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Original Article

Surgery Section

Nutritional Anaemia among Medical Students and its Correlation with Body Mass Index

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ABSTRACT

Introduction: Medical students may suffer from anaemia probably because of hectic study schedule leading to irregular diet. The association between Anaemia and Body Mass Index (BMI); has been controversial. Screening for the detection of anaemia is important in order to identify the at-risk population. There is paucity of data correlating haemoglobin with BMI. Very few studies have been conducted on medical students, who are an integral part of society.

Aim: To estimate nutritional anaemia among medical students and its correlation with BMI.

Materials and Methods: This was an observational study. Total 250 students were enrolled, aged between 18 to 21 years from April 2018 to October 2018. BMI and haemoglobin (Sahli's haemoglobinometer) were measured. Data analysis was being carried out by using Statistical Package for Social Science i.e., SPSS. Correlation between BMI and haemoglobin was determined by Pearson's correlation analysis.

Results: Out of the total 250 students participating in the study, 4.8% (12) were boys and 95.2% (238) were girls. Anaemia was found in 13.6% (34) students, among which 5.88% (2) were boys and 94.11% (32) were girls. The mean haemoglobin value in boys was 12.38 gm/dL (±1.70) and 11.75 gm/dL (±1.15) in girls. Among 250 students, 13.2% (33) were underweight, 78.4% (196) were within normal BMI and 8.4% (21) were overweight. The value of Pearson's correlation coefficient (r) was 0.7956. This suggests undernutrition was associated with anaemia.

Conclusion: Majority of the anaemic girls were found to be underweight. A positive correlation was also found between anaemia and BMI.

Keywords: Iron deficiency anaemia, Obesity, Undernutrition

INTRODUCTION

Nutritional anaemia is a worldwide problem with highest prevalence in developing countries. Iron deficiency anaemia is also a form of nutritional anaemia. Iron deficiency anaemia is the most common form of anaemia all over the world and also India [1]. Adolescence or early adulthood is one of important time in the human life when nutritional requirement increases due to the growth and activities. Nutritional requirements increase significantly during this period of life, thus placing individuals at greater risk of deficiency [2,3]. Medical students, especially females, living in hostels possess high risk of anaemia because of their poor eating habits, skipping breakfast and long schedule in college, burden of medical studies, clinical posting and extracurricular activities [4].

The relation between Anaemia and BMI; a measure of nutritional and health status of adults, has been controversial. The previous studies also accounts the evidences of anaemia in both of over-nourished and undernourished individuals, which represents the high and low socioeconomic classes, respectively [3,5,6].

Screening for the detection of anaemia is important in order to identify the at-risk population as well as to determine the treatment modality in individuals. There is paucity of data correlating anaemia with BMI [7]. Very few studies [1,2,3] have been conducted on medical students, who are an integral part of society. Therefore, the present study aimed to estimate nutritional anaemia among medical students and its correlation with BMI.

MATERIALS AND METHODS

This observational study was conducted at Jawaharlal Nehru Medical College and Acharya Vinobha Bhave Rural Hospital, Sawangi (Meghe), Wardha, Maharashtra, India, the study period was from April 2018 to October 2018. after getting Ethical Approval (Letter no. DMIMS (DU)/IEC/2018-197148). Students from First and Second year MBBS course, aged between 18 to 21 years were included in the study. Sample size was 250. The students with history of cardiovascular diseases, sickle cell anaemia and bleeding disorders were excluded.

Collection of Sample

Details of the study participants were filled into a questionnaire by researcher, which included general information (demography, parent's education, occupation, income and socio-economic status), signs and symptoms regarding anaemia, dietary habits, BMI, general physical examination and systemic examination and previous haemoglobin test history.

Clinically, anaemia was diagnosed by two researchers, looking for pallor in the following sites-lower palpebral conjunctiva, tip and dorsum of the tongue, soft palate, nail beds, palmar or plantar creases and general body skin. Both of the researchers were trained and experienced.

Then the students were subjected for haemoglobin calculation by Sahli's haemoglobinometer and calculation of BMI was done. BMI was categorised according to the Extended International (IOTF) BMI [8].

STATISTICAL ANALYSIS

Data analysis was carried out using Statistical Package for Social Science (SPSS) version 17.0. Correlation was determined by Pearson's correlation analysis.

RESULTS

Of the total 250 students participating in the study, 4.8% (12) were boys and 95.2% (238) were girls. The students were in the age group 18-21 years [Table/Fig-1].

The status of anaemia according to the WHO cut off value (13 gm% for male and 12 gm% for female) was found to be in 13.6% (34) students, among which 5.88% (2) were boys and 94.11% (32) were girls. The mean haemoglobin value in boys was 12.38 gm/dL (±1.70) and 11.75 gm/dL (±1.15) in girls.

Two anaemic boys had normal BMI. Whereas among 32 anaemic girls, 21 were underweight, 09 were normal and 2 were overweight, respectively.

To determine co-relation between BMI and nutritional anaemia, Pearson's correlation coefficient (r) was calculated. The value of r was

BMI	Students	Anaemic students 34		Normal students 216		Total students	
		Male	Female	Male	Female	Male	Female
		02	32	10	206	12	238
<18.5	33		21				
18.5-24.9	196	02	09				
25-29.9	21		02				

[Table/Fig-1]: Shows descriptive data of BMI and anaemia.

0.7956. This value suggests direct correlation of BMI with nutritional anaemia in girls, which co-relate undernutrition with anaemia.

DISCUSSION

The present study demonstrated a direct correlation of low BMI with nutritional anaemia in girls. Undernutrition is associated with anaemia.

A study conducted by Jawed S et al., in a Pakistani medical students reveals anaemia in 74 (33.4%) students out of 221 MBBS students [1]. Among the anaemic students, 56% were under weight and 34.9% were overweight. In a present study anaemia found in less number of students (13.6%), but found to have almost similar co-relation between low BMI and nutritional anaemia.

In a study done by Kanchana R and Pushpa K, anaemia was observed to be more prevalent among males (42%) as compared to females (21%) [2]. Haemoglobin was significantly decreased in males compared to females thus showing a greater prevalence of anaemia among males compared to females. Furthermore, the presence of anaemia was more among overweight students compared to those underweight. These observations are not similar to present study.

Kaur M and Singh K, found in their study that the nutrition education intervention has an impact on improving awareness, approach and practices of iron-deficient female adolescents compared with control [3].

Saxena Y et al., conducted study on medical students shows a negative association of haemoglobin with nutritional status (BMI) in overweight and obese females students [6].

A study conducted by Khakurel G et al., found that among 200 students enrolled, 43.5% (87) of students were anaemic; out of which 72.41% (63) were girls [7]. About 46.15% of overweight students and 50% of underweight students were anaemic. The correlation of haemoglobin to grades of BMI showed a positive association of haemoglobin with BMI among underweight and overweight boys. There was a negative association in underweight girls. Present study is not consistent with this study where girls showed anaemia and an under-nourished status.

A study conducted on 344 medical and paramedical students of Rohilkhand Medical College and Hospital, Bareilly [9] revealed an overall prevalence of anaemia as 29.07%; prevalence was higher among female students (41.92%). It must be noted that anaemia is prevalent even in medical and paramedical students, who are well educated and well oriented about nutrition and its ill effect on health. BMI was found to exhibit higher prevalence of anaemia among normal weight, followed by underweight, preobese and obese.

A cross-sectional study done among adolescent girls revealed that majority of the adolescent girls had anaemia [10]; while another study found anaemia to be common among under-nourished adolescent girls [11].

Anaemia causes fatigue, headache and cognitive impairment reduced exercise tolerance, reduced ability to work, reduced social interaction, reduced pursuit of leisure activities and decline in subjective sense of well being, thus having an adverse impact on health-related quality of life. Chronic, unremitting fatigue and withdrawal from daily life and depression may be a major risk.

Limitation(s)

Sahli's method for haemoglobin measurement is a visual method and chances of error are high. Besides, it determines only oxyhaemoglobin and reduced haemoglobin. Other types of haemoglobin are not estimated. It is a method that depends on the formation of acid hematin which is not a true solution, and some degree of precipitation is associated at many times. Subjective evaluation done by researcher is prone to bias. Another limitation was that it was single centre study. Additional tests such as serum ferritin, serum iron and transferrin or Total Iron Binding Capacity (TIBC) were required for diagnosis of iron deficiency anaemia which was not done in this study.

CONCLUSION(S)

This study revealed nutritional anaemia as a major problem in medical students. It suggests that medical students should take care of their diet and they should be encouraged to eat balanced food in order to fight against anaemia.

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