Association of Anemia with Bmi in Medical Students: A Cross-Sectional Study

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Abstract:
Introduction :- Anaemia remains a major public health problem in India. Nutritional Anaemia is common amongst adolescents and young adults and is a major public health problem in India. Thus, present study was undertaken to find out the status of anaemia and relationship of BMI with Hb% in Undergraduate MBBS Students in RIMS – Ongole.

Objectives :- The purpose of the study was to find out the relation between Anaemia with BMI & SES

Methodology:- study design was a cross sectional study. Study was conducted among first year medical students enrolled in the academic year 2016 – 17 batch, Rajiv Gandhi Institute of Medical Sciences- Ongole. Anthropometric measurements were done using the standard protocol. BMI was calculated by the formula: Weight (kg)/Height (m2). Haemoglobin level was assessed using the Sahli’sHaemoglobinometer. Study tool was Predesigned, pre-tested, semi-structured questionnaire. Statistical Analysis was done using SPSS software version 22.

Results:- 62% were females and 38% were males. 58% were normal and 42% are anaemic. 100% males and 40.3% of females are mild anaemic, 24.2% of females were Moderately anaemic and 3.2% were severely anaemic which is statistically significant. relationship between anaemia and BMI. which is statistically not significant.

Discussion:- In our study 62% were females and 38% were males. 100 seats in Ernakulam, the ratio in the new batch is approximately 70:30 in favour of girls.¹⁰ In our study 58% were normal and 42% are anaemic in which 2% were severely anaemic, 25% were mild anaemic and 15% are moderately anaemic. In a study conducted by Shams Set al the prevalence rates of anaemia in female university students aged 18–25 years were 40.9%. A study by Thankachan et al showed that the prevalence rates of anaemia were 39%, in young women of low socioeconomic status in Bangalore, India.¹⁷ In our study 100% males and 32.3% females were normal. 40.3% of females are mild anaemic, 24.2% of females were Moderately anaemic and 3.2% were severely anaemic which is statistically significant. In a study conducted by Shah Mohammad Abbas Waseem et al gender wise amongst males 89(81.65%) and 20(18.35%) were found to be non anaemic and anaemic respectively. Similarly, 56(61.54%) and 35 (38.46%) females were found to be non anaemic and anaemic respectively.²¹ In our study 38.9% of underweight students were normal Hb%, 5.6% of underweight students were severely anaemic. 1.6% of healthy students are severely anaemic, 24.6% of healthy students were mild anaemic. 100% obese students have normal Hb% levels which is statistically not significant. In a study conducted by Emmanuel Ike Ugwuja et al Anaemia prevalence among body mass index (BMI) groups observed in the present study suggests that Anaemia in this population is not related to BMI.¹³ This is in contrast with studies elsewhere.¹⁴,¹⁵,¹⁶ Conclusion:- Girls have outnumbered the boys in medical field. 42% of budding doctors are anaemic. Girls are more affected with anaemia as no male is suffering with anaemia which is statistically highly significant. There is no relation between BMI and Anaemia.

Keywords:- SES – Socio Economic Status, BMI- Body Mass Index, Hb% - Haemoglobin Percents

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I. Introduction:-
Anaemia remains a major public health problem in India. Nutritional Anaemia is common amongst adolescents and young adults and is a major public health problem in India.² It is estimated that 1.62 billion (24.8% population) people globally, 50% women of reproductive age group and 26% males between age group 15-59 years are suffering from anaemia.³ Human Resource Development depends upon the nutrition because physical, mental health and work capacity is affected by malnutrition.⁴ Nutritional deficiencies leading to anaemia could have detrimental effect on health on budding doctors and health care providers. Adolescence is the stage of the life cycle where rapid spurt in the growth occurs leading to increased nutritional demand.
Medical students are vulnerable to nutritional anaemia because of their sedentary lifestyle to complete the syllabus, less time for physical exercise and improper diet habit. Nutritional deficiencies leading to anaemia could have detrimental effect on health on future doctors and healthcare providers of India. Moreover with doctor patient ratio of 1:1700 in India the issue becomes even more critical. Previous studies have highlighted the relation between anaemia and body composition. Thus, the present study was undertaken to find out the status of anaemia and relationship of BMI with Hb in Undergraduate MBBS Students in RIMS – Ongole.

II. Objectives:-

The purpose of the study was to find out the relation between Anaemia with BMI & SES

III. Methodology:-

Study design was a cross sectional study. Study was conducted among first year medical students enrolled in the academic year 2016 – 17 batch, Rajiv Gandhi Institute of Medical Sciences- Ongole. Anthropometric measurements were done using the standard protocol. Standard height of students was recorded without shoes and wearing light clothes. The measuring tape was mounted on the wall to the nearest of centimeters (<5 and >5 mm). The weight was recorded with shoes off and with light clothes on a weighing machine with at least count of 500 g. BMI was calculated by the formula: Weight (kg)/Height (m2). BMI is independent of age and sex and is a known an epidemiological marker of nutritional status in adolescents. International Obesity Task Force (IOTF2000) has proposed the standards for adult obesity. SES was calculated with Modified Kuppuswamy’s Socioeconomic scale. BMI in Asia and India as follows:

- BMI: > 23 kg/m2: Overnutrition
- BMI: 18.5–23 kg/m2: Adequate nutrition
- BMI: < 18.5 kg/m2: Undernutrition

Haemoglobin level was assessed using the Sahli’s Haemoglobinometer using a standard protocol. The measured haemoglobin values were tabulated according to the gender difference and compared with the standard values of grading of anaemia. According to WHO guidelines haemoglobin concentration of <12 g% was considered as anaemia. Study tool was Predesigned, pre-tested, semi-structured questionnaire. Statistical Analysis was done using SPSS software version 22. Analysed and interpreted for chi-square test to find out the association between Anaemia with BMI & SES.

IV. Results:

Figure 1 showing gender wise distribution 62% were females and 38% were males. In figure 2 showing distribution of anaemia 58% were normal and 42% are anaemic in that 2% were severely anaemic, 25% were mild anaemic and 15% are moderately anaemic.

Table -1, Relation between gender and anaemia

<table>
<thead>
<tr>
<th>Gender</th>
<th>Normal</th>
<th>Mild Anaemia</th>
<th>Moderate Anaemia</th>
<th>Sever Anaemia</th>
<th>P value less than 0.005(highly significant) df -3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>38(100%)</td>
<td>0(0%)</td>
<td>0(0%)</td>
<td>0(0%)</td>
<td></td>
</tr>
<tr>
<td>female</td>
<td>20(32.3%)</td>
<td>25(40.3%)</td>
<td>15(24.2%)</td>
<td>2(3.2%)</td>
<td></td>
</tr>
</tbody>
</table>
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Table-1, showing the relation between gender and anaemia. 100% males and 32.3% females were normal. 40.3% of females are mild anaemic, 24.2% of females were Moderately anaemic and 3.2% were severely anaemic which is statistically significant.

Table-2. Relation between anaemia and BMI

<table>
<thead>
<tr>
<th>BMI</th>
<th>Normal</th>
<th>Mild Anaemia</th>
<th>Moderate Anaemia</th>
<th>Severe Anaemia</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under weight</td>
<td>7(38.9%)</td>
<td>5(27.8%)</td>
<td>5(27.8%)</td>
<td>1(5.6%)</td>
<td>18(100%)</td>
</tr>
<tr>
<td>Healthy</td>
<td>38(62.3%)</td>
<td>15(24.6%)</td>
<td>7(11.5%)</td>
<td>1(1.6%)</td>
<td>61(100%)</td>
</tr>
<tr>
<td>Over weight</td>
<td>11(57.9%)</td>
<td>5(26.3%)</td>
<td>3(15.8%)</td>
<td>0(0)</td>
<td>19(100%)</td>
</tr>
<tr>
<td>Obese</td>
<td>2(100%)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>2(100%)</td>
</tr>
</tbody>
</table>

Table-2, showing the relationship between anaemia and BMI. 38.9% of underweight students were normal Hb%, 5.6% of underweight students were severely anaemic, 1.6% of healthy students are severely anaemic, 24.6% of healthy students were mild anaemic. 100% obese students have normal Hb% levels which is statistically not significant.

V. Discussion:

In our study62% were females and 38% were males. 2011 data shows that the trend is gaining strength with 1,091 girls joining the course, while the number of boys is 967. Of the 100 seats in Ernakulam, the ratio in the new batch is approximately 70:30 in favour of girls. In our study 58% were normal and 42% are anaemic in which 2% were severely anaemic, 25% were mild anaemic and 15% are moderately anaemic. In a study conducted by Shams Set al the prevalence rates of anaemia in female university students aged 18–25 years were 40.9%. A study by Thankachan et.al showed that the prevalence rates of anaemia were 39%, in young women of low socioeconomic status in Bangalore, India. The majority of these anaemic women were iron deficient, and the primary factors responsible for this high prevalence rate in this population were inadequate intake of dietary iron, poor bioavailability and a concurrent inadequate intake of dietary micronutrients. In a study conducted by Sachin Pandey et., al among the medical students there were mild anaemia among 20 students (20.83%) followed by moderate anaemia among 9 students (9.37%) but there were no student having severe anaemia. 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.

In our study 100% males and 32.3% females were normal. 40.3% of females are mild anaemic, 24.2% of females were Moderately anaemic and 3.2% were severely anaemic which is statistically significant. In a study conducted by Shah Mohammad Abbas Waseem et al gender wise amongst males 89(81.65%) and 20(18.35%) were found to be non anaemic and anaemic respectively. Similarly, 56(61.54%) and 35 (38.46%) females were found to be non anaemic and anaemic respectively. In a study conducted by Rumi Debbarma, Pujayeta Paul et al the haemoglobin (Hb) level was significantly higher (p<0.001) in male (13.6±1.84) than female (11.6±1.52) students. Nutritional anaemia was more prevalent among female than male students, this is similar to the study done by Kaur M et al. This less prevalence of anemia in male students could be due to increased testosterone concentration which is associated with increased concentration of erythropoietin and hemoglobin. In contrast to the present study, the previous study done in medical students of central India found prevalence of anemia as 39%, out of which 39% were females and 22% were male students. Anemia prevalence was 30.20% among medical students of Chhattisgarh, affecting 19% of male gender and 18% of female gender. 8% of female students were found to be anemic with none of the boys having <12gm%Hb at Himalayan institute of medical sciences.

Adolescence period is important for human growth and maturation. During this period the risk of iron deficiency anaemia appears both in boys and girls after which it subsides in boys but remains for girls because of menstrual blood loss. So it is now viewed as “Female Disease” which is causing red alert in developing countries.

In our study 38.9% of underweight students were normal Hb%, 5.6% of underweight students were severely anaemic, 1.6% of healthy students are severely anaemic, 24.6% of healthy students were mild anaemic, 100% obese students have normal Hb% levels which is statistically not significant. In a study conducted by Emmanuel Ike Ugwuja et al Anemia prevalence among body mass index (BMI) groups observed in the present study suggests that Anaemia in this population is not related to BMI. This is in contrast with studies elsewhere. In Chinese women from Jiangsu Province, an inverse association was found between overweight, obesity, central obesity and Anaemia. Similarly, a negative association between hemoglobin concentration and BMI has been observed in medical students of Himalayan Institute of Medical Sciences. Among adults from rural communities of North Bengal hemoglobin concentration was found to be significantly associated with BMI. Simar to our studya negative association between BMI and Hb concentration was observed among overweight and obese students (30:31).
VI. Conclusion:-

Girls have outnumbered the boys in medical field. 42% of budding doctors are anaemic. Girls are more effected with anaemia as no male is suffering with anaemia which is statistically highly significant. There is no relation between BMI and Anaemia.

References

[19] A CROSS SECTIONAL STUDY OF NUTRITIONAL ANEMIA AMONG MEDICAL STUDENTS IN A MEDICAL COLLEGE, at BILASPUR, CHHATTISGARH Sachin Pandey1, Arun Singh2, NATIONAL JOURNAL OF MEDICAL RESEARCH, ISSN: 2249 4995 eISSN: 2277 8810