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

*Patibandla Pavana Roy[1],Vijaya vishnu gunturu[2]

[1]Assistant Professor, Department of physiology, RIMS medical college- Ongole
[2]Assistant Professor, Department of Community Medicine, KIMS- Amalapuram
Corresponding author: *Patibandla Pavana Roy

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 study62% 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 effected 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 Perecent

---

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 effected 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 nutritional anaemia because of their sedentary lifestyle to complete the syllabus, less time for physical exercise and improper diet habit [5]. Nutritional deficiencies leading to anaemia could have detrimental effect on health on future doctors and health care providers of India. Moreover with doctor patient ratio of 1:1700 in India the issue becomes even more critical. [11] Previous studies have highlighted the relation between anaemia and body composition. [12] Thus, present study was undertaken to find out the status of anaemia and relashionship 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) [6] has proposed the standards for adult obesity. SES was calculated with Modified Kuppuswamy's Socioeconomic scale .[7]
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'sHaemoglobinometer 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 [8]. 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.
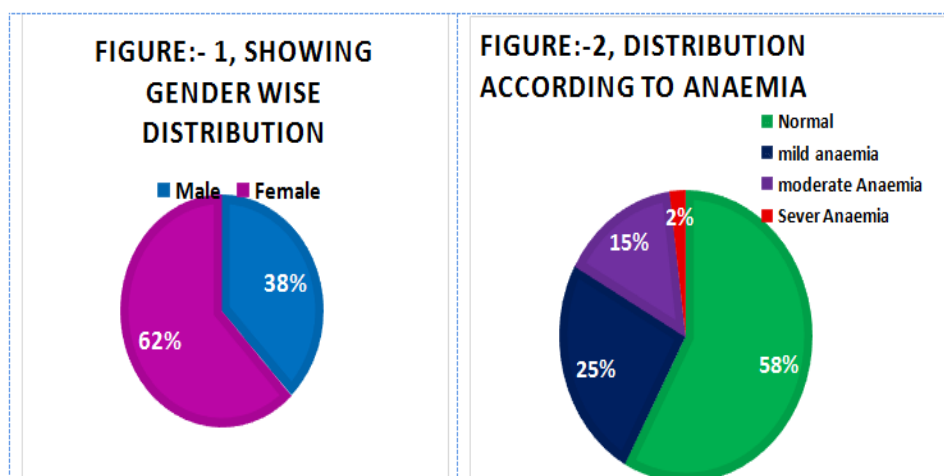
Table :-1, Relation between gender and anaemia

Gender	Normal	Mild Anaemia	Moderate Anaemia	Sever Anaemia	P value less than 0.005(highly significant) df -3
Male	38(100%)	0(0%)	0(0%)	0(0%)	
female	20(32.3%)	25(40.3%)	15(24.2%)	2(3.2%)	

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

BMI	Normal	Mild Anaemia	Moderate Anaemia	Sever Anaemia	Total	P value more than 0.05 (not significant) Df - 9
Under weight	7(38.9%)	5(27.8%)	5(27.8%)	1(5.6%)	18(100%)	
Healthy	38(62.3%)	15(24.6%)	7(11.5%)	1(1.6%)	61(100%)	
Over weight	11(57.9%)	5(26.3%)	3(15.8%)	0(0)	19(100%)	
Obese	2(100%)	0(0)	0(0)	0(0)	2(100%)	

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.[9]Of the 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]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.[18]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 (09.37%) but there were no student having severe anaemia.[19] 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.[20]

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 a study conducted by Rumi Debbarma, Pujayeeta 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.[22] Nutritional anaemia was more prevalent among female than male students, this is similar to the study done by Kaur M et al [23]. 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[26]. 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. [27] Anemia prevalence was 30.20% among medical students of Chhattisgarh, affecting 19% of male gender and 18% of female gender [28]. 8% of female students were found to be anemic with none of the boys having <12gm%Hb at Himalayan institute of medical sciences. [29]

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 [24]. So it is now viewed anaemia as "Female Disease" which is causing red alert in developing countries [25].

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]. In Chinese women from Jiangsu Province, an inverse association was found between overweight, obesity, central obesity and Anaemia [15]. Similarly, a negative association between hemoglobin concentration and BMI has been observed in medical students of Himalayan Institute of Medical Sciences [16]. Among adults from rural communities of North Bengal hemoglobin concentration was found to be significantly associated with BMI [14].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

[1]. Pandey S and Singh A. A cross sectional study of nutritional anemia among medical students in a medical college , at Bilaspur, Chattisgarh. National J of Medical Research 2013;3(2):143-146.
[2]. Park K. Parks textbook of preventive and social medicine. 24nd edition. Bhanot Publishers;2017 page no:-161.
[3]. Kaur K. Anemia 'a silent killer' among women in India : present scenario. European Journal of Zoological Research 2014; 3(1): 32-36.
[4]. Role of Nutrition in human resource and economic development.FAO Corporate Document Repository available online www.fao.org/docrep/007.
[5]. Khan B, Sukhsohale ND, Jawade P. Prevalence of Anemia among undergraduate medical students of central India. GJRAGlobal Journal for research analysis 2015; 4(5):13-14.
[6]. WHO/IASO/IOTF. The Asia-Pacific Perspective: Redefining obesity and its treatment. Sydney: Health Communications, 2000.Available from URL: www.wpro.who.int/nutrition/documents/docs/Redefiningobesity.pdf. Accessed 22nd Dec.2015.
[7]. AH Suryakantha, Community Medicine with recent advances. 3rd edition. Jaypee publishers; 2014;page no – 706.
[8]. Kaur S, Deshmukh PR, Garg BS. Epidemiological correlates of nutritional anemia in adolescent girls of rural Wardha. Indian Journal of Community Medicine 2006; 31(4):255-258.
[9]. http://timesofindia.indiatimes.com/city/mumbai/More-girls-than-boys-join-MBBS-course-in-state/articleshow/15084462.cms
[10]. http://www.thehindu.com/news/national/kerala/girls-outnumber-boys-in-medical-colleges-in-kerala/article6470690.ece
[11]. Deo M G. Doctor population ratio for India- The reality. Indian J Med Res 2013;137(4):632-635
[12]. Mohamed S, Al Hessain A. Anaemia and Body Composition. International Journal of Science and Research2014;3(5):935-941
[13]. Anaemia in Relation to Body Mass Index (BMI) and Socio-Demographic Characteristics in Adult Nigerians in EbonyiState,Emmanuel Ike Ugwuja,[X]1 Lawrence Ulu Ogbonnaya,2 Akuma Johnson Obuna,3 Femi Awelegbe,4 and Henry Uro-Chukwu5,J ClinDiagn Res. 2015 Jan; 9(1): LC04–LC07. Published online 2015 Jan 1. doi: 10.7860/JCDR/2015/9811.5485
[14]. Bhattacherjee S, Banerjee R, Roy JK, Mandal S, Biswas R, Chakraborty M. Under nutrition and Anaemia in rural adults- a cross-sectional study in rural north Bengal. Indian J PrevSoc Med. 41;(1&2):33–6.
[15]. Qin Y, Melse-Boonstra A, Pan X, Yuan B, Dai Y, Zhao J, et al. Anaemia in relation to body mass index and waist circumference among Chinese women. Nutrition Journal. 2013;12:10.
[16]. Saxena Y, Shrivastava A, Saxena V. Effect of gender on correlation of Anaemia with body mass index in medical students. Indian J PhysiolPharmacol. 2011;55(4):364–69.
[17]. The prevalence of iron deficiency anaemia in female medical students in Tehran Shams S, Asheri H, Kianmehr A, Ziaee V, Koochakzadeh L, Monajemzadeh M, Nouri M, Irani H, Gholami N, Singapore Med J 2010; 51(2) : 116
[18]. Thankachan P, Muthayya S, Walczyk T, Kurpad AV, Hurrell RF. An analysis of the etiology of anemia and iron deficiency in young women of low socioeconomic status in Bangalore, India. Food Nutr Bull 2007; 28:328-36.
[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
[20]. 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
[21]. Study of Haematological Profile and Body Mass Index in Undergraduate Medical Students in Lucknow, Uttar Pradesh ,Shah Mohammad Abbas Waseem1*, Rubeena Bano2*, Nadeem Ahmad3, Jitender Kumar4*, Azkia Khan*, International Journal of Health Sciences & Research (www.ijhsr.org) , Vol.5; Issue: 6; June 2015
[22]. Anaemia among Medical Students of Regional Institute of Medical Sciences (RIMS), Imphal Rumi Debbarma, Pujayeeta Paul, BishuDebbarma, TyngshainlangSutnga, BidyaraniLoukrakpam Department of Physiology, RIMS, Imphal, India, Sch. J. App. Med. Sci., Oct 2016; 4(10C):3744-3748.
[23]. Kaur M, Singh A, Bassi R, Kaur H. Nutritional status and anaemia in medical students of SGRDIMSAR, Amritsar. National Journal of Physiology, Pharmacy & Pharmacology. 2015;5(1):35-49.
[24]. Dallman PR, Simes MA, Stekel A. Iron deficiency in infancy and childhood. AMJ ClinNutr. 1980;33:86-118
[25]. Deepthi CS, Bhavani K. A Study of Prevalence and Determinants of Anemia among Adolescent Girls of Urban Slums of Warangal City. Int. J. Preven. Curat. Comm. Med. 2015;1(4):20-25
[26]. Kaur M, Singh A, Bassi R, Kaur H. Nutritional status and anemia in medical students of SGRDIMSAR, Amritsar. Nat J Physiol Pharm Pharmacol 2015; 5:45-49.
[27]. Khan B, Sukhsohale ND, Jawade P. Prevalence of Anemia among undergraduate medical students of central India. GJRA Global Journal for research analysis 2015; 4(5):13-14
[28]. Pandey S, Singh A. A cross-sectional study of nutritional anemia among medical students in a medical college, at Bilaspur, Chhattisgarh. National journal of medical research 2013; 3(2):143-146
[29]. Saxena Y, Shrivastava A, SaxenaV.Effect of gender on a correlation of anemia with body mass index in medical students. Indian J PhysiolPharmacol 2011; 55(4):364-9.
[30]. .Eftekhari M, Mozaffari-Khosravi H ,ShidfarF.The relationship between BMI and iron status in iron-deficient adolescent Iranian girls. Public Health Nutr. 2009; 12(12):2377–81.
[31]. Peter R, Kumar R, Sangwan and Pandey S. Prevalence of anemia and its correlation to body mass index: study among
[32]. unmarried girls .International Journal of Basic and Applied Medical Sciences 2012; 2(3):58-62.