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Dengue Fever in Bangladesh : Present Scenario

Mohammad Mizanur Rahman^{1*} Susane Giti²

Introduction

In Bangladesh, the booming situation of dengue fever has been surfacing as a staid public health problem in terms of morbidity and mortality¹. Among the arboviral infection in the world, dengue causes more severe illness and death². Four antigenically distinct but related dengue virus serotypes transmitted by *Aedes aegypti* mosquito are responsible for Dengue Fever (DF) and Dengue Haemorrhagic Fever (DHF). DHF is the severe form of the disease which is endemic and frequently amplified into epidemics in South-East Asia resulting in frequent hospitalization and death^{3,4}. In the recent past, dengue has come up as an earthshaking global health problem with increased incidence in new countries and tropical areas^{3,5}. From mid 1960s to the mid 1990s, DF was identified in Bangladesh but there was no previous outbreak of DF in this country^{6,7}. Only sporadic cases of DF were reported from 1990s to 1999s. Another outbreak had reported in late June 2000, when DHF was confirmed by Enzyme-Linked Immunosorbent Assay (ELISA) for anti-dengue antibodies in a 28-year old patient got admitted into a hospital in Dhaka, Bangladesh with haemorrhagic fever, ascites, pleural effusion and thrombocytopenia. During this outbreak, more than 5,551 cases of DF and DHF with 93 deaths were reported in Dhaka and other major cities of Bangladesh^{3,8}. In 2001, half the number of cases and deaths were reported and this was followed in 2002 by a larger epidemic (6132 cases) with 1.0% case fatality⁹. More than 28000 cases and 242 deaths have been

reported to the Directorate General of Health Services from January 2000 to December 2014^{2,10}. The dengue situation from 2014 to December 2018 is depicted graphically in figure 1⁹.

Situation in 2019

Bangladesh is fighting with its worst dengue fever outbreak on record in 2019. The dengue fever is endemic in the South Asian country where heavy rains during the monsoon season have created the appropriate breeding ground for the mosquito-borne virus¹¹. However, this year's outbreak is unprecedented, with hospitals registering hundreds of new patients every day, according to a daily updated released by the Directorate of General Health Services (DGHS). According to Dhaka Tribune, nearly 59,823 people have been infected with the dengue virus so far this year (Updated 7th September 2019) in the country of 170 million of whom 305 died. The number of patients hospitalized in nearly seven months of this year is close to surpassing the highest tally in 20 years¹².

Receptivity of Bangladesh to Dengue

Bangladesh is one of the world's most densely populated countries. Currently population density is 964 people per square kilometer and there are more than three million births per year^{13,14}. Poor city management with an absence of proper waste disposal, sanitation, drainage systems and water supply together with the use of unprotected water reservoirs creates suitable habitats for *Aedes aegypti* and *Aedes albopictus*. Ample mosquito breeding sites, in combination with unrestricted mosquito-human contact due to the absence of window and door screens enhance transmission. The urban poor, about 35.2% of the total population of the six major cities (Dhaka, Khulna, Rajshahi, Barisal and Sylhet) live in slum areas which are overcrowded settlements without access to piped water and people store water in temporary containers like drums and earthen jars in which *Aedes aegypti* lays eggs¹⁵. It is clear that socio-demographic profile of Bangladesh facilitates dengue transmission.

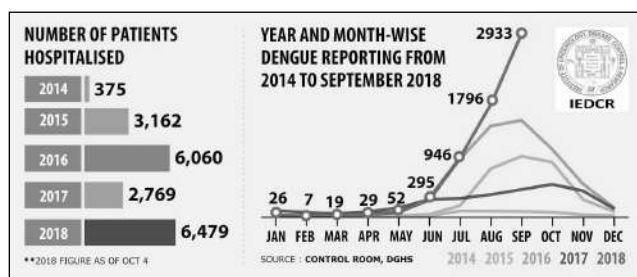


Figure 1 : Incidence of DF from January 2014 to December 2018.

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Future Challenges

Increases in annual temperature of 1.4⁰C and annual mean precipitation 5.6% above baseline average are projected by 2050¹⁶. Ensuing increases in severe drought frequency in pre-monsoon due to increased winter (December - February) temperature and high monsoon rainfall may increase the abundance of *Aedes aegypti* and *Aedes albopictus*. Dengue transmission could increase in the future as a consequence of more frequent and prolonged drought in the pre-monsoon period followed by flooding during the monsoon. It has been projected that an increase of 3.3⁰C in temperature would result in a 40-fold increase in Dengue incidence in Dhaka in 2100 compared to 2010 if no adaptation measures are undertaken and socio-economic conditions remain unchanged.

Conclusion

Passive health surveillance and current control activities are really inadequate and insufficient to address the future risk and therefore strengthening this surveillance as well as control programs are crucial to a national dengue strategy for Bangladesh.

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Consanguinity and Congenital Anomalies in the Bangladesh Armed Forces Personnel

Md Shameem Yazdany^{1*} Mohammed Ali Chowdhury¹

ABSTRACT

Background: The prevalence of consanguinity is very high among the Muslim countries. Different studies revealed that consanguineous parents have the higher risk of giving birth of child with congenital anomalies. Bangladesh, a largely populated Muslim country has a possibility of having higher rate of consanguinity and congenital anomalies among the general populations and as well as Armed Forces Personnel (AFP). **Materials and methods:** This study was a cross-sectional study conducted at Dhaka Cantonment during the period of March 2019 to August 2019. A total number of 400 AFP were selected systematically for the purpose of the study. A pre-tested questionnaire was used to collect data from the respondents. **Results:** Among the respondents 11% were officers, 7.8% JCO, 34.5% NCO and 46.7% ORs. The mean age of the respondents was 35.48±4.76 years. The prevalence of consanguinity was found 7.3%. Among them, 79.3% were first cousin and 20.7% were second cousin. A total 18 children were found with congenital anomalies. Congenital anomalies were significantly associated with consanguineous marriage and with first cousin marriage. The reasons for consanguineous marriage were mostly economic (48.3%). **Conclusion:** The congenital disorders are incurable disease and the family having a child with congenital disorder usually suffer throughout their life. Awareness and information about the risk of congenital anomalies in the consanguineous marriage should be made available at all levels to reduce the problem.

Key words: Consanguinity; Congenital anomalies; Armed forces personnel.

Introduction

Consanguinity or Consanguineous marriage is the marriage between blood relatives that indicate the relationships up to second cousin marriage¹. Congenital anomalies are the structural or functional anomalies, including metabolic disorders, which are present at the time of birth or can be identified prenatally or later in life. Congenital anomalies are also known as birth defects, congenital disorders or congenital malformations (WHO). Although congenital anomalies may be genetic, infectious or environmental in origin, most often it is difficult to identify the exact causes. Congenital anomalies are one of the major childhood health problems and the treatment and rehabilitation of children with congenital anomalies are costly and complete recovery is usually impossible². It results in long-term disability, which may have significant impacts on individuals, families, health-care systems and societies. An estimated one in 33 infants born with birth defects and result in approximately 3.2 million congenital disabilities every year. About 270,000 newborns die during the first 4 weeks of life every year from congenital anomalies³. Consanguinity has

been described as an important risk factor contributing to an increased occurrence of congenital disorders and subsequent morbidity and mortality among the offspring⁴. It was also found that the children with consanguineous parents have a higher risk of congenital disorders than the children of non-consanguineous parents. Close blood relatives have a higher chance of inheriting the same alleles than the less closely related individuals and therefore children of consanguineous unions are more frequently suffer from genetic disorders⁵.

It has been estimated that almost 690 million people in the world are consanguineous⁶. South Asia, Middle East and Northern Africa are the regions where the rate of consanguinity is historically and culturally high⁷. Consanguineous marriage is common in many parts of the world especially in the Middle-Eastern countries and is also common in other Muslim countries and regions⁸. The rate of consanguineous marriage is particularly high among the South Asian population⁹. Because of high consanguinity rates within the Muslim population, the incidence of congenital malformation in Islamic countries is between 10 to 45%¹⁰.

Bangladesh is largely populated Muslim country. Like other Muslim countries, there is a possibility of having higher rate of consanguinity and congenital disorders in Bangladesh. Bangladesh Armed Forces is a small part of total population. Due to its pattern of job its members should be free from all kinds of anxiety and tension. But it has been observed that the children of armed forces personnel have been suffering from various congenital anomalies. Some of them are from consanguineous parents. It was revealed that there is higher risk of congenital disorders among the children with parental consanguinity. But it was not known

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the rate of consanguinity among the armed forces personnel and information related to congenital anomalies. So, this study is an effort to find out the prevalence of consanguinity among Bangladesh armed forces personnel and congenital anomalies among their children.

Materials and methods

This study was a cross-sectional study conducted at Dhaka Cantonment. Out Patient Department of Combined Military Hospital Dhaka, Sick Bay of BNS Haji Mohsin and Medical Squadron of BAF Base Bashar were selected as a place of study conveniently for selecting Army, Navy and Air Force personnel respectively. A total number of 400 armed forces personnel were selected systematically for the purpose of the study. Data were collected during the period of March 2019 to August 2019. Among the 400 samples, 200 from Bangladesh Army, 100 from Bangladesh Navy and 100 from Bangladesh Airforce.

Inclusion criteria:

- i) Married and having child
- ii) Willing to participate in the study.

Exclusion criteria:

- i) Unmarried personnel
- ii) Married personnel but not having child
- iii) Declining to participate in the study.

After taking ethical clearance from appropriate authority and informed consent from the respondent, data was collected by a pre-tested structured questionnaire. Apart from the information related to consanguinity, information related to socio-demographic factors and information related to health disorders of the children were also obtained. The collected data were analyzed with the help of SPSS program.

Results

Table I : Service status of the respondents (n=400)

Rank	Frequency	Percentage
Officer	44	11%
JCO (Junior Commissioned Officer)	31	7.8%
NCO (Non-Commissioned Officer)	138	34.5%
ORs (Other Ranks)	187	46.7%

Table I showed that among the respondents, 11% were Officer, 7.8% were JCO, 34.5% were NCO and 46.7% were ORs. Mean age of the respondents was 35.48 years with SD ±4.755 years. Minimum age was 26 years and maximum age 47 years.

Table II : Type of marriage among the respondents (n=400)

Type of marriage	Frequency	Remarks
Consanguineous marriage	29(7.3%)	1st cousin=23(79.3) 2nd cousin=6(20.7)
Non-consanguineous marriage	371(92.7%)	-

Table II showed that the prevalence of consanguineous marriage was 29(7.3%). Among the consanguineous marriage, majority 23(79.3%) were first cousin marriage and 6(20.7%) were second cousin marriage.

Table III : Association between type of marriage and congenital anomalies among the children (n=400)

Type of marriage	Congenital anomalies among the children		Total	p value
	Yes	No		
Consanguineous	4(22.2)	25(6.5)	29(7.2)	.034
Non-consanguineous	14(77.8)	357(93.5)	371(92.8)	
Total	18(100)	382(100)	400(100)	

Figures within the parenthesis indicate percentage

Table III demonstrated that a total number of 18 children were found with congenital anomalies. Among them 22.2% were from consanguineous marriage and 77.8% were from non-consanguineous marriage. As the p<0.05, so there was statistically significant association between congenital anomalies and consanguineous marriage.

Table IV : Association of congenital anomalies and type of relation between parents (n=400)

Type of relation	Congenital malformations		Total	p value
	Yes	No		
1st cousin	3(16.7)	20(5.2)	23(5.8)	.040
2nd cousin	1(5.6)	5(1.3)	6(1.5)	.112
No relation	14(77.8)	357(93.5)	371(92.8)	.061
Total	18	382	400	

Figures within the parenthesis indicate percentage

According to Table IV, higher rate of congenital anomalies were observed in first cousin marriage (16.7%) than in the second cousin (5.6%) marriage. As in case of 1st cousin marriage the p<0.05, so there was statistically significant association between congenital anomalies and first cousin marriage.

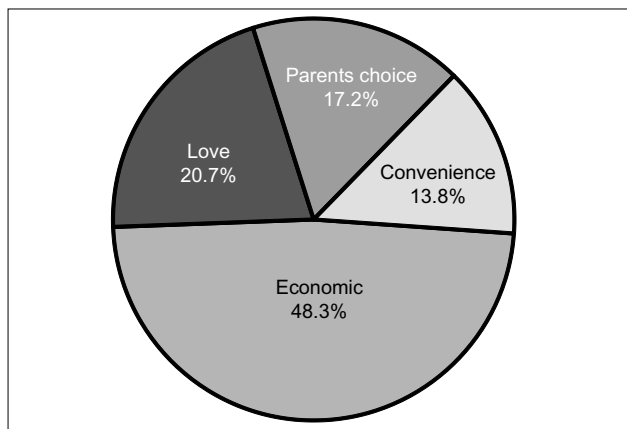


Figure 1 : Reasons for consanguineous marriage

Figure 1 showed that 'Economic' reasons (48.3%) were the major cause of consanguineous marriage. The other causes were 'Love' (20.7%) 'Parents' choice'(17.2%) and 'Convenience'(13.8%).

Table V : Association between congenital anomalies and level of maternal education

Level of maternal education	Congenital anomalies		Total	p value
	Yes	No		
Lower level	4(10.0)	36(90.0)	40(100)	.196
Middle level	11(4.1)	256(95.9)	267(100)	
Higher level	3(3.2)	86(96.8)	93(100)	
Total	18(4.5)	382(95.5)	400(100)	

Figures within the parenthesis indicate percentage

Table V showed that congenital anomalies were 10% among the children with lower level of maternal education, 4.1% among children with middle level maternal education and 3.2% among children with higher level maternal education. So, with the increase in the level of maternal education the percentage of congenital anomalies had gradually reduced. But there was no significant association between the level of maternal education and congenital anomalies ($p=0.196$).

Table VI : Attitude towards consanguinity

Attitude	Frequency	Percentage
Positive	245	61.3%
Negative	112	28.0%
Neutral	43	10.8%
Total	400	100%

Table VI showed that 61.3% of the respondents expressed their positive attitude towards consanguineous marriage, 28% expressed negative attitude and 10.8% were neutral.

Discussion

This study revealed that the prevalence of consanguinity among the Bangladesh Armed Forces personnel was 7.3%. A number of relevant studies on the prevalence of consanguinity had been carried out internationally specially the Muslim countries. In the Arab countries, the rate of consanguinity in Saudi Arabia is 58%, 49% in Jordan, 40-54% in the UAE and 29% in Egypt, 51% Qatar, 40% among the Palestinians, 44% among the Yemenis in Sanaa, 54% in Kuwait, 49% to 33% in Tunisia and Morocco, 50% in Oman. Among the South Asian population, in Pakistan, the overall rate of consanguineous marriage is 60-70%¹¹. In India, it was found about 12%, but it was much higher among Muslims (22%) than other social groups⁸. In a study carried out in Teknaf region of Bangladesh where it was found 17.6%¹². The lower rate of consanguinity among the armed forces personnel might be due to increased awareness, economic reasons and culture in the service environment.

In this study majority 79.3% consanguineous marriages were between the first cousin and 20.7% were second cousin. In the study of Amini SR and Kamali M first cousin

marriage was observed as the most consanguinity in parents among the consanguineous marriage¹³. Hamamy AH et al conducted a study in Jordan and revealed that first-cousin marriages constituted 69% among all consanguineous marriages¹⁴.

In another study conducted by Bittles AH and Black ML found 86% of consanguineous marriage were between first cousin⁶. Bhagya B et al in their study in India observed that first cousin marriage was 43.42%, second cousin marriage was 39.47% and 17.11% were distant relatives¹⁵.

It was found in this study that there was a statistically significant association between congenital malformations and consanguineous marriage. Al-Gazali et al conducted a study in Arab countries and found that consanguinity was closely related with congenital malformations, childhood morbidity and handicap¹⁶. Tayebi N et al conducted a cross-sectional study at Shahid Sadoughi hospital, Yazd of Iran and found a significant correlation between consanguineous marriages and the prevalence of anomaly². In all studies reported among Arabs, including in the UAE, Kuwait, Oman, Jordan, Egypt, Arabs in Jerusalem, and Saudi Arabia, the frequency of congenital malformations was higher among the consanguineous parents compared to the general population¹⁷. Bittles AH and Black ML also revealed that a significant positive association between consanguinity and morbidity has been demonstrated consistently, and congenital and genetic disorders with a complex aetiology likely to be more prevalent in the children of consanguineous parents and have a higher chance of recurrence⁶.

This study showed that higher rate congenital anomalies were observed in first cousin marriage than in the second cousin marriage and this difference was statistically significant ($p=0.040$). Stoll et al in his study demonstrated that the prevalence of still births and birth defects is substantially higher among the offspring of first cousin parents¹⁸. This finding was also similar to the study conducted by Hashmi MA where it was found that the prevalence of malformations had significant association with the types of relationship of parents, the inter-marriage with first cousins alone¹⁹.

This study disclosed that higher number of congenital anomalies were found among the children with lower level of maternal education, but there was no significant association between them ($p=0.196$). This finding was different with the study finding of Nabulsi MM et al where higher maternal education was the only variable that was negatively correlated with parental consanguinity²⁰. This finding was not also consistent with the finding of Bener A et al where it was observed a significant association between mothers' educational level and consanguinity²¹. This difference may be due to the fact that the mothers were from a selected community with average economic background.

Multiple reasons of consanguineous marriage were found at national and international level. Some of them are socio-cultural, strengthening the family ties, retention of property within a family, ease of finding a suitable marriage partner etc¹¹. In the present study economic reason was found the major cause of consanguineous marriage and the other causes were love, parents' choice and convenience. Shamsad, S. in his review article found that to keep property within families, social, economic benefits, easy adjustment after marriage as the reasons of consanguineous marriage²². Bittles AH. in his study found that the most common reasons for popularity of consanguineous marriage include a strong family traditional marriage, maintenance of the family structure, family ties, property, dowry, close relationship between wife and her in-laws, greater marriage stability and durability¹. Hamamy and Bittles in their study revealed that premarital negotiations regarding financial matters of marriage are more easily conducted and sometimes less costly²³. Wife's parents prefer to have their daughter living near them and to enjoy the presence of their grand children. Moreover, wealthy landlords may prefer to keep their property within the family.

This study revealed that 61.3% of the respondents expressed their positive attitude towards consanguineous marriage, 28% expressed negative attitude and 10.8% were neutral. They expressed attitudes in accordance with their experiences but not based on the proper information about consanguinity. This finding was agreed with Shelkamy FR et al who found that more than 75% of students had positive attitude towards the consanguinity and less than 25% of students had negative attitude²⁴. This finding was also similar to Alharbi OA et al who found 481% positive attitude towards consanguinity²⁵.

Conclusion

The congenital anomalies are incurable disease and the family having a child with congenital disorder usually suffer throughout their life. So, awareness is very important in this field. The information about the risk of congenital anomalies in the consanguineous marriage should be made available at all levels especially among the health care personnel and general population. This fact should also be brought to the attention of health, social and political authorities. The only measure that can prevent this disorder is premarital and prenatal screening followed by genetic counseling which are already available in many Muslim countries. Unfortunately, these types of facilities are not available in our country.

So, awareness would be the only measure to reduce consanguinity and congenital health problems in our country. Priority should also be given to address the problem by conducting scientific research and utilizing research finding in this field.

Discloser

Both the authors declared no competitive interest.

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Awareness and Attitude on Hepatitis B and C Virus Infection Among the Nursing Staffs and Paramedics in Combined Military Hospital Dhaka

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ABSTRACT

Background: Hepatitis B and C virus infections are most important public health hinder in Bangladesh. To stop spread and succession of the disease in the population, appropriate community awareness and positive attitude about the disease, as well as its hindrance is essential. The purpose of this study was to assess the level of awareness and attitude regarding hepatitis B and C virus infection among the nurses and paramedics in Combined Military Hospital (CMH) Dhaka. **Materials and methods:** This descriptive cross sectional study was carried out among 141 respondents in CMH Dhaka from July 2018 to December 2018. The respondents were interviewed through an interviewer-administered questionnaire. **Results:** In this study 57.4% participants had HSC or equivalent educational status belongs to Group-II (Paramedic) on the other hand 39.0% had BSc or equivalent educational status and 3.6% had masters or equivalent educational level belongs to Group-I (Nurse). The study revealed that awareness about hepatitis B and C of nurses (90.0%) was significantly ($p=0.026$) higher than paramedics (75.3%). The positive attitude regarding hepatitis B and C of nurses (81.7%) was significantly ($p=0.047$) higher than paramedics (66.7%). **Conclusion:** In this study it was observed that attitude about disease was significantly associated with the awareness about that disease. Hepatitis B and C virus infections have significant impact on burden of disease in which most of the health care personnel are at risk. So, there is an urgent need to train health care professional about risk factors and prevention of HBV and HCV infections especially paramedics to improve awareness and attitude about diseases.

Key words: Awareness; Attitude; Hepatitis B and C infection.

Introduction

The worldwide burden of HBV and HCV infection as being a significant and growing public health problem associated with a heavy burden of morbidity and mortality in both developed and developing nations¹. In Bangladesh, HBV and HCV infection are also a significant community health problem and one of the key issues of concern². Health care workers are more exposed to HBV and HCV infection¹. Hepatitis has become one of the key community health set-back of the globe with about 170 million patients are persistently infected with HCV infection². An anticipated 240 million people are persistently infected with HBV infection³. Worldwide, HBV and HCV are a major cause of chronic liver disease and liver cancer⁴. In Bangladesh, HBV screening prevalence is 3-7% among the common inhabitants and

1.5-12% among children under 5 years⁵. The lifetime threat of acquiring HBV is involving 20-60% in Bangladesh⁶. HBV is transmitted through blood, wound exudates, semen, vaginal secretions and saliva. Blood and serum contain the maximum concentrations of the virus⁴. HBV infection is a vaccine preventable disease for which a safe, immunogenic and effective vaccine is recommended since 1982 though its execution is still inadequate⁶. World Hepatitis Day observed on 19th May 2016 with aims to elevate worldwide consciousness of HBV and HCV and persuade impediment, identification and management⁷. Deficient of teaching and understanding about its spread is the core factors contributing to this disease⁸. Health care workers are at greater threat of contracting blood borne pathogens due to their professional contact to blood and body fluids. When compared to other health professionals, the nurses and paramedics are the groups that are most repeatedly victimized by accidents with cutting and sharp objects. Thus their possibility of accidental contact to HBV and HCV is high and they are considered as high risk group. Predominantly nursing students are at a high risk because of their inadequate clinical knowledge. Understanding and encouraging mind-set of students, nurses and paramedic about spread of HBV and HCV, high risk groups, signs and symptoms of HBV and HCV and immunization can boundary the spread of disease in a large scale. Moreover, not every HBV and HCV infections are symptomatic, meaning an individual may spread HBV and HCV without knowing it. Awareness and positive attitude of the nurses and paramedics regarding disease play a key role in hindrance of

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spread of infection⁹. Thus this study was conducted with the objective to assess the level of awareness and attitude of nurses and paramedics regarding hepatitis B and C in CMH Dhaka. The finding of this study may provide some guidelines in taking preventing measures and to make further specific study.

Materials and methods

This descriptive cross sectional study was conducted to assess the level of awareness and attitude of nurses and paramedics and to compare between two groups in CMH Dhaka. The study was carried out from July 2018 to December 2018. Estimated sample size was 141 nurses and paramedics. Out of these 60 were nurses (Group-I) and 81 were paramedics (Group-II). The respondents who were willing to participate were included in this study. Non-probability sampling of convenient type was followed to select the respondents. The data were collected with an interviewer-administered questionnaire. All data were checked thoroughly after collection. Data processing and analysis were done by using SPSS version 20. For inferential statistics Chi-square test was done to see the level of significance and p<0.05 was considered to be significant. The participants were briefed properly about the objectives of the study and freedom for participating in the study. Informed written consent was obtained from the participants before data collection.

Results

A total of 141 participants were involved in the study including 60 nurses and 81 paramedics

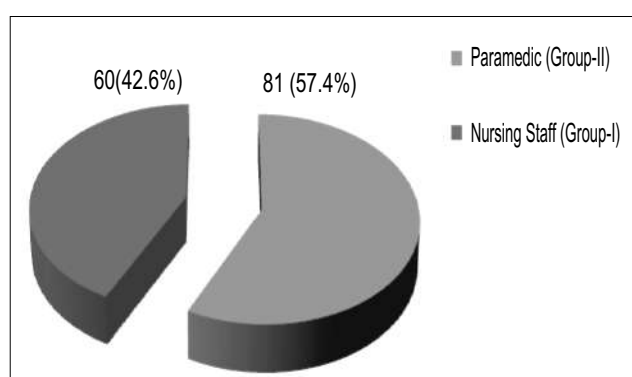


Figure 1: Distribution of the participants by category or group (n=141)

Figure 1 showed that among the study population 42.6% were nursing staffs and 57.4% were paramedics.

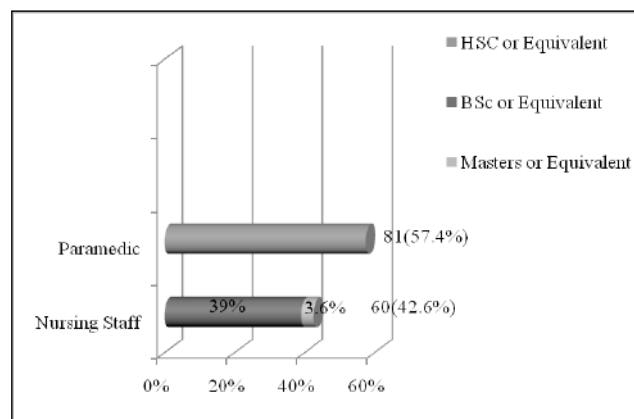


Figure 2 : Distribution of the participants by level of education (n=141)

Table I : Distribution of the respondents by their awareness about disease

Awareness variables	Study Group					
	Group-I (n=60)			Group-II (n=81)		
	Yes (%)	No (%)	Don't know (%)	Yes (%)	No (%)	Don't know (%)
Can hepatitis B & C cause liver cirrhosis and hepatocellular carcinoma?	90.0	3.3	6.7	75.3	14.8	9.9
Whether adults should be vaccinated for HBV?	91.7	5.0	3.3	76.5	8.6	14.9
Should all children be vaccinated against HBV?	93.3	1.7	5.0	77.8	9.9	12.3
Should children be vaccinated immediately after birth?	86.7	5.0	8.3	72.8	11.1	16.1
Does hepatitis B vaccination protect against HBV ?	88.3	5.0	6.7	74.1	9.9	16.0
Can Hepatitis B & C virus infection be transmitted by blood transfusion and contaminated needle?	90.0	1.7	8.3	75.3	8.6	16.8
Average	90.0	3.6	6.4	75.3	10.4	14.2

Table-I showed awareness about disease. Majority respondents of both group had clear conception about hepatitis B and C. Mean percentage of awareness of Group-I and group-II was 90.0 and 75.3 respectively.

Table II : Overall comparison of awareness among study groups (n=141)

Awareness	Study Group (n=141)		p value
	Group-I (n=60) Frequency (%)	Group-II (n=81) Frequency (%)	
Awareness	54(90.0%)	61(75.3%)	0.026
No awareness	6(10.0%)	20(24.7%)	
Total Count	60(100%)	81(100%)	

Test of Significance $\chi^2=4.9466$, df=1, p<0.05 (p=0.026).

Table-II showed that 90.0% respondents of Group-I had awareness about disease, on the other hand 75.3% respondents of group-II had awareness about hepatitis B and C.

Table III : Distribution of the respondents by their attitude about disease (n=141)

Attitude variables about disease	Study Group (n=141)					
	Group-I (n=60)			Group-II (81)		
	Yes (%)	No (%)	Indecisive (%)	Yes (%)	No (%)	Indecisive (%)
1. Will you like to screen yourself for hepatitis B and C?	81.7	8.3	10.0	66.7	11.1	22.2
2. Have you been vaccinated against hepatitis B?	95.0	1.7	3.3	95.1	1.2	3.7
3. Can hepatitis B prevented through vaccination?	83.3	3.3	13.4	70.4	9.9	19.7
4. Are you willing to treat and care for hepatitis B or C cases?	71.7	6.7	21.6	48.1	17.3	34.6
5. Is it required to change the gloves during examination?	78.4	6.6	15.0	59.3	13.6	27.1
6. Are health care workers working in hospital/clinic at risk to HBV & HCV?	80.0	6.7	13.3	60.5	12.3	27.2
7. Will you like to get more investigations/treatment if found positive for hepatitis B or C without any symptom?	81.6	3.4	15.0	66.6	13.6	19.8
Average	81.7	5.2	13.1	66.7	11.3	22.0

Table III showed distribution of the respondents by their attitude about disease, where it was found that majority respondents of both group had positive attitude regarding hepatitis B and C. Mean percentage of positive attitude of Group-I and group-II was 81.7 and 66.7 respectively.

Table IV : Overall comparison of attitude about disease among study groups (n=141)

Attitude about disease	Study Group (n=141)		p value
	Group-I (n=60) Frequency (%)	Group-II (n=81) Frequency (%)	
Positive	49(81.7%)	54(66.7%)	0.047
Negative	11(18.3%)	27(33.3%)	
Total Count	60(100%)	81(100%)	

Test of Significance $\chi^2=3.939$, $df=1$, $p<0.05$ (0.047)

Table IV shows that 81.7% respondents of Group-I had positive attitude regarding HBV and HCV, in contrast 66.7% respondents of group-II had positive attitude about disease which was significantly different.

Discussion

HBV and HCV infections are key public health problems worldwide casting a huge load on health care system^{10, 11}. These are significant causes of hepatocellular carcinoma resulting in considerable morbidity and mortality¹². These

infections are also an important professional vulnerability for Health care personnel due to proximity to the health facility¹³. Awareness and attitude studies are positive steps to which an individual or population is in a position to adopt a disease risk-free behavior for this disease. Hence, this study had been conducted with a purpose to evaluate the awareness and attitude concerning HBV and HCV infection and assist Health Care Workers for the benefit of entire community health. In this study majority (90.0% in Group-I and 75.3% in group-II) of the participants demonstrated a satisfactory level of awareness of HBV and HCV infection as shown in Table-I. Both group had awareness about disease, complication due to HBV and HCV and about main organs involved. In this study 90% of the participants of Group-I and 75.3% of the participants of Group-II knew about contamination and communicability of these diseases by insecure syringes, needles, infected blood and common blade. Immunization of children immediately after birth and vaccine protection of hepatitis B was found to be comparatively lower as shown in Table-I. This result is consistent with the study result of Samuel et al¹⁴. It was found as shown in Table-II that 54(90.0%) respondents of Group-I had awareness about disease, on the other hand 61(75.3%) respondents of group-II had awareness regarding hepatitis B and C which was significantly different. Chi-square test revealed that awareness about disease of nurses was significantly ($p=0.026$) higher than their paramedics counter-part. This result is consistent with the study result of Misra et al which had been carried out in 2009¹⁵. It was found as shown in table-III and table-IV that 81.7% respondents of Group-I and 66.7% respondents of group-II had positive attitude regarding hepatitis B and C which was significantly different. Chi-square test revealed that positive attitude regarding hepatitis B and C of Group-I was significantly ($p=0.047$) higher than group-II. This result is consistent with the study result of Samuel et al conducted in 2009 and Misra et al conducted in 2009^{14,15}. In this study the positive correlations between awareness and attitude revealed the association between awareness and positive attitude with infection control measures. It is concluded that adequate awareness can lead to positive attitude¹⁶. This result is consistent with the study result of Khan et al conducted in 2017 and Misra et al conducted in 2009^{9,15}.

Conclusion

The existing level of awareness and attitude about hepatitis B and C virus infection is satisfactory among the nurses and paramedics in Combined Military Hospital, Dhaka which need to be strengthened especially in paramedics. Nursing staffs and paramedics are the initial point of contact among patients and health care and constantly uncovered to blood and blood products in their proficient practice. Certainly, we should confirm the nursing staffs and paramedics are efficient and well-informed regarding hepatitis B and C commencing from their institutional teaching at the training center.

Adequate awareness can lead to good practices and attitude about disease. In order to address understanding and positive attitude about HBV and HCV we need to achieve the highest possible level of awareness about disease for all nurses and paramedics. This study intends to generate some statistical information which can serve as baseline data for further in-depth study in broader perspective.

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Discloser

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Comparative Study on Prevalence of Hypertension and Diabetes Mellitus Including Pre-hypertensive and Pre-diabetic Among Military Personnel Working in Chattogram Hill Tracts and Chattogram Plain Land Area

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ABSTRACT

Background: Hypertension and diabetes mellitus are growing problems in Bangladesh. Although some important studies on hypertension and diabetes have been carried out in Bangladesh, study on prevalence of diabetes mellitus and hypertension and the associated risk factors in military personnel are insufficient. We studied to determine the prevalence and some of the risk factors associated with hypertension and diabetes mellitus among the army personnel in Bangladesh and also to conduct a comparative study on the prevalence of the diseases between military personnel deployed in Chattogram plain land and hill tracts area. **Materials and methods:** The study was a cross sectional study. The survey was conducted among 265 army personnel of Chattogram plain land and hill tracts area. Data were collected by interview using a semi-structured questionnaire. The difference of prevalence value of hypertension and diabetes mellitus was examined among military personnel working in hill tracts and Chattogram cantonment. **Results:** The study found that the overall prevalence of hypertension in Chattogram plain land unit and hill tracts unit were 23.7% and 4.6% respectively and diabetes mellitus were 4.4% and 1.48% respectively. The prevalence of pre-hypertension and pre-diabetes was 50.37% & 34.6% and 44.4% and 23.1% in the Chattogram plain land unit and hill tracts unit respectively. **Conclusion:** The appropriate health program needs to be implemented with proper strategies including awareness at all level for life style modification, intervention by screening, risk group stratification and continued care and follow up.

Key words: Hypertension; Diabetes mellitus; Army personnel; Chattogram plain land; Hill tracts area, Bangladesh.

Introduction

Hypertension is one of the major Non-Communicable Diseases (NCDs) in the world, which significantly contributes to the burden of Cardiovascular Diseases (CVDs) stroke, kidney failure, disability and premature death. According to the World Health Organization (WHO) about 17 million deaths occur worldwide due to CVDs, of which hypertension alone accounts for 9.4 million deaths, and 80 % of the CVD-related deaths occurred in the developing countries¹. NCDs are global threat to human health and the development and economy in low-income countries². Diabetes is now recognized as a major chronic public health problem throughout the world and affecting a large number of people in a wide range of ethnic and economic levels in both developed and developing countries³. Raised Blood Pressure (BP) is the largest contributor to the global burden of

disease and mortality, leading to approximately 9.4 million deaths annually⁴. Developing countries like Bangladesh are facing a higher burden of non-communicable diseases such as hypertension as a result of demographic transition. The Government of Bangladesh is constitutionally committed to providing health care to every citizen that includes health services, health education, health promotion and rehabilitation⁵. We know that the success in prevention depends on various factors, including magnitude of the diseases burden, awareness on the risk factors and causes of diseases, the ways of their transmission, identifying risk factors and people at risk, availability of preventive, early detection or treatment measures of diseases, appropriate organization for implementing these measures for related individuals groups, and continuous evaluation and development of methods employed⁶. Awareness regarding risk factors is a prerequisite for the prevention of diabetes in general population³. The purpose of this study was to assess the prevalence of hypertension and diabetes mellitus in military personnel working in Chattogram plain land and hill tracts area and also to compare the prevalence of the diseases between the two groups of soldiers.

Materials and methods

For collecting primary data, one Chattogram plain unit and one hill tracts unit were selected for the study. The plain land unit is located at Chattogram Cantonment in Bayezid thana and hill tracts unit is situated in Mohalchari of Khagrachari district. To achieve the research objectives attempts were made to collect both qualitative and quantitative

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data by collecting data from the study units. Besides this, interview and observation methods were applied to understand the exact situation. Among the 265 samples 135 samples were from Chattogram plain land unit and 130 from hill tracts unit. The study was a cross sectional study. Data were collected by interview using a semi structured questionnaire during the period of August 2015 to November 2015. Blood pressure was measured to confirm hypertension, fasting blood sample was tested for blood sugar to detect diabetes mellitus, and height and weight were measured to find out BMI. Statistical analysis was carried out by using SPSS version 22.

Participants were categorized as normal, pre-diabetes and diabetic basing on their fasting blood glucose level. Fasting Blood Sugar (FBS) ranges considered in the study are as follows: normal {3.9 to 5.4 mmol/L (70 to 99 mg/dl)}, Prediabetes or Impaired Glucose Tolerance {5.5 to 6.9 mmol/L (100 to 125 mg/dl)} and diabetic {7.0 mmol/L (126 mg/dl) or above}⁷. Normal Blood Pressure (BP) value considered in the study as under: normal is less than 120/80 mm Hg, elevated- Systolic between 120-129 and diastolic more than 80, Stage 1 hypertension (Pre hypertension) is systolic between 130-139 or diastolic between 80-89 and stage 2 hypertension: Systolic at least 140 or diastolic at least 90 mm Hg⁸. Body Mass Index (BMI) less than 18.5 was considered under weight, BMI within 18.5 to 25 was considered normal, BMI within 25.0 to 30 was considered over weight and BMI \geq 30 was considered obese.

Inclusion criteria

Military personnel of the rank of Lieutenant Colonel and below and age 30 years and above up to retirement age limit were the included in study sample.

Exclusion criteria

Military personnel of the rank of Colonel and above were excluded from the sample.

Ethical clearance was obtained from appropriate individuals and authority

Results

The study found that the overall prevalence of hypertension in Chattogram plain land unit and hill tracts unit were 23.7 % & 4.6 % respectively and diabetes mellitus were 4.4% & 1.48 % respectively. The prevalence of pre-hypertension and pre-diabetes in Chattogram plain land unit and hill tracts unit were 50.37% & 34.6% and 44.4% & 23.1% respectively. The study revealed that 41-45 age group and 36-40 age group are the most affected groups. Proportions of overweight respondents in Chattogram plain land unit and hill tracts unit were 41.48 % & 35.38 % respectively. Mean age of 130 respondents of hill tracts unit was 37.18 years with SD of 4.297 and that of Chattogram plain land unit was 38.17 with SD of 6.253.

Table I : Distribution of diabetic and pre-diabetic among different age groups of plain land unit

		FBS			Total
		Normal	Prediabetes	Diabetes	
Age	31-35 Year	32 (23.70%)	19 (14%)	0	53
	36-40	20 (14.81%)	14 (10.37%)	2 (1.48%)	36
	41-45	16 (11.85%)	22 (16.3%)	3 (2.2%)	39
	46 and Above	1 (.74%)	5 (3.7%)	1 (.74%)	7
Total	69 (51.2%)	60 (44.4%)	6 (4.4%)	135	

The table shows diabetic 4.4% and pre-diabetic 44.4% in the respondents of plain land unit. Age group 41-45 year shows the highest prevalence of prediabetic and diabetic as 16.3% and 2.2% respectively.

Table II. Distribution of diabetic and pre-diabetic among different age groups of hill tracts unit

		FBS			Total
		Normal	Prediabetes	Diabetes	
Age	31-35	36	0	0	44
	36-40	35	2 (1.48%)	0	46
	41-45	22	3 (2.2%)	1 (.76%)	30
	46 and Above	7	1 (.76%)	1 (.76%)	10
Total	100	30 (23%)	2 (1.48%)	130	

The table shows the diabetic as 1.48% and pre-diabetic as 23%. Age group 41-45 years shows the highest prevalence of pre-diabetic and diabetic as 23% and 1.48% respectively.

Table III : Comparative distribution of prediabetic and diabetic respondents in Chattogram plain land unit and hill tracts unit.

FBS Status	Frequency with percentage	
	Plain land unit	Hill tract area
Normal	69 (51.1%)	100 (76.9%)
Prediabetes	60 (44.4%)	30 (23.1%)
Diabetes	6 (4.4%)	2(1.48%)
Total	135	130

The table demonstrates comparative state of the Chattogram plain land unit and hill tracts unit with diabetic as 4.4% and 1.48% respectively and pre-diabetic as 44.4% and 23.1% respectively. The difference in the level of fasting blood sugar between the two units was statistically significant ($p=0.04$).

Table IV : Distribution of hypertensive and pre-hypertensive (Stage-1 and stage-2 hypertension) among the different age groups of Chattogram plain land unit

		Blood Pressure (BP)				Total 36
		Normal	Elevated	Stage 1 Hypertension	Stage 2 Hypertension	
Age	31-35	10	8	23 (17%)	11 (8.15)	53
	36-40	6	6	16 (11.85%)	5 (3.7%)	36
	41-45	3	2	24 (17.78%)	11 (8.15)	39
	Above 46	0	0	2 (1.48%)	5 (3.7%)	7
Total	19	16	68 (50.37%)	32 (23.7%)	135	

The table shows the prevalence of hypertensive and pre-hypertensive among the respondents of Chattogram plain land unit as 23.7% & 50.37% respectively. Age group 41-45 yrs. shows the highest prevalence of hypertension and pre-hypertension as 8.15% & 17.78%.

Table V : Distribution of hypertension and pre-hypertensive (Stage-1 and stage-2 hypertension) among the different age groups of the respondents of hill tracts unit

Age	BP	BP				Total
		Normal	Elevated	Stage 1 Hypertension	Stage 2 Hypertension	
31-35	23	11	9 (6.9%)	1 (.26%)	44	
36-40	19	7	13 (10%)	2 (1.54%)	46	
41-45	7	7	18 (13.85%)	3 (2.30%)	30	
Above 46	4	1	5 (3.85%)	0	10	
Total	53	26	45 (34.6%)	6 (4.6%)	130	

The table shows the prevalence of hypertensive and pre-hypertensive among the respondents of the hill tracts unit as 4.6% and 34.6% respectively. Age group 41-45 years shows the highest prevalence of hypertensive and pre-hypertensive as 2.3% & 13.85% respectively.

Table VI : Comparative distribution of hypertensive and prehypertensive respondents in Chattogram plain land unit and hill tracts unit

BP Status	Frequency with percent	
	Plain land Unit	Hill tracts Unit
Normal	19 (14.1%)	53 (40.8%)
Elevated	16 (11.9%)	26 (20%)
Stage 1 Hypertension	68 (50.4%)	45 (34.6%)
Stage 2 Hypertension	32 (23.7%)	6 (4.6%)
Total	135	130

The table shows hypertensive and prehypertension respondents in Chattogram plain land unit and hill tracts unit as 23.7% and 4.6% respectively. It also shows pre-hypertensive respondents in Chattogram plain land and hill tracts unit as 50.4% and 34.6% respectively. The difference was statistically significant (p value for differences in systolic pressure was 0.003 and for diastolic pressure was 0.004).

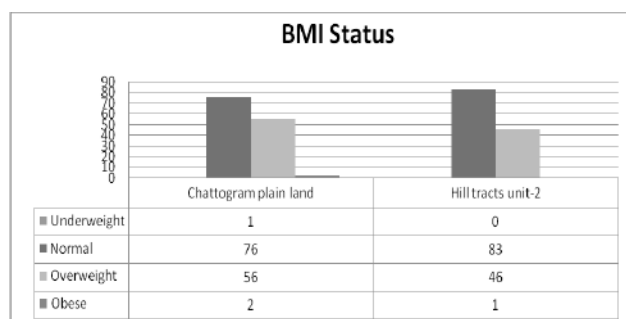


Figure 1 : Presentation of BMI status of the Chattogram plain land unit and hill tracts unit

The figure shows a higher proportions of overweight respondents 56 (42 percent) and obesity 2 (1.48 percent) were from Chattogram plain land unit, 46 (35 percent) overweight and 1 (0.77 percent) obesity respondents were from hill tracts unit. The difference is not statistically significant (p=0.108).

Discussion

The study found that the overall prevalence of hypertension in Chattogram plain land unit and hill tracts unit were 23.7% & 4.6% respectively and diabetes mellitus were 4.4% & 1.48% respectively. It also found the prevalence of pre-hypertensive respondents in Chattogram plain land and hill tracts unit as 50.4% and 34.6% respectively. The study also revealed that the prevalence of pre-diabetic in Chattogram plain land and hill tracts unit as 44.4% and 23.1% respectively. The differences of prevalence of hypertension and diabetes between the two units were found to be statistically significant. Operational duty pattern in hill tracts may be one of the causes of differences. Studies on hypertension and diabetes were conducted by many authors. Actually the impact of hypertension is considerably higher in people with diabetes than it is in the general population, suggesting either an increased sensitivity to its effect or a confounding underlying aetiopathogenic mechanism of hypertension associated with CVD with diabetes⁹.

Saqib, N et al assessed the prevalence of type-2 diabetes and metabolic syndrome among the urban middle class in Bangladesh and the result showed that the prevalence of type-2 diabetes and metabolic syndrome among the middle class in Dhaka is alarming high¹⁰. In low- and middle-income countries, the burden of non-communicable diseases is growing against an existing burden of other disease such as HIV/AIDS¹¹. High blood pressure is a key risk factor for many disease, including heart attack and stroke¹². Diabetes affects both individuals and their families and has an impact on economic and social development of a country. Information on the availability, cost and quality of medical care for diabetes is mostly not amiable for many low- and middle-income countries like Bangladesh¹³. In rural south Asia, hypertension remains a significant public health issue with sub-optimal Blood Pressure (BP) control rates¹⁴. Social inequalities in chronic disease outcomes differ between industrialized and developing countries, but few have directly compared these effects. There were difference in the patterns of educational health disparity for hypertension and diabetes mellitus¹⁵. Islam SM et al conducted a cross-sectional survey in Dhaka using multi-stage random sampling and found that the overall age-adjusted prevalence of hypertension and pre-hypertension among 730 participants was 23.7% and 19%, respectively, which was higher among males compared to females¹⁶. The result is similar to findings of this study with dissimilarities in prehypertensive prevalence. The prevalence of hypertension and prehypertension was 31.9% and 16.0% respectively in a study

in 2015 on adults of rural Bangladesh¹⁷. In a study on Indian population the age-adjusted prevalence in men and women of prehypertension was 40.2% and 30.1%, and of hypertension 32.5% and 30.4%, respectively¹⁸. Akter S et al. estimated the prevalence of diabetes and Prediabetes and their risk factors among Bangladeshi adults using national survey data and found the overall age-adjusted prevalence of diabetes and pre-diabetes was 9.7% and 23% respectively in contrast to the findings of the present study as 4.4% and 44.4% respectively in this study¹⁹. Proportions of overweight respondents in Chattogram plain land unit and hill tracts unit were 41.48 % & 35.38 % respectively. A doctoral study by Sanderson PW based on the secondary analysis of data covering 50,000 British Army soldiers indicated that according to BMI, 56.7% of the study population were overweight and of those individuals 12% were obese²⁰. In an study by Salimi, Y on Iranian military personnel the prevalence of overweight and obesity was found to be 41% and 13% respectively²¹.

Conclusion

The study revealed a high prevalence of hypertension and diabetes including pre-hypertensive and pre-diabetic among military personnel working in Chattogram hill tracts and Chattogram plain land area. The prevalence of both the diseases are significantly higher among military personnel in Chattogram plain than hill tracts.

Recommendations

Appropriate and effective health promotion and prevention programs to be undertaken to promote a healthy lifestyle and to reduce the prevalence of hypertension and diabetes mellitus among army personnel. More studies on army personnel with larger sample size is recommended to explore the burden of hypertension and diabetes mellitus with its overall implications and cost of the burden in terms of finance and operational readiness of the army.

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Discloser

Both the authors declared no competitive interest.

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Autopsy is the Potential Occupational Hazards in the Developing Country: A Retrospective Study

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ABSTRACT

Background : Every occupation including health sectors there are some occupational risks and hazards but in autopsy room at mortuary they are in high risk than other professionals. The risk of working in a mortuary is enormous, cadavers pose the risk of infection with organisms like cholera, plague, typhoid, tuberculosis and anthrax etc. Autopsy surgeons or Forensic pathologists and the personnel who assist in conducting the autopsy are liable to encounter a number of accidents and potential biohazards because of continuous risk of acquiring various kinds of viral, bacterial and fungal infections from contagious body fluids, soft tissues of the dead and skin injuries. The present paper highlights the hazards and risks, presents in the autopsy room. **Materials and methods :** This retrospective study was carried out over one year in the Forensic Medicine Department of Sylhet M.A.G Osmani Medical College in the year (January-December) 2018 . Total 1145 autopsy were done. **Results :** About 20% (Both male and female) of the total 1145 autopsy cases were found hazardous. Of which highest risk are contributed by infective cases (10.48%) and next risk factors are coming from poisoning cases (9.5%). The other existing hazards were studied through a open ended questionnaire given to the autopsy workers regarding physical injury, exposure to chemical, infections and adverse psychological effects secondary to stressful working environment of the autopsy room and presence of other occupational hazards if any. **conclusion :** Proper assessment, personal protective equipment, appropriate autopsy procedures and infrastructural modifications can significantly reduce the risks of occupational health hazards in the autopsy rooms.

Key words : Autopsy room; Hazards; Physical; Psychological.

Introduction

The term 'hazard' and 'risk' are often used interchangeably, which is not accurate. For example, health hazards due to use of scalpels, saws and needles facilitates acquiring hepatitis B, HIV and other infections within host. Staff of the medico legal laboratory have a great risk of infection inherent in their work, which frequent absent of group of workers from their working place. Health hazard and risk among health workers, is a well known occupational problem, but still it continues to be one of the biggest challenges faced till

date. Worthwhile to mention is that, these hazards are directly proportional to the type of work done by the health workers, and thus the autopsy centre becomes one of the biggest health hazards place among the health departments¹. It has also been shown by studies that the post-mortem examination room is one of the most potential sources for infections among all the areas of medical field. The persons at risk include the autopsy surgeons, the pathologist, mortuary technicians, potters, sweepers and others directly or indirectly involved in the postmortem examination. The major risk is infections, which comes from sources of viral origin such as HIV, hepatitis B, hepatitis C, hepatitis D, herpes, human T-cell lymphotropic virus type I etc., and bacterial sources as tuberculosis, staphylococcus, streptococcus, salmonella etc²⁻⁸. Moreover, most of the time the dead bodies coming for autopsy have no past medical records or if at all present, contains inadequate informations. Special informations worth mentioning is information of drug abuse, prostitution, occupations such as truck drivers, army men etc, as individuals with such history are at high risk of acquiring infections which have long latent period of clinical manifestation of the disease, but are potential source of infections, such as HIV, tuberculosis etc³. So risk from these bodies is also unknown and hidden. Also most

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of these dead bodies are cases of hospital admission, possible hospital acquired infections can be present, which are more virulent and resistant to treatment. The medium through which these infective risks can be exposed to workers includes mainly blood and other Potential Infective Materials (OPIM) includes, pleural fluid, peritoneal fluid, CSF, semen, vaginal secretion, pericardial fluid, other body fluids etc)^{3,6,8}.

Routes of Infection

Infections in the autopsy room may be acquired by any one of the following routes:

- i) Wound resulting from needle stick injury (e.g sharp objects) contaminated with blood or body fluids
- ii) Splashing of blood or other body fluids onto an open wound or area of dermatitis
- iii) Contact of blood or other body fluids with mucous membranes of eyes, nose or mouth
- iv) Inhalation and ingestion of aerosolized particles⁹.

Exposure to poisons from poisoning death cases is another important hazard, as death due to poisons is a common occurrence in Bangladesh. Biohazards to health as a result of exposure to decomposed bodies includes irrespirable gases as- Ammonia, Cadaverine, Putrescine, Carbon Dioxide, Hydrogen Sulfide, Methane, and Hydrogen as well as bacteria involved in decomposition^{3,7}. The other hazards includes physical injuries from needle prick, cut from scalpels, cutting saw, chisel and hammer and also cuts from broken sharp bonny parts of the victim while conducting autopsy, chemical hazards from formalin, absolute alcohol, phenol etc used as preservatives and disinfectants and adverse psychological effects as depression, mood swings, addiction etc secondary to stressful working environment in autopsy room⁷. Other possible risk of concern for autopsy workers includes- rabies, prion disease, plague, brucellosis, salmonella etc^{3,10}.

Material and methods

It is a retrospective study. Total 1145 cases of unnatural deaths and/or death under suspicious circumstances reported to Government by Sylhet M.A.G Osmani Medical College Hospital Sylhet, for medico legal autopsy during the period January-December 2018 and a questionnaire was designed to assess the hazards and risks faced by the autopsy workers. Data on the relevant factors was collected from various sources viz case papers or hospital records, the inquest papers and the information furnished by the relatives. The presence of hazards and risk from the dead bodies were noted based on presence of infective (As presence of pus, abscess, fibrosis, and adhere of lung to chest wall, features of gangrene, putried bodies) and poisons in the case of poisoning. These data were correlated with gender, type case, and presence of health problems. The samples from various organs viz Lungs, Liver, Spleen and Kidneys were subjected to histopathological examination

and a portion of spleen was subjected to microbiological examination to ascertain the organism responsible for septicemia. Viscera such as Liver, Kidneys, Stomach and their contents were properly preserved and forwarded to the Forensic Science Laboratory Mohakali, Dhaka for chemical analysis to determine the allegedly consumed poison.

Results

Among 1145 cases of autopsy 229 (20%) cases (132 male and 97 female) were noted to be source of risk and hazard to the health of the autopsy workers and of which infected samples were the commonest 120 cases (10.48%) followed by poisoning 109 cases (9.5%) as shown in Figure 1 and 2.

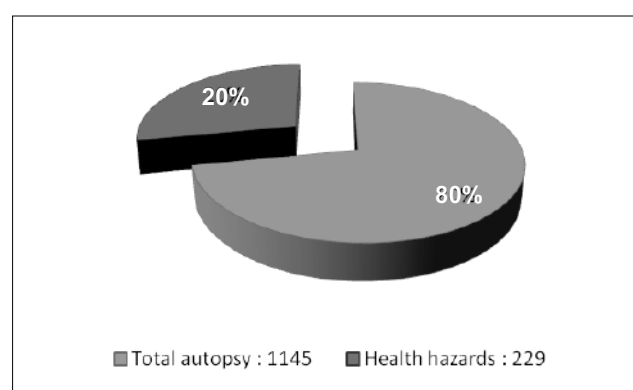


Figure 1 : Total health hazards autopsy

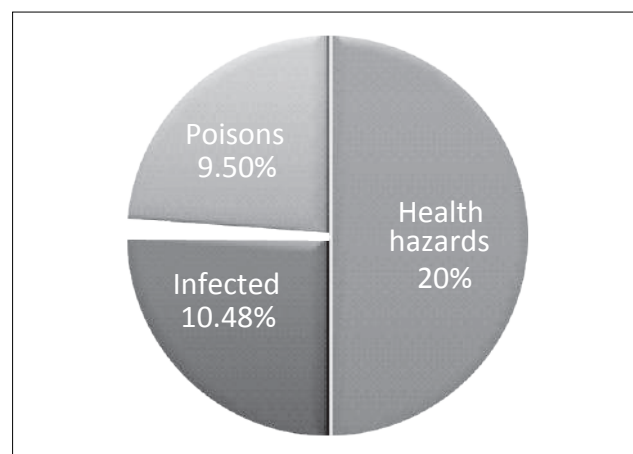


Figure 2 : Hazards and risk of autopsies

Of the infected source 120 cases, the most common case was pneumonia with septicemia 62 cases (51.6%) followed by trauma with sepsis 27 cases (22.5%). Klebsiella was the most common organism responsible for causing septicemia followed by Pseudomonas, Staphylococcus and Salmonella. Custodial deaths are always found various types infective. Other infective cases included, 7 known type tuberculosis, 6 cases peritonitis, 2 cases viral hepatitis B and one single case of gunshot in putrefied body, as shown in table I. The remaining 15 cases were decomposed bodies. The others risks and hazards were shown in table II.

Table I : The types and numbers of infected autopsy cases

Infected cases	Number of case
Pneumonia with septicemia	62
Trauma with sepsis	27
Tuberculosis	7
Peritonitis	6
Hepatitis B	2
Gunshot wound in putrefied body	1
Decomposed body	15
Total	120

Table II : Overall observation of hazards and risks

Hazards	Risk	Observations
Infections	Septicemia, pneumonic lung,	tuberculosis, Hepatitis B and others. 120 cases of autopsied bodies plus history of tuberculosis and treatment in two autopsy workers.
Poisoning	Poisons from Poisoning cases	109 cases
Biohazards	Irrespirable gases and bacteria's from Decomposed bodies	15 putrefied cases
Physical	Cut, needle pricks backaches, muscle pain and other injuries to body.	7 case of needle prick injury, one case of cut injury, and presence of body pain a common feature.
Chemical	Burn, irritations, sore eye, lacrimation, pain etc.	Frequently present.
Psycholo-gical	Stress, depression, mood swing, absenteeism etc.	Common occurrence.
Addictions	Smoking, chewing tobaccos, intake of alcohol	Present as habitual activity, especially among potters, dissectors and sweepers.

Discussion

From the above observations, it is clear that autopsy room is a high risk room for medical workers. The degree of risk faced among the workers involved in autopsy work differs, the highest infective risk is faced by those who are directly involved with the dissection of the body which is followed by those involved in examination and documentation of the observed information into reports (The doctors and the technical assistants) the others exposed to risks includes the potters involve in shifting the bodies, the accompanied police personnel and the sweepers⁵. In the Department of Forensic Medicine, Sylhet Osamani Medical College about 1200 to 1300 autopsies are conducted every year and on an average daily about 2 to 3 autopsies are conducted. The working team for an autopsy in our hospital consists of two doctors on duty having the facility for expert assistance when needed, one technical assistant, one worker helping for dissecting the body, four potters for shifting the body, one sweeper and two police constables on duty. Personal

protections as gloves, apron, rubber boots etc are provided to this team but sad to say of the inadequacy of the material provided, mainly due to inadequate funding to the department. Though rapid advancement and modernization is taking place in all the field of medical sciences in Bangladesh during this present century, the autopsy center remains an exception. The basic concept of health "womb to tomb" clearly indicates that in a health care set up the duty of a doctor is not only to care the living but also the patients who die but practically the later is less adopted¹¹. All these drawbacks and inadequacy of facilities are common problem all over Bangladesh and results in inadequate output of quality of work, thus forensic field in Bangladesh is gradually losing their integrity, which invites negative impacts on Forensic investigation. The eye opening catch from this study for the forensic medical people is how to create a safe and healthy working environment in the autopsy centers. To do so, in brief, safe and healthy practice should be adopted starting from the dead bodies, as washing the bodies, plugging all orifices and protecting the rest of the body with clothing's etc, soon after death^{2,3}. Regarding the autopsy centers, it should be adequately staffed, have adequate space with good ventilation, lighting, exhaust and sterilization facility along with good practice of cleaning and disinfecting the autopsy center especially the autopsy room. The practice of strict universal precautions of using gloves, face mask, goggles, protective aprons and head cap should be followed. In few cases as HIV, an extra care like using double glove, HIV autopsy kit, generously using disinfectants as bleaching powder in contaminated areas with adequate sterilization of instruments and finally careful and safe disposal of these bodies, preferably incinerating them^{2,3,5,7,11}. All these above mentioned practices should be strictly followed to ensure " Safe Life" as right and responsibility as well.

Conclusion

High prevalence of various infectious diseases in the population poses a great risk of occupational hazards to the forensic pathologist/autopsy surgeon and other staff involved in the postmortem examination. Proper assessment, personal protective equipment, appropriate autopsy procedures and infrastructural modifications can significantly reduce the risks of occupational health hazards in the autopsy rooms. Accordingly periodic training and education in safe postmortem procedures, prevention of sharp's injuries and other kinds of exposures should be reported to the forensic personnel regularly. Safe autopsy practice will be a great help and the goal of such practice is to protect the concerned workers and environment from the potential risks associated with occupation.

Disclosure

All the authors declared no competing interests.

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Relations of Glycated Hemoglobin (HbA1c) With Components of Metabolic Syndrome in Newly Diagnosed Type 2 Diabetic Patients

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ABSTRACT

Background: HbA1c is widely used to assess the long-term glycemic status in diabetic patients. However, its relations with different components of metabolic syndrome in newly diagnosed type 2 diabetic patients is not well-studied. So, the aim of the present study was to investigate the associations and predictability of HbA1c with metabolic syndrome and its components in newly diagnosed type 2 diabetic patients. **Materials and methods:** This was a cross-sectional comparative study conducted at Outpatient Department (OPD) of Medicine and Department of Biochemistry of Chattogram Medical College Hospital during the period of January 2016 to December 2016. Our study population of 40-70 years and was divided into two groups. Group A consisted of 100 first time diagnosed type 2 diabetic patients and Group B included 80 healthy subjects from the community. The subjects were recruited purposively. **Results:** Metabolic syndrome and its components i.e. obesity, hypertension, hyperinsulinemia, insulin resistance and dyslipidaemia were much more prevalent in diabetic patients compared to reference subjects. Although BMI, waist circumference, blood pressure, plasma glucose, plasma insulin, insulin resistance index and lipid parameters correlated strongly with HbA1c multiple linear regression analysis identified only plasma glucose and BMI to be significant predictors of HbA1c in diabetic patients. Logistic regression analysis also determined plasma glucose, central obesity and insulin resistance as major predictors of increased HbA1c ($\geq 6.5\%$) in the diabetic group. In these patients, increased HbA1c ($\geq 6.5\%$) was associated with increased BMI, central obesity, hyperinsulinemia and insulin resistance, but not with increased prevalence of metabolic syndrome. **Conclusion:** The study suggests that in newly diagnosed type 2 diabetic patients HbA1c is closely related to components of metabolic syndrome and the relations are particularly strong with plasma glucose, central obesity and insulin resistance.

Key words: HbA1c; Metabolic syndrome; Diabetes; Insulin; Insulin resistance.

Introduction

Glycated Haemoglobin (HbA1c) is usually used to assess the long-term glycaemic control in diabetic patients. It offers the benefits of more convenient sampling, smaller day-to-day variability and greater pre-analytical stability than plasma glucose testing¹⁻². Following the example of the American Diabetic Association (ADA) the World Health Organization (WHO) also recommended HbA1c as an additional test to diagnose diabetes³. In fact, chronic hyperglycaemia can be captured by HbA1c alone, not by plasma glucose even when tests are repeated. Beyond these diagnostic and monitoring benefits, HbA1c was also found to better correlate with many long-term diabetic complications like retinopathy, nephropathy and cardiovascular disease than Fasting Plasma Glucose (FPG). Elevated HbA1c is also

regarded as an independent risk factor for coronary heart disease and stroke in subjects with or without diabetes⁴⁻⁵. However, most of these observations are primarily based on general population, prediabetic persons or diabetic patients on interventions. In addition, the possible relation of HbA1c with metabolic syndrome, the most likely phenomenon linking HbA1c to diabetic complications, has been largely overlooked. So, in this study, we aimed to evaluate the associations and predictability of HbA1c with metabolic syndrome and its components in newly diagnosed type 2 diabetic patients prior to any intervention.

Materials and methods

This was a cross-sectional comparative study conducted at Outpatient Department (OPD) of Medicine and Department of Biochemistry of Chattogram Medical College Hospital during the period of January 2016 to December 2016. The diabetic suspects of 40 to 70 years with no history of diabetes were screened with Oral Glucose Tolerance Test (OGTT). Of them, 100 individuals fulfilling the WHO diagnostic criteria (Glucose-based) of diabetes were taken in Group A⁶. 80 years-sex matched healthy subjects from community with normal OGTT results were included in Group B. Subjects were purposively recruited following the undermentioned inclusion and exclusion criteria.

Inclusion criteria for Group A: Persons aged from 40-70 years diagnosed diabetic for the first time in our tests with no other known pathology.

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Exclusion criteria for Group A: Known diabetic or prediabetic conditions, hemoglobinopathies, anaemia, splenomegaly/splenectomy, chronic renal or liver disease, carcinoma, pregnancy, on aspirin, antiretroviral agents, drugs that affect blood glucose, vitamin C and E supplementation, iron, vitamin B₁₂ or folate administration or their deficiencies, history of recent blood transfusion, smoking, alcohol consumption.

Inclusion criteria for Group B: Healthy individuals from community aged 40-70 years.

Exclusion criteria for Group B: Subjects known or suspected to have any disease or pathology, pregnancy, history of recent blood transfusion, smoking, alcohol consumption, on drugs that may affect blood glucose or haemoglobin glycation.

Plasma glucose was determined by glucose oxidase method in Siemens Dimension clinical chemistry system. Plasma lipid profiling was also done on the same system. Fasting plasma insulin was estimated by direct chemiluminescent technology in ADVIA Cantaur (Siemens) system. HbA_{1c} was measured using High-Performance Liquid Chromatography (HPLC) method in a Bio-Rad D10 system. Insulin resistance was calculated using Homeostatic Model Assessment Insulin Resistance (HOMA-IR) [HOMA-IR = fasting insulin (mIU/L) × fasting glucose (mmol/L)/22.5] higher values representing greater insulin resistance. Those with HOMA-IR value > 2.6 were categorized as insulin resistant. The reference value of fasting plasma insulin was up to 12 mIU/L⁷. Metabolic syndrome was defined as per revised criteria of the National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATP III). For elevated waist circumference or central obesity, cut-points of 90 cm in men and 80 cm in women were applied that appears to be appropriate for the Asians⁸. Statistical analyses were performed using Statistical Package for Social Science (SPSS) for Windows version 22.0. p values <0.05 were considered statistically significant. Quantitative data were expressed as mean ± SEM and qualitative data were expressed in frequency and percentage. Relevant statistical tests of significance were done as appropriate.

Results

Table I : Comparison of studied parameters between Group A and Group B

Traits	Group A (Diabetics) n = 100	Group B (Controls) n = 80	p value
Age (Years)	48.50 ± 0.66	46.07 ± 0.79	>0.05
Male sex (%)	45.00	42.50	>0.05
BMI(kg/m ²)	25.16 ± 0.13	22.42 ± 0.16	<0.0001
Increased BMI (%)	68.00	6.25	<0.01
Waist circumference (cm)	88.49 ± 0.80	81.01 ± 0.60	<0.0001
Central obesity (%)	70.00	23.75	<0.01

Systolic BP(mm Hg)	134.35± 1.21	119.75 ± 0.99	<0.0001
Diastolic BP (mm Hg)	83.70 ±0.67	75.94 ± 0.71	<0.0001
Hypertensive (%)	72.00	23.75	<0.01
FPG (mmol/L)	8.68 ± 0.15	5.27 ± 0.03	<0.0001
2-h glucose (mmol/L)	13.96 ± 0.25	6.99± 0.06	<0.0001
HbA _{1c} (%)	8.24 ± 0.15	5.58 ± 0.05	<0.0001
Increased HbA _{1c} (%)	95.00	6.25	<0.01
Fasting insulin (mIU/L)	20.73 ± 0.56	9.68 ± 0.19	<0.0001
Hyperinsulinemia (%)	94.00	5.00	<0.01
HOMA-IR	8.10 ± 0.29	2.27 ± 0.05	<0.0001
Insulin resistance (%)	96.00	8.75	<0.01
Fasting Cholesterol (mg/dL)	222.04 ± 2.58	152.18 ± 1.84	<0.0001
Fasting LDL-C (mg/dL)	138.56 ± 2.06	84.39 ± 1.08	<0.0001
Fasting HDL-C (mg/dL)	36.14 ± 0.34	49.90 ± 0.48	<0.0001
Fasting TG (mg/dL)	263.61 ± 6.10	141.81 ± 1.06	<0.0001
Metabolic syndrome (%)	97.00	7.50	<0.01

The above table shows that there were no significant differences in age and sex proportions between the two groups. But the anthropometric, clinical and biochemical pictures were significantly different.

Table II : Correlations of HbA_{1c} with different components of metabolic syndrome in diabetic subjects, n = 100

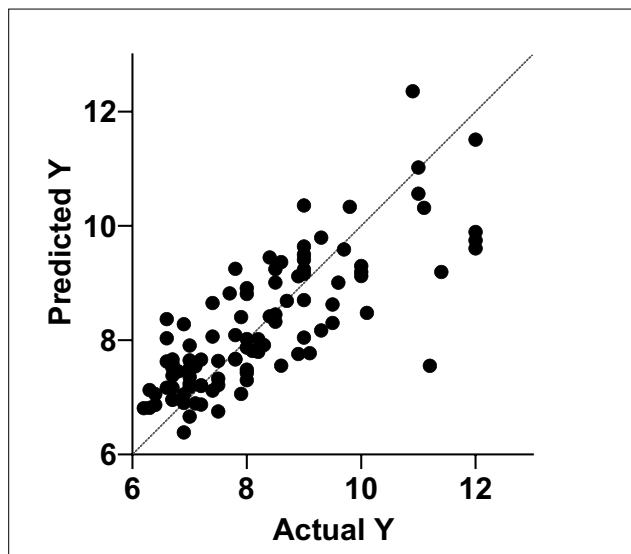
Correlation with	Correlation coefficient (r)	p-value
Age	0.09	>0.05
BMI	0.44	<0.00001
Waist circumference	+0.54 in males (n=45) +0.63 in females (n=55)	<0.001 <0.00001
Systolic BP	+0.48	<0.00001
Diastolic BP	+0.44	<0.00001
Fasting glucose	+0.74	<0.00001
2-h glucose	+0.59	<0.00001
Insulin	+0.26	<0.01
HOMA-IR	+0.57	<0.00001
Triglyceride	+0.49	<0.00001
HDL-C	-0.65 in males (n=45) -0.60 in females (n=55)	<0.00001 <0.00001
LDL-C	+0.72	<0.00001
Total cholesterol	+0.40	<0.0001

In diabetic subjects, HbA_{1c} showed significant correlation with most of the components of metabolic syndrome, the correlation being particularly strong with waist circumference, plasma glucose, HOMA-IR, HDL-C and LDL-C.

Table III : Multiple linear regression analysis to predict HbA1c in diabetic subjects, n = 100

Dependent variable: HbA1c(%)		
Regression type: Least squares		
Variable	Estimate	p value
Intercept	-4.304	<0.05
Age	0.02799	>0.05
Sex	0.1504	>0.05
BMI	0.2173	<0.01
FPG	0.6225	<0.0001
HOMA-IR	0.03038	>0.05
R squared = 0.6163		

Multiple linear regression analysis shows that plasma glucose and BMI were significant predictors of HbA1c in diabetic patients.

**Figure 1:** Actual vs Predicted plot- Multiple linear regression to predict HbA1c in diabetic subjects from age,sex, BMI, FPG & HOMA-IR, n = 100**Table IV :** Logistic regression analysis to predict increased HbA1c ($\geq 6.5\%$) in newly diagnosed diabetic patients, n = 100

Variable	Regression coefficient	Odds Ratio	p
Age	0.064	1.067	>0.05
Sex	-0.638	0.528	>0.05
BMI	0.649	1.914	>0.05
Central obesity	2.362	10.615	<0.05
Fasting glucose	4.531	92.863	<0.001
2-h glucose	2.498	12.153	<0.001
HOMA-IR	1.389	4.009	<0.001
Metabolic Syndrome	2.453	11.625	>0.05

Logistic regression analysis shows that plasma glucose, central obesity and HOMA-IR were major predictors of increased HbA1c in diabetic patients.

Table V : Associations of increased HbA1c ($\geq 6.5\%$) with different parameters in diabetic patients (By Fisher's exact test), n = 100

Parameters	HbA _{1c} $\geq 6.5\%$	HbA _{1c} < 6.5%	p value
Increased BMI	70.53%	20%	<0.05
Central obesity	72.63%	20%	<0.05
Hyperinsulinemia	97.89%	20%	<0.0001
Insulin resistance	97.89%	60%	<0.05
Metabolic syndrome	97.89%	80%	>0.05

In newly diagnosed diabetic patients, increased HbA1c ($\geq 6.5\%$) was associated with increased BMI, central obesity, hyperinsulinemia and insulin resistance, but not with increased prevalence of metabolic syndrome.

Discussion

In the present study, the newly diagnosed type 2 diabetes patients had considerably worse anthropometric, clinical and biochemical parameters compared to the reference population (Table I). Among the diabetic subjects, HbA1c demonstrated significant correlations with most of the components of metabolic syndrome, the correlations being particularly strong with waist circumference, plasma glucose, HOMA-IR, LDL-C and HDL-C (Table II). Some of the previous studies also brought similar observations. In a study of 1,011 type 2 diabetic patients, HbA1c directly correlated with cholesterol, triglycerides and LDL-C and inversely with HDL-C⁹. Correlations of HbA1c with BMI, plasma glucose, weight circumference, lipid parameters and blood pressure were established in other works¹⁰⁻¹¹. In line with our results, Naveen et al showed a positive correlation between HbA1c and HOMA-IR ($r = 0.338$, $p < 0.0001$), whereas Al-Hakeim found HbA1c to correlate with beta-cell function in fair and poorly controlled DM¹²⁻¹³. Contrary to these findings, Borai et al observed the correlation between HbA1c and insulin sensitivity indices only in subjects with normal glucose tolerance and IGT but not in those with diabetes mellitus¹⁴. Multiple linear regression analysis shows that plasma glucose and BMI were significant predictors of HbA1c in diabetic patients (Table III), while logistic regression analysis identified plasma glucose, central obesity and HOMA-IR as major predictors of increased HbA1c in the same group (Table IV). In agreement with our results, Cuiet al also reported age and BMI to be predictors of HbA1c in newly diagnosed female type 2 diabetes patients¹⁵. Whereas Hird et al found age, BMI, waist circumference and family history of diabetes as significant risk factors of increased HbA1c¹⁶. Similarly, logistic regression analysis by Ho-Pham et al recognised age, BMI, waist-hip ratio and fasting plasma glucose to be important risk factors for increased HbA1c¹⁷. In our newly detected diabetic patients, increased HbA1c ($\geq 6.5\%$) was also associated with increased BMI, central obesity, hyperinsulinemia and insulin resistance, but not with increased prevalence of metabolic syndrome (Table V). Likewise, Naveen et al found a statistically significant association between HbA1c and HOMA-IR score¹². One study has

shown that even in nondiabetic subjects there are increasing proportions of all metabolic syndrome components across increasing quartiles of HbA1c. Besides, the HbA1c criterion identified more participants with metabolic syndrome compared to the FPG criterion with a good agreement between HbA1c and FPG¹⁸. Other findings also suggest that HbA1c improves the detection of hyperglycaemia for the diagnosis of metabolic syndrome¹⁹⁻²⁰.

HbA1c is not only a useful marker of long-term glycaemic control but also a good predictor of cardiovascular complications⁹. In a study performed by Selvin et al, an HbA1c cut-off of 6.5% was highly specific and fairly sensitive in connecting HbA1c levels to the risk of long-term microvascular and macrovascular outcomes in nondiabetic adults²¹. Even an HbA1c level of 5%, far below the cut points of prediabetes, was shown to be the risk of cardiovascular events²². An increase of HbA1c by 1% was associated with about 30% increase in all-cause mortality and a 40% increase in cardiovascular mortality among diabetic individuals. However, reducing the HbA1c by 0.2% could lower the mortality by 10%²³. Even though the admission glucose levels may be an indicator for increased risk in the acute and subacute setting after myocardial infarction, HbA1c being a surrogate for more chronic hyperglycaemia, is obviously a more useful marker of long-term risk of death²⁴. HbA1c is also shown to be associated with prevalent retinopathy, CKD, microalbuminuria, peripheral neuropathy²⁵⁻²⁷. In the Journal of the American Medical Association a recent opinion piece concluded that HbA1c remains the only test that can predict the microvascular complications of diabetes and for which generally accepted therapeutic targets are available²⁸.

Conclusion

In conclusion, our study suggests that in newly diagnosed type 2 diabetic patients, HbA1c is closely linked to components of metabolic syndrome, especially the plasma glucose, central obesity and insulin resistance. So, other than the prognostic relevance, there may be additional benefits of early measurement of HbA1c in identifying patients at risk of micro and macrovascular complications.

Disclosure

All the authors declared no competing interests.

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Malaria in Bangladesh: An Updates

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ABSTRACT

There are approximately 300 million cases of malaria each year, resulting in 1 million deaths worldwide. Family physicians can encounter patients preparing to travel to malaria-endemic regions. Most cases occur in sub-Saharan Africa, the Indian subcontinent, and Southeast Asia between the months of May and December. Key elements in prevention include barrier protection and chemoprophylaxis. Travelers to malaria-endemic areas should be advised to use mosquito repellent at all times and bed netting at night. Prophylactic medication should be initiated before travel and continued after return. Travelers should be warned that malaria symptoms can present up to one year after a mosquito bite. Symptoms are vague, and may include fever, chills, arthralgias, and headaches. Travelers experiencing symptoms should seek prompt medical attention. There has been a tremendous reduction in malaria burden in the past decade; however, more work is required to fill the necessary gaps to eliminate malaria.

Purpose of Review

Malaria remains a global burden contributing to morbidity and mortality especially in children under 5 years of age. Despite the progress achieved towards malaria burden reduction, achieving elimination in more countries remains a challenge. This article aims to review the prevention and control strategies for malaria, to assess their impact towards reducing the disease burden and to highlight the best practices observed.

Key words: Malaria; Sub-Saharan Africa; Vector control; Methods under development; Sustainable Development Goals; Malaria Vaccine Implementation Programme (MVIP); Elimination.

Introduction

Malaria remains one of the most serious public health problems in lower and middle-income countries and control and elimination are high priorities within endemic regions. Worldwide an estimated 212 million new cases of malaria and 429,000 malaria deaths occurred in 2015 with 90 and 92% respectively, occurring in the African region. Children under 5 years of age are particularly susceptible to infection in areas with high malaria transmission. More than 70% of all malaria deaths occur in this age group. Since the year 2000, a concerted campaign against malaria (Roll Back Malaria) has led to unprecedented levels of intervention coverage and scale-up of effective treatments across Sub-Saharan Africa (SSA). Currently, the World Health Organization (WHO) has set new goals for global malaria reduction by 2030, which include the reduction of global malaria incidence and mortality rates by at least 90%, as well as elimination of the disease in at least 35 endemic countries. *P. falciparum* malaria is a life-threatening infectious disease that is responsible for over 90% of malaria cases

and almost all the malaria deaths worldwide¹. Bangladesh is one of the four major malaria-endemic countries in South-East Asia having approximately 34% of its population at risk of malaria. Malaria in Bangladesh is concentrated in 13 districts with a prevalence ranging between 3.1% and 36%, and is mostly caused by *Plasmodium falciparum*. Geographical conditions pose a potential risk for *Plasmodium knowlesi* malaria. Resistance to a number of drugs previously recommended for treatment has been reported. Low socio-economic status, poor schooling and close proximity to water bodies and forest areas comprise important risk factors. Despite the significant steps in Long Lasting Insecticide Net (LLIN)/Insecticide Treated Net (ITN) coverage in Bangladesh, there are still many challenges including the extension of malaria support to the remote areas of Bangladesh, where malaria prevalence is higher, and further improvements in the field of referral system and treatment². The government has set a target of total eradication of malaria by 2030. According to the plan, 59 districts will be free of malaria by 2021, Chattogram and Cox's Bazar will be malaria-free by 2025, and the disease will be eliminated from the three hill tract districts by 2030³. According to the government data the incidence of malaria was a bit lower in 2018 compared to 2017, when 13 people died and 29,247 people were infected. As rain began this year early, the incidence of malaria could increase this year, said Sanya Tahmina, director for communicable disease under Directorate General of Health Services. The World Malaria

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Day 2019 observed on April 25 in Bangladesh as elsewhere in the world. This year's theme, 'Zero malaria starts with me', calls for engagement of all in elimination of malaria. In 2014, at least 45 people died and 59,000 were infected with malaria in the country, which was highest since 2010. Experts said the early rain was one of the main reasons for the high number of malaria incidence in 2014⁴. Introduction of RDR for diagnosis, and ACT for treatment of *P. falciparum* cases. Thereafter, a steady decline is noted from 84,690 cases in 2008 to 26,891 cases in 2013, having a 68.2% reduction in case incidence. The total deaths came down to 15 in 2013 as against 154 in 2008, 90.2% reduction. The tribal hamlets are in clusters in the remote hills and foothills. Most of the houses are thatched built with indigenous material e.g. bamboo, wood etc. and these houses seldom have any protection against the vector mosquitoes. The peoples are vulnerable to malaria infection. The aggregation of laborers for development work sometimes further aggravates the malaria situation in these areas. Settlers coming from the plain areas of the country in the hill district are non-immune and more prone to get malaria infection.

Seasonal workers such as 'Jhum cultivators', forest goers etc. are at high risk group due to staying overnight in open spaces in the forest and hill. Malaria affects all age groups and both males and females, however, adult males are commonly affected mainly due to occupations and behavior that put them at risk of being bitten by malaria vectors. Pregnant women and children <5 yrs are biologically at higher risk and they tend to develop more severe malaria due to low level of immunity. Thus, in high transmission areas, these groups should be given priority for interventions. High risk populations, thus includes:

- i) Young children, particularly under <5 yr children
 - ii) Pregnant women
 - iii) Travelers from non-endemic areas
 - iv) People from non-endemic areas residing for a long time and returning home
 - v) 'Jhum cultivators' and forest goers, Tea estates
 - vi) Refugees and mobile population
 - vi) People with HIV/AIDS and TB (For co-infections, if any).
- Bangladesh is also on track to achieving the malaria MDGs Goals, and Targets⁵.

Search Strategy

Available studies and abstract were identified through Pubmed and Medline data bases (From 2012-2019) and Cochrane data bases. Key search topic were "Malaria in Bangladesh: Updates" and relevant articles.

The reference list of review article were also searched. The search term were following key words used in various combination : Malaria; Sub-Saharan Africa; Vector control; Sustainable Development Goals; Malaria vaccine implementation programme; Elimination.

Discussion

Recent Findings

According to the Directorate General of Health Services (DGHS), 10,523 malaria cases were identified in 13 districts in 2018, a steep fall from 39,719 in 2015. The Chattogram Hill Tracts (CHT) have also reported a reduction in malaria cases, 9,540 in 2018 from 35,968 in 2015. Kurigram and Sherpur are very close to eliminating malaria. Both districts reported only two cases apiece in 2018, three in 2016 and 2015. Sherpur improved rapidly. The district identified 7 cases in 2017, 16 in 2016 and 17 in 2015. Eight People who visited those are affected in last 3 years were identified centrally in Dhaka. The prevalence of malaria is high in 13 border districts, including the three districts of Chattogram Hill Tracts. The malaria endemic districts include, Bandarban, Rangamati, Khagrachari, Cox's Bazar, Chittagong, Habiganj, Moulvibazar, Sylhet, Sunamganj, Netrakona, Mymensingh, Sherpur and Kurigram. The total population at risk of malaria in the 13 endemic districts is approximately 13.25 million. About 80% of the cases of malaria in Bangladesh are reported from the three CHT districts with a total population of about 1.6 million. The indigenous population constitutes about 50% of the total population in CHT districts. Use of long-lasting insecticide-treated nets and indoor residual spraying has resulted a decline in the incidence and prevalence of malaria. Other strategies such as larval source management have been shown to reduce mosquito density but require further evaluation. New methods under development such as house improvement have demonstrated to minimize disease burden but require further evidence on efficacy. Development of the RTS, S/ AS01 malaria vaccine that provides protection in under-five children has provided further progress in efforts of malaria control.

New Plan for Malaria Elimination

To ensure that the country remains on track to eliminate malaria by the regionally adopted goal of 2030, the Bangladesh Government has developed a new National Strategic Plan 2017–2021. The revised strategy has been drafted to ensure alignment with the WHO Global technical strategy for malaria (2016–2030). This will also greatly contribute towards overall national development and the Sustainable Development Goals (SDGs). As part of the new plan, Bangladesh aims to achieve a "Malaria-Free Bangladesh by 2030". To achieve this the country sets a target of five related objectives as follows:-

- i) Reduce annual parasite incidence in the 13 endemic districts to less than 0.46 by 2021.
- ii) Interrupt local transmission of malaria in 8 of the 13 endemic districts by 2021.
- iii) Ensure that the remaining 51 districts are free from local malaria transmission by 2021.
- iv) Prevent the re-establishment of malaria in districts where transmission has been interrupted.

v) Prevent the emergence of strains of *Plasmodium falciparum* malaria that are resistant to Artemisinin-based Combination Therapies (ACT) in the country⁶.

Malaria Treatment Regimen 2016

Revised treatment regimen for malaria has been adapted for:

- i) Early Definitive Diagnosis and Prompt Treatment (EDPT).
- ii) Prevention or delay in development of drug resistance.
- iii) Interruption of transmission.
- iv) Reduction of morbidity and mortality.

The Malaria Treatment Regimen 2016 differs in few areas for malaria treatment regimen 2014.

Malaria Case Definition

I. Falciparum Malaria (FM)

● Uncomplicated Malaria (UM)

- i) Fever or history of fever within last 48 hours
- ii) Absence of convincing evidence of any other febrile illness
- iii) No features of severe malaria
- iv) High index of suspicion based on time, place and person - (Enquiring about high risk groups - Jhum Cultivator, Forest goers, new arrival, No travel to endemic area, short term travelers
- v) Presence of asexual form of *Plasmodium falciparum* in Blood Slide Examination (BSE) or Rapid Diagnostic Test (RDT) +ve for *P. falciparum*. The diagnosis of malaria should be confirmed through RDT Or BSE as symptom based clinical diagnosis of malaria may be unreliable.

● Severe Malaria (SM)

- i) Fever or history of fever within last 48 hours
- ii) One or more of the following clinical or lab features of severity
- iii) Change of behavior, confusion or drowsiness
- iv) Altered consciousness or coma (Cerebral malaria)
- v) Generalized convulsions > 2 episodes in 24 hours
- vi) Difficulty in breathing due to acute pulmonary oedema
- vii) Acute Respiratory Distress Syndrome (ARDS) or deep breathing (Acidotic breathing) (Rapid, deep, laboured breathing)
- viii) Circulatory collapse or shock: Compensated shock is defined as capillary refill ~ 3 s or temperature gradient on leg (Mid to proximal limb) but no hypotension. De-compensated shock is defined as systolic blood pressure < 70 mm Hg in children or < 80 mm Hg in adults, with evidence of impaired perfusion (Cool peripheries or prolonged capillary refill) or (Algid malaria)
- ix) Clinical Jaundice : Severe Prostration i.e extreme generalized weakness for the patient cannot walk, stand or sit without assistance and in small child failure to feed
- x) Severe vomiting leading to 'non per os'

xi) Bleeding tendency or abnormal spontaneous bleeding including recurrent or prolonged bleeding from nose, gums or venepuncture sites, haematemesis or melaena

xii) Severe Anemia

xiii) Oliguria 400 ml/24 hrs (or 0.5ml/kg/hr over 6 hours) Laboratory

xiv) Acidosis: A base deficit of > 8 mEq/L or if not available, a plasma bicarbonate level of < 15 mmol/L or venous plasma lactate ~ 5 mmol/L

xv) Hypoglycaemia: Blood or plasma glucose < 2.2 mmol/L or 40 mg/dL

xvi) Severe malarial anaemia: Haemoglobin concentration = 5 g/dL or a haematocrit of = 15% in children < 12 years of age (7 g/dL and < 20%, respectively, in adults) with a parasite count > 10 000/f.IL

xvii) Renal impairment: Plasma or serum creatinine > 265 umol/L (3 mg/dL) or blood urea > 20 mmol/L

xviii) Jaundice: Plasma or serum bilirubin > 50 umol/L (3 mg/dL) with a parasite count 100 000/ f.IL

xix) Pulmonary oedema: Radiologically confirmed or oxygen saturation < 92% on room air

xx) Hyperparasitaemia: *P. falciparum* parasitaemia > 10%

xxi) Presence of asexual form of *P. falciparum* in BSE or +ve RDT for *P. falciparum*.

II. Vivax Malaria (VM)

Fever or history of fever within last 48 hours. Absence of convincing evidence of any other febrile illness. High index of suspicion based on time, place and person (Enquiring about high risk groups - Jhum Cultivator, Forest goers, new arrival, no travel to endemic area, short term travellers). Presence of asexual form of *Plasmodium vivax* in Blood Slide Examination (BSE) or Rapid Diagnostic Test (RDT) positive for *P. vivax* N.B: Results of RDT may be false positive in patient who received anti malarial drugs over 4 weeks. Very low parasite count may be missed by RDT.

Revised Malaria Treatment Regimen

I. Falciparum Malaria (FM)

● Uncomplicated Malaria (UM)

Objective of Treatment of uncomplicated Malaria: The clinical objectives of treating uncomplicated malaria are to cure the infection as rapidly as possible and to prevent progression to severe disease. "Cure" is defined as elimination of all parasites from the body. The public health objectives of treatment are to prevent onward transmission of the infection to others and to prevent the emergence and spread of resistance to anti malarial drugs. First line treatment: Artemether +Lumefantrine combination (ACT)- 6 divided doses over 3 days. Artemether + Lumefantrine combination (ACT) (20mg +120 mg) should be started immediately after confirming the diagnosis (0 hours). The second dose should be given 8 hours after the first dose. The subsequent dose will be given 24 hours after first dose or 16 hours after giving

second dose. Then the doses are to be given 12 hourly until the total 6 doses have been achieved. The calculated dose for adult and children are given in the box (eg. for adults 4 tab stat. Second dose is given 8 hours after first dose. Then 4 tab 12 hourly for two days). Body weight (Kg) Artesunate + amodiaquine dose (mg) given daily for 3 days. Absorption of lumefantrine is enhanced by co-administration with fat. Patients or caregivers should be informed that this ACT should be taken immediately after food or a fat containing drink (eg. milk) particularly on the second and third days of treatment.

If for any reason Artemether +Lumefantrin combination (ACT) cannot be given then **alternative treatment:** Artesunate + Amodiaquine Formulations currently available: A fixed-dose combination in tablets containing 25 + 67.5 mg, 50 + 135 mg or 100 + 270 mg of artesunate and amodiaquine, respectively. Target dose and range: The target dose (and range) are 4 (2-10) mg/kg bw per day artesunate and 10 (7.5-15) mg/kg body weight per day amodiaquine once a day for 3 days.

Artesunate + Mefloquine Formulations currently available: A fixed-dose formulation of paediatric tablets containing 25 mg artesunate and 55 mg mefloquine hydrochloride (Equivalent to 50 mg mefloquine base) and adult tablets containing 100 mg artesunate and 220 mg mefloquine hydrochloride (Equivalent to 200 mg mefloquine base). Target dose and range: Target doses (Ranges) of 4 (2-10) mg/kg bw per day artesunate and 8.3 (7-11) mg/kg bw per day mefloquine, given once a day for 3 days. Body weight (Kg) Artesunate + amodiaquine dose (mg) given daily for 3 days. (4.5 to < 9) 25 + 67.5 (9 to < 18) 50 + 135 (18 to < 36) 100 + 270 (> 36) 200 + 540. Mefloquine was associated with increased incidences of nausea, vomiting, dizziness, dysphoria and sleep disturbance in clinical trials but these symptoms are seldom debilitating and where this ACT has been used, it has generally been well tolerated. To reduce acute vomiting and optimize absorption, the total mefloquine dose should preferably be split over 3 days as in current fixed-dose combinations.

Tab Quinine is to be given at a dose of 10 mg/kg body weight 8 hourly for 7 days. So if a patient had received Artemether+Lumefantrine (ACT) and after completion of the course who still have uncomplicated malaria (Parasitaemia) he or she will be treated with Quinine + Tetracycline/ Doxycycline / Clindamycin. If any patient had received Quinine + Tetracycline/ Doxycycline / Clindamycin with completed course still have uncomplicated malaria (Parasitaemia) will be treated with ACT. Reducing the transmissibility of *P. falciparum* infections: Primaquine: 0.25 mg/kg single dose to be given on 1st day of ACT or Q7T7 /Q7D7 treatment. Primaquine should not be given to: Pregnant women : infants < 6 months of age and women having breast feeding infants < 6 months of age treating uncomplicated *P. falciparum* malaria in special risk grow infants less than 5 kg body weight

treat infants weighing < 5 kg with uncomplicated *P. falciparum* malaria with an ACT at the same mg/kg body weight target dose as children weighing 5 kg. Non-immune travellers treat travellers with uncomplicated *P. falciparum* malaria returning to nonendemic settings with an ACT. Uncomplicated hyperparasitaemia persons with *P. falciparum* hyperparasitaemia (4 to 10%) are increased risk of treatment failure, severe malaria and death. They should receive 1st dose of ACT and immediately admitted in to nearest hospital for close monitoring and treatment. Special issues: Plasmodium knowlesi: Human infections with the monkey malarial parasite. *P. knowlesi* are being reported from the forested regions South-East Asia. Mixed Malaria Infections: Mixed malaria infections are common in endemic areas. In Bangladesh Plasmodium falciparum and vivax are common mixed malarial infections. Although *P. knowlesi* has also been reported which may be a part of mixed infection. Mixed infections are best detected nucleic acid-based amplification techniques, such as PCR, they might be underestimated with routine microscopy. Several RDTs cannot detect mixed infection or have low sensitivity for detecting vivax malaria. BSE is preferable over RDT in mixed infection.

● Severe Malaria (SM)

Severe malaria is a medical emergency and the patient should be treated in a hospital. Objective of Treatment of Severe malaria: The main objective of the treatment of severe malaria is to prevent the patient from dying. Secondary objectives are prevention of disabilities and prevention of recurrent infection. Management of severe malaria comprises clinical, assessment of the patient, specific anti malarial treatment, additional treatment and supportive care. Death from severe malaria often occurs within hours of admission to a hospital, so it is essential that a highly effective parental antimalarial drug to be given as soon as possible.

Specific anti malarial treatment of SM

- IV Artesunate is the antimalarial of choice.
- If for any reason IV Artesunate cannot be given, then IM Artesunate or IM Artemether will be given.
- IV Quinine drip : Inj Quinine are alternative parenteral anti-malarial if IV or IM Artesunate or IM Artemether are not available. Loading dose of Quinine should be given. Parenteral treatment is either: Intravenous Artesunate-2.4mg/kg body weight at 0 hr, 12 hrs, 24hrs and then 24 hourly until the patient can tolerate oral medication but not more than 5 days. At least three doses or upto 24 hrs treatment with IV Artesunate should be used.
- IV Artesunate for children weight less than 20 kg should be 3 mg/kg body weight per dose.

- IV Artesunate dose will remain same for organ dysfunction (e.g-renal failure, hepatic failure etc) Or Intramuscular artemether (3.2 mg/kg stat followed by 1.6 mg/kg daily until the patient can tolerate oral medication but not more than 5 days Or Quinine dihydrochloride 20mg salt/kg stat followed by 10 mg/kg/8 hourly. This may be given by slow intravenous infusion over 3-5 hours or by intramuscular injection to the anterior thigh diluted 1:1 in sterile fluid (The first 20 mg/kg dose is split into 10 mg/kg to each anterior thigh). After 6 doses (Including loading dose) the quinine dose will be reduced to 15-20 mg salt /kg body wt per day until the patient can take or medication follow on treatment: Full dose of ACT (6 dose: e.g 24 tab for adults) should be given once the patient can tolerate oral medication follow on treatment. If for any reason ACT cannot be given for follow on treatment after IV Artesunate/Quinine, then oral Quinine and Tetracycline/Doxycycline/Clindamycin for 7 days should be given(Quinine, 10 mg/kg/dose 8 hourly). Pre referral treatment: Pre referral treatment saves life.
- Artesunate suppository should be used in all patients under 6 years during referral to hospital. Dose: 10 mg/kg body weight. For all above 6 years: IM Artesunate / IM Artemether/ IM Quinine should be given. Quinine dihydrochloride- 20 mg salt/kg stat IM should be given half in each thigh. Hospitalization is a must for complete treatment.

II. Vivax Malaria (VM)

The clinical objectives of treating vivax malaria are to cure the infection as rapidly as possible and to prevent relapse. The public health objectives of treatment are to prevent onward transmission of others and to prevent the emergence and spread of resistance to antimalarial drug.

Treatment of Mixed Malaria Infections: Mixed infection will be treated with ACT for 3 days and Tab. Primaquine for 14 days.

Malaria in Pregnant Women

I. Falciparum Malaria (FM)

- *Uncomplicated Malaria (UM)*
Like non-pregnant woman with ACT in all trimester of pregnancy. Alternate treatment will be 7 days of quinine + clindamycin. (Q7+ Clind 7) Primaquine is contraindicated in any trimester of pregnancy and lactation upto 6 months.
- *Severe Malaria (SM)*: IV Artesunate is preferred antimalarials for SM in all trimester of pregnancy. IM Artemether can be given in all trimester if for any reason IV Artesunate can not be given. In absence of parenteral Artemisinin derivative, IV quinine (Alternatively) should be given, loading dose of Quinine should be given. Oral follow on treatment after IV Artesunate/IM Artemether/IV quinine is ACT full dose.

II. Vivax Malaria (VM)

Chloroquine 3 days (CQ3). Chloroquine is safe in all trimester of pregnancy, primaquine should be avoided in pregnancy, radical cure can be done by primaquine during postpartum period preferably after 6 months if mother is nursing with breast feeding. During pregnancy if the patient developed recurrent attack of vivax malaria, chloroquine can be given in every episode of illness, chloroquine is still highly sensitive and effective in vivax malaria.

Chemoprophylaxis for Malaria

May be used for special risk group (Children and short time travellers) but discouraged. Bangladesh is a multi-drug resistant Falciparum area. Chloroquine, Sulphadoxine+Pyrimethamine (SP) have very high failure rates. Quinine and Artemisinin derivatives are not suitable for prophylaxis. So, recommendations are: To use personal preventive measures (Bed net, mosquito repellents, protective wears etc). All febrile episodes (Up to 4 weeks following visit) should be investigated for malaria by RDT/BSE and treatment with ACT if positive. If cannot be tested for Malaria, should be treated with ACT on suspicion. Mefloquine (250 mg weekly for adult) may be used: to be started 2 weeks before and 4 weeks following visit. Rationale for use/not to use of other drugs available in the market: Chloroquine: Failure rate is high, so it should not be used in falciparum cases. Sulphadoxine+Pyrimethamine (Fansidar) : Failure rate is high, so it should not be used in malaria cases. Quinine monotherapy: Effective but not recommended Mefloquine monotherapy: Effective but not recommended, Artesunate Monotherapy: Effective but not recommended. Monotherapy is less effective and leads to early development of resistance and not recommended.

Mosquito Bite Prevention

Mosquito sprays and bed netting are effective in preventing malaria transmission. A trial in the Bolivian Amazon showed that episodes of malaria were reduced by 80 percent among persons using insect repellent and insecticide-treated bed netting. The CDC recommends diethyltoluamide (DEET) and picaridin as repellents for malaria prevention. The American Academy of Paediatrics does not recommend DEET for infants younger than two months. The recommendations for DEET use in pregnant and lactating women are similar to those for nonpregnant adults⁷.

Malaria Vaccine Implementation Programme (MVIP)

RTS,S/AS01 (RTS,S) is the world's first malaria vaccine that has been shown to provide partial protection against malaria in young children. The vaccine acts against Plasmodium falciparum, the most deadly malaria parasite globally and the most prevalent in Africa. The vaccine has been recommended by WHO for pilot introduction in selected areas of 3 African countries Ghana, Malawi and Kenya. It will be evaluated for use as a complementary malaria control tool that could be added to (and not replace) the core

package of WHO-recommended preventive, diagnostic and treatment measures. GlaxoSmithKline (GSK) led the development of RTS,S over a 30-year period. In 2001, GSK began collaborating with PATH's Malaria Vaccine Initiative (MVI) to continue developing RTS,S. A 5-year Phase 3 efficacy and safety trial was conducted between 2009 and 2014 through a partnership that involved GSK, MVI (With support from the Bill and Melinda Gates Foundation) and a network of African research centres at 11 sites in 7 countries. GSK is the vaccine manufacturer⁸.

E-2020 Initiative and Malaria Elimination

In May 2015, the World Health Assembly endorsed a new Global Technical Strategy for Malaria 2016-2030, setting ambitious goals aimed at dramatically lowering the global malaria burden over this 15-year period, with milestones along the way to track progress. A key milestone for 2020 is the elimination of malaria in at least 10 countries that had the disease in 2015. To meet this target, countries must report zero indigenous cases in 2020. According to a WHO analysis published in 2016, 21 countries have the potential to eliminate malaria by 2020. Together, these 21 malaria-eliminating countries are part of a concerted effort known as the E-2020 initiative, supported by WHO and other partners, to eliminate malaria in an ambitious but technically feasible time frame⁹.

Implementation of Treatment Guideline

- i) All health care providers should be trained on National Guideline
- ii) Parasitological diagnosis of Malaria and drugs should be made available at all level
- iii) RDT should be the method of choice for parasitological diagnosis at the community level
- iv) Static health services should use microscopy or RDT for parasitological diagnosis
- v) Use RDT for Patients presenting in odd hours or in private health setting
- vi) Provision of drugs for pre referral treatment at the community
- vii) Education of the patient/attendant regarding completion of treatment should be emphasized¹⁰.

Conclusions

Malaria remains a public health concern causing so much mortality and morbidity especially among the paediatric population. A malaria vaccine is being developed for delivery through the World Health Organization's Expanded Programme on Immunization. It is being studied in African infants during the first 13 months of life, and has been reported to reduce transmission of malaria by 65 percent with few adverse effects. Along with barrier protection and chemoprophylaxis, vaccination may eventually play a key role in the eradication of malaria worldwide. In general, combined efforts are required from all the stakeholders including governments, NGOs, research institutions and scientists to come up with better strategies to combat malaria.

Disclosure

The author declared no competing interests.

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Investigation on Outbreak of Influenza Like Illness Amongst the Cadets and Recruits of Two Military Institutions of Chattogram

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ABSTRACT

Seasonal epidemics of Influenza Like Illness (ILI) can be caused by both Influenza A and B virus, which can affect the community in a large scale. The authority of BMA (Bangladesh Military Academy) and AC&S (Artillery Centre & School) noticed the outbreak of febrile illness amongst the residential cadets and recruits. An investigation was carried out for this outbreak to identify disease, mode of transmission and to suggest control measures. Individuals with fever (>100°F) and cough or sore throat were Influenza Like Illness (ILI) case patients from 31.3.2019 to 14.4.2019. We collected histories and specimens from hospitalized case patients and visited campus to explore environmental context. Total 202 (21.2%) cases in BMA and 251 (21.3%) cases in AC&S were identified amongst the residential cadets and recruits. Nasal and oropharyngeal swabs from 18 patients were positive for influenza B virus using real-time reverse transcription polymerase chain reaction (rRT-PCR). Overcrowding likely facilitated transmission leading to this dormitory outbreak.

Key words : Influenza; Illness; Fever; Cough; Sore throat.

Introduction

Influenza causes outbreaks in a broad range of settings including hospitals, schools, long-term care or training centers and other confined settings¹. There are 4 types of seasonal influenza viruses, types A, B, C and D, amongst them influenza A and B viruses circulate and cause seasonal epidemics of disease². Influenza A and B viruses are very contagious and can spread from person to person by droplets from the cough or sneeze of an infected person. In 2018, researchers also confirmed that the virus can spread just by breathing, through small particles called aerosols. Other research has found that such infectious particles can travel up to six feet after they are exhaled by a sick person³.

The flu (Short for influenza) is a respiratory virus that affects the throat, nose, bronchi and, sometimes, the lungs. For most people, the flu is an inconvenience that subsides in a few days. For others, influenza can lead to health complications, visits to the hospital and even death. BMA and AC&S are two military training institutions for the cadets and recruits respectively. An epidemic outbreak of viral fever occurred in AC&S and BMA of Chattogram area from March 2019 to May 2019.

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Case Report

On 31st March 2019 BMA informed the higher authority that there were a sudden onset of Influenza Like Illness (ILI) amongst the cadets. The suspected index case was a 20 years old male Cadet in BMA. On 27th March he reported to OPC Bhatia with the chief complaints of fever with chills, runny nose, cough and severe muscle ache. On physical examination patient was ill looking, temp 102°F with general weakness. Onwards cases were reporting with the similar complaints. On the other hand, in AC&S a large number of recruits were reporting with ILI symptoms since 31st March. Of the 948 officers' cadets living in BMA, 202 (21.2%) cases were found and out of 1181 recruits of AC&S, the frequency was 251(21.3%). A sudden rise in influenza like illness started on 31st March 2019 on both training institutions. Higher ILI incidence during 31st March to 9th April, 2019, as compared to preceding daily average rates (In BMA 13 vs 4 patient visits/24 h and in AC&S 23 vs 6 patient visits/24 h) were noticed confirming outbreak.

All cases were male in AC&S, between 18 to 20 yrs with mean age 18.5 ± 1.04 yrs and in BMA it was between 18 to 22 yrs with mean age 19.5 ± 2.02 yrs. No death was reported. Symptoms associated with fever were cough 37(60.8%), running nose 23(25.2%), myalgia and body ache 11(12%) and few other symptoms of generalized weakness and dysphagia. Frequency of cases reached peak on 5th April 2019 then declined to pre outbreak level on 14th April 2019. On both institutions, the cases were interviewed by pre-formed proforma to collect information on travel history, contact with similar cases before onset of disease and clinical examination was also done. Environmental conditions such as lighting, ventilation, overcrowding, sanitation and humidity in the accommodation areas were also examined.

Table I : Distribution of study subjects

Traits	BMA (n=948)	AC&S (n=1181)
Cases with ILI	202(21.2%)	251(21.3%)
Age (m±sd)	19.5±2.02	18.5±1.04
Avg patient visit/24 h (Between 31 st Mar-9 th Apr 19)	13	23

Blood samples (5 ml) were collected for viral serology and blood cultures, from suspected cases having recent onset of fever. Authority informed the IEDCR (Institute of Epidemiology, Disease Control and Research) about the unusual events of fever and cough among the cadets and recruits of BMA and AC&S. An outbreak investigation team from IEDCR conducted the investigation. Line listing was done according to developed case definition and a total 99 ILI cases were enlisted including 6 female cadets. 24 ILI cases were recorded from BMA and 75 cases from AC&S, Haliashahar, Chattogram. Respiratory samples (Nasopharyngeal and throat swabs) and sputum were also collected. Samples were analyzed at virology laboratory of IEDCR. A total of 24 samples were processed. RT-PCR for influenza from nasal and throat swab and Multiplex, PCR for FTD 33 Respiratory pathogens from sputum were performed. Eighteen samples (75%) were positive for seasonal influenza B. Two samples (8%) were positive for H. Influenzae. However, all the samples were negative for Influenza A H1N1.

Incubation period of Influenza B in the present outbreak was short (Few hours to three days). In previous studies, the typical incubation period for influenza of 1 to 4 days, with an average of 2 days has been reported⁴.

Heavy rains followed by excessive heat before outbreak leading to humid conditions in training area facilitated person to person transmission of Influenza B may be by droplet infection/nuclei created by sneezing, coughing and talking.

Treatment

Control measures were employed from the day of outbreak notification. Influenza is usually self-limiting in healthy individuals. Treatment of uncomplicated disease in healthy individuals is supportive and staying off work or school until 24 hours after resolution of fever to limit spread to others⁵. In both institutions patients were given supportive management which includes antipyretics, antihistamine, cough suppressants, adequate fluid intake and rest. No antibiotics were given but patients were advised to take citrus fruits to enhance immunity. Patients were kept in isolation room for 5-7 days until they were afebrile to prevent person to person transmission. Health education program were intimated amongst the cadets/recruits which includes, awareness among trainees about the present outbreak, precautionary measures (Hand hygiene, cough etiquettes), case finding and placing patients on sick leave to prevent future occurrences.

Discussion

The outbreak of influenza B virus is a seasonal disease. The season starts in April and ends in September. Globally, 5-10% of adults and 20-30% of children get the flu each year and 3 to 5 million of these cases are severe, leading to about 250,000 to 500,000 deaths, according to the WHO (2018). In the United States, there were an estimated 80,000 deaths and 900,000 hospitalizations from flu during the 2017 to 2018 flu season, making it the worst flu season in at least four decades, according to the Centers for Disease Control and Prevention (CDC). Sudden onset of ILI occurred in a dormitory student residents of a religious school of northern Bangladesh in 2011, where 47% of the residents reported ILI in less than a week, represented explosive transmission in the dormitory⁶. In our case study we observed the institutional respiratory outbreak of viral influenza with high attack rate. The natural history and transmission of the influenza B virus in a closed training center appeared in our study is found to be similar to those of previously observed epidemic outbreak reports of influenza viruses.

Conclusion

Seasonal influenza, caused by influenza B virus is highly contagious. Though it is a self-limiting disease but special care should be given to high risk group. During the influenza season, necessary precautions should be taken to limit the spread of the disease in overcrowding places. Emphasis on infection control measures should be given to the closed settings e.g school with dormitory, residential training centers, hospitals, long term care centers etc. to decrease the morbidity.

Disclosure

Both the authors declared no competing interests.

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Congenital Cystic Adenomatoid Malformation of Lungs : A Case Report in Neonate

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ABSTRACT

Congenital Cystic Adenomatoid Malformation (CCAM) is a rare developmental abnormality of the lung. This disorder account for 95% of cases of congenital cystic lung disease. Outcome depends on type and associated abnormalities. We are reporting here a case of 23 day- old- male baby delivered by LUCS at term with uneventful perinatal period developed respiratory distress for five days. X-ray chest and CT scan were suggestive of cystic lesions of both right and left lung. Surgery was not done. Baby was on regular follow up for last 03 months and was well, except single episode of respiratory tract infection.

Key words: Congenital Cystic Adenomatoid Malformation (CCAM); Respiratory distress; Neonate.

Introduction

Cystic Adenomatoid Malformation (CAM) is a rare cystic lesion found more often in males and is often diagnosed on antenatal ultrasound¹. It was well described by CH'IN and TANG in 1949 and characterized by the adenomatous overgrowth of the terminal bronchioles, with formation of cystic space-occupying lesion². The reported incidence of Congenital Cystic Adenomatoid Malformation (CCAM) ranges from 1 in 11,000 to 1 in 35,000 live births. CCAM is a hamartomatous lesion containing tissue from different pulmonary origins³. It was classified into three subtypes in 1977, and expanded into 5 types with a new name as Congenital Pulmonary Airway Malformation (CPAM) by Stocker in 2002. Eighty to eighty five percent of cases are recognized in the first two years of life, adult presentation is uncommon. Most Congenital Cystic Adenomatoid Malformation (CCAM) in adults involved unilateral lobes of the lung, and may be complicated with pulmonary bacterial infections and abscesses⁴. Here, we are presenting a case of CAM manifesting at neonatal period with respiratory distress in a full term baby.

Case Report

A newborn male baby of a multiparous mother who was delivered by LUCS at term with uneventful perinatal period developed respiratory distress at twenty three days of age. His mother was on regular antenatal check up and all routine workup including USG was normal throughout pregnancy.

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His anthropometric measurements (Length, weight, and head circumference) were normal. The baby was admitted to neonatal intensive care unit at 23 days of age with the complaints of cough and cold for 5 days which was gradually increased and interfering with feeding and sleep. He also developed fever which was high grade intermittent. There was no history of vomiting, lethargy, unconsciousness, convulsion or cyanosis. On examination baby was tachypneic, chest indrawing and nasal flaring was present. His heart rate was 146/minutes, respiratory rate was 66 breaths/minutes, and temperature was 102 ° F. On auscultation breath sound was bronchial in right mid zone and vesicular in rest of lung fields. Crepitation was present in both lung fields. An ejection systolic murmur was present in left upper sternal border. There was no hepatosplenomegaly. His CBC showed neutrophilic leukocytosis and CXR showed consolidation in right middle and part of lower zone. Small ASD II° was found on Echocardiography. Initially he was diagnosed as a case of lobarpneumonia with ASD II° and managed with IV antibiotics. After seven days of treatment baby was improved clinically but consolidation was increased on X-ray (Fig 1).



Figure 1 : CXR showing multiple ring like radiolucent areas of various size are noted in right upper and adjacent mid zone and also left lower zone, which is seen through heart shadow. Homogenous opacity is seen in right middle and adjacent lower zone.

For further evaluation CT scan (Fig 2) of chest done where multiple thick walled both macro and micro cystic lesions were seen in different segment of right lung and lower lobe of left lung, some of which had air fluid levels and diagnosed as cystic adenomatoid malformation of lungs.

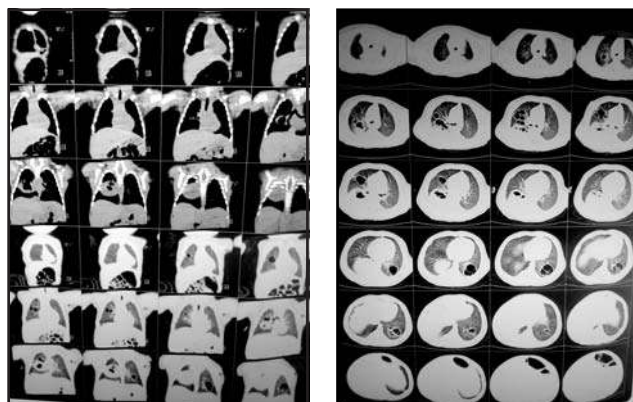


Figure 2 : CT scan of chest showing multiple thick walled both macro and micro cystic lesion are seen in different segment of right lung and lower lobe of left lung.

The case was referred to pediatric surgeon and thoracic surgeon, both of them advised to continue conservative and supportive management and follow up three monthly. They also advised to do surgery if lesion does not regress in size during follow up visit after six months and also after satisfactory weight gain.

Baby was on regular follow up for last three months. Initial follow up was done after fifteen days then monthly. Baby was quite well. He developed single episode of respiratory tract infection during that period. His growth and development was age appropriate. Chest X-Ray was normal on follow up visit.

Discussion

Congenital Cystic Adenomatoid Malformation (CCAM) is a rare malformation of the non-cartilage containing terminal respiratory structures and is a consequence of an embryogenetic alteration occurring during the first 6-7 weeks of pregnancy¹. There is an arrest of normal foetal pulmonary maturation thought to be caused by primary bronchial atresia or failure of normal bronchial segmentation and the subsequent development of dysplastic bronchopulmonary tissue distal to the affected segment. The abnormal morphology of the dysplastic foetal lung tissue seen on prenatal sonography performed in the second trimester allows differentiation from surrounding healthy foetal lung. Early identification of patients with congenital cystic adenomatoid malformation allows prenatal counseling, possible fetal intervention, and birth planning at a tertiary care facility with access to a neonatal intensive care unit and the expertise of a pediatric surgeon⁵. Prognosis of CCAM depends on type of CCAM, extent of involvement, age at diagnosis and associated complications. Adzick et al. have classified CCAM into two types: Microcystic lesions (<5 mm) associated with fetal hydrops and poor outcome and Macrocystic

lesions (>5 mm) associated with good prognosis. Stocker JT et al published a classification of CCAM which later revised by Stocker in 2002 and this is currently the most acceptable classification used for diagnosis and treatment planning (Table I)⁶.

Table I : Stocker's classification of CCAM

Stocker Type	Incidence	Origin	Features
I	50-70%	Bronchi/ Bronchiole	Single or multiple large cysts (3 to 10 cm), Confined to one lobe and filled with air or fluid. Associated congenital anomalies upto 11%
II	10-15%	Bronchiole	Consist of multiple evenly distributed, medium sized cysts (0.5-2.0 cm) that resemble terminal bronchioles. Associated with a higher incidence (50%) of other congenital anomalies.
III	5-10%	Bronchiolar/ Alveolar	Large bulky lesions with evenly distributed small cysts. May be limited to one lobe or entire lung.
O	1-3%	Tracheo bronchial	Solid appearance with small and firm lungs.
IV	28%	Distal Acini	Large cysts upto 10 cm.

The most common mode of presentation is acute respiratory distress secondary to the cyst expanding and compressing its surrounding structures. The distress occurs through a ball-valve mechanism leading to air trapping. This mode of presentation is common during the neonatal period. It may remain asymptomatic and be discovered later in life on routine chest films or present after the neonatal period as recurrent pneumonia. Late presentation of such cases has also been documented in the literature by other authors. The CCAM may be complicated by secondary bacterial, mycotic or tubercular infection. An occasional case of CCAM in an adult has been reported presenting as lung abscess. It can also present with pneumatocele and pleural effusion⁷. All babies with CCAM should be delivered in a hospital with neonatal ICU facility. Often babies born with no symptom at birth. If baby has no symptom and no prenatal intervention done, surgery may be performed at the age of three to six months. Babies with prenatal or postnatal surgical intervention continue to grow the lung up to the age of nine years till the development of normal healthy lung⁸. Ultrasonographic findings suggesting a poor prognosis include: Polyhydramnios, hydrops, ascites, mediastinal shift, and entirely adenomatous lesions¹. Congenital cystic adenomatoid malformation can be associated with other congenital malformations, including anasarca, renal agenesis, Potter's syndrome, pectus excavatum or bile duct hypoplasia². Pulmonary resection during infancy is associated with low morbidity and mortality rates and may prevent the late complications of infection and occult malignant transformation. In lobectomy the remaining lung grows and expands

well enough so that the total lung volume and pulmonary function tests return to normal. The treatment of CCAM is always surgical. Thoracotomy and delivery of the hyperinflated lobe into the wound brings immediate relief of the ventilatory and circulatory problems. Lobectomy is usually necessary, but segmental resection is occasionally feasible⁹.

Conclusion

Early recognition and surgical treatment of CCAM is essential to prevent the consequences of recurrent pulmonary infections and the potential risk for malignant transformation.

Disclosure

All the authors declared no competing interests.

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