



## PREVENTION OF IRON DEFICIENCY ANAEMIA IN ADOLESCENTS

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**ABSTRACT** The adolescents around the world are facing a series of serious nutritional challenges which are not only affecting their growth and development but also their livelihood as adults. Anemia in adolescent girls copiously contributes to maternal mortality and morbidity in future. The study was conducted in an urban area in a school. A total of 300 girls (12-18 years) were included in this study. The prevalence of anemia was found to be 90%. A significant association of anemia was found with socio-economic status and literacy status of parents. Mean height and weight of subjects with anemia was significantly less than subjects without anemia. A high prevalence of anemia among adolescent females was found, among those whose parents were less educated. The overall prevalence of anemia among adolescent females was found to be 90%. There is significant association of anemia with socio-economic status and parents' educational status. There is need to increase awareness of anemia in adolescent girls and parents.

**KEYWORDS :** Adolescence, Anaemia, Maternal mortality and morbidity

## INTRODUCTION

Adolescence has been defined by the World Health Organization as the period of life spanning the ages between 10 to 19 years. This is the formative period of life when the maximum amount of physical, psychological, and behavioral changes take place. This is a vulnerable period in the human life cycle for the development of nutritional anemia.<sup>1</sup> Anemia has a negative effect on cognitive performance in adolescents.<sup>2</sup> Compared to the vast amount of work done in pregnant mothers and young children, there are relatively few published studies in India evaluating deficiencies of Iron, Vitamin B12 and Folate in adolescents having nutritional anemia and its association with severity of anemia.<sup>3</sup> In response to the problem, the national Ministry of Health and Family Welfare (MHFW) launched a nationwide Weekly Iron and Folic Acid Supplementation (WIFS) programme in January 2013-14. The UNICEF India has been the partner of choice in supporting the universal roll-out of the programme in 14 major states in India.<sup>4</sup> The pre-pregnancy nutritional status of young girls is important as it impacts on the course and the outcome of their pregnancy. Hence, the health of adolescent girls demands special attention.

Adolescent girls are at a high risk for anaemia as well as malnutrition. An inadequate nutrition during adolescence can have dire consequences throughout the reproductive years of life. In India, girls get married and pregnant even before the growth period is over, thus doubling the risk for anaemia. During this period, iron requirements increase dramatically owing to the expansion of the total blood volume, the increase in lean body mass and the onset of menses in young females.<sup>5</sup> The overall iron requirements increase from a preadolescent level of ~0.7-0.9 mg Fe/d to as much as 2.2 mg Fe/d or perhaps more in heavily menstruating young women. These increased requirements are strongly associated with the timing and size of the growth spurt as well as sexual maturation and the onset of menses.<sup>6</sup> Regular nutritional education sessions should be carried out for increasing awareness in adolescent girls regarding anemia.<sup>7</sup> This study was conducted to highlight the problem of anemia in adolescent girls and to study socio-demographic factors related to anaemia.

## OBJECTIVES

The objectives of the study are

1. To estimate the frequency of anaemia among adolescent girls,
2. To study the socio-demographic factors associated with anaemia and
3. To evaluate the cause and type of anaemia

## METHODOLOGY

In the present study 300 girls between 12 and 16 years of age were screened for anaemia by Sahli's haemoglobinometer. Girls were screened at Sri Padmavathi Girls High School, Tirupati, Andhra Pradesh. A survey was carried out by the investigator after obtaining written informed consent from the Principal information about the socio-demographic characteristics and education of parents was recorded in the schedule. This was followed by a clinical examination of the girls including height and weight. Socio-economic status (SES) was estimated according to a modified Kuppuswamy's scale. The total

number of members in the family constituted the family size. For hemoglobin estimation, Sahli's hemoglobinometer was used. Criteria for anemia is Hb < 12 gm%. The severity of anemia is graded as

- Mild 10-11.9 g/dL
- Moderate 7-9.9 g/dL
- Severe <7 gm/dl

## Statistical analysis

The statistical analysis was done using Chi-square test, Students t test, mean etc. The help of a statistician was sought while analyzing the data.

## RESULTS AND DISCUSSION

## Prevalence of Anaemia

Anaemia is one of the diseases rampantly spreading in adolescents due to malnutrition, consuming iron deficiency foods etc. The prevalence of anaemia in the study area has been presented in the Table 1.

Table 1 Prevalence of anaemia

Sl. No.	Haemoglobin	Number of Girls	Percentage
1	< 12 gm	270	90
2	>12 gm	30	10
	Total	300	100

The table portrays that out of 300 girls, 270 girls were found to be anaemic. Thus, prevalence of anaemia was very high at 90 per cent in the study area. It is concluded that either the girls do not know the causes of anaemia or due to malnutrition, consuming iron deficiency foods etc.

## Socio-economic Status

The socio-economic status of the girls has been ascertained and the details are dovetailed in the Table 2.

Table 2 Socio-economic status

Sl. No.	Socioeconomic status	Number of Girls	Anaemic Girls	Chi-Square	P-Value
1	Upper	0	0	26.85	0.001**
2	Upper Middle	50 (16.6 %)	35 (70 %)		
3	Lower Middle	150 (50 %)	140 (93.3 %)		
4	Upper Lower	100 (33 %)	95 (95 %)		
5	Lower	0	0		

\*\* Significant at 1 % level

The table quite obviously presents that 50 per cent of the girls were from lower middle (III) class, 33.3 per cent girls were from upper lower (IV) class while 16.6 per cent girls were from upper middle (II) class. It is also noticed from the table that none of the subjects belonged to socio-economic strata I (upper) and V (lower). There was significant association of anaemia with socio-economic status. The Chi-square value is significant at 1 per cent level and infers a statistically significant association of anemia with the socio-economic status.

### Parents Education

Parents' education plays a pivotal role in demographic variables. Parents having education may have awareness over anaemia and provide good food to their children. The parents' education of the girls has been elicited and the details are presented in the table 3.

**Table 3 Co-relation of parent's education with anaemia**

Parents Education	No. of Girls	No. of anaemic girls	Chi-Square	P-Value
Mother's Education			51.49	0.001**
Illiterate	20 (6.67%)	18 (90%)		
Primary	170(56.67%)	163 (95.88%)		
Middle	80 (26.67%)	73 (91.25%)		
SSC or higher	30 (10%)	16 (53.33%)		
Father's education			38.43	0.001**
Illiterate	10 (3.33%)	9 (90%)		
Primary	50 (16.67%)	48 (96%)		
Middle	140 (6.67%)			
SSC or higher	100 (3.33%)	75 (75%)		

\*\* Significant at 1 % level

The table explicitly shows that around 57 per cent of mothers have primary education where anemia is around 96 per cent in girls, around 27 per cent mothers have education till middle school where anemia is 91.25 per cent in girls. 10 per cent of mothers had education till 10th standard or more where anemia was seen in 53.33 per cent girls. Around 7 per cent mothers were illiterate where anemia was seen in 90 per cent girls. Moreover, around 47 per cent of fathers had education till middle school where around 99 per cent of girls were anaemic, 33.3 per cent of fathers had education till 10th standard or more where 75 per cent of girls were anaemic, around 17 per cent of fathers had education till primary school where 96 per cent of girls were anaemic, 3.33 per cent of fathers were illiterate where 90 per cent of girls were anaemic. The Chi-square value is significant at 1 per cent level and infers that there is statistically highly significant association of anaemia was found with the parents' educational status.

### Severity of anemia

The anaemia varies from person to person and hence the severity of anaemia among the girls has been ascertained and the details are presented in the Table 4.

**Table 4 Severity of anemia**

Sl. No.	Type of Anaemia	Number of Girls	Percentage
1	No anaemia	30	10
2	Mild anaemia	220	73.03
3	Moderate anaemia	50	16.6
4	Severe anaemia	0	0
Total		300	100

The table crystal clearly presents that out of 270 girls, 220 girls (73.3%) have mild anemia (Hb 10 to <12 gm %) while 50 girls (16.6%) have moderate anemia (Hb 7 to <10 gm %). None of the subjects had severe anemia. By and large, it is concluded that majority of the girls are mildly anaemic. Girls with mild anaemia were given 1 tab of 200 mg of ferrous sulfate containing 60 mg of elemental iron and 1 tablet of folic acid 5 mg daily. Girls with moderate anaemia were further investigated with complete blood count by automated cell counter, peripheral smear for opinion and hemoglobin electrophoresis.

### Mean height and mean weight

The mean height and mean weight of subjects with and without anemia were compared and the results are presented in the Table 5.

**Table 5 Comparison of mean height and mean weight of subjects with and without anemia**

Sl. No.	Variable	Girls with Anaemia	Girls without Anaemia	t-value	p-value
1	Mean height (cms)	148.94 (10.74)	153.27(9.62)	-1.96	0.05*
2	Mean Weight (kgs.)	37.43(10.45)	40.62(10.43)	-1.35	0.179

\*\* Significant at 1 % level

It was found that the mean height and mean weight of subjects with anemia is less as compared with that of subjects without anemia. The

't' value is significant at 5 per cent level and infers that there is substantial association between mean height and mean weight.

### Peripheral smear examination

The Peripheral smear examination was conducted to identify the type of anaemia and the details are presented in the Table 6.

**Table 6 Peripheral smear examination**

Sl. No.	Peripheral Smear	Number of Girls	Percentage
1	Iron deficiency anaemia	28	56
2	Dimorphic anaemia	18	36
3	Sickle cell trait	3	6
4	Thalassemia minor	1	2

The table presents that 56 per cent girls had iron deficiency anemia while 36 per cent girls had dimorphic anemia, 6 per cent had sickle cell trait while 2 per cent had thalassemia. Hemoglobin electrophoresis of 46 patients was normal. These girls were given 1 tablet of 200 mg of ferrous sulfate containing 60 mg of elemental iron and 1 tablet of folic acid 5 mg daily. Patients with sickle cell trait and thalassemia minor were given folic acid tablet 5 mg daily.

### Recommendations

To control the anaemia the following suggestions are followed

1. Strategies must be developed for adult education.
2. To improve the socio-economic status of the population must be improved by implementing various programmes for alleviating poverty.
3. The programmes must be conducted for the prevention of anemia among adolescent girls through nutrition education and anemia prophylaxis.
4. Prevention of worm infestation.
5. Screening of target groups for anaemia.
6. Referring anaemic girls to appropriate health facility.

### CONCLUSION

Anaemia is a long-standing problem in India with high prevalence of anaemia in adolescents. India has the world's highest prevalence of iron deficiency anaemia among women, and 70 per cent of the adolescent girls being anaemic. The overall prevalence of anaemia among adolescent females was found to be 90 per cent. It is seen that anaemia affects the overall nutritional status of adolescent females. There is significant association of anaemia with socio-economic status and parents' educational status. It was found that mean height and mean weight of subjects with anemia is less as compared with that of subjects without anemia; the difference was statistically significant. It was found that out of 270 girls, 220 girls (73.3%) had mild anemia (Hb 10 to <12 gm %) while 50 girls (16.6%) had moderate anemia (Hb 7 to <10 gm %). None of the subjects had severe anemia. So, majority of the girls were mildly anaemic. Majority (30) girls had iron deficiency anemia while 20 girls had dimorphic anemia. Yet, adolescents remain a largely neglected, difficult to measure and hard to reach population, in which the needs of adolescent girls in particular, are often ignored.

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