

ORIGINAL RESEARCH

A Hospital Based Prospective Study to Assess the Clinic-Hematological Profile of Nutrition Anemia Among Adolescents at a Tertiary Care Centre

¹Abender Singh Maanju, ²Priyanka Singh, ³Monisha Sahai

^{1,3}Associate Professor, ²Assistant Professor, Department of Pediatrics, Jaipur National University Institute for Medical Sciences & Research Centre (JNUIMSRC), Jaipur, Rajasthan, India

Correspondence:

Abender Singh Maanju

Associate Professor, Department of Pediatrics, JNUIMSRC, Jaipur, Rajasthan, India

Email: maanju1039@gmail.com

ABSTRACT

Background: Anemia is the world's second leading cause of disability and thus one of the most serious global public health problems. Adolescents of both sexes are particularly vulnerable for developing anemia because of rapid growth and girls additionally because of the onset of menstruation. The aim of this study to assess the clinic-hematological profile of nutrition anemia among adolescents at a tertiary care centre.

Materials& Methods: This is a hospital based observational study done on 50 adolescents attending OPD at JNUIMSRC, Jaipur, Rajasthan, India during one year study period will be participating in this study as per the inclusion and exclusion criteria. Anemia will be diagnosed according to the World Health Organisation (WHO) criteria. Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters by using SPSS version 22.0 software.

Results: In 50 anemic adolescents studied, 34 were females, 16 were males. 50% belonged to middle adolescence. 30% of study population belonged to lower middle socioeconomic status according to modified Kuppaswamy's classification. Anemia was high among vegetarian adolescent girls (55.88%). The commonest clinical presentation was fatigue which was 56%. 42% adolescents had severe thinness according to WHO classification of body mass index (BMI). 48% had food skipping, 20.58% of adolescent girls had menstrual irregularities. There was no significant difference among the adolescent males and females pertaining to clinical features and laboratory values.

Conclusion: Nutritional anemia is a burden on adolescent children, as it affects the transition of childhood to adulthood, and it influences the future health. B₁₂ deficiency is highly prevalent among the vegetarians. Nutritional awareness education should be given to adolescents as they fear of gaining weight, irregular food habits, food faddism, decreased intake of green leafy vegetables/animal proteins.

Keywords: Adolescence, Iron Deficiency Anemia, Nutrition, Vegetarian.

INTRODUCTION

Adolescence is a period of transition from childhood to adulthood, during which certain health problems and risk behaviors prevalent during this period influence their future health.¹

Anemia is a global public health problem affecting both developing and developed countries with major consequences for human health as well as social and economic development.²

Anemia is the world's second leading cause of disability and thus one of the most serious global public health problems. It is widely prevalent in the developing countries.

Iron deficiency anemia is the most common nutritional anemia affecting more than 2 billion people worldwide.³ It can have profound negative impact on psychological and physical development, behavior and learning performance, working capacities and reproductive health.⁴ It can result from inadequate iron intake, reduced bioavailability of dietary iron, increased need for iron, chronic blood loss and parasitic infections.⁵ Adolescents of both sexes are particularly vulnerable for developing anemia because of rapid growth and girls additionally because of the onset of menstruation. Despite strong reasons focusing on anemia on adolescents, only little research was done.

A study of health and family welfare (2000) showed point prevalence of anemia in various age groups and was found to be high in both sexes. In adolescents, the prevalence rate of anemia was very – very high i.e., 65.8 percent in boys and 81.3 percent in girls.⁶

Iron deficiency anemia and even iron deficiency without significant anemia, affects attention span, alertness, and learning in both infants and adolescents. Adolescent girls with serum ferritin levels < 12 ng/ml but without anemia have demonstrated improved verbal learning and memory after taking iron for 8 weeks.⁷

The population differences in the prevalence of anemia are explained by environmental factors affecting nutrition, chief among these are economic status, ethnic customs and geographic considerations.⁸ The aim of this study to assess the clinic-hematological profile of nutrition anemia among adolescents at a tertiary care centre.

MATERIALS & METHODS

This is a hospital based observational study done on 50 adolescents attending OPD at JNUIMSRC, Jaipur, Rajasthan, India during one year study period will be participating in this study as per the inclusion and exclusion criteria.

INCLUSION CRITERIA

- Age group: 10 - 19 years.
- Those who fully fill the WHO criteria for anaemia.

EXCLUSION CRITERIA

- Below 10 years and above 19 years of age.
- Anemia due to acute blood loss.
- Bone marrow suppression.
- Hemolytic anemia.

METHODS

A detailed history and physical examination will be done according to a predesigned proforma to elicit various nutritional and socioeconomic factors. Age of the child will be recorded in completed years.

Then blood will be drawn, and haemoglobin will be estimated by an automated analyser followed by a peripheral blood smear, serum Iron, TIBC, transferrin saturation, ferritin, folic acid and vitamin B12 levels will be estimated. Anemia will be diagnosed according to the World Health Organisation (WHO) criteria. Anemia was graded as:⁹

- Mild: Hb% above 10gm/dl and less than 12gm/dl.
- Moderate: Hb% between 7 gm/dl and 10gm/dl.
- Severe: Hb% lesser than 7 gm/dl.

STATISTICAL METHODS

Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters by using SPSS version 22.0 software.

RESULTS

Our study showed that in early adolescence, 35.29% were females and 50% were males. In middle adolescence, 50% were females and 50% were males. In late adolescence, 14.7% were females. There is significant relation between middle adolescence and anemia. Anemia was more prevalent in the lower middle socio economic status comprising of 30%, followed by upper lower comprising of 28%, followed by lower class comprising of 26%.

It is found that 55.88% of adolescent girls prefer vegetarian diet where as only 31.25% of adolescent boys preferred vegetarian diet. There is significant relation between diet and anemia. 42% of study population had severe thinness according to WHO classification of body mass index. Out of 50 adolescents only 6% were dewormed and does not show any statistical significance (table 1).

Table 1: Demographic profile of adolescents

Demographic profile	Gender		Total (N=50)	P-value
	Female (N=34)	Male (N=16)		
Age in years				
10-13	12(35.29%)	8(50%)	20(40%)	<0.05*
14-16	17(50%)	8(50%)	25(50%)	
17-19	5 (14.70%)	0(0%)	5(10%)	
Socioeconomic status				
Upper middle	6(17.64%)	2 (12.5%)	8(16%)	>0.05
Lower middle	9 (26.47%)	6 (37.5%)	15 (30%)	
Upper lower	9 (26.47%)	5 (31.25%)	14 (28%)	
Lower	10 (29.41%)	3 (18.75%)	13 (26%)	
Diet pattern				
Vegetarian	19 (55.88%)	5 (31.25%)	24 (48%)	<0.05*
Non-vegetarian	15 (44.11%)	11 (68.75%)	26 (52%)	
BMI (kg/m²)				
<16	13 (38.23%)	8 (50%)	21(42%)	>0.05
16-16.9	5 (14.70%)	1 (6.25%)	6 (12%)	
17-18.49	8 (23.52%)	1 (6.25%)	9 (18%)	
18.5-24.9	8 (23.52%)	5 (31.25%)	13 (26%)	
>25	0(0%)	1 (6.25%)	1 (2%)	
Deworming				
Not done	31 (91.17%)	16 (100%)	47 (94%)	>0.05
Done	3 (8.82%)	0 (0%)	3 (6%)	

There was no significant difference among the adolescent males and females pertaining to clinical features and laboratory values showed in table no. 2& 3.

Table 2: Clinical features of patients studied

Clinical features	Gender		Total (n=50)	p value
	Female (n=34)	Male (n=16)		
Fatigue	19 (55.88%)	9 (56.25%)	28 (56%)	>0.05
Appetite	16(47.05%)	9 (56.25%)	25 (50%)	>0.05

Food skipping	18 (52.94%)	6 (37.5%)	24 (48%)	>0.05
Irritability	9 (26.47%)	6 (37.5%)	15 (30%)	>0.05
Scholastic performance	12 (35.29%)	8 (50%)	20 (40%)	>0.05
Bare foot walking	14 (41.17%)	5 (31.25%)	19 (38%)	>0.05
Recurrent infection	6 (17.64%)	4 (25%)	10 (20%)	>0.05

Table 3: Comparison of clinical variables according to gender

Parameters	Gender		Total	p value
	Female (N=34)	Male (N=16)		
BMI (kg/m²)	18.23±4.24	17.73±2.56	17.84±3.35	>0.05
Hemoglobin %	8.16±2.47	8.69±2.35	8.46±2.43	>0.05
MCV	107.78±146.23	78.52±5.65	94.43±83.78	>0.05
MCH	25.78±3.61	25.55±3.04	25.68±3.34	>0.05
MCHC	32.46±3.18	31.92±2.76	32.24±2.93	>0.05
TIBC	459.72±150.66	437.23±145.57	444.65±147.77	>0.05
Serum Iron	33.68±24.34	43.56±42.18	38.43±33.56	>0.05
Transferrin	11.98±8.98	13.85±15.42	13.36±14.33	>0.05
Vitamin B₁₂	284.54±144.20	290.23±248.46	288.54±223.28	>0.05
Folic acid	6.68±3.32	7.58±4.25	7.25±4.09	>0.05
Serum ferritin	14.55±9.36	12.16±5.63	13.36±7.24	>0.05

DISCUSSION

The number of studies on adolescent nutritional anemia is limited, the few studies which were done concentrated on adolescent girls. In this study, boys were also included to study their pattern of nutritional deficiency. A study done by SahuML¹⁰ shows similar prevalence of anaemia among early and late adolescent males, and middle adolescent females.

Irregular eating habits and lower consumption of animal and green leafy foods contribute to the development of anaemia. Poverty limits the availability and consumption of foods of animal origin.¹¹ In this study, 48% adolescents consumed vegetarian diet whereas in study conducted by Sahu ML¹⁰, 61.8% adolescents consumed vegetarian diet. In one of the studies conducted by Vanderjagtetal represented that the lower intake of meat results in lower vitaminB12 level.¹²

Socio economic status when compared to the study done byNeelam S. Deshpande, showed similar prevalence of anemia among the lower middle-class adolescents.¹³ BMI is not significantwith anemia, a similar reference was seen in a study donebyAnmol.¹⁴ Fatigue is the commonest complaint; it is similar in both adolescent males and females in present study and study done by Kaur.¹⁵

Associated iron with B12 deficiency is similar to study done by Suarez.¹⁶ Studies done by Yasemin¹⁷ had shown increased prevalence of iron with B 12 deficiency. There was 90.9% folic acid deficiency in study conducted by Suarez whereas only 20% were deficient in the study group, this is probably because of the iron and folic acid supplementation given by the government. The serum iron level is inadequate in female adolescents in both study group and study conducted by SahuML.¹⁰ The mean B12levelswere lower instudy doneby Yasemin¹⁷ when compared to the present study.

No single test is diagnostic of iron deficiency anemia. Multiple tests give better assessment of the iron status. MCV if determined by electronic counter is an accurate and practical laboratory test. MCHC is the least sensitive of various indices. The key diagnostic tests for the evaluation of iron deficiency anemia are estimation of transferrin saturation, free erythrocyte protoporphyrin and serum ferritin.

CONCLUSION

Nutritional anemia is a burden on adolescent children, as it affects the transition of childhood to adulthood, and it influences the future health. B₁₂ deficiency is highly prevalent among the vegetarians. Therefore, early screening and supplementation is essential. Nutritional awareness education should be given to adolescents as they fear of gaining weight, irregular food habits, food faddism, decreased intake of green leafy vegetables/animal proteins.

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