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Iron, Vitamin B12 And Folate Deficiency In Adolescents Havingnutritional Anaemia : A Hospital Based Study

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Abstract: *Adolescence is the formative period of life when the maximum amount of physical, psychological and behavioral changes takes place and this is a vulnerable period in the human life cycle for the development of nutritional anaemia.The prevalence of anaemia is disproportionately high in developing countries than developed countries. It is mainly due to to poverty, inadequate diet, certain diseases,pregnancy and lactation, and poor access to health services in developing countries Prevalence of anaemia in adolescents in India have been reported in limited studies available from 16.25% to 96.5%. Nutritional anaemia constitutes the most important cause of anaemia in adolescents. It is mainly due to deficiency of Iron, Vitamin B12 and Folate.*
Keywords: *Anaemia, Adolescence, Iron deficiency, Folate deficiency, Vit.B12 deficiency*

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I. Introduction

Adolescence is the formative period of life when the maximum amount of physical, psychological and behavioral changes takes place and this is a vulnerable period in the human life cycle for the development of nutritional anaemia. The prevalence of anaemia is disproportionately high in developing countries like India. It has mainly been due to poverty, inadequate diet, certain diseases, pregnancy and lactation, and poor access to health services in developing countries. Prevalence of anaemia in adolescents in India have been reported in limited studies available from 16.25% by Basuet. al to 96.5% by Bulliyya et al.

Nutritional anaemia constitutes the most important cause of anaemia in adolescents. It is mainly due to deficiency of Iron, Vitamin B12 and Folate. Young people are particularly susceptible to develop anaemia because of their rapid growth and associated high iron requirements. Girls lose considerable amount of blood during menstruation. Adolescent's eating behavior is guided by many factors such as personal self-esteem, body image making them skip meals to reduce weight and peer pressure indulging them in unhealthy food habits making them prone to nutritional anaemia.

The awareness regarding anaemia and appropriate diet is extremely poor in adolescents, which is made worse by the promotional campaigns of various junk foods.

Objective:
To study the types of nutritional anemia in adolescents (10-18 yrs.) attending the hospital and correlate severity of nutritional anemia with serum levels of ferritin, Vit B12 & folate.

II. Methods:

The present study is a hospital-based cross-sectional observational study conducted in the Department of Pediatrics and Neonatology, Rajendra Institute of Medical Sciences,Ranchi,Jharkhand, during November 2016 to February 2018. Adolescents (age 10-18 years) attending the outpatient department or admitted in the hospital, and having hemoglobin values below the cut-offs (Hb<12g/dL in 10-18 y girls and 10-14 y boys and Hb<13g/dL in 15-18 y boys) were included in the study after written informed consent from parent/ guardian. Those who had received blood transfusion or hematinics in past 4 weeks or having apparent infection (fever, diarrhea, cough or burning micturition) or any chronic disease were excluded from the study. A detailed history and physical examination of theStudy population was carried out. The dietary intake of the child was assessed by 24-hour recall method. This data was entered in 'Diet soft' software from which the daily intake of iron, folate and vitamin B12 was calculated.

Complete blood count with peripheral smear examination was done.
Serum ferritin was estimated by a MicroplateImmunoenzymometric assay using Calbiotech Ferritin ELISA Kit, California, US (FR06F)
while serum Folate and Vitamin B12 were estimated through automated immunoassay system using Beckman Coulter Access-2 (Beckman Coulter, Inc. Access Folate Reagent- A14208 and Access Vitamin B12 Reagent-33000), California, US.
The severity of anemia was graded as mild (>10 g/dLbut below age related cut-off for defining anemia),moderate (7-9.9 g/dL) and severe (<7g/dL).
Serum vitamin B12 level of <200 pg/mL, folate level <5 ng/mL and ferritin level < 30ng/mL were considered as deficient.
Normocytic anemia was defined as MCV 78-98 fL; microcytic as MCV <78 fL; and macrocytic as MCV >98 fl.
The SPSS 21.0 software was used for data analysis. Fischer's exact test and analysis of variance were performed; $P<0.05$ was considered as significant

III. Results

A total of 150 adolescents with pallor were selected out of which Two-thirds (69.5%) of participants belonged to early adolescence age (10-13.9 y). Almost half (54%) of the adolescents had normal BMI (+1 to -2 SD), 27.5% were very underweight (<-3 SD), 17.5% were underweight (-2 to -3 SD), and only 1 % were overweight (+1 to +2 SD). Dietary evaluation revealed that energy intake was deficient in 94.5% of adolescents, iron intake was deficient in 99.5%, vitamin B12 intake was deficient in 14.5% and folate intake was deficient in 62.5% of anemic adolescents. Mean (SD) hemoglobin was 9.4 g/dL with 50.5% having mild anemia, 29% having moderate anemia while 20.5% having severe anemia; 55% had normocytic anemia, 27.5% had microcytic, 8.5% had macrocytic, and 9% had dimorphic anemia. Median levels of micronutrients across different groups of anemia severity are presented in Table I.

Table 1. MICRONUTRIENT INTAKE AND LEVELS ACROSS DIFFERENT GROUPS OF ANEMIA SEVERITY

	Mild anemia	Mod. anemia	Sev. anemia	Total
Iron (mg/d),	11.4	9.9	9.4	10.5
Vit.B12 (µg/d) intake	1.0	0.8	0.5	0.9
Folate (mg/d) intake	144.0	135.3	110.2	135.1
Serum ferritin (ng/mL)	45.3	45.1	35.4	43.6
Serum vitamin B12	206.0	241.0	119.0	198.5
Serum folate (ng/mL)	4.0	3.7	3.27	3.7

Iron deficiency was present in 30.5% subjects, vitamin B12 deficiency in 50% of subjects and folate deficiency was present in 79.5% of subjects. Isolated iron, vitamin B12 and folate deficiency was seen in 5%, 4% and 25%, respectively while combined folate and vitamin B12 deficiency was seen in 32%. Deficiency of all the three micronutrients was documented in 12% while 9% had no deficiency. Severe anemia was significantly associated with history of worm infestation, attainment of menarche, vegetarian diet and low serum B12 levels (Table II). Low intake of iron, vitamin B12 and folate were also significantly associated with severe anemia.

Table 2. ASSOCIATION OF SOCIODEMOGRAPHIC PARAMETERS WITH SEVERITY OF ANEMIA

	Sev anemia(%)	Mid-mod Anemia (%)	P-value
Female gender	60.9	47.7	0.16
Vegetarian diet	41.4	13.8	<0.001
Upper lower socioeconomic status	78.0	66.0	0.18
History of worm infestation	31.7	18.2	0.04
Post menarchal	36.5	28.9	0.02
BMI < −3SD	29.2	27	0.84
Serum ferritin <30 ng/mL	43.9	27	0.055
Serum vitamin B12 <200 pg/mL	68.2	45.2	0.01
Serum folate <5 ng/mL	75.6	80.5	0.51

IV. Conclusion

Our study showed that deficiency of folate, vitamin B12 and iron are common in anemic adolescents. Higher proportion of severely anemic individuals (20.5%) in our study can be attributed to hospital-based nature of the study.

Vegetarianism was significantly associated with severe anemia. Attainment of menarche was also significantly associated with of anemia and high menstrual blood loss was associated with increased risk of anemia. A significant association between history of worm infestation and severity of anemia. Our study findings are limited by the hospital-based design of the study. We conclude that low intake of iron folate and vitamin B12 is a significant determinant towards causing nutritional anemia in adolescents. Supplementation with not only iron and folic acid but also vitamin B12, besides deworming, is required through national programs.

References:

[1]. Kapil U, Bhadoria AS. National Iron-plus initiativeguidelines for control of iron deficiency anaemia in India,2013. Natl Med J India. 2014;27:27-9.

[2]. Jayasree P, Sushamabai S, Abraham S, Mathew A, Kadam RM, Varghese BA. Epidemiological factors affecting anaemia prevalence in rural adolescents in South India. Pushpagiri Medical Journal. 2012; 3 (2): 99-102.

[3]. Biradar S.S., Birafar S.P., Alatagi A.C., Wantamutte A.S., Malur P.R. Prevalence of Anaemia among Adolescent Girls: A One Year Cross-Sectional Study. Journal of Clinical and diagnostic Research,2012; 6 (3): 372-7.

[4]. Patra S, Pemde HK, Singh V, Chandra J, Dutta A. Profileof adolescents with severe anemia admitted in a tertiary care hospital in northern India. Indian J Pediatr. 2011;78:863-5.

[5]. Vir SC, Singh N, Nigam AK, Jain R. Weekly iron and folic acid supplementation with counseling reduces anemiainadolescent girls: a large-scale effectiveness study in Uttar Pradesh, India. Food Nutr Bull. 2008; 29:186-94.

[6]. Chaudhary SM, Dhage VR. A study of anemia among adolescent females in the urban area of nagpur. Indian J Community Med. 2008 Oct; 33 (4): 243-5.

[7]. Bulliyya G, Mallick G, Sethy GS, Kar SK. Hemoglobin status of non-school going adolescent girls in three districts of Orissa, India. Int J Adolesc Med Health. 2007 Oct-Dec; 19 (4): 395-406: 22-6.

[8]. Basu S, Basu S, Hazarika R, Parmar V. Prevalence of anemia among school going adolescents of Chandigarh. Indian Pediatr. 2005 Jun; 42 (6): 593-7.

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