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A study on the prevalence of Anaemia among the hostel students of University of Science & Technology Meghalaya, India

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Abstract

Anaemia is considered as one of the important global health issues and one of the common health problems among Indian adolescent girls or women. Anaemia is mainly found common among teenagers as they usually take unhealthy food or they have poor balanced diet. Several studies have shed light on prevalence of anaemia among various study subjects of different age groups from different study areas but however, information regarding the prevalence of anaemia among University students of age group of 18-25 among hostellers especially from Ri-bhoi District, Meghalaya are lacking. To understand this area and their prevalence, this cross-section study is conducted. 200 students of this age-group were selected for measuring Haemoglobin concentration using Digital Haemoglobin meter. In this study, we found that 84% were anaemic, among this, 91% were females and 77% were males. It is also seen 55.95% were found anaemic in 21-23 age group which the most affected age group. Students of blood group B+ are also mostly affected to anaemic. It also been observed that the non-anaemia cases are quite high those who maintain a proper diet plan and follow healthy life style habits. This study revealed that anaemia can be prevented if one individual follows a healthy life style along with a balanced diet plan. Cases of anaemia is rising just because lack of awareness and unhealthy dietary habits among students specially women and girls.

Key words : Anaemia, prevalence, lifestyle, University, Meghalaya.

Anaemia is not a unique disease, but a group of disorders where the blood concentration of haemoglobin is lower than normal range as per the age and sex of the subject[3]. Anaemia can be defined as a condition where low level of haemoglobin has been found due to either few numbers of red blood cells and/or little haemoglobin in each

cell[1]. It is a gradual process and takes several months to show up as a normal person has about 14-15g of Hb. Anaemia is one of the most significant global health issues and it has been estimated that more than 2 billion people worldwide are suffering from anaemia[4,5,6]. It affects people of all age groups and may be caused by both non-nutritional and nutritional factors[2]. The maximum cases of anemia are due to iron deficiency, and the remainders are due to vitamin B12, folic acid, protein and vitamin C deficiency. Anaemia is a grave global public health problem that particularly affects young children, menstruating adolescent girls and women, and pregnant and postpartum women. It is categorized as one of the 10 most serious health problems by WHO[7]. According to a World Health Organization (WHO) report, anemia is defined as haemoglobin (Hb) levels <12.0 g/dL in women and <13.0 g/dL in men. However, normal Hb distribution varies not only with sex but also with ethnicity and physiological status. As a result, anaemia is marked when haemoglobin level is below 13gm/dl in adult males; 11.5gm/dl in adult female; and 15gm/dl in newborn baby.

WHO estimates that 40% of children 6–59 months of age, 37% of pregnant women, and 30% of women 15–49 years of age worldwide are anaemic[7]. A major part of the work regarding prevalence of anaemia has been done on pregnant women and adolescent females. The purpose of this study is solely to determine the prevalence of anaemia among the hostel residing University students between the age group 18-25 in Ri-Bhoi District, Meghalaya.

Study Design :

A survey design was adapted for the study. This study is done to determine the prevalence of anaemia among the University Hostel Students by analyzing blood samples using digital haemoglobin meter to measure the concentration of Haemoglobin and through a questionnaire to evaluate their body mass index (BMI), blood group, age group, food habits, their food intake, physical activity and awareness of anaemia. It was a dissertation work for the particular requirement for the degree Master of Zoology.

The study included 200 graduation and post-graduation level students aged 18-25 years (100 female and 100 male) from different departments. Before collecting blood, participants were informed about the experiment and verbal consent was taken from each of the students and collected from those who were interested to be part of this survey of providing their blood voluntarily. And those students who were not interested to provide their blood voluntarily were excluded. The information of each student under the study is preserved confidentially.

While preparing separate data with different parameters, collected data were divided into different groups according to its requirement. Firstly, female and male prevalence of anaemia were seen separately. Next focus was age group, and sub-groups were like 18-20, 21-23 and 24-25 were created to see the prevalence of anaemia separately, then prevalence of anaemia is seen separately on each blood. The prevalence of anaemia with physical parameters of study subjects being active and non-active was observed.

Then, according to candidates dietary habits groups were divided and then overall prevalence of anaemia was observed separately.

Data Collection :

For data collection, a pretested questionnaire is prepared which obtain information about age, sex, blood group, height, weight, physical activity, food habits, BMI and their measured haemoglobin concentration. The questionnaire obtained information of the intake of regular breakfast as well as iron rich food is included in their food habits or not and the fast food or junk food intake in their food habits of participants.

The sample was collected by using the digital haemoglobin meter and all the precautions were taken properly while collecting the samples from the participants. Reliable and proper equipments were used with adequate amount of availability of the equipments.

The ring finger or middle finger of the participant was selected, sterilized with 90% alcohol using cotton balls, dried and pricked. Now, 10µml of blood was taken with the help of micropipette from each individual on the particular position of the freshly prepared data strip on digital haemoglobin meter and showed the result of haemoglobin concentration within few seconds. The height and the weight were measured with measuring tape and weight machine respectively. Then the BMI of the participants were calculated as weight (in kg) divided by height (in m). Then the observed results of haemoglobin concentration, BMI and the other information were noted down on the questionnaire on the site.

The figure 1 illustrates that, out of 100 female students, the majority (55%) showed their haemoglobin levels in the range of 10.0-11.9 g/dL *i.e.*, mild anaemic, 29% showed 8.0-9.9 g/dL *i.e.*, moderate anaemic, 9% showed 12.0-14 g/dL *i.e.*, non-anaemic and 7% were found in the range of 6.9-7.9 g/dL *i.e.*, severely anaemic. And out of 100 male students, the majority (70%) showed their haemoglobin levels in the range of 10.0-12.0 g/dL *i.e.*, mild anaemic, 23% showed 13.0-14 g/dL *i.e.*, non-anaemic, 7% showed 8.0-9.9 g/dL *i.e.*, moderate anaemic. And no students were found in the range of severe and life threatening level.

In the figure 2 it is illustrated that, in the age group of 18-20, 23.21% were found anaemic and 34.38% were non-anaemic; in the age group of 21-23, 55.95% were found anaemic and 28.13% were non-anaemic; and lastly in the age group of 24-25, 20.83% were anaemic and 37.5% were non-anaemic.

Figure 3 shows that among total anaemic students, 32.74% and 30.36% were found having blood group A+ and B+ respectively, 25.59% were having O+, 10.71% were AB+ and 0.59% was found having A- while no students were found having B-, AB- and O- whereas, in case of non-anaemic students, half of the students were found having blood group AB+, 28.13% were having B+, 12.5% were of O+, 6.32% were A+ and 3.13% were of O- while no students were found in A-, B-, AB-. Table-1 shows that the prevalence of anaemia with physical parameters of the study subjects. The parameters include Sex and Body Mass Index (BMI): 84% students were found anaemic and among this 45.83% were female and 54.17% were male.

And whereas 16% were found non-anaemic, of whom 28.13% were female and 71.88% were male.

When considering BMI among female anaemic students, about 61.54% were found under healthy weight and pearson correlation coefficient turned out to be -0.496; 24.18% were overweight and pearson correlation coefficient turned out to be -0.496; 24.18%

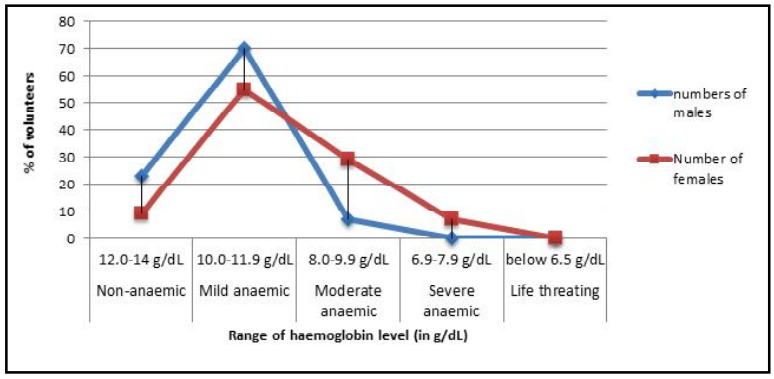


Fig. 1. Prevalence of anaemia between male and female subjects

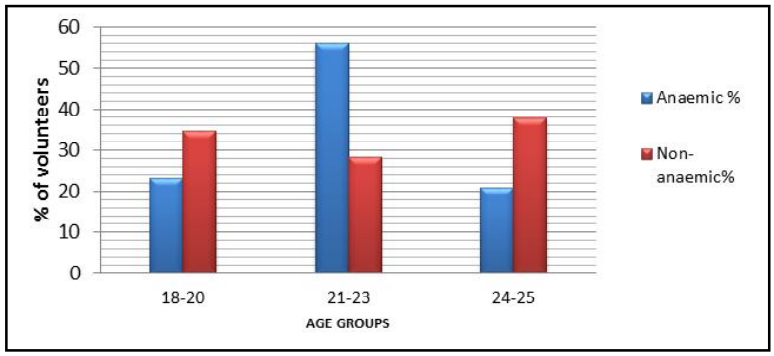
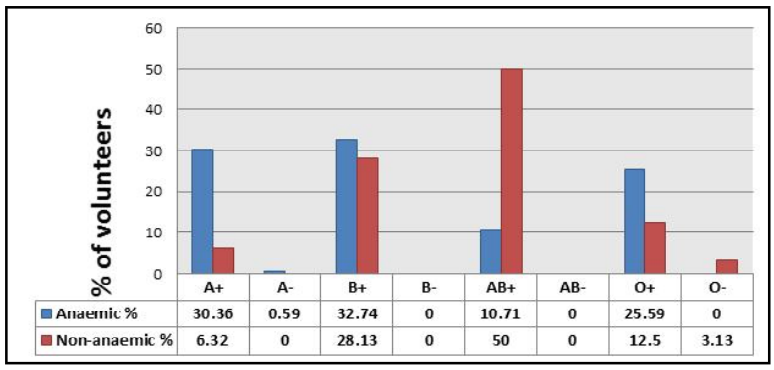


Fig. 2. Prevalence of anaemia as per different age groups



	A+	A-	B+	B-	AB+	AB-	O+	O-
Anaemic %	30.36	0.59	32.74	0	10.71	0	25.59	0
Non-anaemic %	6.32	0	28.13	0	50	0	12.5	3.13

Fig. 3. Prevalence of anaemia as per different blood groups

were overweight and pearson correlation coefficient turned out to be -0.049; 13.19% were underweight and pearson correlation coefficient turned out to be 0.189; and 1.09% were obese and pearson correlation coefficient turned out to be 1whereas, in the case of non-anaemic students, about 55.55% were found under healthy weight and their pearson correlation coefficient turned out to be -0.75; 22.22% were found underweight and pearson correlation coefficient turned out to be -1 and 22.22% were also found in overweight category but pearson correlation coefficient turned out to be1 and no obese student is found in non-anaemic category.

On the other hand, 63.64% anaemic male were found under healthy weight and pearson correlation is 0.193; 18.18% were overweight and -0.041 is correlation value; 10.39% were obese and -0.241 is turned out to be pearson correlation value and 7.79% were underweight and 0.386 is pearson correlation value whereas in non-anaemic male, 65.22% were under healthy weight, 21.74% were underweight, 13.04% were overweight and respectively the pearson correlation coefficient value is 0.124, 0.671 and 1. No students were found obese. This whole table shows perfectly positive correlation in anaemic females whereas in anaemic males a moderate negative correlation.

Table 2 shows that, prevalence of anaemia among physically active and inactive study subjects. Here the parameters include physically active or inactive male and female students. In the case of anaemic female students, 74.73% were found physically inactive while 12.09% and 13.19% were totally active in physical activities and occasionally active respectively whereas, in non-anaemic female, 66.67% were found physically active and 22.22% and 11.11% were found physically inactive and occasionally active respectively. In the case of male anaemic students, 50.65% were found active in physical activities while 35.04% were inactive and 14.29% were occasionally active, whereas in case of non-anaemic students, 73.91% were found physically active and 21.74% were not active and 4.35% were found occasionally active.

In case of not taking breakfast volunteers 50% were found anaemic and 18.75% were found non-anaemic. In case of regular breakfast taking volunteers 59.38% were found non-anaemic and 35.71% were anaemic. In case of sometimes and very rarely taking breakfast volunteers 13.09% and 1.19% were found anaemic whereas 21.87% were non-anaemic and 1.19% were found anaemic while no students were found under rare category as non-anaemic.

In case of intake of junk food, 68.45% were found anaemic those who take junk food in regular basis, 17.86% were anaemic those who do not take junk food, 10.71% and 2.98% were found anaemic those who take junk food sometimes or rarely. Whereas, for non-anaemic, 56.25% were taking junk food regularly, 21.88% were those who do not take junk food, 18.75% were those who take junk food on sometimes basis and 3.13% were those who takes junk food rarely.

Vegetarians were found to be less anaemic than non-vegetarian participants. This data shows that 8.33% were anaemic in case of vegetarians but 91.67% were found anaemic in non-vegetarians. Whereas, 93.75%

Table-1. Prevalence of Anaemia with physical parameters of the study subjects as per Pearson Correlation Coefficient

Parameters	Category	Anaemic		Non-Anaemic	
		%	Pearson Correlation Coefficient(r)	%	Pearson Correlation Coefficient(r)
Total No. of students		84		16	
(N=200)					
Sex					
Male		45.83		71.88	
Female		54.17		28.13	
Body Mass Index					
Female (n=100)					
Below 18.5	Underweight	13.19	-0.496	22.22	-1
18.5 to 24.9	Healthy weight	61.54	-0.049	55.55	-0.78
25.0 to 29.9	Overweight	24.18	0.189	22.22	1
30 and above	Obesity	1.09	1	0	0
Male (n=100)					
Below 18.5	Underweight	7.79	0.386	21.74	0.671
18.5 to 24.9	Healthy weight	63.64	0.193	65.22	0.124

were non-anaemic those who are vegetarian and 6.25% were non-vegetarian. Here we found that only 2 volunteers out of 200 took iron supplements and those who take iron supplements were 1.19% anaemic and these two participants were affected by mild anaemia and rest who do not take iron supplements were 98.81% anaemic. And whereas no student were found in non-anaemic category as they do not take any iron supplements as they should to keep the right amount of iron content in their body.

In case of regular iron-rich food intake, 68.75% were non-anaemic while 37.5% were anaemic. In case of do not take iron-rich food, 44.64% were anaemic while 9.38% were non-anaemic. In case of occasionally intake of iron-rich food, 3.13% were non-anaemic and 2.98% were anaemic. And lastly in case of rarely intake of iron-rich food, 18.75% were non-anaemic while 14.88% were anaemic. Figure 4 illustrates that overall prevalence percentage of anaemia to check the severity among the total 200 study subjects. The

Table-2. Prevalence of anaemia as per dietary habits among the study subjects

Parameters	Anaemic % (n=168)	Non-Anaemic % (n=32)
Regularity of breakfast intake		
Yes	35.71	59.38
No	50	18.75
Sometime	13.09	21.87
Rare	1.19	0
Junk food intake		
Yes	68.45	56.25
No	17.86	21.88
Sometime	10.71	18.75
Rare	2.98	3.13
Feeding type		
Vegetarian	8.33	93.75
Non-vegetarian	91.67	6.25
Intake of iron supplements		
Yes	1.19	0
No	98.81	0
Iron-rich food intake		
Yes	37.5	68.75
No	44.64	9.38
Sometimes	2.98	3.13
Rare	14.88	18.75

Table-3. Prevalence of anaemia as per dietary habits of individuals

Parameters	Anaemic %	Non-Anaemic %
Physical activity Female (n=100)		
Yes	12.09	66.67
No	74.73	22.22
Sometimes	13.19	11.11
Male (n=100)		
Yes	35.04	73.91
No	50.65	21.74
Sometimes	14.29	4.35

25.0 to 29.9	Overweight	18.18	-0.041	13.04	1
30 and above	Obesity	10.39	-0.241	0	0

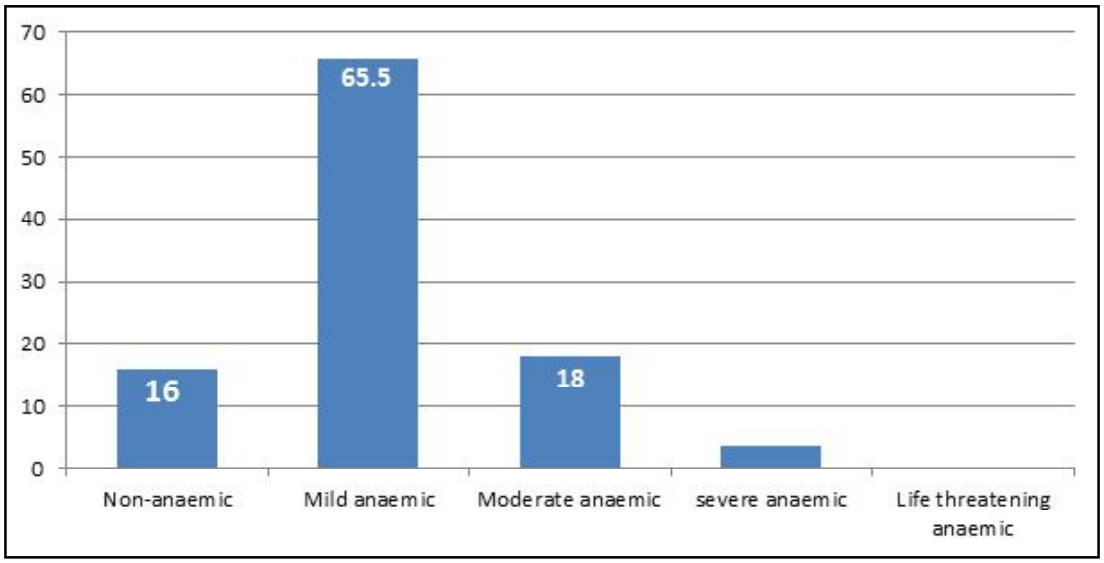


Fig. 4. Overall percentage of severity of anaemic among the participants

maximum cases are found under mildly anaemic category *i.e.* 64%, here 17% were moderately anaemic, 16% were non-anaemic whereas, only 3% were severely anaemic. No study individuals were found under the life threatening category.

From this survey this is concluded that in the study area most of the study subjects were mildly affected to anaemia. Past studies always revealed that women were mostly affected to anaemia, here too it is found that females are mostly affected (54.17%) whereas 45.83% males are also affected. These days anaemia in females and males cannot be differentiated just by gender difference, food and dietary habit is one of the main reason. Most important for those students who stays away from their homes because it is seen that hostels in universities or outside university does not pay that much attention to the student dietary food chart. In this study, it is seen that 21-23 age group are mostly affected. It is also seen blood group B+ are mostly affected as per previous studies. According to WHO, a dietary food chart for an adult should include nuts, whole grains, at least 400g of fruits and vegetables, less than 10% of total energy intake from free sugars, less than 30% of total energy intake from fats, less than 5g of salt per day[7].

According to this survey, we can concluded that poor food habits, an unhealthy life style and lack of awareness is the possible reason for students to get affected to anaemia.

This study will be helpful to spread awareness about anaemia among the students of age group 18-25 and in future too if this kind of studies are done, we can spread more awareness. It will be great if Indian education system include a proper health education program in schools, colleges and universities to build a knowledge and awareness about their

effects, symptoms and causes, which will include all kind of disease and disorders specially about anaemia, the most ignored one but it affect an individual in a gradual process while an individual being not attentive toward their balance diet.

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