ORIGINAL ARTICLE

A CROSS SECTIONAL STUDY OF NUTRITIONAL ANEMIA AMONG MEDICAL STUDENTS IN A MEDICAL COLLEGE, AT BILASPUR, CHHATTISGARH

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ABSTRACT

Background: The medical students may also suffer anaemia because of long schedule in college, clinical postings, and extra-curriculum activities. They come from different socio economic, cultural backgrounds and various geographical regions of the country.

Methodology: A cross sectional study was conducted during from 1st January, 2009 to 28th February, 2009 among 3rd year MBBS Students between the ages of 20 to 25 years studying at Chhattisgarh Institute of Medical Science (CIMS), Bilaspur. A total of 96 students age ranging 20 to 25 years out of 100 students enrolled in the batch were studied. A structured questionnaire, which include general information, sign and symptoms regarding anaemia, dietary habit, BMI, general physical examination, systemic examination and a TALLQVIST strip for Hemoglobin estimation were carried out.

Results: Anaemia prevalence was 30.20% among medical students. Out of total 96 students 29 students were found anaemic out of which 11 (19%) male students were anaemic. And 18 (47.4%) female students were found anaemic. The cutoff hemoglobin level below 12.0 gm% was considered anaemia. The mean hemoglobin among student was 12.4 gm % with standard deviation of 1.59, variance of 2.54, and median of 12.5.

Conclusion: The studies like present one in the country can highlight the size of the problem i.e. iron deficiency without anaemia which is also called latent iron deficiency among unexpected population i.e. medical students. Iron supplementation is thus required for the target group. Therefore preventive programs and policies of the country can target this age group particularly in educational institutes.

Key Words: Anaemia, Hemoglobin, Medical, Students

INTRODUCTION

Nutritional anaemia is a particularly common disorder among infants, preschool aged children, young women and older people, but it can occur at all ages and in any region. There are about 100 students enrolled every year in the Chhattisgarh Institute of Medical Science situated at Bilaspur, Chhattisgarh which offers a five and half year undergraduate course of MBBS[1]. These students come from different socio economic, cultural backgrounds.

The medical student also come under the vulnerable group that suffer anaemia because of having long schedule of studying in college, clinical postings, and other curriculum activities, Their living in the hostel or as day scholars away from parents and families was reflected upon their diet habits and had a significant reflection upon the prevalence of anaemia among the studied group, and also appropriate nutrition requirements increase significantly during certain 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 human life cycle when nutritional requirement increases due to the growth spurt.

Nutritional anaemia is prevalent all over the world with an estimated one billion people being iron deficient[2]. And it is one the most common nutritional disorder in the developing world, With an average prevalence of 40% among the general population that it affect nearly two-third of pregnant and one half of non pregnant women in those countries which is three to four times higher than in the developed countries, where prevalence is between 4% to 12% among women of child bearing age[3]. In India, Recent data from the District Nutrition Project (Indian Council of Medical Research) in 16 districts of 11 states, on prevalence of anaemia in non pregnant adolescent girls (11-18 years) showed rates as high as 90.1% with severe anaemia (Hb <7 g/dL) in 7.1%[4].

Very few studies have been conducted on anaemia in the state of Chhattisgarh and little is known about anaemia among medical college students. The present study aimed at measuring the magnitude of anaemia prevalence among the MBBS students of 3rd year[1]. Following are detailed aims and objectives of the present study

OBJECTIVES

Objectives of this study were to measure the prevalence rate of anaemia among the 3rd year medical students of Chhattisgarh Institute of Medical Science (CIMS), Bilaspur; to measure the severity of anaemia among medical students using hemoglobin percentage as cutoff value provided by WHO; to compare the nutritional status (BMI) with the prevalence of anaemia among medical students; and to find out any relationship between their socioeconomic status, BMI, eating habit/schedule with prevalence of anaemia among medical students.

MATERIALS AND METHODS

A cross sectional study was conducted during from 1st January, 2009 to 28th February, 2009 among 3rd year MBBS Students between the age of 20 to 25 years studying at Chhattisgarh Institute of Medical Science (CIMS), Bilaspur. After ethical approval from IEC of the Chhattisgarh Institute of Medical Science (CIMS), Bilaspur a total of 96 students age ranging 20 to 25 years out of 100 students enrolled in the batch were studied. All the students were administered a structured questionnaire, which include general information, sign and symptoms regarding anaemia, dietary habit, data for BMI and a TALLQVIST strip for Hemoglobin estimation. The general information including bio-data, parents' education, occupation, income, family structure and socioeconomic status collected. A detailed clinical history taken from tem for any presenting symptom regarding anemia and physical examination was done to look for pallor, icterus, edema, hyper pigmentation, lymph-adenopathy, bleeding spots and signs of vitamin deficiency and was noted on the Performa. Systemic Physical examination was done to rule out any systemic abnormality. Their dietary habit includes, diet consumed, habit, schedule, calorific value. Each student was directed for the measurement of height and weight to evaluate their nutritional status with help of BMI according to cut off directed by WHO[5,6,7]. The data were recorded in the Performa. Then blood sample was taken from them with sterile needle and blood hemoglobin level is estimated with help of TALLQVIST method. TALLQVIST method is the simple subjective, colorimetric method, feasible and easily available for the institutional study which was used in this study. A finger-prick drop of blood was placed on a strip of absorbent paper and was left to dry. The blood colour was compared to the standard TALLQVIST color scale, which is calibrated at an interval of 10 units [Image 1]. The collected blood samples were used in the HemoCue haemoglobinometer machine to estimate haemoglobin. After calibration of the machine using a control cuvette provided by manufacturer, the standard cuvette was filled with a drop of blood from a finger prick and haemoglobin values were read and recorded to one decimal point. In comparing the two scales, a value of 14.8 g/dl in the HemoCue scale falls within a point interval of 100% in the Tallqvist scale. Similarly 11.0 g/dl falls next to 80%, 10.5 g/dl to 70%, 8.5 g/dl to 60%, and 7.0 g/dl to 50%. The student having hemoglobin level below 12.0 gm% considered anemic[8,9,10]. The data obtained from structured questionnaire and TALLQVIST strip feed in the computer in Excel format and analysis was done with help of EPI_INFO computer software provided by WHO free of cost for health data analysis.

RESULTS

The anaemia was observed in 29 (30.20%) students out of total 96 students selected to carry out study from whole MBBS batch of 100 students of 3rd year. Anaemia was absent in the remaining 67 (69.80%) medical students. The prevalence of anaemia was 30.20% among medical students, out of which 18.96% (11 students) were males and 47.37% (18 students) were females suffering from anaemia. There were 11 (18.96%) males anaemic and 47 (81.03%) males non-anaemic out of total 58 males included in the present study and similarly 18 (47.37%) females anaemic and 20 (52.63%) were non-anaemic out of 38 females [Table1].

Table1: Sex-wise distribution of Anaemia

Anaemia	Males (%)	Females (%)	Total (%)
Present	11 (18.96)	18 (47.37)	29 (30.20)
Absent	47 (81.03)	20 (52.63)	67 (69.80)
Total	58 (100)	38 (100)	96 (100)

x^2=8.78, df=1, *p=0.0030374

The mean hemoglobin among student was 12.4 gm % with standard deviation of 1.59, variance of 2.54 and median of 12.5. If we observe about severity of anemia among student there were mild anaemia among 20 students (68.97%) followed by moderate anaemia among 9 students (31.03%) but there were no student having severe anaemia [Table2].

Table2: Severity of Anemia among Medical Student

Severity	Males (%)	Females (%)	Total (%)
Mild	5 (45.45)	15 (83.33)	20 (68.97)
Moderate	6 (54.55)	3 (16.67)	09 (31.03)
Severe	0 (0.00)	0 (0.00)	00 (00.00)
Total	11 (100)	18 (100)	29 (100)

x^2=4.58, df=1, p-Value=0.0324

Table 3: BMI of Medical Students

BMI	Males (%)	Females (%)	Total (%)
Underweight	5 (8.62)	10 (26.31)	15 (15.62)
Normal	41 (70.69)	24 (63.16)	65 (67.71)
Overweight	12 (20.69)	4 (10.53)	16 (16.67)
Total	58 (100)	38 (100)	96 (100)

$x^2=6.22$, df=2, p-Value=0.0447

According to World Health Organization (WHO) standard of BMI student are classified as underweight (BMI below 18.5) normal (BMI 18.5 – 24.99) and overweight (BMI >25)[5,6,7]. Mean BMI of student was 21.49 with standard deviation of 3.1007. Among 96 students 15.62% (15) student were underweight, 67.71% (65) had normal BMI, and 16.67% (16) were overweight [Table3].

After the analysis we found Anemia was more prevalent among the students who were underweight, and over weight student have less prevalence of anemia then the other study group. The prevalence of anemia among underweight was 60%, and in students with normal BMI was 27.69% and overweight have prevalence of 12.5% [Table4].

Table 4: Prevalence of Anemia Among Student Belonging Different Nutritional Level

Anemia	Underweight (%)	Normal (%)	Overweight (%)	Total (%)
Present	9 (60.00)	18 (27.69)	2 (12.50)	29 (30.20)
Absent	6 (40.00)	47 (72.31)	14 (87.50)	67 (69.79)
Total	15 (100)	65 (100)	16 (100)	96 (100)

$x^2=8.890$, df=2, p-Value=0.0117

This also suggests that anemia prevalence decrease as nutritional status of subject increase. Mean height of female is 1.58 m (anemia presenr-1.57m, anemia absent-1.58m) and mean height of male is 1.71 m (anemia present-1.72m, anemia absent-1.71m). Mean weight of female is 51.84 kg (anemia present-50 kg, anemia absent-53kg) and mean weight of male is 64.62 kg (anemia present-60kg, anemia absent-65 kg). Mean BMI of female is 20.80 kg/m2 (anemia present-20.30 kg/m2, anemia absent-21.24 kg/m2) and mean BMI of male is 21.95 kg/m2 (anemia present-20.33 kg/m2, anemia absent-22.33 kg/m2).

DISCUSSION

The Nutritional anaemia is the most common cause of anaemia worldwide. It frequently occurs due to inadequate iron intake, chronic blood loss or disease, malabsorption, or a combination of all these factors. It affects one's development, growth and resistance to infections, and is associated with mortality among children younger than two years old1[11]. Iron Deficiency Anaemia is also a form of Nutritional anaemia which is distributed universally; the most affected population groups are infants aged between four and 24 months old, school-age children, female adolescents, pregnant women and nurturing mothers.

In the present study among the medical students there were mild anaemia among 20 students (20.83%) followed by moderate anaemia among 9 students (09.37%) but there were no student having severe anaemia. The similar trend was observed in a study carried out among female medical students in a medical institute at Tehran in the study groups, 118 (52.7%) had a normal iron status (Group 1), nine (4.0%) suffered from Iron Deficiency Anaemia (Group 3) and 97 (43.3%) had Iron Deficiency without anaemia (Group 2)[12]. In this study the prevalence of nutritional anaemia was 30.20% among students, 19% (11 students) of male student have anemia and 47.4% (18 students) of female student were found anemic. There were 11 (19%) males anaemic out of total 58 and 18 (47.4%) females anaemic of 38.

Sanjeev M Chaudhary and Vasant R Dhage et al carried out a study in an urban area under Urban Health Training Center of a medical college, Nagpur, among a total of 296 adolescent females (10–19 years old) and according their observations the prevalence of anemia was found to be 35.1%. A significant association of anemia was found with socio-economic status and literacy status of parents[13] In the study of Sanjeev M Chaudhary and Vasant R Dhage et al, mean height and mean weight of subjects with anemia was significantly less than subjects without anemia, which suggests that anemia affects the overall growth of adolescents[13]. Similarly in the study carried out by Shams S, Asheri H, the prevalence rates of ID and IDA in female university students aged 18–25 years were 40.9% and 3.8%, respectively[12].

After the analysis we found Anemia was more prevalent among the students who were underweight, and over weight student have less prevalence of anemia then the other study group. 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 prevalence of 12.5%. This also suggests that anemia prevalence decrease as nutritional status of subject increase. Bulliyy et al[14] found 96.5% prevalence among non school going adolescent girls in three districts of Orissa, of which, 45.2%, 46.9%, and 4.4% had mild, moderate, and severe anemia. They found significant association between Hb concentration and the educational level of girls, their parents' family income, and body mass index. If we observe about

severity of anemia among student there were mild anaemia among 20 students (20.83%) followed by moderate anaemia among 9 students (09.37%) but there were no student having severe anaemia in the present study. In the study of Sanjeev M Chaudhary and Vasant R Dhage, out of 104 subjects, 72 subjects (69.2%) had mild anemia [Hb 10 to < 12 gm%] while 32 subjects (30.8%) had moderate anemia [Hb 7 to < 10 gm%]. None of the subjects had severe anemia[13]

CONCLUSION

The following conclusions can be drawn from present study:

Anemia prevalence among medical students of 3rd year batch in the medical college was 30.20%. The mean Hb among these students was 12.4 gm/dl with standard deviation of ±1.59. The prevalence of severe, moderate and mild anemia was 0.0%, 9.37% and 20.83% respectively. The prevalence of anemia remained high and closely related to the nutritional status.

RECOMMENDATION

On the basis of results observed in the present study the following measures can be suggested:

Medical student are as gems for medical college they are future doctor of the society, there should be some program to fulfill their nutritional requirement. And the quality of food in hostel mess must be maintained and supervised by respective authority of institute.

Medical student should go for routine hemoglobin analysis to keep an eye on their hemoglobin level.

REFERENCE

1. Education and career: Regular Colleges / institutions in India: http://career.webindia123.com/career/institutes/details.asp?inst=Chhattisgarh Institute of Medical Sciences.asp

2. United Nations Administrative Committee on Co-ordination Sub committee on Nutrition. Second report on the world nutrition situation. Geneva, 1992; 40-48.

3. WHO/UNICEF/UNU 2001. Iron deficiency anemia : Assessment, prevention and control. A guide for programme managers. Available from: http//www.who.int/documents/ida_assessment_ prevention_control. Assessed May 26th 2003.

4. Teoteja GS, Singh P. Micronutrient profile in Indian population (Part-I). New Delhi: Indian Council Medical Research, 2002; p 131-140.

5. World Health Organization. Physical status: The use and Interpretation of Anthropometry. Technical Report Series No.854.Geneva: World Health Organization; 1995.

6. World Health Organization. Measuring nutritional status. Geneva: World Health Organization; 1985.

7. Must, A.; Dallal, G E & Diet, W.H. (1991). Reference data for obesity: 85th & 95th percentiles of body mass index (Wt/ Ht2)- a correction. American journal of Clinical Nutrition. 54:773.

8. WHO/UNICEF/UNU 2001. Iron deficiency anemia : Assessment, prevention and control. A guide for programme managers. Available from: http//www.who.int/nut/documents/ida_ assessment_prevention_control. Assessed May 26th 2003.

9. WHO (World Health Organization). (1968). Nutritional anemia: report of a WHO Scientific Group. Technical Report Series No. 405. Geneva WHO.

10. Richard LG. Iron deficiency and iron deficiency anemia. Richard LG, Foerster J, Lukem J, Paraskevas F, Green JP, Rodgus GM, editors. Wintrobe's Clinical Haematology. 10th ed. Baltimore: Interprint; 1999; p 979-1010.

11. Queiroz Sde S, Torres MA. [Iron deficiency anemia in children]. J Pediatr (Rio J) 2000; 76 suppl 3:S298-304. Portuguese.

12. Shams S, Asheri H, Kianmehr A, Ziaee V, Koochakzadeh L, Monajemzadeh M, Nouri M, Irani H, Gholami N. The prevalence of iron deficiency anaemia in female medical students in Tehran. Singapore Med J 2010; 51(2) : 116

13. Sanjeev M Chaudhary and Vasant R Dhage. A Study of Anemia Among Adolescent Females in the Urban Area of Nagpur. Indian J Community Med. 2008 October; 33(4): 243–245

14. Bulliyy G, Mallick G, Sethy GS, Kar SK. Haemoglobin status of non school going adolescent girls in three districts of Orissa, India. Int J Adolesc Med Health. 2007;19:395–406

15. DeMaeyer EM. A guide for health administrator. WHO; 1989. Preventing and controlling iron deficiency anemia through primary health care; p. 26.