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Distribution of Common Nutritional Deficiencies in Adolescents with Anemia – In a Tertiary Care Hospital

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I. Introduction

Adolescence is a susceptible phase in Indian population for the development of nutritional anemia. In addition to physical health, iron and B vitamins also affect adversely the mental health and cognitive performance in children and adolescents.[1]

Patra, et al.[2] in his study on severely anemic adolescents in a tertiary care hospital, found that megaloblastic anemia was the most common type of anemia (42.5%) and iron-deficiency accounted for 15% of cases. Choudhary, et al.[3] found two-thirds of the anemic adolescents in community were suffering from iron deficiency anemia.

The objective of this study is to find out the common nutrient deficiencies in anemic adolescents coming to RIMS, Ranchi.

II. Methods

This study was a cross-sectional hospital-based observational study conducted in the department of Paediatrics, Rajendra Institute of Medical Sciences, Ranchi from November 2017 to October 2018. Adolescents aged 10 to 17 years attending outdoor or admitted in the hospital were screened for this study.

Inclusion criteria was set as hemoglobin values less than cut offs (Hb < 12g/dl in 10-17y girls and 10-14 y boys and Hb < 13g/dl in 15-17y boys) and whose parents gave consent.

Patients who have received blood transfusion or hematinics in last 1 month, having apparent infections (fever, diarrhea, cough) or having chronic diseases or hemolytic/aplastic/hypoplastic anemia were excluded from the study.

Detailed history (including premorbid dietary history) was taken and thorough physical examination of the patients was carried out.

Complete blood count and peripheral blood smear examination were done. Serum iron was estimated by Iron-Ferrozine method in Biosystem BA 400; Serum ferritin, serum folate and serum vit. B12 were estimated by Chemiluminescence Microparticle Immunoassay (CMIA) in ABOTT Architect 2000sr.

The severity of anemia was graded as mild (<10g/dl), moderate (7-9.9g/dl) and severe (<7g/dl). Serum iron level <60mcg/dl, serum ferritin level <20ng/ml, serum vit B12 level <200pg/ml and folate level <5ng/ml were considered as deficient.

Normocytic anemia was defined as MCV 75-95fL, microcytic as <75fL and macrocytic as >95fL. Anova test (analysis of variance) was performed. Data was analysed using SPSS 21.0 software. Significance level was set as p value <0.05.

III. Results

A total of 289 patients with pallor were screened (of which 161 were outpatients and 128 were inpatients) out of which 120 patients (74 females, 46 males) met the inclusion criteria. Almost three-fourth (72%) of the patients were from early adolescent age group (10-14yr). 60% of the adolescents had normal BMI, 30% were severely underweight (-3SD) and 10% were moderately underweight (-2 to -3SD).

Mean hemoglobin was 9.4 (±1.7) g/dl with 58.3% having mild anemia, 20.3% having moderate anemia and 20.3% having severe anemia. Mean hemoglobin in males was 9.5±1.8 and in females it was 9.4±1.6.

Iron deficiency was present in 34(28.33%), folate deficiency was present in 92(76.67%) and vitamin B12 deficiency was present in 39(32.5%) of adolescents. The association between severity of anemia and serum

iron levels, vitamin B12 levels, folate levels, ferritin levels, vegetarian diet and history of worm infestation is statistically significant.

50.8% had normocytic anemia, 31.7% had microcytic anemia,12.5% had macrocytic anemia and 5.8% had dimorphic anemia.

Table 1: Hemoglobin and Serum Micronutrient levels in different groups of severity of anemia

	Mild Anemia (n=70)	Moderate Anemia (n=25)	Severe Anemia (n=25)	Total (n=120)
Hb level (g/dl)	10.7±0.4	8.4±0.9	6.8±0.5	9.4±1.7
Serum iron (mcg/dl) Median(IQR)	94.5 (74.5-126.5)	78 (52.5-108)	64 (36-81)	83.5 (50-120)
Serum ferritin (ng/dl) Median(IQR)	70.3 (38-111.2)	68 (50-83.8)	54 (28-87.6)	67.4 (38.5-95.95)
Serum vitamin B12 (pg/ml) Median(IQR)	324 (273.25-416.5)	231 (188.9-305.25)	174.9 (132-198.15)	276.65 (190.75-362)
Serum folate (ng/ml) Median(IQR)	4.40 (3.38-5.99)	4.04 (3.45-4.54)	3.20 (2.59-3.73)	3.85 (3.14-4.66)

Table 2: Association of severity of anemia with demographic parameters and serum micronutrient levels

	Mild Anemia	Moderate Anemia	Severe Anemia	P value
Female sex	41 (58.57%)	21 (84%)	12 (48%)	0.751
Veg Diet	4 (5.7%)	4 (16%)	9 (36%)	0.003
Worm Infestation	13 (18.57%)	5 (20%)	8 (32%)	0.003
BMI <3SD	12 (17.14%)	9 (36%)	8 (32%)	0.1
Sr Iron <60mcg/dl	15 (21.42%)	7 (28%)	12 (48%)	0.040
Sr Ferritin <20ng/ml	14 (20%)	7 (28%)	12 (48%)	0.026
Sr Vit B12 <200pg/ml	16 (22.85%)	8 (32%)	15 (60%)	0.021
Sr Folate <5ng/ml	55 (78.57%)	18 (72%)	19 (76%)	0.531

IV. Discussion

Our study showed that there is deficiency of folate, vitamin B12 and iron in anemic adolescents which was in agreement with the findings of Thomas D, et al.[4]

Ahmed F, et al.[5] found that there are also other causes of anemia, in adolescent schoolgirls of Bangladesh, apart from iron deficiency. Kumar T, et al.[6] found that anemia was common in north Indian children. Iron, folate and vitamin B12 status were important predictors for plasma Hb concentration. Al Khatib L, et al.[7] concluded that anemia not related to iron deficiency is partly explained by folate deficiency in Lebanese women of child-bearing age. Like our study, Verma, et al.[8] also found that vegetarian diet was significantly associated with severe anemia in adolescents.

Neha Goyal, et al.[9] concluded that among the school going adolescent girls nearly half are still suffering from anemia in India despite the efforts of government and it is still a challenging health problem.

Similar to our study Gopalkrishnan S, et al.[10] found close association between anemia and intestinal parasitic infestation in adolescent school children.

Limitations of our study was hospital-based design which led to higher prevalence of severely anemic cases; and being an acute phase reactant, serum ferritin level may have been elevated in cases with hidden infections.

We conclude that folate deficiency is most common followed by vitamin B12 deficiency and iron deficiency in adolescents with anemia in this region. Low intake of these micronutrients in diet is presumed to be the main cause of their deficiency. Besides iron and folic acid, supplementation with vitamin B12 is warranted in Indian adolescents. Along with these micronutrients supplementation, deworming should be done periodically and mixed diet pattern should be encouraged.

References

[1]. Swaminathan S, Edward BS, Kurpad AV. Micronutrient deficiency and cognitive and physical performance in Indian children. Eur J Clin Nutr.2013;67:467-474.
[2]. Patra S, Pemde HK, Singh V, Chandra J, Dutta A. Profile of adolescents with severe anemia admitted in a tertiary care hospital in northern India. Indian J Pediatr. 2011;78:863-5.
[3]. Choudhary A, Moses PD, Mony P, Mathai M. Prevalence of anemia among adolescent girls in the urban slums of vellore, south India. Trop Doct. 2006;36:167-9.
[4]. Thomas D, Chandra J, Sharma S, et al. Indian Pediatr. 2015;52:867.
[5]. Ahmed F, Khan MR, Islam M, Kabir I, Fuchs GJ. Anemia and iron deficiency among adolescent schoolgirls in peri-urban Bangladesh. Eur J Clin Nutr. 2000;54:678-83.
[6]. Trivendra Kumar, Sunita Taneja, Chittaranjan S. Yajnik, Nita Bhandari, Tor A. Strand, Study Group Nutrition. 2014 May; 30(5);531-537.
[7]. Al Khatib L, Obeid O, Sibai AM, Batal M, Adra N, Hwalla N. Folate deficiency is associated with nutritional anemia in Lebanese women of childbearing age. Public Health Nutr. 2006;9:921-7.

[8]. Verma M, Chhatwal J, Kaur G. Prevalence of anemia among urban school children of Punjab. Indian Pediatr. 1998;35:1181-6.
[9]. Goyal N, Rawat CMS. Study of anemia and its correlates among adolescent girls in schools of Haldwani, India. Int J Res Med Sci 2018;6:3320-6.
[10]. Gopalkrishnan S, Anantha V M, Muthulakhsmi M, Geetha A. J Family Med Prim Care. 2018;Nov-Dec;7(6):1395-1400.

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