

RESEARCH ARTICLE

Prevalence of anemia among 1st year MBBS students

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ABSTRACT


Background: Nutritional anemia is the most common type of anemia in the world. Iron deficiency anemia is very common in India. Medical students may suffer from anemia due to irregular eating habits due to the hectic study schedule. They also come from the different socioeconomic background. **Aim and Objectives:** The aim of the study was (1) to find out the presence or absence of anemia among male and female students of 1st year MBBS; (2) to determine the degree of anemia among male and female students; and (3) to study the presence of anemia among students of different nutritional status. **Materials and Methods:** A cross-sectional study was carried out among 150 1st year medical students aged between 18 and 25 years from October 1 to November 30 2013. Ethical approval was obtained from the ethical committee of the institution. The data were collected using case record form including general information, sign and symptoms of anemia, dietary habits, body mass index, general, and systemic examination. Hemoglobin was estimated by Sahli's method. ESR was estimated by Westergren's method. Red blood cell (RBC) count and blood indices, namely mean corpuscular volume, mean corpuscular hemoglobin (MCH), and MCH concentration were also determined. All investigations were carried out at central lab Sree Balaji Medical College and Hospital, Chennai. **Results:** Hemoglobin was significantly decreased in males compared to females thus showing a greater prevalence of anemia among males compared to females. Furthermore, the presence of anemia was more among overweight students compared to those underweight. There may be a correlation between hemoglobin, ESR, RBC count, and blood indices indicating the presence or absence of anemia. **Conclusion:** There is a need for increased awareness among students on adopting healthy eating habits. Deworming also has to be carried out to prevent the occurrence of iron deficiency anemia. Treatment of anemia could significantly improve memory and academic performance of students.

KEY WORDS: Anemia; Hemoglobin; Medical Students; Prevalence

INTRODUCTION

Iron deficiency anemia is the most common form of anemia all over the world.^[1] Among different types of anemia, iron deficiency anemia is very common in India. Medical students

may suffer from anemia due to irregular eating habits due to the hectic study schedule. They also come from the different socioeconomic background. The medical student also comes under the vulnerable group that suffers anemia due to having long-schedule of studying in college, clinical postings, and other curriculum activities. They live in the hostel away from parents and families which has reflected upon their diet habits. Appropriate nutrition requirements increase significantly during this period of life, thus placing individuals during these periods at greater risk of deficiency. Adolescence or early adulthood is one of the most vulnerable periods in the human life cycle when nutritional requirement increases due to the growth spurt.^[2-4]

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Anemia is characterized by tiredness, lethargy, headache, dizziness, blurred vision, ringing sound in the ears, lack of sleep, decreased immunity, etc. Poor memory is seen in Vitamin B12 deficiency, also called megaloblastic anemia. Anemia has a gradual onset and is usually not detected until and unless the person becomes symptomatic. It is detected by blood investigations.^[5-7]

With this background, the present study was carried out with the following aims and objectives: (1) To find out the presence or absence of anemia among male and female students of 1st year MBBS; (2) to determine the degree of anemia among male and female students; and (3) to study the presence of anemia among students of different nutritional status.

MATERIALS AND METHODS

A cross-sectional study was carried out after obtaining permission from the ethical committee of the institution. 150 1st year students aged between 18 and 25 years participated in the study. The study was carried out between October 1, and November 30, 2013. The data were collected using case record form including general information, sign, and symptoms of anemia, dietary habits, body mass index (BMI), general, and systemic examination.

Hemoglobin was estimated by Sahli's method. The hemoglobinometer tube is cleaned and allowed to dry. N/10 HCl is taken in the tube up to 10% or 2 g/dl mark. The finger is pricked after taking aseptic precautions. The first drop of blood is discarded. Blood is sucked from the next big drop of blood into the hemoglobinometer pipette up to 20 cu.mm mark of the pipette. The tip of the pipette is wiped, and the blood present in it is blown into hemoglobinometer tube containing N/10 HCl. The setup is left aside for 10 min to enable the formation of acid hematin. Then, distilled water is put into this tube drop by drop. It is mixed with stirrer. The color of the solution is matched with the standards of the comparator. The reading is noted at the point when the solution in the tube matches with the standard result is expressed in g/dl. Normal range of values was considered for males having Hb level 14–18 g/dl and for females having Hb level 12–16 g/dl.

ESR was estimated by Westergren's method. A sample of blood is obtained after taking all aseptic precautions. The blood is mixed with 3.8% trisodium citrate solution in 4:1 ratio (4 parts blood and 1-part citrate solution). Citrate acts as an anticoagulant. The concentration of the solution is isotonic with blood. The blood is mixed by rotating the tube between the palms. Blood is sucked into the Westergren's tube. Blood is taken up to zero marks. The upper end of tube is closed by a finger tightly, then the lower end of the tube is pressed against the cushion in the Westergren's stand taking care no blood escapes. While continuing to apply pressure over the cushion

the finger closing the top end is released slowly, and the tube is fixed vertically in the stand. At the end of 1 h, the upper level of the red column above, which there is clear plasma, is noted down. The result is expressed in mm per hour. The normal range of values was considered for males having ESR 3 to 5 mm/h and for females having ESR 5–12 mm/h.

Red blood cell (RBC) count and blood indices, namely mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and MCH concentration (MCHC) were also determined. All investigations were carried out at central lab of Sree Balaji Medical College and Hospital, Chromepet, Chennai.

RBC Indices

- MCV: (Packed cell volume in 100 ml/number of RBC's in millions per cu.mm of blood) * 10 μ cu mm. Normal MCV range is 87–90 femtoliter
- MCH OR MCH = (Hb in g per 100 ml of blood/RBC count in millions per cu.mm of blood)*10
- Normal MCV RANGE IS 27–33 pg
- MCHC OR MCHC = (Hb in g/100 ml) * 100/PCV in 100 ml
- Normal range of MCHC Is 32–38 g/dL.

Data were analyzed using Microsoft Excel and presented in number, frequency, and percentage. For comparison of different parameters, Chi-square test and student's *t*-test were used. $P < 0.05$ denotes the difference is statistically significant.

RESULTS

Anemia was found to be significantly more prevalent among male students when compared to female students with $P = 0.019776$ [Table 1]. 59% of the students had mild anemia while 41% of students had moderate anemia ($P = 0.006308$) [Table 2]. 8% of students were underweight and 32% of students were overweight ($P = 0.003008$) [Table 3]. 15% of underweight, 100% of those with normal weight and 27% of overweight students had anemia, respectively ($P = 0.02$) [Table 4]. The anemia observed to be present among the students was of the microcytic hypochromic type as MCV and MCHC was decreased. It can thus be concluded that the presence of anemia among MBBS students highlights the need to look in to and correct dietary habits. It is also advised that the students have frequent medical check-ups to correct and prevent anemia (MCV * $P = 0.003111$; MCHC * $P = 0.002909$) [Tables 5 and 6].

DISCUSSION

Iron deficiency anemia is very common, and it occurs mainly due to lack of nutrition, loss of blood over a long duration,

Table 1: Gender-wise distribution of anemia

Anemia	Males (%)	Females (%)	Total (%)
Present	30 (42)	16 (21)	46 (31)
Absent	42 (58)	61 (79)	103 (69)
Total	72 (100)	77 (100)	149 (100)

Table 2: Severity of anemia among medical student

Severity	Males (%)	Females (%)	Total (%)
Mild	15 (50)	12 (75)	27 (59)
Moderate	15 (50)	4 (25)	19 (41)
Severe	0 (0)	0 (0)	0 (0)
Total	30 (100)	16 (100)	46 (100)

Table 3: BMI of medical student

BMI	Males (%)	Females (%)	Total (%)
Under weight	8 (11)	4 (5)	12 (8)
Normal	43 (60)	46 (60)	89 (60)
Overweight	21 (29)	27 (35)	48 (32)
Total	72 (100)	77 (100)	149 (100)

BMI: Body mass index

decreased absorption, or by a combination of these factors. It is very essential for growth and development. It also plays an important role in the immunity of the body to infections. It causes death if occurs in children lesser than 2 years of age. Nutritional anemia is a common entity present all over the world. It affects babies less than a year old, adolescents, lactating mothers, and during pregnancy.^[6-9]

In our study, anemia was observed to be more prevalent among males (42%) when compared to females (21%) about 59% of students had mild anemia (Hb of 10–<12 g%) and 41% had moderate anemia (Hb of 7–<10 g%). None of the students had severe anemia. Majority of students having anemia were of normal weight (BMI of 18.5–25). Sachin *et al.* found anemia to be present among the students who were underweight compared to overweight students. The prevalence of anemia among underweight (BMI below 18.5) was 60%, and normal (BMI 18.5–24.99) of 27.5% and overweight (BMI >25) have a prevalence of 12.5%. This also suggests that anemia prevalence decrease as nutritional status of subject increase.^[10]

The anemia was more prevalent among males than females in our study, in contrast, to study done by Jawed *et al.* They found in their study that anemia was more common among females and was attributed to the blood loss occurring every month during the menses.^[11] Amruth *et al.* found decreased awareness among 1st-year medical students of risk factors of cardiovascular disease. So was the case in our study where in the students were not aware about anemia and its complications.^[12] The anemia observed was of microcytic hypochromic variety. This finding was similar to studies

Table 4: Prevalence of anemia among students belonging to different nutritional level

Anemia	Underweight (%)	Normal (%)	Overweight	Total
Present	12 (15)	21 (100)	13 (27)	46 (31)
Absent	68 (85)	0 (0)	35 (73)	103 (69)
Total	80 (100)	21 (100)	48 (100)	149 (100)

Table 5: MCV

MCV	Males (%)	Females (%)	Total (%)
Microcytosis	63 (88)	57 (74)	120 (81)
Normocytosis	9 (13)	20 (26)	29 (19)
Macrocytosis	0 (0)	0 (0)	0 (0)
Total	72 (100)	77 (100)	149 (100)

MCV: Mean corpuscular volume

Table 6: MCHC

MCHC	Males (%)	Females (%)	Total (%)
Hypochromic	61 (85)	61 (79)	122 (82)
Normocytosis	11 (15)	16 (21)	27 (18)
Hyperchromic	0 (0)	0 (0)	0 (0)
Total	72 (100)	77 (100)	149 (100)

MCHC: Mean cell hemoglobin concentration

done by Sood and Sood^[13] and Sehgal *et al.*^[14] Iron deficiency anemia is the most common of this type indicating the need for frequent hemoglobin monitoring and iron supplementation among MBBS students.

Studies have been done observing the fact that as the year of study progressed prevalence of anemia increased. This was attributed to the hectic study schedule, unhealthy eating habits, poor quality of hostel meals, etc. There was no statistical significance to be found between type of dietary pattern and anemia among the students.^[10-14] The information about dietary intake was obtained by 24-h recall method which could be the reason for the lack of association between dietary intake and the presence of anemia among the students.

Kaur and Singh^[15] found out that anemia among adolescent girls could be prevented by enhancing the nutritional value of the meals by the addition of green leafy vegetables in their meals. Thus, it is suggested that the medical college authorities increase awareness about healthy eating habits and advise the students to consume more of green leafy vegetables. Olsen *et al.* in their study found that supplementation of iron failed to cure anemia. This was due to heavy worm infestation among the affected people in Kenya. Hence, deworming had to be carried out to cure anemia.^[16]

Limitations of the Study

Sahli's method for hemoglobin estimation is a visual method and chances of error are high. Besides, it estimates only

oxyhemoglobin and reduced hemoglobin. Other types of hemoglobin are not estimated. It is a method dependent on the formation of acid hematin which is not a true solution, and some degree of precipitation occurs at times.

CONCLUSION

There is a need for increased awareness among students on adopting healthy eating habits. Deworming also has to be carried out to prevent the occurrence of iron deficiency anemia. Treatment of anemia could significantly improve memory and academic performance of students.

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