INTERNATIONAL JOURNAL OF CURRENT MEDICAL AND PHARMACEUTICAL RESEARCH
ISSN: 2395-6429, Impact Factor: 4.656
Available Online at www.journalcmpr.com
Volume 7; Issue 06(A); June 2021; Page No.5829-5831
DOI: http://dx.doi.org/10.24327/23956429.ijcmpr20211023

Research Article

OBESE ADOLESCENT HEALTH ASSESSMENT USING HAEMATOLOGY PARAMETERS-A CROSS SECTIONAL STUDY IN RURAL AREA OF VADODARA IN GUJARAT

Harsida Gosai[1]* and B. M Palan[2]

[1]Department of Physiology, Nootan Medical College & Research Centre, Sankalchand Patel University, Visnagar 384315
[2]Department of Physiology, Smt. Bhikhiben kalidas Shah Medical Institute and Research Center, Piparia, Vadodara- 461775

ARTICLE INFO

Article History:
Received 10th March, 2021
Received in revised form 2nd April, 2021
Accepted 26th April, 2021
Published online 28th June, 2021

Key words:
Adolescents, Overweight, Hematological Parameters

ABSTRACT

Background & Objective: Many adolescent boys and girls are Hb -deficient, but it is unclear whether Hb deficiency is associated with other nutritional risk indicators. The present study aimed to investigate the association between Hb deficiency and weight status (measured as BMI) among a representative sample of adolescent population.
Materials and Method: A cross-sectional study apparently healthy subjects were selected by systematic random sampling among all students. Blood samples were collected and analyzed for Hb, haematocrit, RBC count, Reticulocyte count with other hematological parameters, Weight and height were measured. BMI was calculated and compared with age and gender-specific BMI reference values. A total 100 adolescent subjects out of 25 adolescent over weight girls and 45 adolescent overweight Boys of aged 17-19 years were included with prior consent.
Results: In our study 15.3% of the participants were at risk for Anemia and 9.5% of them were overweight with Anemia. An inverse association was found between Hemoglobin and BMI. Anemia was more prevalent among overweight adolescents (P<0.001). Other hematological parameters are also significant (P <0.01)
Conclusions: An inverse association was found between BMI and Hemoglobin. Overweight adolescents demonstrated an increased prevalence of Nutrional-deficiency anemia. It seems that both abnormalities of weight and Hemoglobin status should simultaneously be targeted in overweight adolescents by proper dietary intake.

INTRODUCTION

The increase in the incidence of obesity among children and adolescents is considered a worldwide public health problem. Adolescence is a time of rapid growth and development, and nutrition plays an important role in during this life cycle stage. Healthy eating habits formed during childhood can persist into adulthood and can prevent premature onset of a number of morbidities[1]. Nutritional surveys have shown that the highest prevalence of nutritional deficiency occurs during adolescence, with deficiencies of Ca, Fe, riboflavin, thiamin and vitamins A and C being the most common reported. Nutritional deficiencies and poor eating habits established during adolescence can have long-term consequences, including delayed sexual maturation, short adult stature, osteoporosis, dyslipidaemias and obesity[2].India experienced a rapid 'nutrition transition' during th1990s. The implantation of Western lifestyles, especially the intake of energy-dense food with undesirable composition, increased consumption of animal fats and sugars and reduced consumption of dietary fiber, along with a lack of sufficient physical activity, has resulted in an increasing prevalence of overweight and obesity in Indian children and adolescents [3].Interestingly, despite their excessive energy intake compared with expenditure, obese children and adolescents may be at risk of several micronutrient deficiencies ,including Fe deficiency, as they tend to consume imbalanced meals with low nutrient density. In a US study, low nutrient-density foods contributed more than 30% of daily energy intake, and micronutrient intake was inversely related to the intake of low-nutrient-density foods [4]. Fe deficiency results in increased sympathetic activity, as evidenced by increased plasma and urinary catecholamine concentrations [5, 6] where increased sympathetic nervous system activity[(5,6)] was coupled with overt hypothyroidism[7]. Thyroid hormones have been indicated to have at least a permissive role in adaptive thermo genesis by influencing several aspects of energy metabolism, such as substrate cycling, ion cycling and mitochondrial proton leaks [8]. Whether a deficit in resting energy expenditure plays a role in the development of weight gain leading to obesity is matter of debate [9].Therefore, in order to evaluate a possible association between BMI and

*Corresponding author: **Harsida Gosai**
Department of Physiology, Nootan Medical College & Research Centre, Sankalchand Patel University, Visnagar 384315

Hemoglobin status , we conducted a cross-sectional study in adolescent Population.

MATERIALS AND METHODS

A cross-sectional study was carried out Smt. Bhikhiben Kalidas shah medical institute and research center Piparia. The study was conducted among 100 adolescents out of which 65 male and 35 female adolescent subjects. On basis of weight 45 Overweight male and 25 Overweight female were selected using systematic random sampling.

Inclusion criteria were:

1. Subjects should be apparently healthy and willing to Participate in this study
2. There is absence of any active disease or systemic disease
3. Age within the range of 17 to 19 years;
4. no H/o vitamin or mineral supplements taken regularly during Last 6 Months.

Anthropometric measurements

Anthropometric assessment included measurements of weight, height, waist and hip circumferences. All anthropometric measurements were obtained by the investigator. Body weight was measured to the electronic weighting scale while participants were minimally clothed. Height was measured without shoes to the nearest using a wall-mounted tape. Subsequently BMI was calculated by dividing weight by the square of height (kg/m2). Waist circumference was measured midway between the lower hip margin and the iliac crest. Hip circumference was measured at the largest circumference. Waist: hip ratio (WHR) was calculated as the ratio of waist to hip circumferences.

Biochemical analyses

A fasting venous blood sample of 2ml venous blood was drawn from the vein once only, All the samples were taken between 9.00 a.m-10.00 a.m. to avoid diurnal variations. Also the samples were analyzed immediately within 1-2 hrs, to avoid any variations due to storage. The samples were analyzed by Sysmex KX-21, Automated Hematology Analyzer. It is an automatic multi-parameter blood cell counter for in vitro diagnostic use in clinical laboratories.

Statistical Analysis

Out comes was measured for different groups as mean ± S.D. The differences was calculated by using unpaired students 's 't' test. The difference in the result was considered as significant at the level of p- value ≤ 0.05. for entire statistical analysis SPSS-17.0 version of window based software was used.

RESULTS

Overall, 100 adolescents constituted our sample population. Age of the studied subjects ranged from 17 to19 years respectively. We categorized all participants into two groups (Normal and Over weight) As Table 1 shows, In order to compare anthropometric characteristics at different two groups. Hematological parameters in different two group are shown in Table 2 & 3. The hematological Parameters showed that Majority participants were Anemic and Anemia and obesity were more prevalent among younger adolescents

Table 1 Physical Characteristics of subjects

Characteristics	Over weight subjects	Normal subjects	P value
Age(yr)	18.6 ± 44.5	18.1± 42.0	NS
Weight(kg)	79.9±4.0	62.4± 56.5	HS
BMI(kg/m2)	30.0±1.1	23.06±4.14	HS
Waist/ Thigh ratio	1.68± 0.02	1.32±0.03	HS

Data are presented as Mean ±SD (standard variation), NS- not significant (p>0.05), S- significant (P<0.05) HS- highly significant (P<0.01)

Table 2 Hematological characteristics of subjects

Test	Over weight subjects	Normal subjects	P value
RBC Count	3.91± 0.35	4.12 ±1.67	HS
HB(Gm/dl)	8.93 ± 0.91	9.56±1.12	HS
HCT (%)	29.43±3.46	30.21±4.33	S
MCH (pg)	27.42±3.37	29.42±3.42	HS
MCHC(%)	21.17±2.58	23.43±2.33	S
Reticulocyte count	1.11±0.76	1.33±0.66	S

Data are presented as Mean ±SD (standard variation), NS- not significant (p>0.05), S- significant (P<0.05) HS- highly significant (P<0.01)

Table 3 WBC & Platelet count characteristics of subjects

Test	Over weight subjects	Normal subjects	P value
Total WBC Count	7738 ± 3212	7046±1316	S
Differential Neutrophil count	62.68±9.33	60.43±5.3	S
Differential Lymphocyte count	33.58±10.24	31.33±4.78	S
Differential Monocyte count	2.53±1.81	4.53±0.68	S
Platelet count	1.58±0.92	2.92±0.5	S

Data are presented as Mean ±SD (standard variation), NS- not significant (p>0.05), S- significant (P<0.05) HS- highly significant (P<0.01)

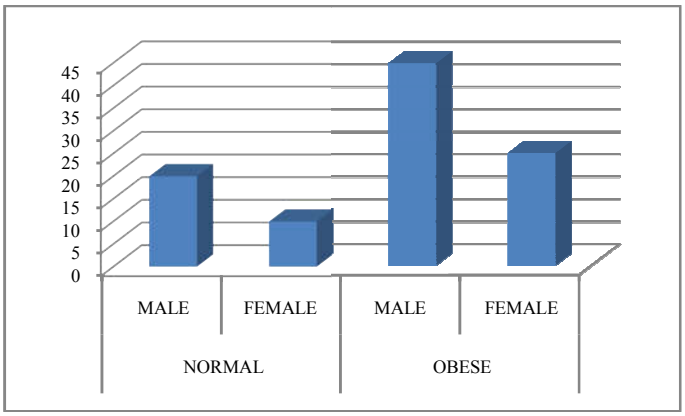

Chart 1 Age and Gender wise distribution of subjects

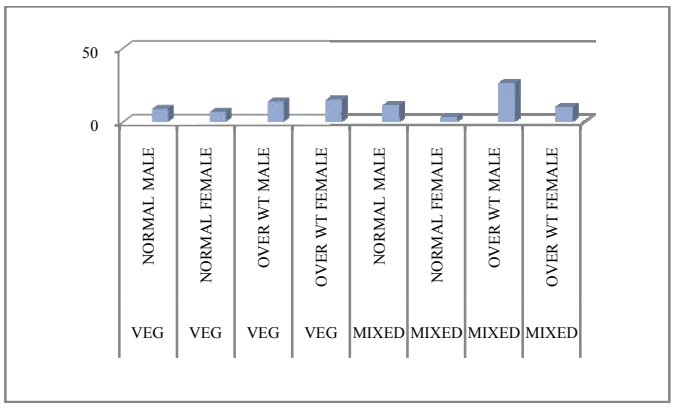

Chart 2 Diet wise distribution of subjects

DISCUSSION

Adolescence is characterized by a growth spurt and the acquisition of adult phenotypes and biological rhythms. During this period, Fe requirements increase dramatically in both boys and girls as a result of the expansion in total blood volume, the increase in lean body mass and the onset of menses in young females. The consequences of Fe deficiency are more serious for women. However, anaemia is only one manifestation of Fe deficiency; it can also impair physical endurance, immune response, temperature regulation, energy metabolism and cognitive performance[10].Although mal absorption and bleeding are regarded as two main causes of Fe deficiency, the overwhelming cause is dietary in origin. The present study explored the hypothesis that serum ferritin concentrations might be lower among the obese as reported previously [6]. In the present study, 12.8% of adolescents in the normal weight group had low Hb levels. According to BMI classification, parallel with the increase in BMI, the rate and intensity of anaemia increased. On the other hand, regression analysis showed that there was a negative correlation between Hemoglobin and BMI, i.e. adolescents with higher BMI had lower Hemoglobin. India has experienced a rapid nutrition transition in the last two decades, with a decrease in physical activity and increased energy and fat intakes. Increased obesity prevalence might therefore be expected[11]. So, the consistent and strong negative association between BMI and decreased Hemoglobin concentrations may pre-sage a future increase in adult anaemia, if the prevalence of obesity keeps increasing. Diverse hypotheses may explain this phenomenon. The urbanization that has taken place in recent decades has obliged children and adolescents to limit the time they spend outside. they have learned to spend their leisure time on sedentary activities such as television watching, electronic games and computers. The combination of these factors coincided with the ever greater availability of wide variety of foods with high energy content and low Fe density to result in an epidemic increase in obesity and Fe deficiency in children and adolescents. Another It is possible that Fe requirements are increased in obese adolescents because of their increased growth and body surface area[9]. This phenomenon can serve as another explanation for the increased prevalence of overweight and obesity adolescents. Tungtrongchitr *et al*.[12], assessing overweight and obese volunteers, found anemia, using hemoglobin as an indicator, in 18.7% of overweight and obese female subjects. Significant associations were found between weight, height, BMI, waist circumference, hemoglobin, hematocrit, and serum leptin in both male and female overweight subjects.

CONCLUSION

Our findings show that in parallel with the increase in body weight, the rate anaemia increases. Causes may be poor quality of diet, increased Fe needs, poor exercise capacity. Thus, public health interventions to improve the consumption of Fe-rich foods should be recommended, Fe (Iron) fortification of suitable food Substance, such as salt and bread, has been of value in areas where Fe deficiency is a problem.

References

1. Wahl R (1999) Nutrition in the adolescent. Pediatr Ann 28,107–111.
2. Skiba A, Logmani E & Orr DP (1997) Nutritional screening and guidance for adolescents. Adolesc Health Update 9,1–8.
3. Kelishadi R, Hashemipour M, Sarraf Zadegan N, Sadry GH, Ansari R, Alikhassy H & Bashardoust N (2003) Obesity and associated modifiable environmental factors in Iranian adolescents: Isfahan Health Heart Program – Heart Health Promotion from Childhood. Pediatr Int 45, 435–442.
4. Kant AK (2003) Reported consumption of low-nutrientdensity foods by American children and adolescents: nutritional and health correlates, NHANES III, 1988 to1994. Arch Pediatr Adolesc Med 157, 789–796.
5. Dillman E, Johnson DG, Martin J, Macker B & Finch C (1979) Catecholamine elevation in iron deficiency. Am J Physiol 237, R297–R300.
6. Groeneveld D, Smeets HGV, Kabra PM & Dallman PR (1985) Urinary catecholamines in iron deficient rats at rest and following surgical stress. Am J Clin Nutr 42,263–269.
7. Beard JL, Tobin B & Green W (1989) Evidence for thyroid hormone deficiency in iron-deficient anemic rats. J Nutr 119, 772–778.
8. Wu Z, Puigserver P, Andersson U *et al*. (1999) Mechanisms controlling mitochondrial biogenesis and respiration through the thermogenic coactivator PGC-1. Cell 98,115–124.
9. Goran MI (2000) Energy metabolism and obesity. Med CliNorth Am 84, 347–362.
10. Dallman PR (1986) Biochemical basis for the manifestation of iron deficiency. Annu Rev Nutr 6, 13–40.
11. Dorosty AR, Siassi F, Reilly JJ, Rona RJ & Chinn S (2002) Obesity in Iranian children. Arch Dis Child 87, 388–391.
12. Tungtrongchitr R, Pongpaew P, Phonrat B, TribunyatkulS, Viroonudomphol D, Supawan V, *et al*. Leptin concentration in relation to body mass index (BMI) and hematological measurements in Thai obese and overweight subjects. Southeast Asian J Trop Med Public Health. 2000;31(4):787-94.

How to cite this article:

Harsida Gosai and B. M Palan (2021) 'Obese Adolescent Health Assessment Using Haematology Parameters-A Cross Sectional Study In Rural Area of Vadodara In Gujarat', *International Journal of Current Medical and Pharmaceutical Research,* 07(06), pp 5829-5831.

****