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Hemoglobin Status among Rural Population in Selected Area of Bangladesh: A Cross Sectional Observational Study

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Abstract:

Background: *Anemia is one of the world's most prevalent public health problems, affecting .1.6 billion people worldwide. The most common cause of nutritional anemia is iron deficiency.* ***Objective:*** *To assess hemoglobin status among rural population in selected area of Bangladesh* ***Methodology:*** *It was a cross sectional*

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observational study. Five hundred samples were collected conveniently. Face to face interview by using structured questionnaire was used to collect data. Standard technique was used to collect blood and measure hemoglobin. Anemia status was determined according to WHO cut off value. ***Result:*** *The mean age of the respondents were 35.12± 16.48 years. The majority of the respondent's occupation was agriculture. About 79% of study subjects had income between 5001-10000/monthly. Normal, mild and moderate anemia among female was 34.3%, 62.8% and 2.9% respectively whereas that was 15.8%, 54.8% and 29.5% among male. Significant association was found between income and hemoglobin status of both male and female subjects.* ***Conclusion:*** *The overall hemoglobin status among study subjects was not so good. Further large scale study can be instituted to get more precise result. Effective health education and nutrition programme should be instituted on community based.*

Key words: Hemoglobin status, Rural population

Introduction

Micronutrient malnutrition is recognized as an important public health problem affecting >2 billion people worldwide (1). The magnitude is much greater in low income countries where malnutrition, infection, and poverty are widespread and often interlinked (1,2). If left untreated, micronutrient deficiencies can have significant negative consequences on health and economic development (1). Anemia is present when the hemoglobin (Hb) level in the blood is below the lower extreme of the normal range for the age and sex of the individual. Lower limit of normality is reduced during pregnancy (3). Arbitrary grading of pathological anemia is made according to the level of hemoglobin and labeled as mild when the level is between 8 and 10 gm/dl, moderate if that is between 7 gm/dl and 8 gm/dl and severe if less than 7 gm/dl (4). In the majority of pregnant women, the anemia is due to decreased intake or supply of

nutrients needed for hemoglobin synthesis. Numerous studies from the developing countries have shown that anemia especially the iron deficiency anemia was highly prevalent in the pregnant women (5). In Bangladesh it was observed in a study that about 40% of the pregnant women were anemic (6). Maternal anemia during pregnancy is one of the underlying causes of maternal mortality (7) and perinatal mortality as well as complications to the fetus including increased risk of premature delivery and low birth weight (8). There is evidence that iron deficiency during pregnancy reduces fetal iron stores, which may lead to iron deficiency and may adversely affect infant development (9). The aim of this study was to assess the hemoglobin level in rural population both male and female in selected part of Bangladesh.

Materials and method

Study Area: Maheshpur Upazilla of Jhenaidah district
Design of Survey: Cross sectional observational type of study
Study population: All adult subjects attending a health camp arranged by Lab Skin diagnostic center. Pregnant and lactating mothers were excluded from the study.
Sample size: 500
Sampling technique: Non probability convenient sampling
Methods of data collection: Face to face interview by pretested structured questionnaire. Along with socioeconomic data blood sample was collected to check hemoglobin status by Sahli method. Prior blood collection verbal consent was taken from every participant.
Data processing: As a means of processing, classifying and presentation of data I used few statistical tools.
Method of analysis: Collection data were verified and checked to any missing value or double entry to minimize errors to avoid

inconsistency. Both descriptive and inferential statistics were used.

Hemoglobin below 12 gm/dl in female and 13 gm/dl in male was detected as anemia according to WHO (10).

Result

The mean age of the respondents (n=500) were 35.12± 16.48 years where 58.4% (292, n=500) respondents were male. The educational level of the respondents were illiterate (2.2%), primary (3.4%), SSC (58.4%), HSC (36.0%). The majority of the respondent's occupation were agriculture (43.3%) followed by student (27.3%) and housewife (26.9%). The majority of the respondent's (79%) monthly income was between 5001 to 10000 BDT. (Table1).

Table 1: Socio-demographic characteristics of the study subjects (n=500)

Variables	**n (%)**
Age (Mean±SD)	35.12± 16.48
Gender	
Male	292 (58.4)
Female	208 (41.6)
Educational level	
Illiterate	11 (2.2)
Primary	17 (3.4)
SSC	292 (58.4)
HSC	180 (36.0)
Occupation	
Agriculture	216 (43.3)
Service	14 (2.8)
Housewife	134 (26.9)
Student	136 (27.3)
Monthly Family Income (BDT)*	
<5000	86 (17.2)
5001-10000	395 (79.0)
10001-15000	10 (2.0)
>15000	9 (1.8)

The result is expressed as number (%) and mean ± SD); *BDT = Bangladeshi Taka.

Normal, mild and moderate anemia was 34.3%, 62.8% and 2.9% respectively (Table 2)

Table 2: Hemoglobin status of female subjects (n=208)

Hemoglobin level	Number	Percentage
>12.00 gm/dl (normal)	71	34.3
10.00-11.99 gm/dl (mild anemia)	130	62.8
7.00-9.99 gm/dl (moderate anemia)	6	2.9
Mean±SD	11.25±1.002	

Normal, mild and moderate anemia was 15.8%, 54.8% and 29.5% respectively (Table 3)

Table 3: Hemoglobin status of male subjects (n=292)

Hemoglobin level	Number	Percentage
>13.00 gm/dl (normal)	46	15.8
11.00-12.99 gm/dl (mild anemia)	160	54.8
8.00-10.99 gm/dl (moderate anemia)	86	29.5
Mean±SD	11.39±1.25	

Significant association was found income and hemoglobin status of female subjects (Table 4)

Table 4: Association between income and hemoglobin status of female subjects (n=208)

Income	Hemoglobin level			χ^2	P value
	Normal	Mild	Moderate		
<5000	27(13)	26(12.6)	0(0)	12.24	0.016
5001-10000	43(20.8)	104(50.2)	6(2.9)		
10001-15000	1(0.5)	0(0)	0(0)		

$\chi 2$ test was performed and $P<0.05$ was level of significance
Significant association was found income and hemoglobin status of male subjects (Table 4)

Table 5: Association between income and hemoglobin status of male subjects (n=292)

Income	Hemoglobin level			χ^2	P value
	Normal	Mild	Moderate		
<5000	10(3.4)	20(6.8)	3(1)	13.97	0.030
5001-10000	31(10.6)	131(44.9)	79(27.1)		
10001-15000	3(1.0)	4(1.4)	2(0.7)		
>15000	2(0.7)	5(1.7)	2(0.7)		

$\chi 2$ test was performed and $P<0.05$ was level of significance

Discussion

Iron deficiency is recognized as the most common micronutrient deficiency in low-income countries. Women of child-bearing age are especially at risk because pregnancy entails a high demand for iron. A major factor contributing to iron deficiency in these settings is inadequate intakes of bioavailable iron. Such deficits arise because diets are predominantly plant-based, and intakes of readily available heme iron from flesh foods are generally low (11). The present study found that normal, mild and moderate anemia was 34.3%, 62.8% and 2.9% respectively and this may be due to less intake of animal as well as dairy protein and lack of nutritional knowledge and tendency to eat last after serving all. A recent study in China found preconception anemia and depleted iron stores among young female textile workers were significantly associated with reduced infant birth weight (12). The prevalence of anemia among Chinese women was much higher. The prevalence of moderate anemia among male in the current study (30%) is consistent with national estimates in Bangladesh among urban and rural adolescents (21–44%) (13). The prevalence of anemia among pregnant Bangladeshi women is higher, ranging from 20 to 60% (13). Given that iron requirements increase by the end of the first trimester (14,15), it is likely that an even greater proportion of the women in this study will develop anemia during pregnancy and after childbirth. Moreover, only a small proportion of women is likely

to have sufficient iron stores to meet the requirements of pregnancy. Significant association was found in the present study between income and hemoglobin status among both male and female and probable reason behind that is if they had enough money, they would have more purchasing power and finally they could buy animal protein.

Conclusion

Poverty, hunger and under nutrition are interrelated. The overall hemoglobin status among study subjects was not so good. If we wish to build up a healthy productive nation, hemoglobin status of rural men and women should be emphasized on urgent basis. Along with income generating capacity, effective health education and nutrition programme should be instituted on community based.

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