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Frequency of Nutritional Anemia among Medical Students of Faisalabad Medical University, Faisalabad

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ABSTRACT

Background: Globally low socioeconomic status leads to high prevalence (89%) of nutritional anemia in developing countries. **Objective:** For anemia detection, screening is an important tool in identifying the at-risk population, also to determine an individual's treatment modality. Therefore, we conducted the present study to determine the severity of nutritional anemia among female medical students and to correlate it with Body Mass Index (BMI). **Study Design:** It was a cross sectional study. **Settings:** Department of Physiology, Faisalabad Medical University, Faisalabad Pakistan. **Duration:** Six months, starting from Nov, 2020 to May, 2021. **Methods:** A total of 151 female students were included in the project. A structured questionnaire was used for taking relevant information about the participants. All the students were divided into two groups, A1 and A2. Group A1 includes only hostelites and group A2 day scholars. All the data of both groups were collected, tabulated and analyzed statistically. **Results:** Mean age of all the participants was 18.44 ± 0.62. Out of 151 students, 49 (32.45%) students were anemic and 102 (67.54%) were normal. Out of 49 students, 38 (77.55%) students were having mild anemia, 10 had moderate (20.4%) and one was severely anemic (2.04%). Comparing the two groups, A1 (N=96) and A2 (N=55), in group A1, 32 (33.33%) students were anemic and 64 (66.67%) were normal. In group A2, 17 (30.9%) students were anemic and 38 (69.09%) were normal, with significant statistical correlation, p-value =0.001*. On the basis of BMI, 37(24.5%) had normal weight. 34(22.51%) students were labeled as underweight and 80 (52.98%) students were found to be overweight. **Conclusion:** Comparing the two groups, anemia was more common in hostelites. The irregular diet habits, lack of intake of fruits and vegetables were the contributing factors.

Keywords: Anemia, BMI, Hostelites, Undernutrition.

INTRODUCTION

Globally, nutritional anemia is a widespread public health problem.[1] Due to low socioeconomic status its prevalence is higher in developing countries (89%).[2] World wise, anemia affects almost two billion people, damaging not only their health but also their social and economic development.[3] Prevalence rate of anemia in Azad Jammu and Kashmir is 41.0%. In Pakistan anemia is a major health problem, affecting equally pregnant (50%, 41 to 58) and nonpregnant women (51%, 43 to 59).[4] According to the recent reported data, micronutrient deficiency is the leading cause of anemia among adolescent girls in Pakistan.[5] Nutritional anemia can not only seriously damages the body growth and working capability but one's cognitive development also. Its affects on immune system can lead to repeated infections.[6,7] In Pakistan, studies conducted on anemia among the adolescent girls. Treating an individual suffering from anemia, societal factors play an important role in keeping a person healthy.[2] Among medical students, excessive stress and irregular diet habits due to over burden study schedule can lead to anemia development in them[8]. Now-a-days stress with its adverse effects has an important influence on professional and personal life of the students and may lead to anxiety, depression and suicidal ideation among these medical students, to a lesser extent, adversely affects their overall performance during their examination.[9,10,11] The leading etiological factors responsible for anemia among medical students were found to be their age, sex, dietary deficiencies, stress,

social class, menstrual blood loss (in female students) and intestinal worm infection.[12,13] In Punjab, the largest province of Pakistan, students of medical institutions come from different areas of the country with lot of differences regarding their backgrounds, socioeconomic statuses, traditions, customs and educational environments.[9] In this situation, if they have irregular diet habits or imbalance diet chart, lot of them can suffer from nutritional anemia.[1] The present study is aimed to estimate the frequency of nutritional anemia among medical students of Faisalabad Medical University, Faisalabad. The outcomes of our study, on one hand, can be helpful to find out effective interventions for improving nutritional status of these students and on other hand preventing occurrence of anemia and its physical, mental and reproductive health consequences.

METHODS

It was a cross-sectional comparative study carried out at Physiology Department, Faisalabad Medical University, Faisalabad Pakistan with the duration of six months, from Nov, 2020 to May, 2021. After taking institutional ethical approval, finally a total of 151 female students were selected by convenient non-probability sampling technique.

Only female students of first year MBBS were included in the study. The students with any kind of major illnesses like pulmonary, cardiac or renal diseases, any kind of hemoglobinopathies, menstrual disorders were excluded from the study.

Basic information about the participant's like their age, religion, education, income of parents, socio economic status, dietary habits, family structure and exercise was collected, tabulated and analyzed statistically. From students, other questions related to their menstruation and its regularity were asked and recorded on predesigned proforma. Written informed consent was taken from each student. The purpose of the study and its details was explained clearly to all students. Their complete physical examination, specially focusing signs and symptoms of anemia and dehydration, was done. Stadiometer was used to measure their heights and weights. BMI was calculated by Quetelet's index: BMI= weight in kg/ height in m^2.[14] Blood sample was collected by venipuncture and mixed with anticoagulants. All parameters including blood hemoglobin levels, MCHC, MCH and MCV were estimated in main pathology laboratory of Allied Hospital Faisalabad. An automated hematology analyzer, HumaCount 80TS, REF 16420/80, SN 925182, Germany, was used for this purpose. The severity of anemia was labeled according to WHO criteria.[15]

Students having hemoglobin levels less than 12.0 gm/dl was considered as anemic, in-between levels of 10.0-11.9 gm/dl is graded as mild anemia, 7-9.9 gm/dl and <7gm/dl are graded as moderate and severe anemia respectively. Two groups, A1 and A2 were made. A1 group includes only hostelites and A2 dayscholars. All the data of both groups were collected, tabulated and analyzed statistically to check which group has higher risk for anemia.

The association of hemoglobin with BMI was checked on the basis of BMI cut off values recommended by WHO and categorized as Normal (BMI= 18.5-24.9 kg/m^2), Overweight (BMI ≥ 25 kg/m^2) and underweight (BMI < 18.5 kg/m^2).[14]

All the data was collected, arranged and analyzed statistically by using SPSS version 20. Values of descriptive data were described in terms of Mean± SD for continuous variables, and frequencies and percentages for qualitative variables. For comparison of means of variables including BMI, Hb, height and weight independent sample t test and for comparison of severity of anemia and nutritional status, Chi-square were used. P-value ≤ 0.05 was taken as statistically significant.

RESULTS

In our research project, 151 MBBS female students participated. All the students were divided into two groups A1 and A2. Group A1comprises students residing in hostel (n=96) while group A2 includes dayscolers (n=55). The age of participants (n=151) was 17 – 20 years with a mean age of 18.4437± 0.6286 years. All hematological and descriptive variables of our study are elaborated below (Table 1). To compare these variables between groups A1 and A2, independent sample t test was used. Statistically significant P-values were found, between our study groups.

Table 1: Descriptive Statistics of study group (n=151)

Variables	Minimum	Maximum	Mean ± SD
Age (years)	17.04	20.23	18.4437 ± 0.6286
Height (inches)	53. 00	67. 00	60.8411 ± 1.81509
Weight (kg)	30.00	65.01	53.9007 ± 5.44641
BMI	21.09	24.00	22.5099 ± 1.14814
Hb (gm/dl)	6.00	13.05	11.2715 ± 1.40444
MCV (fl)	78.07	81.11	79.7748 ± 0.925
MCH (pg)	23.11	27.55	25.4437 ± 0.77146
MCHC (gm/dl)	28.01	32.14	30.3245 ± 0.72617

Body mass index (BMI), Hemoglobin (Hb), Mean corpuscular volume (MCV), Mean corpuscular hemoglobin (MCH), Mean corpuscular hemoglobin concentration (MCHC), Kilogram (kg) fl: femtoliters, pg: pictograms, gm/dl: grams per deciliter.

Comparison of different variables between hostilities (A1, N=96) and day scholars (A2, N=55) using independent sample t test, with their respective p-values are given in table 2. *p-value≤ 0.05 was considered as statistically significant.

Table 2: Comparison of different variables between hostilities (A1, N=96) and day scholars (A2, N=55)

Variables	A1 (N=96)	A2 (N=55)	*p-values
Age	18.4688 ± 0.63167	18.4 ± 0.62657	.000*
Height	60.7500 ± 2.05196	61 ± 1.30526	.006*
Weight	54.3333 ± 5.17213	53.1455 ± 5.86710	.710
BMI	21.4427 ± 2.97257	23.00 ± 2.26078	.822
Hb	11.3125 ± 1.70641	11.7636 ± 1.33283	.000*
MCV	79.5417 ± 0.83246	80.1818 ± 0.94459	.005*
MCH	25.5 ± 0.82078	25.3455 ± 0.67270	.029*
MCHC	30.4792 ± 0.73955	30.0545 ± 0.62118	.700

Out of 151 students, 49 (32.45%) students were anemic and 102 (67.54%) were normal. Out of 49 students, 38 (77.55%) students were having mild anemia, 10 had moderate (20.4%) and one was severely anemic (2.04%).

Comparing the two groups, A1 (N=96) and A2 (N=55), in group A1, 32 (33.33%) students were anemic and 64 (66.67%) were normal. In group A2, 17 (30.9%) students were anemic and 38 (69.09%) were normal. Statistical correlation between the two groups was proved significant, p-value =0.001*. In group A1, out of 32 students 23 (71.87%) had mild anemia while eight (25.8%) moderate and one (3.22%) was severely anemic. In group A2, 15 (27.27%) students were mildly affected while 2 (3.63%) had moderate anemia. In this group no severely affected case was reported.

On the basis of BMI, our results showed that out of 151 students, 37(24.5%) had normal weight. 34(22.51%) students were labeled as underweight and 80 (52.98%) students were found to be overweight. Comparison of A1and A2 is shown in Figure 1.

Figure 1: Comparison of A1and A2 based on BMI

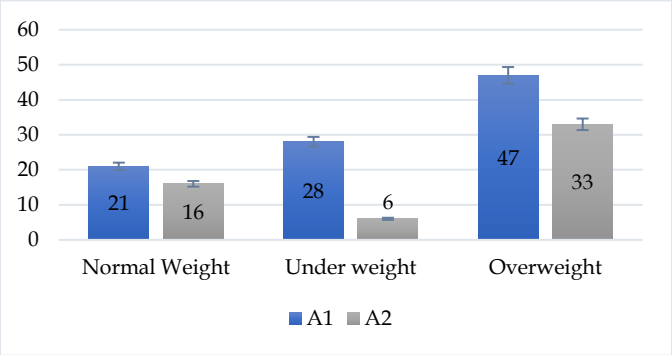

Table 3: Correlation of Hb & BMI of hostelites (n=96)

One-Sample Test						
	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Hemoglobin	64.955	95	.000	11.31250	10.9667	11.6583
BMI	70.678	95	.000	21.44271	20.8404	22.0450

Table 4: Correlation of Hb & BMI of dayscholars (n=55)

One-Sample Test						
	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Hemoglobin	65.456	54	.000	11.76364	11.4033	12.1240
BMI	75.449	54	.000	23.00000	22.3888	23.6112

On further analysis of anemic student's weight it was observed that out of 49 anemic students, nine were of normal weight, 14 students were underweight and 26 were overweight. Further details are shown in table 5.

Table 5: Status of anemia among students belonging to different nutritional levels (BMI n=151), (Anemia n=49)

Variables	Normal Weight n=37 (24.5%)	Under weight n=34 (22.51%)	Over weight n=80 (52.98%)
Mild Anemia N=38 (77.55%)	5 (13.15%)	9 (23.68%)	24 (63.15%)
Moderate Anemia N=10 (20.4%)	4 (40%)	5 (50%)	1 (10%)
Severe Anemia N=1 (2.04%)	0	0	1 (10%)

DISCUSSION

During adolescence or early adulthood, there is significant increase in nutritional requirements and can place an individual at greater risk of deficiency.[16] The relation between BMI (which is a measure of nutritional and health status in adults) and Anemia; mostly remained controversial. In previous research studies anemia was found in both over-nourished and undernourished people of high and low socioeconomic classes, respectively.[17]

In Pakistan, N. H. Jamali *et al*[18] found anemia to be the most prevalent micronutrient deficiency among adolescent girls. In present study we demonstrated the severity of anemia as well as the degree of nutritional status among female medical students of Faisalabad Medical University, Faisalabad. Our results showed that 49 (32.45%) students were anemic which is almost same to the results, forwarded by Jawed S *et al*[19] in their research project, 74 (33.4%) students out of 221 MBBS students. In another study conducted by Gajbhiye V *et al*[8], anemia was found in less number of students (13.6%) as compared to our study. But almost similar co-relation between low BMI and nutritional anaemia was found in all these studies.

Among adolescent girls Nazneen Habib *et al*[2], reported the prevalence of anemia as 47.9%, out of which 47.7% had mild anemia. 51.7% cases had moderate anemia while 5.7% were found to be severely anemic. As compared to our study results in which we found 32.45% anemic students. Among these students 77.55% had mild, 20.4% moderate and 2.04% severe anemia. The slight difference of the results may be due to the difference of location as Nazneen Habib *et al* conducted their research work in Azad Jammu and Kashmir.

In another study the overall prevalence of anemia was 11.7% while the female adolescents had 1.73 times more anemia as compared to males.[20] They found that consumption of eggs, flesh foods with three times or more meal per day was associated with low prevalence of anemia. Lemia Shaban *et al*[21] also reported a significantly higher prevalence of anemia among females as compared to males (10.96% vs. 5.04%) with an overall prevalence of 8.06%. In multivariable analysis, they also detected an association between age, gender, ferritin, iron concentration and anemia. Unhealthy eating practices among hostelites like breakfast skipping, snacking and/or consumption of fast food, are important facts. The reported mean weight of day scholars was 59.16 kg while in hostelites, it was decreased to 55.19 kg.[19] Our results were slightly different with the mean weight 54.33 kg of hostalites and 53.14 kg of day scholars.

According to the report forwarded by Ying-Xiu Zhang *et al*,[22] the total prevalence of thinness grades 1-3, and overweight and obesity grades 1-3 were 6.78%, 19.61% and 9.95% for boys, and 11.17%, 14.96% and 4.49% for girls, respectively. They also found that the prevalence of anemia was increased with increasing severity of obesity. On the basis of BMI, our results showed that out of 151 students, 37(24.5%) had normal weight. 34(22.51%) students were labeled as underweight and 80 (52.98%) students were found to be overweight.

CONCLUSION

In our research project we found that among medical students mild anemia is more prevalent affecting their daily life activity and its early diagnosis can prevent further complication. Moreover, there is a need to improve their diet habits inspite of great study load. There is need to conduct further studies with on a larger population scale with more specific blood tests to get better results.

LIMITATIONS

The study is done one setting only. Nationwide sample collection can change the outcome.

SUGGESTIONS / RECOMMENDATIONS

We suggest that there should be more and more such programs should be conducted regularly. It will definitely improves the health quality.

CONFLICT OF INTEREST / DISCLOSURE

No conflicts of interest with respect to the authorship, research work, and/or publication of this article.

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