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RESEARCH ARTICLE

PREVALENCE OF ANEMIA IN 1ST YEAR MBBS STUDENTS OF A PRIVATE MEDICAL COLLEGE IN BANGLADESH

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ABSTRACT

Background: Increased prevalence of anemia has been observed in adolescent, who are susceptible more often to nutritional anemia. **Materials and methods:** This retrospective study was conducted on 276 newly admitted MBBS students of Prime Medical College, Rangpur, Bangladesh. For this serum haemoglobin level, total count of RBC and RBC indices of each student were recorded from records preserved in Pathology Department of Prime Medical College. **Results**: Among 276 male and female students, 33.70% (93) were anemic. Again, 16.66% (22) among the male and 48.61% (71) among the female students were anemic. Mild anemia was observed in 16.66% (22) male and in 31.94% (46) female students and 17.36% (25) female had moderate anemia. The differences among the anemic students were statistically highly significant ($p<0.001$). **Conclusion**: The observed prevalence of anemia is more among the female students and most of the students are mildly anemic.

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INTRODUCTION

Anemia is one of the most important global health problem (Shill, 2014), where 1.3 – 2.15 billion people are anemia all over the world. Among them more than 90% are living in the developing countries (Medani, 2014 and Al-Sayes, 2011 and Mamdooh, 2008). Anemia is defined as a reduction in the red cell volume or hemoglobin concentration below the normal range for that particular age, sex and race. The most significant contributor for anemia is iron deficiency. So prevalence of anemia is often used as a proxy for Iron deficiency anemia (IDA) (Manjula, 2014), which is the most common micronutrient deficiency in the world (Bano, 2012) and cuts across all the sections of the population. It has been estimated that approximately 50% of anemia is caused by iron deficiency (Khan, 2015). However deficiency of any essential elements may lead to anemia. According to WHO Anemia is "a condition in which the hemoglobin content of blood is lower than normal as a result of a deficiency of one or more essential nutrients, regardless of the cause of such deficiency" (Bano, 2012).

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Adolescent period of life is that where persons are more susceptible to nutritional anemia. At this stage considerable changes in growth pattern, lifestyle, dietary habits & behavior are likely to influence the hemoglobin levels. Among the adolescent, girls are at high risk of developing iron deficiency because of menstrual losses, increased iron demands, but less dietary iron intake (Khan, 2015). Adolescence is the transition from childhood to adulthood which is a vulnerable period in one's life cycle for the development of nutritional anemia (Abhishek, 2015). The medical students also come under the vulnerable group as they would suffer from the effects Anemia in future due to long schedule of studying in college, clinical postings, and other curriculum activities. Their living in the hostel or away from parents and families reflects upon their diet habits and had a significant reflection upon the prevalence of Anemia thus placing individuals during these periods at greater risk of deficiency (Pandey, 2013), which also affect their learning capacity (Mamdooh, 2008). Nutritional anemia though global in occurrence, is more of concern in the developing countries because of the high prevalence in these regions (Saratha, 2010). Hemoglobin is an iron rich protein which helps red blood cells to supply oxygen from lungs to the rest of the tissues. Hence reduction in this iron protein impairs proper oxygen supply to tissues and organs causing shortness

of breath, dizziness or headaches and fatigue (Subramaniyan, 2016). It has been observed that prevalence of Anemia is more in female than male student (Shill, 2014; Bano, 2012 and Pandey, 2013). The greater prevalence of Anemia in female compared to male may be due to deficiency of iron (Bano, 2012). In our country researches have been carried out on children and pregnant women regarding prevalence of iron deficiency anemia as well as iron deficiency in male and female young adult. To the best of our knowledge few researches has been done on medical students regarding prevalence of anemia in our country. Moreover, if they have some nutritional deficiency from adolescent period, that may in the long run affect in their studies. Therefore, we have selected first year medical students to find out the prevalence of anemia and to observe the degree of anemia among them.

MATERIALS AND METHODS

The present retrospective study was conducted on 276 newly admitted MBBS students of three batches of Prime Medical College and Hospital, Rangpur, Bangladesh. For this student's age, serum hemoglobin level, total count of RBC and RBC indices of each student were recorded from records preserved in Pathology Department of Prime Medical College in the year from January 2014 to January 2016. The study protocol was approved by the ethical committee of Prime Medical College, Rangpur. The hemoglobin estimation was performed by Sahli's hemoglobinometer and results interpreted as per the WHO criteria. Anemia is considered if the hemoglobin is below the cut-off points as recommended by WHO (Mamdooh, 2008 and Manjula, 2014). Packed Cell Volume (PCV), Mean Corpuscular Volume (MCV), Mean Corpuscular hemoglobin (MCH), Mean Corpuscular hemoglobin Concentration (MCHC) were also recorded to rule out non nutritional causes of Anemia. Data were analyzed by SPSS version 17.0 for Windows. p value < 0.05 was considered as significant. Chi-square test &'t' test were done for comparison.

RESULTS

This study was carried out on 276 MBBS students, in which 132 were male and 144 were female. The mean (±SD) age of male and female students were 18.42 ±0.72 & 18.31±0.67 years respectively. Again, the mean (±SD) hemoglobin level in male and female students were 14.26±1.24 and 11.98 ± 1.08 gm/dl respectively (Table 1). In the present study among 132 male students 16.66% (22) were anemia and among 144 female students 48.61% (71) were anemia. In total 33.70% (93) students were anemic and 66.30 % (183) were non anemia. The association between normal hemoglobin level and anemic status was statistically significant (p<0.05) on applying chi-square test of significance (Table 2). In our study, all anemia students were distributed according to grade of Anemia. Among them 24.64% (68) had mild grade of anemia, 9.06% (25) had moderate grade of Anemia. 16.66% (22) male students had mild Anemia but no male students were moderately or severely anemia. Whereas, among the female students 31.94% (46) had mild Anemia and 17.36% (25) had moderate Anemia. No female student had severe Anemia. The differences among the anemia students were statistically highly significant (p<0.001) by applying chi-sqaure tests (Table 3). The mean heamoglobin level, RBC total count, PCV, MCV, MCH were significantly (p<0.001) low in anemia subjects compared to non anemia subjects. The mean MCHC value in anemia subjects was less than non anemia subjects but the difference was not statistically significant (p>0.05) (Table 4).

Table 1. Distribution of subjects according to mean (±SD) age and Haemoglobin level (n=276)

Parameters	Male	Female
Age (yrs)	18.42±0.72	18.31±0.67
Concentration of Hb(gm/dl)	14.26±1.24	11.98±1.08

n= total number of subjects.

Table 2. Sex wise distribution of anemia among subjects (n= 276)

Status of Anemia	Male (%)	Female (%)	Total (%)	Chi-square	p value
Normal hemoglobin	110(83.33)	73(51.38)	183(66.30)	32.8384	<0.05
Anemic	22(16.66)	71(48.61)	93(33.70)		
Total	132(100)	144(100)	276(100)		

n= number of subjects

Table 3. Distribution of study subjects according to grades of Anemia

Grades of Anemia	Males (n =132)	Females (n =144)	Total (n=276)	Chi-square	p value
Normal hemoglobin	110(83.34)	73(50.89)	183(66.30)		
Mild	22(16.66)	46(31.94)	68(24.64)	40.5063	<0.001
Moderate	0	25(17.36)	25(9.06)		
Severe	0	0	0		
Total	100(100)	100(100)	100(100)		

Figures in parentheses indicate percentage. n= number of subjects.

Table 4 Comparison of Mean (±SD) hemoglobin and other hematological parameters among anemic and non anemic subjects (N=276)

Variables	Anemic (Mean ±SD) n= 93	Non anemic (Mean ±SD) n=183	P value
Age	18.29±0.76	18.40±0.66	.180^{NS}
Hemoglobin	11.41±0.83	13.91±1.22	.000***
RBC count	4.53±0.62	5.11±0.56	.000***
PCV	36.03±3.28	43.70±4.97	.000***
MCV	79.84±8.63	85.05±5.67	.000***
MCH	25.70±3.23	27.40±2.13	.000***
MCHC	31.94±0.99	32.15±1.00	.094^{NS}

N= total number of subjects; n= number of subjects in each group;
Unpaired student 't' test was done;
NS= Not significant; ***= highly significant; (p <0.001)
The normal values for MCV = 87 ± 7 fl.
MCH = 29 ± 2 picograms (pg) per cell.
MCHC = 34 ± 2 g/dl [12].

DISCUSSION

In the present study the prevalence of Anemia in newly admitted 1st year MBBS students among three batches was 33.70%. This may be related to the adolescent age, as at this stage considerable changes in growth pattern, lifestyle, dietary habits & behavior are likely to influence the hemoglobin levels (Khan, 2015). Again, prevalence of Anemia was 48.61% in female student and 16.66% in male student. Similar findings were observed by some researchers (Bano, 2012 and Pandey, 2013). Another study revealed Anemia in 63.3% female and in 36.7% male, which is higher than our study but in their study prevalence in female was more than male which is similar to our study (Shill, 2014). The greater prevalence of Anemia in female may be due to the fact that the adolescent girls are at high risk of developing iron deficiency because of increased iron demands during puberty and menstrual losses (Bano, 2012 and Khan, 2015). In our study according to grade of Anemia we have observed mild Anemia in 24.64% (68) students of both sexes. In respect to sex, among all male students we have

observed mild Anemia in 16.66% (22) whereas, among all the female students 31.94% (46) were observed as mildly anemia. Moderate Anemia has been observed in 17.36% (25) female students. However, we did not observed severe Anemia among male or female students. This result is in contrast with a study where they have observed 68.97% mild Anemia, which is higher than our study. Again, they have observed moderate Anemia in male but we didn't observe moderate Anemia incase of male and in their study no students were suffering from severe Anemia, which is similar to our study (Pandey, 2013). In this study the mean value of Hb, MCV, MCH and PCV were significantly low in anemia subjects compared to normal subjects. These observations are similar to the results observed by some researchers (Manjula, 2014 and Ravi Sarma, 1990). This may be due to deficiency of iron in the adolescent students, which results from recurrent worm infection, low socioeconomic status, dietary behavior/pattern (intake of iron reach foods, Iron absorption and bioavailability enhancers and inhibitors), blood loss during menstruation that includes duration of menstrual flow more than five days and passing of clots during menstruation (Manjula, 2014; Mehta, 2004 and Adem, 2015). Again, lack of awareness of iron deficiency in this group of people might be the possible reason of anemia (Shill, 2014). The finds in our study also supports that, nutritional anemia is more of concern in the developing countries (Saratha, 2010).

Our study has some limitations like, we could not do complete blood count, peripheral blood film and serum iron profile. Again, it was not possible to get history of recurrent worm infection, socioeconomic status, dietary pattern and menstrual history of the students. However, medical students if suffer from Anemia, it would affect their health (Subramaniyan, 2016) as well as learning capacity in future (Mamdooh, 2008) due to long schedule of studying in college, clinical postings, and other curriculum activities (Pandey, 2013). Moreover, most of the students live in the hostel or away from parents and families thus putting the individuals during these periods at a greater risk of developing shortness of breath, dizziness or headaches and fatigue due to Anemia (Pandey, 2013 and Subramaniyan, 2016). Therefore, we recommend prospective type of study with the same study population including the mentioned investigations to rule out the exact cause of Anemia in this adolescent group, which will help to correct Anemia by specific treatment plan and help them continue their study without undue fatigability.

Conclusion

From this study it can be concluded that the prevalence of Anemia is more among the female than the male medical students and regarding the grading of Anemia, most of the students were mildly anemia.

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