

Original Research Article

## **Anaemia among Medical Students of Regional Institute of Medical Sciences (RIMS), Imphal**

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**Abstract:** Anaemia is a serious public health and nutrition problem affecting both developing and developed countries. Adolescents are more vulnerable to iron deficiency anaemia, because of increased iron requirements related to rapid growth. Considerable changes in growth pattern, lifestyle, dietary habits and behaviour are likely to influence the haemoglobin levels among adolescents group. The objective of the study was to determine haemoglobin level and RBC count in adolescents and difference in male and female students. A cross sectional study was conducted on 139 medical students of Regional Institute of Medical Sciences (RIMS, Imphal, Manipur) belonging to both sexes from August 2014 to November 2015, after taking written consent from all participants. 3ml of venous blood was collected and analyzed in automated haematoanalyzer in Physiology Department. Statistical analysis was done by using SPSS 21. Unpaired t test was used to compare numerical variables among two groups. A p-value of <0.05 was taken as significant. In our study, total 139 students were included within the age group of 18-21 years. There was a significant difference of Hb and RBC level between male and female (p value <0.001\*). Out of 75 male students, 70 were normal (Hb > 13 gm/dl), 5 had Hb < 12 gm/dl and out of 32 female students, 14 had mild, 17 had moderate and 1 had severe anaemia. Anaemia was more prevalent among female students rather than male students inspite of being literate. At the time of admission to medical colleges haemoglobin estimation should be done. Iron and folic acid tablets should be provided to anaemic students. Deworming drugs should be provided.

**Keywords:** adolescents, anaemia, haemoglobin, RBC, students

### **INTRODUCTION**

Anaemia is a condition in which the haemoglobin (Hb) concentration decreases than the normal level or number of red blood cells is insufficient or both and there by consequently their oxygen-carrying capacity decreases to meet the body's physiological needs. Specific physiological needs vary with a person's age, gender, residential elevation above sea level (high altitude), smoking behaviour and different stages of pregnancy [1]. Anaemia is a serious public health and nutrition problem affecting both developing and developed countries with major consequences on human health as well as social and economic development [2]. Iron is present in all body cells and is fundamental for basic physiological processes such as haemoglobin production and enzyme function [3].

Adolescence is the second decade of life and is a period in which an individual undergoes major physical and psychological changes [4]. The period of adolescence is a period of intense growth [3].

Adolescents in India represent over 1/5th (22.3%) of total population. Since adolescence is a significant period of human growth and maturation, unique changes occur and many adult patterns are established [4]. Adolescents are vulnerable to suffer from anaemia because of increased iron requirements related to rapid growth. Among adolescent girls, menstruation increases the risk of iron-deficiency anaemia throughout their adolescent and child bearing age. Anaemia in adolescence severely impairs the physical and mental development, weakens behavioural and cognitive development, reduces physical fitness, decreases the work performance and even contributes to the adverse outcomes in pregnancy [2].

Nutritional anaemia is a disease syndrome caused by malnutrition in its widest sense. It has been defined by world health organization (WHO) as "a condition in which the haemoglobin 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" [7]. By far the most frequent cause of nutritional anaemia is iron deficiency and less frequently folate or vitamin B<sub>12</sub> deficiency [5]. Iron deficiency anaemia is the state where in iron content of the body is below normal, low transferrin saturation and ferritin as well as high iron binding capacity. As per WHO iron deficiency anaemia affects 1.3 billion people world-wide amongst which 43% are pre-school children, 51% are pregnant women and 37% are school age children [6] Iron deficiency generally results when dietary iron intake can not meet required needs and iron reserves in the body are depleted in order to support the body's physiological demands [3]. It has significant impact on physical and psychological development, immunity, behaviour and work performance. It is the most prevalent nutritional problem in the world, today affecting more than 700 million people [4]. Several studies across the country have shown that the prevalence of anaemia in rural adolescents is more than the urban primarily due to ignorance, low socioeconomic status and poor dietary habits. Although prevalence of anaemia is marginally higher in rural areas but some recent studies have highlighted that, there is increasing prevalence of anaemia among adolescents living in urban settlements [2].

#### AIMS OF THE STUDY

To determine haemoglobin status and RBC count in adolescents and difference in male and female students.

#### MATERIAL AND METHODS

##### Study design

Cross sectional study.

##### Study duration

August 2014 to November 2015.

##### Sample size

139 medical students (first year MBBS students).

##### Study area

This study was undertaken in Department of Physiology, Regional Institute of Medical Sciences (RIMS), Imphal, Manipur, India.

#### Methods

Written informed consent was obtained from all students and approval for the study was taken from the Institutional Ethical Committee and Scientific Committee.

#### Specimen collection

3 ml of venous blood was collected in EDTA vial.

#### Analysis

Collected blood was analyzed using Automated Haematoanalyzer (SAMSUNG LABGED HClO, MODEL: IVD-CIOA) at the Haematology Laboratory of Department of Physiology, RIMS, Imphal. Before analyzing, instrument was calibrated with reference methods and after that daily quality control programme was performed.

#### Statistical methods

The results of the study were interpreted using Statistical Packages of Social Sciences (SPSS version 21.0). Descriptive analysis of data was done by calculating mean, median, mode and standard deviation. Unpaired t test was used to compare numerical variables among two groups. A p-value of <0.05 was taken as significant.

#### Ethical issue

The study was conducted after approval of the Institutional Ethical and Scientific Committee. Written informed consent was taken from all the participants. Confidentiality of participants was maintained.

#### RESULTS

In our study, total 139 medical students (first year MBBS students) were included, out of which 75 (54%) were male and 64 (46%) were female. Mean age of study population was 20.1 years with standard deviation of 1.58. Most of the subjects were within the age group of 18–21 years pursuing their MBBS course.

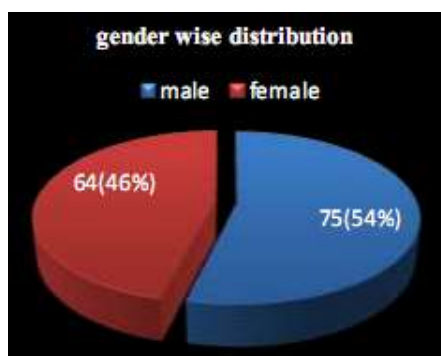


Fig 1: gender wise distribution

**Table 1: Statistics of haemoglobin (Hb) level of medical students**

Statistics (Hb level)	Total (n=139)	Male (n=75)	Female (n=64)
Mean	12.7	13.6	11.6
SE Mean	0.17	0.21	0.19
St dev	1.97	1.84	1.52
Median	12.4	13.5	11.75
Minimum	7.8	10	7.8
Maximum	18.1	18.1	15


There was a significant difference of Hb level between male and female (p value <0.001\* with 95% confidence interval, unpaired t test).

**Table 2: Statistics of RBC levels of medical students**

Statistics (RBC level)	Total (n=139)	Male (n=75)	Female (n=64)
Mean	4.39	4.77	3.94
SE Mean	0.06	0.07	0.08
St dev	0.76	0.65	0.62
Median	4.3	4.9	4.0
Minimum	2.5	3.3	2.5
Maximum	6.2	6.2	5.4

There was a significant difference of RBC level between male and female (p value <0.001\* with 95% confidence interval, unpaired t test).

**Table 3: Severity of anaemia among male students**

Male (n=75)	Normal (Hb $\geq$ 13g/l)	ANAEMIC 	Mild -Moderate (Hb < 12 g/l)	Severe (Hb <8 g/l)
Number	<b>70</b>		<b>5</b>	<b>0</b>
%	<b>93.4</b>		<b>6.6</b>	<b>0</b>

**Table 4: Severity of anaemia among female students**

Female (n=64)	Normal (Hb $\geq$ 12g/l)	Mild (Hb 11- 11.9 g/l)	Moderate (Hb 8-10.9 g/l)	Severe (Hb <8 g/l)
Number	<b>32</b>	<b>14</b>	<b>17</b>	<b>1</b>
%	<b>50</b>	<b>21.9</b>	<b>26.6</b>	<b>1.5</b>

50% female students had normal Hb level; where as 21.9% had mild, 26.6% had moderate and 1.5% had severe form of anaemia.

## DISCUSSION

In our study, out of 139 medical students (first year mbbs students), 75 (54%) were male and 64 (46%) were female. Mean $\pm$ SD of age of study population was 20.1 $\pm$ 1.58. The red blood cell (RBC) value was also significantly higher (p<0.001) in male (4.77 $\pm$ 0.65) than female (3.94 $\pm$ 0.62) students.

In our study, the haemoglobin (Hb) level was significantly higher (p<0.001) in male (13.6 $\pm$ 1.84) than female (11.6 $\pm$ 1.52) students. Nutritional anaemia was more prevalent among female than male students, this is similar to the study done by Kaur M *et al* [2].

Nutritional anaemia, although it is a global problem, is more of concern in developing countries due to high prevalence. Unfortunately, this problem is not only restricted to rural areas and low socioeconomic status people but also shows increasing prevalence in developed societies [8, 9].

In our study, out of 75 male, 70 had no anaemia (>12 gm/dl) and 5 had haemoglobin level (<12 gm/dl), which is similar to the study conducted by Saxena *et al* [10]. The prevalence of anaemia among male adolescents reported in our study was low and it can be due to adequate nutrition and healthy environment conditions free from diseases prevailing at the area of study. It may also be due to the higher altitude where chance of anaemia is reported to be lesser.

Out of 64 female students, 32 had normal haemoglobin level (>12gm/dl) and 14 had mild, 17 had moderate and 1 had severe anaemia. Adolescence is a period of life, characterized by a spurt in physical growth and increase in iron requirements related to rapid growth and increase in lean body mass in both boys and girls as a result of the expansion in total blood volume. But due to onset of menstrual cycle, the consequences of iron deficiency are more common and serious in young females. Malnutrition and menstrual

bleeding are regarded as two main causes of iron deficiency anaemia in young females [11].

Adolescence period is important for human growth and maturation. During this period the risk of iron deficiency anaemia appears both in boys and girls after which it subsides in boys but remains for girls because of menstrual blood loss [12]. So it is now viewed anaemia as “Female Disease” which is causing red alert in developing countries [13].

Worldwide, anaemia affects about 24.8% of the population, with highest prevalence of 47.4% in preschool children and the lowest prevalence of 12.7% in men. The regional estimates of WHO indicate that the highest proportion of population with nutritional anaemia is in Africa (47.5%–67.6%) whereas the greatest number of individuals affected are in South East Asia [14].

In the present study, 50% girls and 6.6% boys were found to have anaemia with haemoglobin levels <12 g%. According to the National Family Health Survey 3, conducted in 2005-06, the national estimate of prevalence of anaemia in adolescent girls was 56%, which is consistent with our study results. The prevalence of anaemia among the adolescent girls aged 11-18 years was found to be 25%-80% in several previous studies conducted by the Indian Council of Medical Research in 16 districts of 11 states [15]. Higher prevalence of anaemia in 32% was also reported among adolescent urban girls of Nagpur [16]. A study conducted in rural adolescent girls of Wardha, Maharashtra, India, found to have prevalence of anaemia was found to be 59.8% [17].

Peter *et al* [18] reported that 77.41% urban girls and 77.90% rural girls had haemoglobin level <10 g%. Higher prevalence of anaemia was also found in 98% of rural girls and 56% of rural boys in Punjab [19].

## CONCLUSION

In the present cross sectional study on 139 medical students, female students showed higher prevalence of anaemia as compared to male students. Nutritional anaemia was found to be prevalent even in medical students who were literate and had access to the nutritive diet. Nutritional anaemia specially iron deficiency anaemia is more common among child bearing women due to increased nutritional demand and adolescents girls due to causes like menstrual blood loss, poor diet and under nutrition as compared to males. There is a need for improving nutritional status through nutrition education, community awareness and various supplementation programs. Routine health check-up, supplementation of iron and folic acid, deworming drugs in therapeutic doses and haemoglobin estimation needs to be included in college curriculum.

Students should be educated and motivated to take balanced diet, rich in green leafy vegetables and fruits. Nutritional anaemia is easily preventable and treatable.

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