



RESEARCH ARTICLE

Prevalence of anemia among children age 10 to 15 years in urban, ChidambaramR. Devi¹, T.M. Jaysree^{2,3}, A. John William Felix³, N. Ethirajan⁴

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ABSTRACT

Back ground: In India, 74% of children and over 50% of adolescent girls and women of reproductive age are anemic.

Aims & Objectives: 1) To find out the prevalence of anemia among children of 10-15 years of age.

2) To find out the association between anemia and selected socio demographic variables and menstrual blood loss.

Materials and methods: 500 children of 10-15 years were selected from girl's higher secondary school, Chidambaram. Details regarding socio demographic variables were collected using pretested proforma and hemoglobin was measured by cyanmethemoglobin method.

Results: Prevalence of anemia was found to be 58.5% (mild 29.6%, moderate 25.6% and severe 32%). There is statistical association between hemoglobin and age, personal hygiene, body mass index and menarcheal status.

Conclusion: Prevalence of anemia in adolescent age is high. Difference in nutritional needs widens after the onset of puberty.

Key words: adolescents, anemia, BMI, menarche.

INTRODUCTION:

Anemia afflicts an estimated 2 billion people worldwide; it is a serious health issue for women and young children. Prevalence of anemia is disproportionately high in developing countries due to poverty, inadequate diet, certain diseases, pregnancy and lactation and poor access to health services.¹ Anemia is ignored in most developing countries even though it is one of the most prevalent public health problems and serious consequences for national development.

Adolescence is a significant period of human growth and maturation, unique changes occur and many adult patterns are established. Adolescence is an opportune time for interventions to address anemia. In addition to growth needs, girls need to improve iron status before pregnancy. This study is planned to find out the magnitude of anemia in adolescent girls of age 10-15 years of urban Chidambaram.

MATERIALS AND METHODS:

A descriptive study was carried out in the Government higher secondary school of Chidambaram. The prevalence of anemia was 60% according to previous study done by S.Kaur et al,⁶ sample size in the present study was assessed by the formula $n = z^2pq/d^2$. A total of 500 children were included in the study to obtain an almost equal sample of pre and post menarcheal girls. The total students in the Government girls higher secondary school was 3078. The class 6, 7 and 9 were selected purposefully. The class 8 has been left out since we

expect atleast one year duration of post menarcheal period which is not possible among 8th standard students. There are about 34 sections from class 6, 7 and 9. Three sections from class 6,7 and 6 sections from class 9 has been randomly selected. Hemoglobin was assessed by cyanmethemoglobin method. Same lab technician and same instrument was used for the whole study.

DATA ANALYSIS:

The data was subjected to statistical analysis using the package of SPSS 20.0 version. The statistical test used to determine the attributes include descriptive statistics and chi square test. The level of significance was fixed as 5%.

RESULTS:

Out of total (500) students surveyed – 292 students (58.4%) were found to be anemic. Majority were in the age group of 11 years (39.6%) and 14 years (33.6%) . 74.2% were from joint family. Most of them belong to upper lower class (66.6%). None of the girls had any symptoms of anemia, except for 5.4% who had loss of appetite. 26.8% was found with pale conjunctiva. There was no statistically significant association between anemia and variables such as birth order, socio economic status of the family, family type and age at onset of menarche and usage of sanitary latrine. There is a statistically significant association between anemia and variables such as age, personal hygiene, BMI and menarche status.

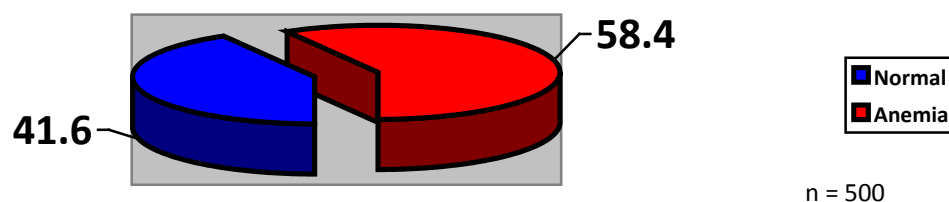


Figure 1: Distribution According to Anaemia Status

58.4% of study subjects are found to be anaemic.

Table 1: correlation of Hb status with select socio demographic variables

Socio demographic variables		Anemia Status				Chi-Square	P Value
		Absent		Present			
		No	%	No	%		
Age	10 years	23	62.2	14	37.8	61.5	<0.001
	11 years	117	59.1	81	40.9		
	12 years	3	16.7	15	83.3		
	13 years	13	20.6	50	79.4		
	14 years	49	29.2	119	70.8		
	15 years	3	18.8	13	81.3		
Birth Order	1 st child	99	39.1	255	60.9	1.67	0.433
	2 nd child	71	43.3	93	56.7		
	>3 rd child	38	46.3	44	53.7		
Socio economic status	Lower	36	37.5	60	62.5	0.928	0.629
	Upper lower	143	42.9	190	57.1		
	Upper & Lower middle*	29	40.8	42	59.2		
	Upper middle*	6	46.2	7	53.8		
Personal Hygiene	Nails-neat clean	187	46.4	216	53.6	19.71	<0.001
	Dirty	21	21.6	76	78.4		
Usage of Sanitary Latrine	Using	139	44.4	174	55.6	2.718	0.099
	Not using	69	36.9	118	63.1		
Type of Family	Joint	162	43.7	209	56.3	2.526	0.112
	Nuclear	46	35.7	83	64.3		
Menarcheal Status	Attained	65	26.1	184	73.9	49.02	<0.001
	Not attained	143	57	108	43		
No. of days bleeding	1 – 3 days	11	21.2	41	78.8	1.479	0.477
	4 – 6 days	44	28.8	109	71.2		
	7 – 9 days	10	22.7	34	77.3		
Frequency of cycle	Monthly once	58	25.7	168	74.3	1.044	0.593
	Once in 2 mts	6	35.3	11	64.7		
	>Once in 2 mts	1	16.7	5	83.3		
Body mass index	Under weight	11	30.6	25	69.4	9.15	0.027
	Normal	156	40.3	231	59.7		
	Over weight	27	61.4	17	38.6		
	Obese	14	42.4	19	57.6		

DISCUSSION:

This descriptive study was conducted among 500 school children aged 11-15 years from government girls higher secondary school, Chidambaram. To find out the prevalence of anemia and also to correlate influence of menstrual blood loss and other socio-demographic variables on the hemoglobin status of adolescents.

Prevalence of anemia was found to be 58.4% in this study. Similar prevalence (55%) was observed in NFHS-3.³ Similar finding was also observed in studies done by Rajini et al (55.9%)⁴. Sesadri et al⁵ recorded prevalence as 63%, 54% and 63% in villages covered by 3 government PHCs in Gujarat respectively. 63.8% prevalence was reported in the urban population of Bombay. Similarly S.Kaur et al⁶ and S.Tripathi et al² reported the prevalence to be 59.8% and 53.6% in rural Wardha and Lucknow, respectively.

In the present study prevalence of mild, moderate and severe anemia was observed as 29.6%, 25.6% and 3.2% respectively. Somewhat similar results has been observed in NFHS-2 with 36%, 17.9% and 1.9% of mild, moderate and severe anemia respectively.⁷ FEI Shan reported 82.7%, 16.5% and <1% respectively.⁸

The present study showed a statistically significant association between age and the haemoglobin status. Similar findings has been observed in a study done by F.E.I. Shan, *et al.*, (2000)⁸ in a community based study which shows 48% girls were anemia at 10yrs of age. This declined with age up to 13yrs then raised at 14 yrs to 55%, probably due to menarche. In a school based cross-sectional study conducted among adolescents in urban community of Shimla (2003)⁹ reveals that prevalence of anemia is higher in the age group of 10-13 yrs (22.4%) and decreased with increase in age 14-16 yrs (13.7%) A cross – sectional study carried out in 4 villages by S.Kaur, *et al.*,⁶ (2006) in their study has shown that age has no significant role associated with anemia. Tjalling, *et al* (2003)¹⁰ in their study showed that age was not associated with anemia among adolescent girls.

Indian girls from affluent back grounds are found to have a slightly lower age at menarche (12.5yrs) compared to those of European origin in United States (12.8yrs). The America girls, of American origin have same age at menarche as Indian girls (12.5 yrs).⁴ In our study majority of the girls have attained their menarche at 13 years. Similar findings are observed by Rajarathnam, *et al.*, (1998)¹¹ reported the mean age at menarche was 13.5 years \pm 1.03 years. With in India, girls from Urban Delhi have an average menarche age of 12.3 years.⁴

The present study shows no correlation between the age at menarche and the haemoglobin status. Similarly

Metha *et al.*,¹² and Kotecha *et al.*,¹³ has reported that age at menarche is not a significant correlate of anemia.

Out of total study subjects, 49.8% are post menarcheal (249). Prevalence of anemia in post menarcheal girls were much higher compared to the pre menarcheal girls (73.9% Vs 43%). Mean Hb for pre menarche girls were found to be 11.87 whereas for post menarche it was 11.08 in the present study. This difference was statistically significant. The higher prevalence may be explained by the fact that menstrual blood loss is significant parameter. Similar findings are observed in a study done by Rajarathnam *et al.*,¹¹ with documented a higher prevalence of anemia in girls who had attained menarche (42.5%) compared to girls not attained menarche (40%) Vasanthi, *et al.*,¹⁴ observed a prevalence of 27% and 22% in rural and 24.2% and 27.8% in the urban post menarcheal girls. In a study done by Robert T.Jacson, *et al.*,¹⁵ has found that there is negative correlation between duration of menstrual cycle and Hb concentration.

The present study showed no significant association between the socio-economic status of the family and the haemoglobin status. This is in accordance with the study done by Rajini *et al.*,⁴ and in contrast with study done by Rajarathnam *et al.*,¹¹ in which a positive correlation between socio-economic status and the Hb level¹² was reported.

The influence of the type of family, whether joint or nuclear on Hb level is in significant in the present study. Meerut study shows anemia is higher in adolescents of joint family (45.2%) as compared to nuclear family (28.3%).¹⁶

No significant association between Hb status and the birth order of the child was found in the present study. In the present study there is a statistical association between Hb status and personal hygiene. Similarly S. Goel *et al.*,¹⁷ has observed statistically significant association between personal hygiene and anemia, i.e. 63% of anemia individuals have very poor personal hygiene. Likewise similar finding has been observed by Tripathi, *et al.*,² in their study 53.6% of subjects with poor personal hygiene were anemic.

In the present study there is a statistically significant association between body mass index and the haemoglobin status which is similarly observed by Gillium *et al*¹⁹. In contrast to this Rita Singh *et al.*,¹⁸ has observed a negative correlation between the BMI and the haemoglobin concentration.

CONCLUSION:

Prevalence of anemia in adolescent age is high. Menstrual blood loss and lack of personal hygiene are found to be major factors influencing anemia.

REFERENCES:

1. WHO, 1991, National Strategies for Overcoming Micronutrient Malnutrition.
2. Tripathi S. Effect of Deworming on Response of IFA Supplementation among Adolescent School Girls of Lucknow. Indian Jr of CM. Vol. 24 No. 4, Oct – Dec. 2004.
3. NFHS -3, 2005-2006 and the National Monitoring Bureau Survey (NNMBS), 2006.
4. Rajini. A Study on Prevalence of Anemia and Efficacy of Different Dosages of Iron Prophylaxis among Adolescent Girls in Rural Area.
5. Seshadri S. Gopaldas T. Impact of Iron Supplementation on Cognitive Functions in Pre-School and School-aged Children: The Indian Experience. Am J Clin Nutr. 1989; 50 : 675-86.
6. Kaur, S., Deshmukh PR., Garg B.S., Epidemiological Correlates of Nutritional Anemia in Adolescent Girls of Rural Wardha. Indian Journal of Community Medicine. 2006; 31(40): 255.
7. NHFS – 2. Evolving strategies for empowerment of adolescent girls.
8. F.Ei. Shan, S. William. Anemia among Egyptian adolescent; Prevalence and determinants. Eastern Mediterranean Health Jr vol. 6, issue 5/6, Sep-Nov 2000, page 1075-1025.
9. S.Goel,B P Gupta et al. Low Prevalence among Adolescents of Urban Hilly Community. Vol.32, No.1 (2007-1-2007-30)
10. Tjalling Leenestra. Permethrin- treated bed nets in the prevention of Malaria in Anemia in adolescent school girls in Western Kenya. European Jr of clinical nutr [2004] 58; 681-91.
11. Jolly Rajarathnam. Prevalence of anemia among adolescent girls of rural Tamil Nadu. Indian Ped. 200; 37 ; 532-536.
12. Mehta M.N. Effectiveness of daily and weekly supplementation in anemic adolescent girls. UNICEF funded project, 1998; pp 21-25.
13. Kotecha P.V. Prevalence of anemia among adolescent girls, Varodra distridt, Varodra, Govt. Medical College, Varodra, Aug. 2000.
14. Vasanthi G. Iron nutritional status of adolescent girls from rural and urban slums. Indian Ped. 1994; 31; 127-132.
15. Robert T. Jacson and Zamzam Al mousa. Iron deficiency is a more important cause of anemia in Kuwaiti adolescent girls. Department of Food and Nutrition Shaab, Kuwait.
16. C.M.S.Rawat. Socio demographic correlates of anemia among girls in rural area of Meerut District. Indian Jr of Community Medicine, vol. 25, no; 4, Oct-Dec 2001.
17. S. Goel, BP Gupta et al. Low Prevalence Among adolescents of urban hilly community. Vol.32, no.1 [2007-1-2007-30]
18. Rita Singh. Socio Demographic Factors Causing Anemia In Adolescent Girls In Meerut. Health and Population – perspective and issues 38: 198-203
19. Gillium. Association of serum ferritin and indices of body fat distribution and obesity in Mexican American men – the third national health and nutrition examination survey. Int j obs relat metab disord 2001,25(5): 639-645.