subclinical hypothyroidism.⁵ Those who had preeclampsia in their first pregnancy were 70% more likely to have high thyroid-stimulating hormone (TSH) concentrations years later than were women who had not had

preeclampsia. Those who had preeclampsia in two pregnancies had a nearly six fold increased risk of high TSH levels.⁶

Subclinical hypothyroidism is a laboratory definition: a raised concentration of thyroid stimulating hormone (TSH) yet a normal concentration of free thyroid hormone (FT₃, FT₄) without specific symptoms of thyroid dysfunction. Patients with subclinical hypothyroidism have an increased risk of progressing to overt hypothyroidism.⁷ Measurement of serum TSH is generally considered the best screening test for thyroid disease; increased values usually indicate hypothyroidism, and decreased values usually indicate hyperthyroidism. This test has proved to be both sensitive and specific. Some patients who have elevated serum TSH levels, suggesting hypothyroidism, but have normal levels of thyroid hormone, whether measured as free T₄ or free T₃ index.⁸ Elevated maternal thyroid-stimulating hormone (TSH) has been associated with adverse maternal and fetal effects, which may justify screening for thyroid function during pregnancy.⁹

Untreated or inadequately treated hypothyroidism in

^aDepartment of Gynaecology and Obstetrics, Barind Medical College, Rajshahi, Bangladesh.

^bDepartment of Community Medicine, Barind Medical College, Rajshahi, Bangladesh.

Correspondence to :
N Rahman
Dr.nasrinrahman@yahoo.com

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preeclampsia has been associated with adverse health outcomes for both mother and child like maternal anaemia, congestive heart failure, abruption placenta, preterm delivery, post-partum haemorrhage, maternal death, pre mature birth, low birth weight, fetal death and impaired neuropsychological development in children. Thyroxine replacement therapy substantially reduces the associated morbidity and improves the quality of life. Identification of hypothyroidism in preeclampsia might be of help in preventing the occurrence of preeclampsia.³

This study will be carried out to facilitate a better understanding to evaluate an association between preeclampsia and hypothyroidism. So, assessment of thyroid function in preeclamptic women will help to prevent maternal and perinatal morbidity and mortality.

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Methods

This cross-sectional comparative study was conducted at Department of Obstetrics and Gynecology, Rajshahi Medical College Hospital, Rajshahi, Bangladesh. A total number of 134 pregnant women consisting of 66 preeclamptic (cases) and 68 normal pregnant women (control) were enrolled in the study. The inclusion criteria of the cases (preeclamptic women) were all consecutively diagnosed cases of preeclampsia (blood pressure $\geq 140/90$ mmHg taken on two occasions at 6 hours apart and urinary protein of 0.3 gm/l or more) with gestational age 20-40 weeks, singleton pregnancy and no history of thyroid disease before and through pregnancy. The inclusion criteria of the controls were healthy pregnant mother (normotensive and urinary protein nil/ trace) with gestational age 20-40 weeks, singleton pregnancy and no history of thyroid disease before and through pregnancy. The patients with the history of hypertension, renal disorders, cardiovascular diseases, any metabolic disorder before or during the pregnancy, and history of intake of any medication such as levothyroxine that may affect on thyroid function were excluded from the study. Written informed consent was obtained from all patients participating in the study and they were assured about the privacy of the data. The study was approved by the Ethical Review Committee of Rajshahi Medical College, Rajshahi.

Preeclampsia was defined as mild when blood

pressure (BP) $>140/90$ mmHg but $<160/110$ mmHg on two more occasions at least 6-h apart with proteinuria of 1+ on dipstick reagent strip, and as severe when BP $\geq 160/110$ mmHg with proteinuria of 2+ or more on reagent strip. BP was measured with the patient in lying position keeping cuff of sphygmomanometer at the level of heart. When DBP was found to be more than 90 mmHg, it was confirmed on two occasions at least 6 hours apart.

After hospitalization, under full aseptic precaution 5 ml of venous blood was drawn from each women (cases and controls), after the diagnosis was made before the initiation of the antihypertensive treatment. The collected blood was then allowed to stand for about 30 minutes to clot. After 30 minutes the clot was separated from the test tube by a wooden stick and was centrifuged at 2000 rpm for 5 minutes. The separated serum was carefully drawn by micropipette and should be stored in micro-centrifuged tube at -35°C until the analysis was done. Serum free triiodothyronine (FT_3), free thyroxine (FT_4) and Thyroid Stimulating Hormone (TSH) were estimated by FT_3 ELISA (Tietz 1976), FT_4 ELISA (Tietz 1976) and TSH ELISA (Engall 1980) method. Random urine sample was collected in a clean test tube and assayed for presence of protein by dipstick reagent strip (Hallak 1999).

The statistical analysis was performed using SPSS, version 16. For evaluating two groups, chi-square and Independent sample 't-test' were used. $p \leq 0.05$ was considered statistically significant.

Results

A total of 134 pregnant women participated in the study. Among them 66 were preeclamptic (cases) and 68 were healthy pregnant women (controls). The mean ages of the cases and control group were 27.45 ± 3.88 years (range 19-35 years) and 26.45 ± 4.16 years (range 19-35 years) respectively. The mean gestational ages of the cases and controls were 30.60 ± 2.89 weeks and 30.69 ± 3.41 week respectively. In cases, 42 (63.6%) women were nullipara and 24 (36.4%) were multipara. On the contrary in control group, 43 (63.2%) women were nullipara and 25 (36.8%) were multipara. There was no significant association of parity between the groups. There was no significant difference between both the groups in regards to their age, parity and gestational age (Table 1).

Table 1. Background characteristics of case and control groups.

Characteristics	Cases (n=66) Mean \pm SD/ N (%)	Controls (n=68) Mean \pm SD/ N (%)	t/ χ^2 value	P value
Age (years)	27.45 \pm 3.88	26.45 \pm 4.16	0.56	ns
Gestational age (wks)	30.60 \pm 2.89	30.69 \pm 3.41	0.88	ns
Parity				
Nullipara	42 (63.6%)	43 (63.2%)	.0023	ns
Multipara	24 (36.4%)	25 (36.8%)		

The mean free triiodothyronine (FT₃) and free thyroxine (FT₄) of the control group were 2.89 \pm 0.20 pg/ml and 1.39 \pm 0.09 ng/dl respectively. These mean thyroid hormones were slightly higher in preeclamptic group but within the normal range and not statistically significant. The mean Thyroid Stimulating Hormone (TSH) in control group was 1.80 \pm 0.08 μ IU/ml. it was 6.16 \pm 0.85 μ IU/ml in preeclamptic group, significantly ($p < 0.001$) higher than that of control group (Table 2).

Table 2. Serum FT₃, FT₄ and TSH of the study subjects

Hormones	Cases (n=66) Mean \pm SD/ N (%)	Controls (n=68) Mean \pm SD/ N (%)	t	P
FT ₃ (pg/ml)	3.22 \pm 0.38	2.89 \pm 0.20	1.09	ns
FT ₄ (ng/dl)	1.51 \pm 0.20	1.39 \pm 0.09	1.95	ns
TSH (μ IU/ml)	6.16 \pm 0.85	1.80 \pm 0.08	6.77	<0.001

Results are expressed as mean \pm SD; ns= not significant; Statistical difference was calculated using Student's unpaired 't' test.

The mean FT₃ and FT₄ in mild PE group were 3.55 \pm 0.21 pg/ml and 1.86 \pm 0.12 ng/dl respectively, which were significantly lower in severe PE. The mean TSH in mild PE group was 5.43 \pm 0.55 μ IU/ml. It was slightly higher in severe PE but was not statistically significant (Table 3).

3. Serum FT₃, FT₄ and TSH in PE group on the basis of blood pressure.

Hormones	Mild PE (Sample group) (n=34)	Severe PE (Sample group) (n=32)	t	P
FT ₃ (pg/ml)	3.55 \pm 0.21	2.86 \pm 0.07	5.32	<0.05
FT ₄ (ng/dl)	1.86 \pm 0.12	1.34 \pm 0.08	2.39	<0.05
TSH (μ IU/ml)	5.43 \pm 0.55	6.94 \pm 0.07	1.28	ns

Severe PE (DBP >110 mmHg); Results are expressed as mean \pm SD; n=number of subjects; ns not significant; Statistical difference was calculated using Student's unpaired 't' test.

Discussion

The physiological changes in the thyroid gland during pregnancy are well understood but only a few reports provide information about thyroid function in complicated pregnancies. Preeclampsia is a serious complication of pregnancy with unknown etiology that may occur at any stage of second or third trimester.^{10,11} Data on the level of thyroid hormones in Preeclampsia are still scanty and controversial.¹² A prospective study was conducted by Qublan et al. (2003)¹³ to determine the thyroid function in 27 severe preeclampsia and 26 healthy normotensive controls. Both the groups were matched according to gestational age. They found a statistically significant increase in terms of systolic blood pressure, diastolic blood pressure but there were no significant changes in the levels of free triiodothyronine (FT₃), free thyroxine (FT₄) and thyroid stimulating hormone (TSH) between the two study groups. They concluded that the thyroid function is not altered in preeclampsia. Their finding was in accordance with the current study by Khadem et al. (2012).¹

Basbug et al. (1999)¹⁴ conducted the study on 37 proteinuric preeclamptic and 20 normotensive pregnant women to measure thyroid hormones, TSH and endothelin. A significant decrease in concentrations of total thyroxine (TT₄), total triiodothyronine (TT₃), free thyroxine (FT₄) and free triiodothyronine (FT₃) and a significant increase ($p < 0.01$) in thyroid stimulating hormone (TSH) were observed in preeclamptic group as compared with the normotensive group. The authors believed that changes in thyroid function during pregnancy are accounted for by high levels of circulating estrogen but the mechanism of hypothyroidism in preeclamptic women has not been identified. Lao et al. (1990)¹⁵ measured plasma concentrations of total thyroxine (TT₄) and free thyroxine (FT₄), total triiodothyronine (TT₃) and free triiodothyronine (FT₃), thyroid stimulating hormone (TSH), plasma albumin and urate in 39 proteinuric preeclamptic patients presenting before labor. Preeclamptic patients had significantly lower FT₄ and higher TSH concentrations compared with values in third trimester normotensive pregnancies. The results suggested that mild biochemical hypothyroidism may be found in preeclampsia and the concentrations of TT₃, TT₄, FT₃ and TSH may reflect the severity of preeclampsia.

In this study, the mean TSH value was found to be significantly raised in preeclamptic patients as compared to comparison group. Mean serum Free Triiodothyronine (FT₃) and free Thyroxine (FT₄) in preeclamptic group were remain within normal limit and were not significantly differ than the control

group. It suggests that the subclinical hypothyroidism of the pregnant mother may be associated with the development of preeclampsia. In a study, Kumar et al. (2005)¹⁶ observed that mean serum TSH levels were significantly increased without concomitant changes in free T₃ and T₄ in preeclampsia. Free thyroxine (FT₄) and free triiodothyronine (FT₃) were within normal limits in preeclamptic and normotensive groups. They also suggested that the abnormal TSH titers might be associated with the risk for manifestation of preeclampsia. However, it needs a further study to investigate the causal relationship of subclinical hypothyroidism to develop preeclampsia.

Several studies showed a relation between the level of thyroid hormones and development and severity of preeclampsia. Although pregnancy is usually associated with mild hyperthyroxinemia, preeclamptic women have high incidence of hypothyroidism that may correlate with the severity of Preeclampsia.^{12,14,17} Moderate decrease in thyroid hormones with concomitant increases in TSH levels in maternal serum correlated with severity of preeclampsia. Patients with severe preeclampsia showed significantly lower levels of free T₄ and free T₃ with higher levels of TSH levels in comparison with the mild cases. Changes in results of thyroid function tests induced by preeclampsia might be consequences of the dysfunction in the hypothalamic-pituitary-thyroid axis, secondary to the disease itself.^{12,14} The findings of the present study was in accordance with these studies.

The results of this study have certain implication in clinical practice. Routine estimation of thyroid hormones and TSH in antenatal care of a pregnant mother might be the basis of risk assessment and as well as the hormones replacement therapy to prevent the preeclampsia as well as to prevent maternal and perinatal morbidity and mortality due to preeclampsia.

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Prevalence, treatment and control of hypertension among the elderly people in a rural community of Bangladesh

Md. Rafiqul Alam, Md. Anayet Ullah, ABM Selimuzzaman, Md. Kabiul Hasan, Md. Minarul Islam

Abstract

Background: Hypertension is a worldwide challenge. The prevalence of hypertension among the adult (≥ 15 years) and the elderly people (≥ 60 years) in Bangladesh are 13.5% and 65% respectively. **Objective:** To measure the prevalence of hypertension and its associated factors among the people over 50 years in a rural community of Puthia Upazila, Rajshahi. **Methods:** This was a cross-sectional descriptive type of study conducted among the rural people over fifty years in different villages of Puthia Upazila, Rajshahi, Bangladesh. Total 412 participants over 50 years were included in this study. Data were collected with the help of semi-structured interview schedule by face to face interview. Blood pressure of the respondents were measured by sphygmomanometer and stethoscope. Data were analyzed in computer using SPSS program. Association between variables were conducted applying Chi-square. Multiple logistic regression analysis was used to identify the risk factors of hypertension. **Results:** The prevalence of hypertension among the people over 50 years in the rural community was 44.4%, among them, more than 43% did not received treatment. Only 15.3% of the hypertensive patients controlled their blood pressure. Female, lower monthly family income and diabetes mellitus were identified as important risk factors of hypertension. **Conclusion:** Country-specific guidelines of hypertension based on local competing health care priorities and economic realities is needed to be formulated in Bangladesh. Opportunistic screening at individual level during routine visits in different health care centers in order to identifying patients at high risk of cardiovascular diseases should be encouraged in Bangladesh.

Key words: hypertension, risk factors, Bangladesh.

Introduction

Although blood pressure is easily measurable it has taken several decades to realize that hypertension is a frequent world wide health disorder.¹ Hypertension is a worldwide challenge because of its high prevalence in the adult population and the concomitant increase in risk of stroke, myocardial infarction (MI), congestive heart disease (CHD), sudden cardiac death, peripheral vascular, cerebrovascular and end-stage renal disease.^{2,3} The prevalence of hypertension is showing an upward trend in most countries.⁴ Near the beginning of the twenty-first century, it is estimated that nearly one billion people are affected by hypertension worldwide, and this figure is predicted to increase to 1.5 billion by 2025.⁵ Several community-based investigations have served to emphasize that hypertension is rapidly emerging as a major public health problem also in developing countries. The prevalence of hypertension among the elderly people (≥ 60 years) in Bangladesh and India is 65%.^{6,7} A meta-analysis, covering studies between 1995 and 2009 on the prevalence of hypertension, reported a prevalence of 13.5% in the adult (≥ 15 years) population of Bangladesh.⁸

Risk factors for hypertension include older age, female gender, smoking, alcohol consumption, unemployment, low education level, stress, family history, insufficient physical activities, bad dietary habits, obesity, presence of high systolic (and sometimes diastolic) blood pressure (BP), elevated total (and sometimes LDL) cholesterol, and diabetes mellitus (DM).⁹⁻¹⁰ The main factors responsible for this rising trend are changing life styles, obesity, and behaviour pattern of people etc.⁴

However, only a few of these studies included elderly people, and fewer still have focused exclusively on this segment of the population. The objectives of the present investigation were to evaluate the prevalence, treatment and control of hypertension among elderly individuals living in the community in selected regions of rural Rajshahi. We also examined the impact of socio-demographic characteristics and known risk factors for high blood pressure on the prevalence in the elderly population.

Methods

This was a cross sectional type of descriptive study carried out in the different villages of Puthia

^{*}Department of Community Medicine, Barind Medical College, Rajshahi, Bangladesh.

Correspondence to: M A Ullah
md.anayet_u@yahoo.com

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Upazila of Rajshahi District with a view to find out the prevalence of hypertension and to identify the associated factors of hypertension among the people above 50 years in a rural community. All people above 50 years residing in different villages of Puthia Upazila constituted the study population. Total 410 people were selected as sample unit purposively. Data were collected by 4th year medical students of Barind Medical College with the help of a pretested semi structured interview schedule by face to face interview. Blood pressure of the respondents were measured by sphygmomanometer and stethoscope. The interview schedule was designed to record the socio-demographic characteristics, physical activities, smoking habits and history of Diabetes mellitus. Obtaining informed consent of the respondents and maintaining all confidentiality and privacy, the students conducted an interview session and data were recorded in the questionnaire. The blood pressure of the respondents were measured during the course of the interview. Blood pressure measurements were obtained after the subject had rested for at least 5 min in a seating position. The hypertension status and blood pressure distribution of the study sample were assessed using standard criteria formulated by WHO-International Society of Hypertension (WHO-ISH)¹¹ and the US Sixth Joint National Committee on Detection, Evaluation and Treatment of Hypertension (JNC-VI).¹² Hypertension was defined as either an SBP \geq 140 mm Hg, and/or a DBP \geq 90mmHg, and/or treatment with antihypertensive medication.^{11,12} Data were entered in the computer and processed using SPSS for windows. Descriptive analytical techniques involving frequency distribution, computation of percentage, mean, SD etc. were applied. However, association between variables were conducted applying Chi-square. Multiple logistic regression analysis was used to identify the risk factors of hypertension.

Results

Of the total 412 respondents, 251 (60.2%) were male and the rest 163 (39.8%) were female. More than 65% of the respondents were in the age group of 51 to 60 years, educated only up to Class V, having monthly family income Tk.10000.00 or less and led sedentary life style. More than 31% of the respondents were smoker. Sixteen percent of the respondents having diabetes mellitus (Table 1).

Table 1 Socio-demographic and clinical characteristics of the study subjects. N=412

Characteristics	Number N (%)
Age of the patients	
51 – 60 years	293 (71.1)
61– 70 years	83 (20.2)
>70 years	36 (8.7)
Gender	
Male	251 (60.9)
Female	161 (39.1)
Educational Status	
Up to Class V	279 (67.7)
Class VI – XII	107 (26.0)
>Class XII	26 (6.3)
Monthly family income	
Up to Tk. 10000/-	325 (78.9)
Above Tk. 10000/-	87 (21.1)
Life style	
Sedentary	270 (65.5)
Active	142 (34.5)
Smoking	
Smoker	129 (31.3)
Non smoker	283 (68.7)
Diabetes mellitus	
Present	66 (16.0)
Absent	346 (84.0)

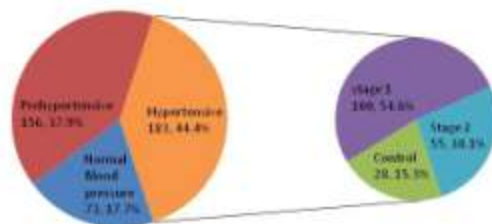


Figure 1. Blood pressure status of the study subjects

A total of 412 adult rural people, 183 (44.4%) were hypertensive (\geq 140/90 mmHg), 156 (37.9%) were pre-hypertensive (120-139/80-89 mmHg) and the rest only 73 (17.7%) were normotensive ($<$ 120/80 mmHg). Out of 183 hypertensive patients, 104 (56.8%) were received treatment and the rest 79 (43.2%) were not received treatment. Only 28 (15.3%) hypertensive people controlled their BP, 100 (54.6%) people had BP at the Stage 1 (140-159/90-99 mmHg) and the rest 55 (30.1%) people had BP at the stage 2 ($>$ 160/100 mmHg) (Figure 1).

Table 2. Factors associated with hypertension. n = 4

Factors	Blood pressure status		p-value
	Normotensive N (%)	Hypertensive N (%)	
Age of the patients			
51 – 60 years (n=293)	168 (57.3)	125 (42.7)	0.522
61– 70 years (n=83)	43 (51.8)	40 (48.2)	
>70 years (n=36)	18 (50.0)	18 (50.0)	
Gender			
Male (n=251)	149 (59.4)	102 (40.6)	0.034
Female (n=161)	80 (49.7)	81 (50.3)	
Educational Status			
Up to Class V (n=279)	166 (59.5)	113 (40.5)	0.041
Class VI – XII (n=107)	53 (49.5)	54 (50.5)	
>Class XII (n=26)	10 (38.5)	16 (61.5)	
Monthly family income			
Up to Tk. 10000/- (n=325)	194 (59.7)	131 (40.3)	0.001
Above Tk. 10000/- (n=87)	35 (40.2)	52 (59.8)	
Life style			
Sedentary (n=270)	145 (53.7)	125 (46.3)	0.290
Active (n=142)	84 (59.2)	58 (40.8)	
Smoking			
Smoker (n = 129)	79 (61.2)	50 (38.8)	0.119
Non smoker (n = 283)	150 (53.0)	133 (47.0)	
History of diabetes mellitus			
Present (n=66)	28 (42.4)	38 (57.6)	0.019
Absent (n=346)	201 (58.1)	145 (41.9)	

Chi-square test applied

The prevalence of hypertension was significantly higher among females, the people having higher educational and economical status, and diabetes people (Table 2). Age, life style and smoking habit of the study subjects were not significantly associated with hypertension. Diabetes mellitus was identified as the most important risk factor of hypertension. Diabetes people had a 1.84(95% CI 1.07 – 3.17) times greater chance to have hypertension than the patients without diabetes. Other risk factors of hypertension identified in this study were lower monthly family income {RR:1.82 (95% CI 1.07 – 3.1), } and female {RR:1.61(95% CI 1.05 – 2.44)}. Lower educational status was not identified as a significant risk factor of hypertension (Table 3).¹²

Table 3. Multiple logistic regression analysis: Risk factors of hypertension.

Variables	Adjusted odds ratio [95% confidence interval (CI)]	p-value
Gender		0.026
Male (n=251)*	1.00	
Female (n=161)	1.61(1.05 - 2.44)	
Educational status		0.202
Up to Class V (n=279)*	1.00	
Class VI – XII (n=107)	1.44 (0.9 – 2.30)	
>Class XII (n=26)	1.81 (0.72 – 4.57)	
Monthly family income		0.026
Up to Tk. 10000/- (n=325)*	1.00	
Above Tk. 10000/- (n=87)	1.82 (1.07 – 3.10)	
History of diabetes mellitus		0.028
Present (n=66)	1.84 (1.07 – 3.17)	
Absent (n=346)*	1.00	

*Reference group

Discussion

Hypertension is a worldwide challenge because of its high prevalence in the adult population. The prevalence of hypertension among older adults over 50 years in low and middle-income countries ranged from 32% to 78%.¹³ Hypertension is a major public health problem in the Indian subcontinent including Bangladesh as well. The prevalence of hypertension among the elderly people (≥ 60 years) in Bangladesh and India is 65%.⁶ In a recent study among the elderly people in the Matlab Health and Demographic Surveillance Area, prevalence of hypertension was 50% among the elderly people but only 26% had control of their blood pressure.¹⁴ The present study findings consistent with these findings and also suggest that hypertension is a striking health problem among the elderly population in rural Bangladesh.

Only 63.8% of the hypertensive patients in this study adhere to antihypertensive treatment. In developed countries, adherence among patients suffering from non-communicable diseases averages 50%.¹⁵ In the United States, 65% of hypertensive individuals received treatment.¹⁶ In Indian subcontinent and China, only 40% and 43% of patients with hypertension adhere to their antihypertensive

medication regimen, respectively.^{7,17} In developing countries, the magnitude of poor adherence is assumed to be higher given the scarcity of health resources and difficulties in access to health care.¹⁸ Comparing the adherence to treatment of hypertension between the developed and developing countries suggests that the magnitude of the poor adherence in rural Bangladesh is not only due to the scarcity of health resources and difficulties in access to health care, but also some other factors, it is needed to investigate.

In this study, prevalence of hypertension was higher for women than for men. It may be due to the menopause.¹⁹ The consistency of this finding is at odds with other studies which show varied gender effects.^{20,21} This study suggested that Prevalence of hypertension increased with age in the rural community of Bangladesh. This is in keeping with the findings of the other studies in Bangladesh and other countries.^{8,13,22} The association of higher educational and economic levels with increased odds of hypertension is in contrast to findings from developed countries, where risk factors for cardiovascular diseases, including hypertension, are more pronounced among the less educated and economically weak groups.^{23,24} But it was inverse in developed countries, when cardiovascular diseases emerged as the modern epidemic at the beginning of twentieth century. It was the disease of the higher social classes in the most affluent societies in the early stages of epidemiological transition. This pattern reverses in the later stages of epidemiological transition, with the burden of chronic disease (including hypertension) and risk factors shifting to the lower social classes (less educated and economically poorer groups).^{25,26} However, it is important to note that the communities surveyed in this study are at an early stage of epidemiological transition. That is why the present study findings is inversed with that of the developed countries. In this study there was no difference between regular physical activity and hypertension although the positive effect of physical training in both primary and secondary prevention of hypertension has been confirmed.²⁷ Thus, further studies are required. This study did not reveal any difference of hypertension between cigarette smokers and cigarette non-smokers. This result is not consistent with that of other researches, i.e. smokers have a significantly higher BP than non-smokers.^{28,29} It may be due to the effect of non cigarette tobacco used. In rural Bangladesh, there are so many cigarette non-smoker used other form of tobacco rather than cigarette. The

association of hypertension with diabetes mellitus has been reported previously on numerous occasions.^{30,31} The present study also agreed with these.

The results of this study have certain public health implications. The present study findings suggest, the problem of hypertension among the elderly people poses a major economic challenge to health care systems in rural Bangladesh. The different guidelines have recommended different approaches towards the cost of treating hypertension, all with good reason. While Canadian hypertension treatment guidelines specifically exclude economic considerations,³² US and WHO guidelines lay the onus for cost considerations on the individual treating physician.^{11,12} The British Hypertension Society guidelines relate the risk level at which treatment is recommended to the availability of resources.³³ We believe it to be crucial that health planners, clinicians, community representatives, and public health practitioners in developing countries formulate country-specific guidelines based on local competing health care priorities and economic realities. These regional guidelines should identify realistic goals, such as the thresholds for treatment, the "desirable" level of blood pressure control, the "affordable" degree of hypertension control, the "acceptable" extent of hypertension control (based on a balance between aspiration for the ideal and what is feasible and achievable), and the likely strategies for achieving these targets. While controversy has raised over the dangers of applying economic considerations in the management of hypertension and the need for social justice and equity, we agree with Swales that the treatment of the hypertensive patient has to take place in the real world of constrained health care systems.³⁴ Consequently, it is important to assess the resources available for detecting and treating hypertension in the rural Bangladesh, given that nearly two-thirds of elderly individuals have elevated blood pressure levels. While mass screening of the elderly population is neither feasible nor sustainable, the existence of a nationwide infrastructure of community health centres offers a unique possibility in the rural Bangladesh. At present, these health centers focus on communicable diseases and family planning programs but they could also be used to promote "opportunistic screening" during routine visits in order to identifying patients at high risk of cardiovascular diseases. The development of affordable screening programs should be accompanied by an evaluation of the efficacy,

acceptability and affordability of low cost treatment regimens. At the individual level, it is important to target for treatment individuals with an increased absolute risk of cardiovascular disease¹¹. These individual level strategies must be combined with population level efforts directed at reducing the average blood pressure of the population (primary prevention of hypertension).

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Hypothyroidism and hyperprolactinemia in infertility: Bangladesh perspective

Gopa Sarker^a, Hasina Akhter^a, Nahid Yusuf^b, Nasrin Rahman^a, Md. Kabiruzzaman^c

Abstract

Background: Infertility is the highest in Bangladesh among all South Asian countries. Hypothyroidism specially subclinical hypothyroidism is a prevailing cause of infertility and habitual abortion. **Objective:** To find out the prevalence of hypothyroidism specially subclinical hypothyroidism as well as hyperprolactinemia in infertility. **Methods:** This was a cross-sectional comparative type of study conducted at Obstetrics & Gynaecology Out Patient Department (OPD) of Rajshahi Medical College Hospital (RMCH), Bangladesh. The sample size was 94. Data on nature of infertility, clinical presentations and biochemical findings were collected by a preformed Data Collection Sheet. Serum hormone assay TSH, T3, T4, and prolactin (PRL) were done in Institute of Nuclear Medicine and Allied Sciences (INMAS), Rajshahi, Bangladesh. Pearson's chi-square and student's 't' test were applied to determine differences in proportions and means respectively. **Results:** Prevalence of clinical hypothyroidism, subclinical hypothyroidism and hyperprolactinemia were 10.6%, 29.8% and 22.3% respectively in study subjects. Prevalence of hypothyroidism and hyperprolactinemia were significantly higher in primary than in secondary infertility. Prevalence of subclinical hypothyroidism was 37.7% in primary and 15.2% in secondary infertility. Prevalence of hyperprolactinemia was 27.9% in primary and 12.1% in secondary infertility. The mean TSH and Prolactin values in primary infertile women (3.14 ± 2.21 mIU/L and 507 ± 206 mIU/L) were significantly higher than those of secondary infertile women (1.35 ± 1.87 mIU/L and 422 ± 136 mIU/L). There was no correlation between TSH and prolactin levels in both primary and secondary infertility. **Conclusion:** Hypothyroidism specially subclinical hypothyroidism and hyperprolactinemia are important health disorders in Bangladeshi infertile women. Further studies are needed to clarify the etiology of the hypothyroidism and hyperprolactinemia for better management of infertility cases.

Key words: infertility, hypothyroidism, hyperprolactinemia, Bangladesh.

Introduction

Infertility is not a physically debilitating disease. However, the desire to have a child is the strongest that people experience, and no wonder that infertility is ranked among life's greatest stresses, similar in intensity of having a life threatening illness.¹ Infertility affects at least 12% of couples worldwide.² It is 10 – 15% in Western countries.³ Infertility rate is approximately 15% in Bangladesh, which is the highest among all South Asian countries.^{4,5}

Prevalence of hypothyroidism in the reproductive age group is 2-4% and has been shown to be the cause of infertility and habitual abortion.^{6,7} Hypothyroidism can be easily detected by assessing thyroid stimulating hormone (TSH) levels in the blood. A slight increase in TSH levels with normal triiodothyroxine (T3) and thyroxine (T4), indicates subclinical hypothyroidism whereas high TSH level accompanied by low T₃ and T₄ levels indicate clinical hypothyroidism.⁸ Subclinical hypothyroidism is more common. It can cause anovulation directly or by causing elevation in PRL. It is extremely important to diagnose and treat the subclinical hypothyroidism for pregnancy and to maintain it unless there are other independent risk

factors. Many infertile women with hypothyroidism had associated hyperprolactinemia due to increased production of thyrotropin releasing hormone (TRH) in ovulatory dysfunction.^{9,10} Traditionally, measurements of prolactin and thyroid stimulating hormone have been considered important components of the evaluation of women presenting with infertility.¹¹ Hypothyroidism in females, maternal hypothyroidism and sub-clinical hypothyroidism, have all come under a lot of discussion recently.¹²

Due to the lack of infertility data of women with hypothyroidism in Bangladesh, it is intended to find out the prevalence of hypothyroidism specially subclinical hypothyroidism as well as hyperprolactinemia and correlation between TSH and prolactin levels both in primary and secondary infertility.

Methods

This was a cross-sectional descriptive type of study conducted at Obstetrics & Gynaecology Out Patient Department (OPD) of Rajshahi Medical College Hospital (RMCH), Bangladesh. All the infertile women attending at the OPD of RMCH for seeking fertility treatment constitute the study population. A

^aDepartment of Gynaecology and Obstetrics, Barind Medical College, Rajshahi, Bangladesh.

^bDepartment of Gynaecology and Obstetrics, Rajshahi Medical College, Rajshahi, Bangladesh.

^cInstitute of Nuclear Medicine and Allied Sciences (INMAS), Rajshahi, Bangladesh.

Correspondence to :
G Sarker
gopasarkerme@yahoo.com

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total of 94 infertile women attended at the OPD were included in this study. The women who were with liver, renal or cardiac diseases; those already on treatment for thyroid disorders or hyperprolactinemia; or whose male partner identified as infertile were excluded from the study. Before selecting the women, informed written consent was taken from each of them.

Data were collected by a preformed Data Collection Sheet (DCS). The DCS was designed to record the nature of infertility, clinical presentations and biochemical findings. The information were recorded from the patients' treatment slips, investigation reports, interview with the patients and consultation with the concerned doctors when necessities. Serum hormone assay TSH, T3, T4, and prolactin (PRL) were done in Institute of Nuclear Medicine and Allied Sciences (INMAS), Rajshahi, Bangladesh. Normal TSH and PRL levels were 0.3–3.0 mIU/L (as per American Association of Clinical Endocrinologists)¹³ and < 460 mIU/L¹² respectively. Therefore, hypothyroidism was considered at TSH levels of > 3 mIU/L and hyperprolactinemia at PRL levels of >460 mIU/L. Depending upon the T3 & T4 levels, hypothyroid infertile women were further subdivided into clinical and subclinical hypothyroidism. Clinical hypothyroidism was considered at TSH levels of > 3 mIU/L with decreased serum T3 (<1.1 nmol/L) and T4 (<54.0 nmol/L) levels than normal. Subclinical hypothyroidism was considered at TSH levels of >3mIU/L with normal serum T3 (1.1–2.7 nmol/L) and T4 (54.0–173.0 nmol/L) levels.

Chi-square test was applied to find out the association between nature of infertility and patients' clinical presentation, hypothyroidism and hyperprolactinemia. Student's t test was applied to observe any significant difference of mean TSH and Prolactin values between primary and secondary infertile women. Correlation between serum TSH and Prolactin level in both primary and secondary infertility was calculated.

Results

A total of 94 women with primary (n=61) and secondary (n=33) infertility were included in this study. Out of 61 primary infertile women, 29(47.5%), 31(50.8%), 32 (52.5%) and 45 (73.8%) women had irregular menstrual cycle, hirsutism, polycystic ovary and body mass index 25 or more. Among the secondary infertile women these clinical

findings except body mass index 25 or more were significantly lower than those of primary infertile women (Table 1).

Table 1. Clinical findings of women with primary and secondary infertility.

Clinical findings	Infertility		P-value
	Primary N= 61	Secondary N = 33	
Irregular menstruation	47.5% (29)	21.2% (7)	0.015
Hirsutism	50.8% (31)	12.1% (4)	0.000
Polycystic Ovary (PCO)	52.5% (32)	12.1% (4)	0.000
Body Mass Index 25 or above	73.8% (45)	63.6% (21)	0.214

A total of 94 infertile women, 10(10.6%) were clinical hypothyroid, 28 (29.8%) were subclinical hypothyroid and the rest 56 (59.6%) were euthyroid women. None of the infertile women was hyperthyroid. Prevalence of clinical hypothyroidism was 14.8% in primary infertile and it was only 3.0% in secondary infertility. Prevalence of subclinical hypothyroidism was 37.7% in primary infertile women. It was 15.2% in secondary infertile women. Prevalence of hyperprolactinemia was 27.9% in primary and 12.1% in secondary infertile, and over all prevalence was 22.3% (Table 2).

Table 2. Serum thyroid stimulating hormone and Prolactin levels in primary and secondary infertility.

Hormones	Status	Type of fertility		Total N(%)	P Value
		Primary N(%)	Secondary N(%)		
TSH (mIU/L)	Clinical hypothyroidism	9 (14.8)	1 (3.0)	10 (10.6)	10.64, p=.005
	Subclinical hypothyroidism	23 (37.7)	5 (15.2)	28 (29.8)	
	Euthyroidism	29 (47.5)	27 (81.8)	56 (59.6)	
	Total	61 (64.9)	33 (35.1)	94 (100.0)	
Prolactin (mIU/L)	Hyperprolactinemia	17 (27.9)	4 (12.1)	21 (22.3)	3.06, p= 0.065
	Normal	44 (72.1)	29 (87.9)	73 (77.7)	
	Total N(%)	61 (64.9)	33 (35.1)	94 (100.0)	

The mean TSH value in primary infertile women (3.14±2.21 mIU/L) was significantly higher than that of secondary infertile women (1.35±1.87 mIU/L). The mean Prolactin value in primary infertile women (507±206 mIU/L) was too significantly higher than that of secondary infertile women (422±136 mIU/L) (Table 3). There was no

correlation between TSH and prolactin levels in both primary and secondary infertility.

Table 3. Serum TSH and prolactin level in primary and secondary infertile women.

Type of infertility	TSH level mean \pm SD mIU/L	Prolactin level mean \pm SD mIU/L
Primary	3.14 \pm 2.21	507 \pm 206
secondary	1.35 \pm 1.87	422 \pm 136
P-value	0.000	0.019

Discussion

The prevalence of hypothyroidism, specially subclinical hypothyroidism among the present study population was much higher than (those previously reported in Bangladesh) that reported by Akter et al.¹² in Mymensingh, Bangladesh. They were reported that prevalence of sub-clinical hypothyroidism was 6.5% in primary and 15% in secondary infertility. The higher prevalence of hypothyroidism reported in this present study may be due to use of narrow reference range of TSH which is recently recommended by American Association of Clinical Endocrinologists.¹³ But the present study findings and the previous report of Akter et al.¹² suggested that hypothyroidism, specially subclinical hypothyroidism in infertility is a major health problem in Bangladesh like other countries of the world.¹⁴⁻¹⁷ In the present study, the prevalence of hyperprolactinemia was 22.3%, which is much lower (37.5%) than in Mymensingh, Bangladesh¹², but similar with the findings in North India (18.3%).¹⁵ The prevalence of hyperprolactinemia was higher in Iraq (60%)¹⁸ and in Hyderabad, India (41%)¹⁹ as compared to the present study in Northern part of Bangladesh. Hyperprolactinemia may result from stress, and the variable prevalence may be due to the different stress levels in different areas.

In this study, prevalence of hypothyroidism both clinical and subclinical was significantly higher ($P=0.005$) in primary infertility than in secondary infertility and mean serum TSH in primary infertility (3.14 \pm 2.21 mIU/L) was also comparatively higher than in secondary infertility group (1.35 \pm 1.87 mIU/L). As Northern part of Bangladesh is an iodine-deficient zone, this may be one of the reasons for the higher prevalence of hypothyroidism in primary infertility. But it is not consistent with a previous study by Akter et al.¹² Akter et al.¹² reported higher prevalence of hypothyroidism in secondary than primary infertility. They suggested that the higher prevalence of hypothyroidism in secondary infertility due to antibody reaction. They

considered the sequel of previous autoimmune thyroid diseases (AITD) which caused the thyroid function to worsen after the first conception leading secondary infertility. Although they did not evaluate thyroid antibodies in their study.

Hypothyroidism is associated with increased production of thyrotropin-releasing hormone (TRH), which stimulates pituitary to secrete TSH and PRL release.^{20,21} So the higher prevalence of hyperprolactinemia and higher mean serum prolactin in primary than secondary infertility found in this present study may be explained by this phenomenon. A significantly higher prevalence of oligomenorrhea, hirsutism, polycystic ovaries and body Mass Index 25 or above reflected the higher prevalence of hypothyroidism / high TSH level and hyperprolactinemia / high PRL level in primary than secondary infertility also consistent with this phenomenon. In a study by Cramer et al.¹¹, TSH and prolactin were positively correlated in women undergoing In Vitro Fertilization (IVF). In this study, no correlation was observed between TSH and PRL levels in primary or secondary infertility.

This study has some limitations. The sample size was small. Identification of clinical and subclinical hypothyroidism was done on the basis of biochemical (TSH, T3 and T4) analysis, clinical findings of hypothyroidism were not considered.

The findings of this study have some implications for further research on hypothyroidism and hyperprolactinemia in infertility in Bangladesh. Further studies are recommended with a large sample size and long follow-up to validate the variation in TSH and prolactin levels in primary and secondary infertility and to clarify the etiology of the hypothyroidism and hyperprolactinemia for better management of infertility cases.

Conclusion

Hypothyroidism specially subclinical hypothyroidism and hyperprolactinemia are important health disorders in Bangladeshi infertile women. Further studies are needed to clarify the etiology of the hypothyroidism and hyperprolactinemia for better management of infertility cases.

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Curriculum for Undergraduate Medical Education in Bangladesh 2012: Reflection of Teachers' & Students' Expectation

Md. Anayet Ullah^a, A.B.M.Selimuzzaman^a, Md. Jawadul Haque^b, Gopal Chandra Sarker^c, M. Monsur Rahman^d

Abstract

Background: Medical education is a dynamic and continuous process. Curriculum for under-graduate medical education in Bangladesh has updated in 2012. Before 2012 it was updated in 2002. **Objective:** To explore the students' and teachers' feedback on the structure and contents of the undergraduate MBBS curriculum 2002 and reflection of their expectation in latest update, undergraduate MBBS curriculum 2012. **Methods:** A total of 845 students and 171 teachers of Rajshahi Medical College and Islamic Bank Medical College, Rajshahi, Bangladesh participated in this study. Students' and teachers' perceptions and suggestions regarding the undergraduate MBBS curriculum 2002 were measured in 2009 before update it by a pretested self-administered questionnaire. Data were analyzed by SPSS for windows. Descriptive analytical techniques involving frequency distribution, computation of percentage etc. were done. **Results:** Of the 845 students and 171 teachers, 404 (47.8%) students and 119 (69.6%) teachers were not in favor of the frame work of Phase II of the curriculum updated in 2002. Majority of them suggested to split the 2 years of phase II into two equal parts, 1 year each. Of the 845 students and 171 teachers, 361 (42.7%) students and 30 (17.5%) teachers perceived that the contents of the curriculum was overloaded. More than 65% of the students and 61.4% of the teachers were not in favor of 6 monthly professional examination scheduled. Majority of them suggested 3 monthly schedule of the professional examination. **Conclusion:** The unmet issues of recent updated undergraduate curriculum, like subject distribution in Phase II and Phase III, content overload and provision of professional examination at the 3 months interval should be considered during the future curriculum review.

Key words: undergraduate medical education curriculum, teachers & students, expectation

Introduction

Change is an inevitable consequence of progress and development. Medical education is a dynamic and continuous process. During the last two decades, many authorities like World Federation for Medical Education (WFME) (The Edinburgh Declaration) and General Medical Council (GMC) (Tomorrow's Doctors) highlighted the need for reorientation of medical education and suggested strategies for such changes.^{1,2} Various innovations and trends which have been under-taken globally as strategies include education for capability to reduce information overload, community oriented medical education, problem based learning, early patient contact and integrated learning.^{2,3}

In the light of the above situation, the preceding under-graduate medical education curriculum in Bangladesh was introduced in 2002. It had 3 segments Phase I (preclinical), Phase II (para-clinical) and Phase III (clinical). During first one & half years (Phase I), students learned about preclinical subjects such as Anatomy, Physiology and Bio-chemistry and introductory chapters of one para-clinical subject, Community Medicine Part I. During next 2 years (Phase II), students learned

about 5 para-clinical subjects such as Pharmacology, Forensic Medicine, Pathology, Microbiology and Community Medicine Part II with their clinical subjects like Medicine, Surgery and Gynaecology & Obstetrics. During this time students were also attached to the wards for their clinical training. In the Phase III (last one & half years), students continued to learn about Medicine, Surgery, Gynaecology & Obstetrics. There are provisions of three professional examinations each at the end of each phase. Each professional examination was held twice a year, within an interval of 6 months. Unsuccessful students of a professional examination had to wait 6 months for their supplementary examination.⁴ In 2012 Bangladesh Medical & Dental Council introduced the current undergraduate MBBS curriculum with some modification of previous one. In present curriculum the total course is divided into four phases. The present course structure is the similar the previous curriculum with some modifications. Major modification are: reduction of Community Medicine Part I teaching hours from 30 hours to 5 hours in phase I, splitting of previous Phase II into equal two phases (Phase II and Phase III) with their subjects and provision of professional examination at the end of each phase.

^aDepartment of Community Medicine, Barind Medical College, Rajshahi, Bangladesh.

^bDepartment of Community Medicine, Rajshahi Medical College, Rajshahi, Bangladesh.

^cDepartment of Physiology, Barind Medical College, Rajshahi, Bangladesh.

^dDepartment of Forensic Medicine, Barind Medical College, Rajshahi, Bangladesh.

Correspondence to :
M. A. Ullah
md.anayet_u@yahoo.com

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The present study has been taken to explore the students' and teachers' feedback on the structure and contents of the undergraduate MBBS curriculum 2002 and reflection of their expectation in updated curriculum 2012. It is believed that this is very much essential for the future curriculum review.

Methods

The study was conducted at Rajshahi Medical College (RMC) and Islamic Bank Medical College (IBMC), Rajshahi, Bangladesh. Data regarding the structure and contents of the undergraduate MBBS curriculum 2002 were collected from the students and teachers of both the institutions during September to November 2009 by a pretested self-administered questionnaire. The questionnaires were distributed to the students of each year at the end of a lecture class and were collected with the responses. Data from the teachers of both the institutions were collected by personal contact at any convenient time. Written informed consent forms were signed by the students and teachers before responding to the questionnaires. The questionnaire was designed to record the perceptions and suggestions of the students and teachers on course structure both time frame and subjects, time of professional examination and content overload of the existing undergraduate medical curriculum (Curriculum 2002) during that time. The perceptions of the teachers and students were measured by a five points Likert scale with the following rating scheme 1-strongly disagree (SDA), 2-disagree(DA), 3-un-decide(UD), 4- agree(A) and 5- strongly agree (SA).

Data were computed and processed using SPSS for windows. During data analysis, the collected data by five points Likert scale were collapsed to a three points scale, Strongly Disagree & Disagree=1, Un-decide=2, and Strongly Agree & Agree=3. Descriptive analytical techniques involving frequency distribution, computation of percentage etc. were done.

Results

All the teachers, 216 (RMC-160 & IBMC-56) and students, 993 (RMC-747 and IBMC-246) of these two institutions were invited to participate in the study. Among them 171 (79.1%) of the teachers and 845 (85.09%) of the students responded. Of the 845 students and 171 teachers, 404 (47.8%) students and 119 (69.6%) teachers were not in favor of the frame work of Phase II of the curriculum 2002 (Table I). Majority of these dissatisfied students and teachers

suggested to the phase II into two equal parts as part I (May be as phase II) & Part II (May be as Phase III), 1 year each (Table II).

Of the 845 students and 171 teachers, 396 (46.9%) students and 119 (69.6%) teachers were not satisfied with the subjects contents of Phase II (Table 1). Of the 396 disagreed students, majority (62.6%) suggested Pharmacology and Community Medicine Part II in Part I/phase II(proposed) and Forensic Medicine, pathology & microbiology in Part II/phase III (Proposed) of Phase II. But more than 80% of the disagreed teachers suggested Pharmacology and Forensic Medicine in Part I/phase II(proposed) and Community Medicine Part II, Pathology & Microbiology in Part II/phase III (Proposed) of Phase II (Table 2).

Table 1 Students' and teachers' opinion on the structure of the present undergraduate medical curriculum. n=845/171^a

Structural Characteristics of the present undergraduate medical curriculum	Disagreed by	
	Students N (%)	Teachers N (%)
Frame work		
Length of the total course (5 years)	51 (6.0)	16 (9.4)
Phase I (1.5 years)	106 (12.5)	64 (37.4)
Phase II (2 years)	404 (47.8)	119 (69.6)
Phase III (1.5 years)	135 (16.0)	62 (36.3)
Course contents		
In Phase I: Anatomy, Physiology, Bio-chemistry & Community Medicine Part I	424 (50.2)	121 (70.8)
In Phase II: Pharmacology, Forensic Medicine, Community Medicine Part II, Pathology & Microbiology	396 (46.9)	119 (69.6)
In Phase III: Medicine, Surgery & Gynaecology & Obstetrics	00 (0.0)	00 (0.0)
Professional examination in the course		
3 Professional examinations, at the end of the each phase	396 (46.9)	119 (69.6)
Number of examination in a year		
2 Professional examinations, six months interval	556 (65.8)	105 (61.4)

^aStudent

^bTeacher

Of the 845 students and 171 teachers, 396 (46.9%) students and 119 (69.6%) teachers were not satisfied with the professional examination schedule of the curriculum 2002 (Table I). All of the students and 98.3% of the teachers, who were not satisfied with the professional examination schedule, suggested to implement 1 extra professional examination at the end of the suggested Part I of Phase II (Table 2).

Of the 845 students and 171 teachers, 556 (65.8%) students and 105 (61.4%) teachers were not satisfied with the existing professional examinations schedule i.e. twice in a year, after 6 months interval (Table 1). Majority of them suggested four professional examination in a year i.e. 3 months interval (Table 2).

Table 2 Suggestions of the disagreed students and teachers on the structure of the present undergraduate medical curriculum.

Suggestion	Suggested by	
	Student N(%)	Teacher N(%)
Regarding frame work		
<i>Length of the total course</i> n = 517/16 ^a		
Extension of the course to 6 years	51 (100.0)	16 (100.0)
<i>Phase I</i> n = 106/62 ^b		
Extension of the phase to 2 years	106 (100.0)	62 (96.9)
Split the phase into Part I (1 year) and Part II (1.5 years)	00 (0.0)	2 (3.1)
<i>Phase II</i> n = 404/119 ^b		
Contraction of the phase to 1.5 years	8 (2.0)	00 (0.0)
Split the phase into Part I (1 year) and Part II (1 years)	369 (91.3)	119 (100.0)
Split the phase into Part I (1.5 years) and Part II (1 year)	21 (5.2)	00 (0.0)
Split the phase into Part I (1.5 years) and Part II (1.5 years)	4 (1.0)	00 (0.0)
Split the phase into Part I (2 years) and Part II (1 years)	2 (0.5)	00 (0.0)
<i>Phase III</i> n = 135/62 ^b		
Contraction of the phase to 1 year	82 (60.7)	48 (77.4)
Extension of the phase to 2 years	53 (39.3)	14 (22.6)
Regarding course contents		
<i>Phase I</i> n = 424/121 ^b		
Anatomy, Physiology & Bio-chemistry	424 (100.0)	119 (98.3)
Anatomy & Physiology in Part I and, Bio-chemistry and Pharmacology in Part II	00 (0.0)	2 (1.7)
<i>Phase II</i> n = 396/119 ^b		
Pharmacology & Community Medicine in Part I and, Forensic Medicine, Pathology & Microbiology in Part II	248 (62.6)	14 (11.7)
Pharmacology, Forensic Medicine & Community Medicine in Part I and Pathology & Microbiology in Part II	47 (11.9)	00 (0.0)
Pharmacology & Forensic Medicine in Part I and Community Medicine, Pathology & Microbiology in Part II	36 (9.1)	97 (81.5)
Forensic Medicine, Pathology & Microbiology in Part I and Pharmacology & Community Medicine in Part II	33 (8.3)	2 (1.7)
Pharmacology, Forensic Medicine & Microbiology in Part I and Community Medicine & Pathology in Part II	18 (4.5)	2 (1.7)
Pharmacology, Pathology & Microbiology in Part I and Forensic Medicine & Community Medicine in Part II	9 (2.3)	2 (1.7)
Forensic Medicine & Community Medicine in Part I and Pharmacology, Pathology & Microbiology in Part II	5 (1.3)	00 (0.0)
Forensic Medicine & Community Medicine in Part I and Pathology & Microbiology in Part II	00 (0.0)	2 (1.7)
Regarding professional examination n = 396/119 ^b		
4 professional examinations, each at the end of Phase I, Part I & part II of Phase II and Phase III respectively	396 (100.0)	117 (98.3)
5 professional examinations, each at the end of Part I & part II of Phase I, Part I & part II of Phase II and Phase III respectively	00 (0.0)	2 (1.7)
Regarding repeat (supplementary) professional examinations n = 556/105 ^a		
After 2 months of previous professional examination	79 (12.6)	19 (18.1)
After 3 months of previous professional examination	334 (60.1)	61 (58.1)
After 4 months of previous professional examination	152 (27.3)	25 (23.8)

^aStudent

^bTeacher

Of the 845 students and 171 teachers, 361 (42.7%) students and 30 (17.55) teachers perceived that the under graduate medical curriculum was content overloaded. More than 50.% of the students and 70.8% of the teachers were dissatisfied with the subjects contained in Phase I of the curriculum 2002 (Table 1). Among them all the students and 98.3% of the teachers suggested to exclude Community Medicine Part I from Phase I (Table 2).

Discussion

The length of the undergraduate medical course varies from 4-6 years in different countries though preadmission educational level of the students are very similar. It is 5 years in most of the medical schools in UK and Australia. In US and Canada the standard undergraduate medical curriculum is 4 years. In Germany it is 6 years.⁵ The medical schools in Bangladesh traditionally follow the British medical education system and offer 5 years undergraduate medical course leading to the award of MBBS (Bachelor of medicine and bachelor of Surgery).⁶ The present study findings suggest that most of the students and teachers are in favor of the present length of undergraduate medical education in Bangladesh. It is also reflected in present curriculum.

In the Undergraduate MBBS Medical Education Curriculum 2002 in Bangladesh, Phase-I (preclinical) is 1.5 years, it was 2 years in previous curriculums before 2002.⁷ Due to shortening of the Phase I, students get opportunity to early clinical exposure in Phase II. This early clinical exposure of the students is consistent to the recommendation of Tomorrow's Doctors of the General Medical Council (GMC) of UK.² Most of the medical schools in the different countries of the world like India, UK also have reduced the duration of the preclinical phase of their undergraduate medical curriculum to 1 year by discarding the unnecessary scientific knowledge irrelevant to clinical practice from the curriculum contents in basic subjects.^{8,9} They teach the students

only the basic principles of preclinical subjects in phase I. They teach preclinical subjects further in diluted form by integrated organ/system based approach with clinical subjects in the subsequent phases. Most of the students and teachers in the present study are in favor of 1.5 year as the length of the phase I. This is reflected in newly introduced curriculum (Undergraduate MBBS curriculum 2012), the length of the phase I is remained unchanged. But a considerable proportion of the participants specially teachers are not satisfied with it and advised to extend it to 2 years. A possible explanation for this findings is that vertical integration between basics and clinical subjects is very poor, it is nearly absent in Bangladesh.⁶ So the shortening of the Phase I aggravated the information overloaded per unit of time. Additionally many medical teachers of basic subjects believe that the claim continuous teaching of the basic subjects specially anatomy through out the undergraduate medical curriculum is not true.¹⁰

Adoption of community orientation in medical education has potential benefits for the students, the medical schools and also for the community.¹¹ Community oriented medical education is one of the trends during the last few decades in medical education. As a strategy of community oriented medical education most of the medical schools of the world including Bangladesh introduced community medicine from first year to fifth year in their undergraduate medical curriculum. But in this study majority of the students and teachers suggested to exclude the community medicine Part I from Phase I. This students' and teachers' expectation is reflected in the present curriculum, only five teaching hours is allocated for the community medicine Part I in phase I. Though it is conflicting with the recommendation of Tomorrow's Doctors of the General Medical Council (GMC) of UK.² In the curriculum 2002, the duration of the Phase I was reduced from 2 to 1.5 years, but the contents of the subjects remain same as before. The shortening of the Phase I aggravated the information overloaded per unit of time. This may be possible reason of this type of students' and teachers' suggestion.

The study findings suggested that splitting Phase II into two separate phases of equal duration (1 year) by the subjects and introduction of 1 extra professional examination at the end of the first part is the key solution of the students and teachers disappointment with existing frame work and subjects contents of Phase II, and existing

professional examination schedule. A possible explanation for this findings is that students may feel discomfort, anxiety, tension due to load of 5 subjects at a time. It keeps students busy all year round with the same level of burden instead of the piling up of work at the end of the year. Pakistan and India follow conventional undergraduate medical curriculum. They paraclinical phase (phase II) is divided into two parts and the subjects were assessed by two separate professional examinations, like Pharmacology, Forensic Medicine and Microbiology by 2nd professional examination at the end of the 3rd year, and Community Medicine and Pathology by 3rd professional examination at the end of 4th year,¹² which was suggested by most of the students and teachers in this study. In present curriculum there is partial reflection of students' and teachers expectation. Students' and teachers' expectations regarding the splitting of Phase II and provision of professional examination are reflected in present curriculum. But the subject distribution in the splitting parts of the previous Phase II are not consistent with the students' and teachers' expectations. Subject distribution in the splitting parts of Phase II in present curriculum was suggested only few students in this study. And none of the teachers suggested this type of subject distribution. However, It should be considered in future curriculum review.

The perception toward the curriculum 2002 as overloaded among the students was remarkably higher (42.7% vs 17.5%) than that was among the teachers. It may be due to hidden curriculum. Because many medical teachers of basic subjects believe that detail basic medical sciences knowledge is needed for becoming a good doctor, and clinicians during clinical posting also expect their students' strong prior knowledge of basic medical sciences. However, the study findings suggests that definitely there is a overloading of the undergraduate medical curriculum in Bangladesh. Studies¹³⁻¹⁵ suggested different strategies to overcome this problem such as integrated both vertical and horizontal teaching learning approach. In Bangladesh, the demarcation between basic and clinical sciences is very clear with very little integration. Integrated teaching in different subjects on a particular organ or system by teachers from various disciplines is very much advocated in the present curriculum, but in the most of the subjects, its approaches were not well defined. In some subjects, like anatomy arrangement of a seminar is advised after completion of each card where teachers from various disciplines can address

organs or organ systems from different functional and clinical angles. But it goes against the issue of overloading, because this type of seminars don't minimize but maximize the duplications of teaching. This approach is not also realistic. Organ / system based integrated learning program is feasible within a conventional medical curriculum. In India some medical colleges following traditional curriculum have successfully introduced integrated organ / system based learning modules in the first year and also in clinical clerkship. Teaching throughout the medical course should be directed and coordinated at Faculty level rather than at departmental level, hence lessening the tendency of rapid accumulation of factual content and duplication of teaching. In Bangladesh, there is an individual Phase Committee for each phase consisting the subject specialists of the subjects remained under its jurisdiction, not from the subjects of other phases. So, horizontal duplication of the subject matters may be prevented by the each phase committee but vertical duplications can't be. Practically, the phase committees coordinate only the assessments and time space of the different subjects, nothing about the subject contents. The course contents should be given much more emphasis on applied aspects so that students can apply this knowledge in clinical medicine in third year. Additionally organization of courses / subjects is mainly departmental based. Educational objectives and core curricula are being defined for individual subjects and modules throughout the course. During the development of the curriculum 2002, a special study guide book was also developed and introduced containing core curriculum as guide for the students and teachers. But how far it is followed is questionable. To overcome this problem, teachers should also be aware about the strategy of "need to know" to identify the subject materials.

Majority of the students and teachers suggested the provision of professional examination at 3 months interval instead of 6 months. They probably thought that those who need to appear supplementary examination majority of them will be able to prepare themselves for examination within 3 months and as well as it will be easy to catch up the subjects that are taught during the last 3 months. In 6 months option students have only two opportunities to join their main stream, after failure of 2nd time in supplementary examination, they bound to join the next year students. This may be another possible reason for rejection of the existing 6 monthly examination option. This students and teachers

expectation was remained unmet in recent introduced curriculum.

The results of this study have certain implication in future curriculum review and further research. The study findings suggest further researches to explore the motives of negative attitudes of the students and teachers towards teaching of community medicine in phase I and formulate the effective strategies to accumulate the community medicine teaching in this phase. To add about phase I the unmet issues of recent updated undergraduate curriculum, like subject distribution in Phase II and Phase III, content overload and provision of professional examination at the 3 months interval should be consider during the future curriculum review.

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Nanotechnology in Biomedical Applications

Mayeesha Masrura Haque^a, M. Manzurul Haque^b

Abstract

Nanotechnology is an emerging field of Materials Science which deals with design, production, characterization and fundamental understanding of physical properties and construction of devices at nanoscale. Imaging and microscopy have been experiencing an explosive proliferation over the last decade. Atomic force microscopy (AFM) is a powerful and widely used imaging technique visualizing processes at the single-molecule level down to 10 nm and viruses smaller than 100 nm in diameter. Medical scientists started using the unique physical capabilities of material at nanoscale to be applicable in biomedical science. They believe that potential applications of Nanotechnology are practically unlimited. Nanotechnology is being used in different sectors of medical science in early detection and adequate treatment of some of the life threatening medical conditions. It also is being used in diagnostic and prognostic fields as well. However before going to a large scale application of nanotechnology in biomedical practice, adequate assessment of safety should be ensured.

Key words: Nanotechnology, medical science, biomedical application.

Introduction

The biomedical world has been dramatically revolutionized with the recent developments of nanotechnology. Researchers, scientists, and physicians across various disciplines and specialties are working to develop innovative clinical tools that incorporate materials, devices, and systems engineered at the nanoscale.¹ A nanometer is a billionth of a meter and the real challenge in nanotechnology is to address the ability to measure, manipulate and assemble matter with features on the scale of 1-100 nm. The exciting developments of nanotechnology leads to an inconceivably entrancing territory of scientific study and can hold answers for a good lot of delicate unsolved issues of biomedical sciences.

Coordination of various research fields of science and technologies at multiple levels and their convergence at a focal point has resulted in an exciting and unprecedented progress and innovations in nanotechnology. It appears to be a reality that medical diagnostics and management is going to be applicable on each of the nearly 75 trillion cells of the human body systems individually and it is not a science fiction.²

History of Nanotechnology in Biomedical sciences

Famous physicist, Nobel laureate, Richard P. Feynman first dreamt of nano-surgical procedures for application in medical science.³ In 1986, K. Eric Drexler introduced the idea of injecting the small robots into the human body.⁴ At a stage scientists proposed for other small machines which might be permanently incorporated in the body to assist some inadequately functioning organ, to monitor vital

parameters of human physiology and most importantly, to fix disorders at molecular level as and when necessary.⁵ At the beginning of the twenty first century, Japanese scientists developed tiny magnetically driven spinning machines swimming along veins to carry drugs to infected tissues.⁶ There were attempts to use variable MRI magnetic fields to generate forces on a microrobot, developing sufficient propulsive power to direct the small device through the human body.⁷

Nanobiotechnology is a multidisciplinary field of science leading to the development of pharmaceutical drug delivery devices and biomedical imaging modalities at nanoscale.^{8,9} It is currently undergoing explosive development to generate innovations and going to play a critical role in future of medical science.^{10,11} Nanoparticles (NPs) have emerged as an important tool to deliver conventional drugs, recombinant proteins, vaccines and more recently, nucleotides and are expected to modify the drug release pattern, absorption, distribution, metabolism, excretion and therapeutic responses.¹²

Atomic force microscopy (AFM) is a powerful imaging modality visualizing phenomenon at the cellular level both in air and in solution.¹³ An AFM-based nanorobot was developed to visualize and quantify the dynamics of cell proteins interactions under physiological and pathophysiological conditions at the nanoscale leading to delineation of causes of many life-threatening or incurable diseases.¹⁴ This can be regarded as a novel approach to reveal disease markers and elucidate the disease mechanisms.¹⁵ AFM has the advantages of high-resolution imaging and a vacuum-free working environment. In recent

^aDepartment of Material Science and Engineering, University of Rajshahi.

^bDepartment of Surgery, Barind Medical College, Rajshahi, Bangladesh.

Correspondence to :
M M Haque
mayeesha009@yahoo.com

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years, it played an increasingly important role in biomedical research as well as applications.^{14,15,16}

Nanotechnology in Biomedical Applications

Potential applications of Nanotechnology are practically unlimited. Various salts of silver and their derivatives that act as antimicrobial agents are used to treat burns wounds and infections. Recent studies have reported that nanosized silver particles exhibit antimicrobial properties and may act as a medium for antibiotic delivery as well.^{17,18}

Nano/microfluidic Point-of-care (POC) diagnostics have significant advantages over conventional diagnostics to be easy and cost-effective. It enables on-chip diagnosis and real-time monitoring of infectious diseases from a small volume of body fluids.^{19,20,21,22} Current POC devices have been successfully combined with Nano/microfluidic technologies for on-chip diagnosis and monitoring of infectious diseases at resource-limited settings.²⁰ Intravenously administrated spherical gold nanoparticles broadened the temporal profile of reflected optical signals and enhanced the contrast between surrounding normal tissue and tumors. The gold nanoparticles, tuned to the wavelength of the laser, can enhance the resolution and precision of laser-based cancer detection system.²³ An e-bra platform with nanosensors can acquire electrocardiograph, which is sent to a textile mounted wireless module. A smartphone as a base station or a wireless Bluetooth enabled PC can receive these data and store or process the information as and when necessary.²⁴

Nanoparticles can deal with targeted and/or controlled delivery of proteins and peptides. The products in this field are called nanobiopharmaceuticals.² Drug delivery systems, can be designed to improve the pharmacological and therapeutic properties of drugs.^{25,26} Delivery of drugs at the site of action is one of the most prospective use of nanodevices reducing the burden of side effects.

Nanoplatelets carry a small mesh net that dissolves into a sticky membrane upon contact with blood plasma and are expected to be used to treat hemophiliacs or patients with serious bleeding disorders specially with open wounds.²⁷ The theoretically designed artificial mechanical platelet or clottocyte would complete hemostasis in approximately 1 second.²⁸

There are nanodevices which could fight with the small parasites and bacteria inside the patient's body.

In this one or more nanorobots will battle together with this parasite and bacteria to destroy them.^{5,29} It traps in the pathogens present in the blood stream and break down to smaller molecules. The main function of microbivore is to absorb and digest the pathogens in the blood stream by the process of phagocytosis.

Respirocytes are designed as artificial mechanical red blood cells which carry oxygen and carbon dioxide molecules throughout the body. These Nanorobots can deliver 236 times more oxygen to the body tissues when compared to natural red blood cells.^{30,31} When the respirocyte passes through the lung capillaries, O₂ partial pressure will be high and CO₂ partial pressure will be low, therefore the onboard nanocomputer commands the sorting rotors to load in oxygen and release the carbon dioxide molecules.^{4,32} The stored gases are released from the tank in a controlled manner through molecular pumps. The respirocytes exchange gases via molecular rotors. The rotors have special tips for particular type of molecule.³³

Nanotechnology appears to be specially promising in case of cancer treatment. The prospect of targeted drug delivery in cancer patients inspired the development of nanodevices. Cancer chemotherapy is a hazardous form of treatment that harms healthy tissue in addition to malignant cells. If nanorobots are used to deliver drugs specifically to the tumour cells without damaging the healthy tissue then it is possible to have a highly concentrated targeted action, with no peripheral damage.³⁴ Cancer can be successfully treated depending on how earlier it was diagnosed.³⁵ Nanorobots with embedded chemical biosensors can be used to perform detection of tumor cells in early stages of development inside the patient's body.³ Failure of intraoperative detection and elimination of microscopic residual disease (MRD) during cancer surgery causes lethal recurrence and metastases, and the removal of important normal tissues causes excessive morbidity. It has been reported that a plasmonic nanobubble (PNB), a non-stationary laser pulse-activated nanoevent, intraoperatively detects and eliminates MRD in the surgical bed. In resectable MRD, PNB-guided surgery prevented local recurrence and delivered 100% tumor-free survival.^{37,38} Recent studies suggest that conjugates of antibodies and photoluminescent nanoparticles should be used in the development of multifunctional agents for selective labeling and therapy of cancer.^{39,40} Nanoparticles are successfully used to carry imaging agents for melanoma detection and specific mutation silencing.⁴¹

Monitoring diabetes and controlling glucose levels for patients is a possible application of nanotechnology in medical science. Rapid synthesis of monodispersed spherical CuNPs was successfully accomplished by *D. bulbifera* tuber extract and excellent inhibitory potential of the CuNPs against α -amylase and α -glucosidase provided strong scientific evidence for antidiabetic potential of CuNPs and its use in therapy and management of T2DM.⁴²

It is reported that fisetin and fisetin loaded on mesoporous carbon nanoparticle (MCN) may have anti-inflammatory effects on thioglycollate-induced peritonitis. The future research could focus on the combination of fisetin therapy and traditional antibiotics, which might be more efficient than using antibiotics alone.⁴³

Nanosurgery involves the process of cutting, local drug delivery, and dynamically monitoring the situation. Today, nanosurgery is an in vivo technique in model organisms. However, with future advents of hybrid technologies and development of safe and reliable biological methods for in vivo operation, nanosurgery is set to become a very promising method in medical science. A surgical nanorobot, operated or guided by a specialist in the field, is envisioned to act as on-site surgeon. Such devices are expected to perform various procedures such as detection of pathology and then diagnosing abnormal lesions by nano scale manipulations.⁴⁴ Some of the genetic diseases can be treated by comparing the molecular structures of DNA and proteins in the cell by the medical nanorobots and the desired modifications can be encrypted in place and the irregularities can be fixed adequately.^{45,46} Nanotechnology can ensure sustained-drug release in the lung tissue and local delivery of inhalable NPs resulted in reduced dosing frequency and improved patient compliance. Studies performed so far suggest that nanoparticles are an interesting, reasonable as well as feasible option for in the systemic and/or local treatment of respiratory diseases.⁴⁷

The transition metal oxides (TMOs) are attracting a great deal of attention in the field of material science due to its unique properties. The nano crystalline TMO, molybdenum trioxide (MoO_3), exhibits antibacterial activities with unique chemical, electrochemical, electronic and catalytic properties. The phenomenon of nanobiointerface is also important in order to study the antibacterial activity of nanocrystalline MoO_3 for the destruction of micro-organisms in hospitals. The Silver NPs were found to have wider antimicrobial activity in gram negative than gram positive organisms including

Enterobacter cloacae, *Staphylococcus aureus*, *Streptococcus aemolyticus*, *Pseudomonas aeruginosa*, *Proteus vulgaris*, *Proteus mirabilis* whereas less activity against *Pseudomonas aeruginosa* was observed.⁴⁹ Ag nanoparticles supported in TiO_2 - SiO_2 provide an effective treatment for Hospital-acquired infections.⁵⁰

Nanorobots may treat conditions like arteriosclerosis by physically chipping away the plaque along artery walls. The robot must also be small enough so that it doesn't block the flow of blood itself.⁵ Nanorobots will be capable of locating atherosclerotic lesions in stenosed blood vessels, particularly in the coronary blood vessels and treat them either mechanically, chemically or pharmacologically.⁵¹

The Au-NP vaccine formulations, provides a multifaceted approach. While such an approach is likely to generate an immune response, its potential to generate memory of B and T cells is not still defined adequately.⁵² In dermatology and cosmetics, it is expected to provide therapeutic, diagnostic as well as preventive applications.⁵³

Risks of nanotechnology in biomedical applications

Despite the exceptional and fascinating promises that nanotechnology holds in biomedical applications for healthcare, there is a concern about its safety and, in particular, the possibility of causing side effects. The concern that the nanotechnology poses a serious health and environmental risks had obstructed the development of the field for long years. There is not adequate information and knowledge about the effect of the prolonged exposures to nanoparticle on human health and environment. The implication of nanoparticles on health needs to be assessed very elaborately and adequately before their large-scale production and application in healthcare.^{54,55} Studies conducted on the NP-induced toxicity have revealed that the metal-based nanoparticles can affect the biological behaviour at the organ, tissue, cellular, sub cellular, and protein levels. The size of the nanoparticles is small and these can easily access the skin, lungs, and brain and may cause adverse affects.⁵⁶

Conclusions

Nanotechnology in the biomedical applications has a more extensive scope and is being developed more rapidly than most of the sub speciality sciences. Material science has converged on biomedical engineering to be utilized basically in any place as a part of conjunction with human pathophysiology. Nanotechnology is going to change health care and

human life more profoundly than any other branch of medical science. This science might sound like a fiction now but it is going to be a reality in no time at all. The advent of molecular nanotechnology has strong potential to revolutionize healthcare, to treat disease in future by expanding enormously the effectiveness, comfort and speed of cure while at the same time significantly reducing their side effects, complications and risk. It also leads to new ways for extensive research work and substantial amount of research results published annually. Consequently they will change the shape of the industry, leading to marketing interactions between Pharma, Biotech, Diagnostic and Healthcare industries. Nanomedicine holds the promise to lead to an earlier diagnosis, better management and improved follow up care exploiting the in-depth understanding of diseases on a molecular level. However, the implication of nanoparticles on health and environment needs to be assessed completely before their large-scale production and application in various fields is being implemented

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Double heterozygous for hemoglobin S and hemoglobin E-a case report from Rajshahi, Bangladesh.

ASMM Rahman^a, N Islam^a, MK Rahman^a, MG Rabbani^b, SH Pramanik^a

Abstract

Double heterozygosity for Hbs and HbE is rare & clinically it is silent as compared to HbS-β Thalassaemia. Only 25 cases have been reported to date. The current literature generally associates HbSE with a benign clinical course, although vaso-occlusive complications have been reported. We report a case of 15-year-old male named Tarik who came for evaluation of recurrent respiratory tract infection and abdominal pain & microcytic hypochromic anaemia. We carried out Sickling, solubility test were positive and on Hb electrophoresis on agar gel, he was having HbS 63.7%, HbE 26.8% and HbF 5.6% confirming his double heterozygous state for HbS and HbE. On family screening his mother turned out to be sickle cell trait and father as hemoglobin E trait.

Keywords: hemoglobinopathy, HbE, HbS, HbSE

Introduction

Two of the most common variant hemoglobins are hemoglobin (Hb) S (Glu6Val) and hemoglobin E (Glu26Lys). Double heterozygosity for HbE and HbS, known as HbSE disease, is a rare, clinically benign condition, however.^{1,2} HbSE disease symptoms are variable, ranging from none to different hemolytic episodes. Prevalence of abnormal haemoglobins varies considerably with geographic location and racial groups. Four hemoglobin variants, HbS, HbE, HbC, HbD; each affects millions worldwide.³ HbS is common in equatorial Africa, Eastern Saudi Arabia and Central India.¹ HbE is extremely common in many Asian countries, and is primarily seen in Eastern India, Sri Lanka, Southwest China and Southeast Asia.^{1,4} The Eti-Turk family in 1957 was the first instance of HbSE disease reported in southern Turkey.^{5,6} Actual prevalence of sickle cell disease in Bangladesh is not known. We report an interesting case of compound heterozygosity for HbS and HbE.

Case report

A 15 yr old male, Tarik got admitted in medicine department of Rajshahi Medical College Hospital for abdominal pain. He had history of repeated upper respiratory tract infection, weakness & easy fatigability. On examination, he was mildly anaemic, non icteric but was just palpable spleen. Complete haematological profile was done. His sickling & solubility test were positive. Hb electrophoresis on agar gel at alkaline pH showed two bands, one at HbE and another at HbS. Looking at the result of Hb-electrophoresis the case was diagnosed as a case of double heterozygous for HbS and HbE disease. So family screening was advised.

Results

Table-1 was showing haematological profile of all family members of HbSE case. Patient's haematological profile was Hb 9.3gm/dl, RBC count 4.0million/cumm, MCV 65.22fl, MCH 24.34pg, MCHC 37.24% and RDW15.30. On quantification HbE was 26.8%, HbS was 63.7%, HbF 5.6% and diagnosed as double heterozygous for HbS and HbE. On family screening it was found that his mother having positive sickling and solubility test, Mothers Hb level was lower limit of normal range, MCV less than 80 fl and MCH less than 27 pg & on quantification HbA 59%, HbS 37% and HbF 1.5%, considering above picture she was diagnosed as a case of sickle cell trait. Patient's father and brother were negative for sickling and solubility test, both had Hb level upper limit of normal range (father 12.7gm/dl, brother 14gm/dl), MCV slightly below normal in both case. On quantification father had HbA 70.8% & HbE 25.7%; brother had HbA 71.1% & HbE 25.5%. Both of them were diagnosed as HbE Trait. Patient's sister was negative for sickling and solubility test, Her Hb level was about normal (12.10gm/dl), MCV and MCHC also normal (MCV 78.9fl, MCHC 27.7pg) & on quantification HbA was 97.3%. She was normal.

Sl No	Realtion	Hb gm/dl	RBC m/mm ³	MCV fl	MCH Pg	MCHC %	RDW	HbA %	HbE %	HbS %	HbF %
1	Patient	9.3	4.0	65.22	24.34	37.24	15.30	-	26.8	63.7	5.6
2	Father	12.7	4.81	77.12	26.40	34.20	14.9	70.8	25.7	-	-
3	Mother	11	4.15	75.42	26.50	35.10	15.5	59	-	37	1.5
4	Brother	14	5.78	68.92	24.22	35.10	15.6	71.1	25.5	-	-
5	Sister	12.10	4.37	78.92	27.7	35.10	15.0	97.3	-	-	-

^aDepartment of Medicine, Rajshahi Medical College, Rajshahi, Bangladesh.

^bDepartment of Medicine, Barind Medical College, Rajshahi, Bangladesh.

Correspondence to: ASMM Rahman
drahahin@hotmail.com

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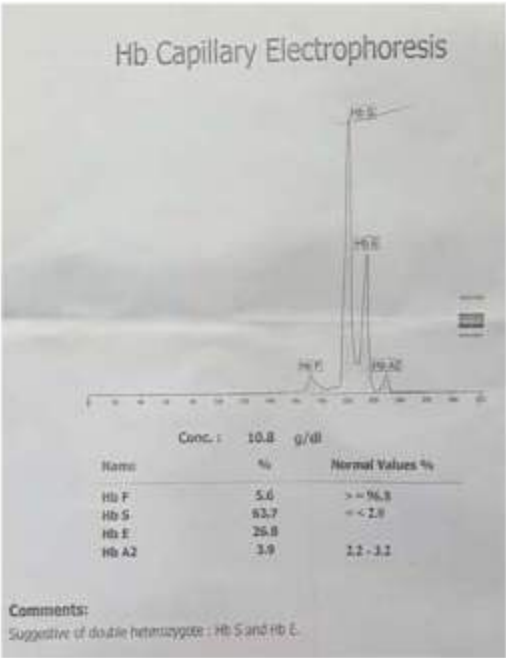


Figure: 1 Hb Electrophoresis (Patient)

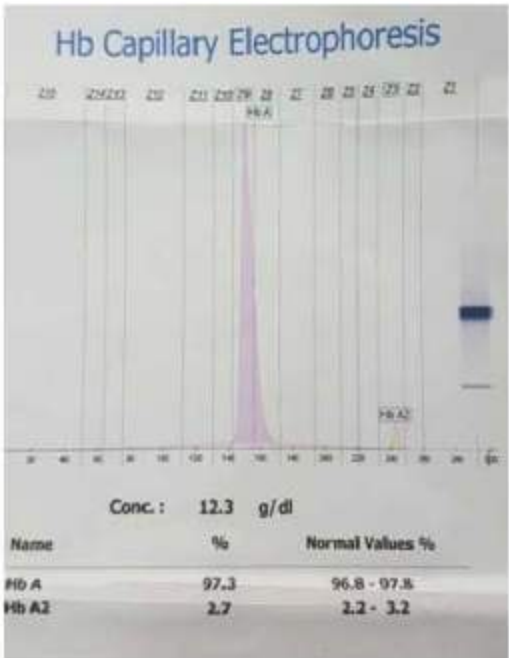


Figure: 2 Hb Electrophoresis (Patient's sister)

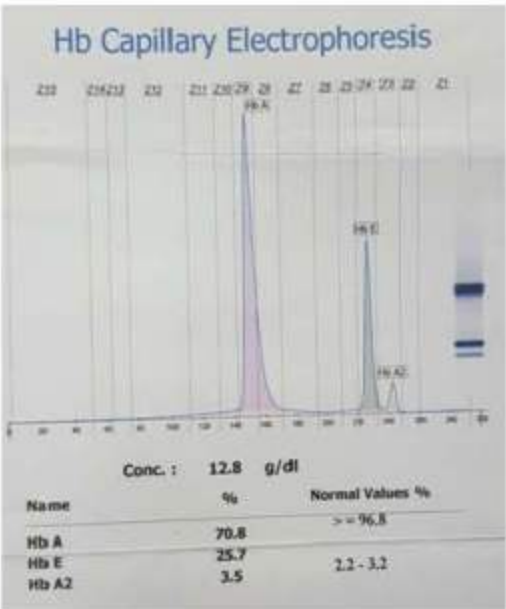


Figure:3 Hb Electrophoresis (Patient's Father)

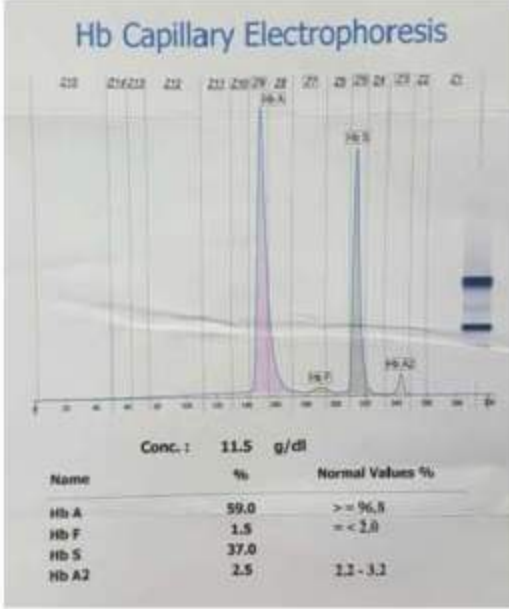


Figure:4 Hb Electrophoresis(Patient's mother)

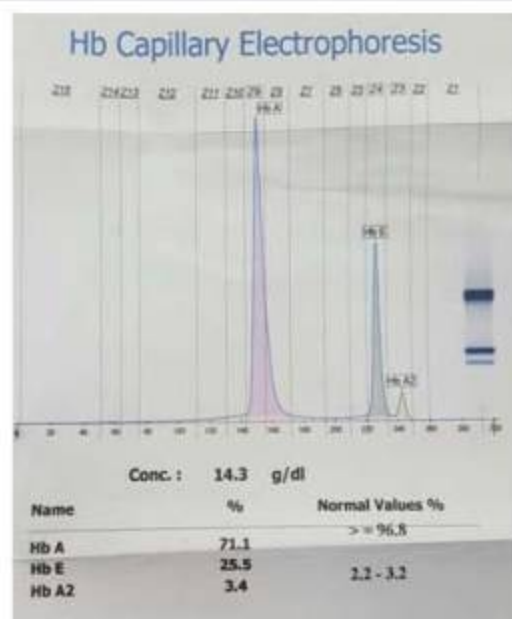


Figure: 5 Hb Electrophoresis (Brother)

Discussion

HbS and HbE are the most commonly seen variants of hemoglobin. HbSE is rarely encountered and resembles sickle cell disease with a syndrome similar to sickle β + thalassemia. Despite the reported vaso-occlusive complications, the current literature mostly refers to HbSE as benign.^{1,3} This is probably the first case of double heterozygous condition for HbS and HbE reported from Bangladesh. Our patient Tarik was incidentally diagnosed as microcytic hypochromic anaemia. On further evaluation we got patient having double heterozygosity. Patient with HbSE disease may have anaemia and microcytosis along with approximately 30% HbE and patient usually asymptomatic.⁷

Patient's mother was sickle cell trait as she having HbS 37%, but her MCV less than 80 fl and MCH less than 27 pg suggestive of sickle cell trait may be coexistent with either alpha thalassaemia or iron deficiency

anaemia.⁸ Further studies are required for confirmation of coexistent with alpha thalassaemia or iron deficiency anaemia.

HbSE disease (double heterozygous condition) is probably the first reported case from Bangladesh. It is not known to the authors about the actual picture of this disease in Bangladesh. The HbSE double heterozygous state, however, is not common, with only 25 reported cases in the literature.⁹ It is said that Inter caste marriage among communities have resulted into this compound heterozygous condition. Double heterozygous state for HbS and HbE is clinically silent as compared to HbS- β thalassaemia and HbSS state. Mass screening for detection and counseling to prevent further spread of these genes in community is required.

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Acute compartment syndrome resulting from self induced picking of a boil.

Mamunur Rashid Chowdhury, Md. Nasir Uddin, Md. Anwarul Haque,
Md. Saiful Islam, Md. Sabbir Hasan, Md. Tauhiduzzaman

Abstract

Acute compartment syndrome is a well recognized complication of lower limb trauma. Prompt diagnosis is essential to avoid permanent functional restriction or even the loss of the affected limb. Clinical signs and symptoms might be nonspecific, especially in the early stages; therefore, knowledge of predisposing risk factors can be helpful. To measure the musculofascial compartment pressure, a split catheter was introduced into the compartment close to the level of the fractures. Difference between diastolic pressure & compartmental pressure less than 30mm of Hg is indication for immediate compartmental decompression. Here we present a case of an unusual acute compartment syndrome due to self picking a boil with a needle in the left knee joint. This is the only such case report and considered as unusual because the onset of compartment syndrome was so long since the initial injury. Treatment is prompt surgical: The patient was treated by performing fasciotomy in affected muscular compartments and debridement following stamp partial thickness skin graft. After the follow up period of 4 month there was no recurrence and clinically the patient was found to be well.

Keywords: compartment syndrome; infected boil; skin graft.

Introduction

Acute limb compartment syndrome (ACS) is a condition in which increased pressure within a closed musculofascial compartment compromises blood circulation and biomechanical function. There are several etiologies of ACS. ACS may occur after significant trauma, for example, long-bone fractures. Other forms of injury which cause soft tissue damage, such as crush injuries, severe thermal burns and bleeding diathesis are known causes as well. Pathophysiologically, the expansion of tissue in a closed muscle compartment in ACS leads to an increase in pressure, which subsequently causes compression of thin-walled veins within that compartment. As a result, venous outflow decreases and venous and arterial intra-vassal pressure increase, which causes diminished perfusion of the affected compartment. The consequences of this insufficient perfusion are nerve and muscle ischemia. Muscle infarction and lasting nerve damage will occur if prompt surgical decompression is delayed. ACS is diagnosed on the basis of clinical evaluation. Severe pain, which appears to be out of proportion in relation to the apparent injury, is often the major clinical sign of ACS. Pain on passive stretch of the muscles and tenseness are further clinical signs frequently encountered in ACS. In the late stage of ACS, sensory deficits, paresthesias, muscle weakness, paralysis, pallor and pulselessness

are typical features. Definitive treatment for patients with ACS consists of decompression of the affected compartment by performing surgical fasciotomy.

Here we represent a case of acute compartment syndrome of a 25-year-old shopkeeper hailing from gongo, akuwa, mymensingh and diagnosed by history, clinical examination because acute compartmental syndrome was so obvious clinically. He was treated by 4 compartment fasciotomy in affected muscular compartments. Acute compartmental syndrome has been recognized following rupture of the infected boil. Presentation usually occurs within 24 hours of such an injury. No case has yet been described of a compartment syndrome occurring weeks following rupture of the infected boil. We describe such a case presenting 05 days after rupture of the infected boil.

Case Report

A 25-year-old shopkeeper presented with a sudden onset of pain in his left knee joint. Five days previously he discovered a small boil on his left knee joint lateral surface. After two days he ruptured the boil by heated pin. After six hours he felt diffuse moderate pain around the left knee joint. He was able to continue walking, the pain had radiated below his left knee joint after 6-8 hours, and the left leg became transiently swollen. During the following three day, he continued his usual activities, and noted his left leg became diffuse swelling and difficulty on walk.

Department of Orthopaedic
Surgery, Community Based
Medical College
Bangladesh, Mymensingh,
Bangladesh.

Correspondence to :
MR Chowdhury
mamunakus@gmail.com

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On admission



1st POD following fasciotomy

Five days following the initial episode, he awoke with huge swelling and mild pain in the left leg and presented to the orthopedics department immediately.

On Examination: Revealed a grossly swollen and tense left thigh, legs and foot, which was mild tender to the touch over the anterior, lateral and posterior aspects of left thigh, leg and foot. Peripheral pulses were absent, but he was noted to have paraesthesias over the antero-lateral surface of his left thigh, left leg and foot. Loss of power in knee joint with ankle dorsiflexion and plantarflexion. A clinical diagnosis

of compartment syndrome was made with loss of sensation of the foot, and an ascending pattern of loss over the leg.



Following Escharectomy

Surgical Technique

At surgical fasciotomy was performed, a single longitudinal lateral incision was made on thigh, two longitudinal Postero-medial and lateral incision was made on left leg and a single vertical incision on dorsum of the foot without resecting the fibula(1). The Posterior (deep and superficial) and Lateral/peroneal compartments were tense, and were

released throughout their length, revealing grossly oedematous musculature. The fascia of the superficial posterior compartment was incised, digital examination revealed. The musculature of the deep posterior compartment was similarly decompressed. The wound was dressed, and left open. Post-operatively he reported immediate relief of heaviness and pain but not regained complete sensation to the lower limb. Escharotomy started on 2nd POD following to form escher. Stamp partial thickness skin graft done first of all on leg (anterior, medial & lateral surface) then posterior surface of the leg & back of the knee joint. Finally on thigh (first anterior, medial & lateral surface than posterior surface).

extended up to left inguinal ligament above and around the ankle joint next 24 hours. Regular dressing was done.



After 8 weeks



Stamp PTSG on leg



After 10 weeks



Stamp PTSG on thigh

Postoperative care

The wound was re-inspected at 24 hours and saw Escher from anterior and medial surface of the leg but the musculature of all compartments was viable. Next 24 hours Escher extended lateral aspect of the thigh and posterior surface of the leg. The Escher

Discussion

Acute compartment syndromes are most commonly associated with severe muscle trauma and closed fractures of long bones. Less common associations include tight casts and non-traumatic soft tissue injuries; such as exertional damage and minor sporting injuries (2). The mechanisms involved are those of bleeding into muscular compartments, oedema and tissue necrosis. When haemostasis is present, water enters the

compartment by osmosis, and increases the intrinsic compartment pressure. Once this reaches a critical level, venous return is obstructed, and pressure rises steeply, with concomitant muscle ischaemia, oedema and necrosis. Increase of single compartment pressures can cause concomitant pressure rises in neighboring compartments (3). This would account for the findings in this case. Liquefaction of a haematoma may lead to a delayed response. The injury is usually mild, and complications are rare (4). Acute compartment syndrome is a rare complication (5). One case has been described where onset of the compartment syndrome was delayed over a period of 48 hours (6). Our case shows that a compartment syndrome may occur with a longer interval between the index injury and onset. Search of the literature has revealed no other case of an acute compartment syndrome presenting following iatrogenic rupture of the boil. Prompt recognition and early fasciotomy led to complete recovery in this case. It is well documented that delay in treatment of compartment syndromes is associated with a high amount of subsequent morbidity and disability (7). Compartmental pressure monitoring may be helpful in assessment of the patient with unclear pathology, and to document objective findings, but surgical intervention should be largely based on clinical grounds (8). Pressure monitoring was not performed in this case due to lack of available resources, and therefore all four compartments were decompressed due to the clinical findings of progressive nerve involvement. We hope by presenting this case to literate that compartment syndromes may present following minor trauma, and that rarely, this may be weeks following the index injury. A careful history will alert the clinician to the possibility of a compartment syndrome despite no immediately preceding trauma.

Conclusions

Acute compartment syndrome can occur following either a fracture or soft tissue injury. Acute compartment syndrome is a preventable condition. We recommend proper patient history, physical examination, timely diagnosis and early fasciotomy in order to avoid irreversible damage of the limbs. Where diagnosis and surgery treatment seem to have been simple and decisive. We would recommend continuous compartment pressure monitoring as the prime diagnostic tool in the following situations:

- All young patients with high-energy femoral injuries, with or without an associated fracture

- All patients with soft tissue swelling suggestive of compartment syndrome, irrespective of age, gender or causality.

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