

## Anaemia and Associated Factors among School Going Adolescent Girls in Chidambaram, Tamilnadu - A Cross Sectional Study.

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**Abstract :** A cross sectional study was conducted in a higher secondary school in Chidambaram to estimate the prevalence of anaemia among school going adolescent girls and to identify the associated factors. Haemoglobin levels were assessed directly in the school. Data related to age, personal and dietary habits were collected by interview method and analyzed with the help of Microsoft excel and SPSS version 17. The prevalence of Anaemia was found to be 61.3% among adolescent girls. The prevalence of anaemia was comparatively more in adolescent girls who attained early menarche (65.4%), whose mothers were illiterate (66.7%), with more number of siblings(69%), who do not use latrine (62.6%) or even slippers (71.4%), and who consume animal food less frequently (milk 64.4%, egg 62.1% and meat 73.4%). Thus the present study emphasizes the need for developmental and health education strategies to improve dietary habits, hygienic practices of adolescents with intensifying adolescents anemia prophylaxis programs.

### INTRODUCTION

Anaemia 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. It occurs at all stages of the life cycle, but is more prevalent in pregnant women and young children. According to the studies from India, the prevalence of anemia in adolescent girls is also fairly high.<sup>1,2,3</sup> An adolescent is a period of transition between childhood and adulthood is a significant period of human growth and maturation. Being a period of growth spurt, exceptionally rapid rate of growth occurs with unique change during this phase of life. Anemia in adolescent girls affects their physical work capacity and reproductive physiology and work productivity of adults.<sup>4,5</sup> Although anaemia has been recognized as a public health problem for many years, little progress has been reported and the global prevalence of anaemia remains unacceptably high. WHO and UNICEF therefore reemphasize the urgent need to combat anaemia and stress the importance of recognizing its multi-factorial etiology for developing effective control programmes.<sup>6</sup> The present paper reports the prevalence of anemia and associated factors among adolescent school girls in Chidambaram in Tamil Nadu with the objectives to estimate the prevalence of anaemia among school going adolescent girls in Chidambaram and to identify the associated factors influencing the occurrence of anaemia among adolescent girls.

### METHODOLOGY

A cross sectional study was conducted in the randomly selected Girl's Higher Secondary School among the four schools in Chidambaram. In the selected school, we were given permission to examine only 11<sup>th</sup> class students. Institutions ethical clearance was obtained. Nature of the study was explained to them and informed consent form was distributed to girls to get approval from their parents. Those who were not willing and those who did not bring signed informed consent were excluded from the study. The study participants were examined

clinically for anaemia and hemoglobin was estimated by calorimetric method. Haemoglobin estimation was done with the help of trained laboratory technician from department of Pathology and Biochemistry. The sample was taken in capillary blood from fingertip of each girl, after the first drop, by painless sterile safety blood lancet. Girls whose haemoglobin level were below 12 grams per 100 ml of blood were considered as anaemic.<sup>7</sup> Girls were clinically examined based on presence or absence of following findings of paleness of conjunctiva, paleness of tongue, paleness of nails and shape of the nails. Data related to age, personal and dietary habits were collected by interview method. The data was analyzed with the help of Microsoft excel and SPSS version 17. The descriptive data were presented as percentages, unadjusted odds ratio to measure the strength of association and 95% confidence interval were calculated. The chi-square test of significance was used for analysis of categorical variables.

### RESULTS

This cross sectional study conducted among 204 adolescent girls showed 125 (61.3%) of them to be anemic. Nearly 71% of the adolescents in the age group of 16 years were anaemic. Prevalence of anaemia varies with age and it was statistically significant (Table 1).

**Table 1:** Age wise distribution of anemic status among adolescents

Age	Anaemic	Not anaemic	Total
15 years	35(17.2)	46(22.5)	81(39.7)
16 years	76(37.2)	31(15.3)	107(52.5)
17 years	11(5.4)	2(0.9)	13(6.3)
Above 17 years	3(1.5)	0(0)	3(1.5)
<b>Total</b>	<b>125(61.3)</b>	<b>79(38.7)</b>	<b>204(100)</b>

(Figures within parentheses indicate percentages)

$\chi^2 = 20.3$ ,  $df = 3$ ,  $p = 0.001$

Table 2 depicts the proportion of anaemia among adolescent girls and associated factors. Less number of adolescent girls (47.9%) who attained menarche after the age of 15 were anaemic compared to those who attained menarche at early age (65.4%) and it was statistically significant ( $p=0.03$ ). Comparison of the association between number of siblings and anaemia showed that the risk increases as the number of sibling increases (OR= 1.7,  $p=0.09$ ) but it was not

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statistically significant. The proportion of anaemic adolescents were high among those girls whose mothers were illiterate (66.7%) compared to those adolescents with literate mothers (57.7%) (OR=1.5, p=0.19). In our study, no association was found between the prevalence of anaemia and both mother's and father's education. On comparison of family income and anaemia status, it showed that as the income level increases the proportion of anaemia decreases. Adolescent girls with monthly family income more than 3000 rupees were at lesser risk of developing anaemia (46.5%) than those with family income less than 3000 rupees (65.2%) (OR=0.5, p=0.02) and it was statistically significant. Those adolescent girls with history of duration of menstruation of more than three days have higher risk of developing anaemia (71.4%, OR=2.4, p=0.002) and it was statistically significant. The study of association between use of latrine, wearing slippers and anaemia showed that those adolescent girls who were not using sanitary latrine (62.6%, OR=1.1 p=0.7) and not wearing slippers (71.4%, OR=1.9, p=0.2) were at higher risk compared to the adolescent girls who use latrine and wear slippers.

Table 2: Anaemic status among adolescent and associated factors

Factors	All cases	Cases with Anaemia	Odds ratio	95% CI	$\chi^2$	P value
<b>Age at menarche</b>						
<15 years	156(76.5)	102(65.4)	1	-	-	-
>15 years	48(23.5)	23(47.9)	0.5	0.3-0.9	4.72	0.03
<b>No of siblings</b>						
2 or less than 2 siblings	133(65.2)	76(57.1)	1	-	-	-
>2 siblings	71(34.8)	49(69.0)	1.7	0.9-3.1	2.75	0.09
<b>Father's literacy status</b>						
Literate	138(67.6)	89(64.5)	1	-	-	-
Illiterate	66(32.4)	36(54.5)	0.7	0.4-1.2	1.86	0.17
<b>Mother's literacy status</b>						
Literate	123(60.3)	71(57.7)	1	-	-	-
Illiterate	81(39.7)	54(66.7)	1.5	0.8-2.6	1.65	0.19
<b>Family income per month</b>						
<Rs3000	161(78.9)	105(65.2)	1	-	-	-
>Rs3000	43(21.1)	20(46.5)	0.5	0.2-0.9	5.00	0.02
<b>No. of days of menstruation</b>						
<3 days	99(48.5)	50(50.5)	1	-	-	-
>3 days	105(51.5)	75(71.4)	2.4	1.4-4.4	9.40	0.002
<b>Use of latrine</b>						
Yes	105(51.5)	63(60)	1	-	-	-
No	99(48.5)	62(62.6)	1.1	0.6-2	0.15	0.7
<b>Wearing slippers</b>						
Yes	183(89.7)	104(56.8)	1	-	-	-
No	21(10.3)	15(71.4)	1.9	0.7-5.1	1.65	0.2

(Figures within parentheses indicate percentages)

On the assessment of the dietary habits of the adolescents and anaemia, it was found that those who take vegetables (OR=0.6, p=0.1), green leafy vegetables (OR=0.9, p=0.7), milk (OR=0.8, p=0.4), egg (OR=0.9, p=0.7), fruits (OR=0.6, p=0.06) and meat (OR=0.3, p=0.0001) for more than 3 days a week were at lesser risk of developing anaemia compared to those who consume the same for less than three days. It was statistically highly significant for meat consumers but not for other food intake. (Table 3)

## DISCUSSION

In the present cross sectional study conducted among 204 adolescent girls, the prevalence of anaemia was found to be 61.3%; similar findings were reported in the literature from i.e. 73.7% to 44.8%<sup>8-10</sup>. In our study the prevalence of anaemia among adolescent girls increased with increasing number of siblings. Among adolescent girls who had two or less than two siblings the prevalence of anaemia was 57.1 percent while for those with 3 or more siblings it was 69.0% but it was not statistically significant. EL Hioui et al<sup>11</sup> had reported the prevalence of anaemia among children who had five or less family members was 11.7 per cent, while for those with more than five family

Table 3: Anaemic status among adolescent and food consumption

Food items	All cases	Cases with Anaemia	Odds ratio	95% CI	$\chi^2$	P value
<b>Intake of Leafy vegetables</b>						
2 or <2 times / week	165(80.9)	102(61.8)	1	-	-	-
3 or >3 times / week	39(19.1)	23(58.9)	0.9	0.4-1.8	0.11	0.7
<b>Intake of vegetables</b>						
2 or <2 times / week	57(27.9)	40(70.2)	1	-	-	-
3 or >3 times / week	147(72.1)	85(57.8)	0.6	0.3-1.1	2.64	0.1
<b>Milk intake</b>						
2 or <2 times / week	87(42.6)	56(64.4)	1	-	-	-
3 or >3 times / week	117(57.4)	69(58.9)	0.8	0.4-1.4	0.61	0.4
<b>Egg consumption</b>						
2 or <2 times / week	153(75)	95(62.1)	1	-	-	-
3 or >3 times / week	51(25)	30(58.8)	0.9	0.5-1.7	0.17	0.7
<b>Fruits consumption</b>						
2 or <2 times / week	137(67.2)	90(58.4)	1	-	-	-
3 or >3 times / week	67(32.8)	35(67.2)	0.6	0.3-1.0	3.43	0.06
<b>Meat consumption</b>						
2 or <2 times / week	128(62.7)	94(73.4)	1	-	-	-
3 or >3 times / week	76(37.3)	31(40.8)	0.3	0.1-0.5	21.42	0.0001

(Figures within parentheses indicate percentages)

members this figure was 12.6 percent. Gupta N et al<sup>12</sup> reported prevalence of anemia was found lower in nuclear families than joint families. In our study no association was found between the prevalence of anaemia and both mother's and father's education. In contrast, Hiouiet al<sup>11</sup> and Hyeon-Jeong Choi et al<sup>13</sup> reported a significant relationship between education of the mother and anaemia in children.

In our study, family income was inversely proportional to the prevalence of anaemia in adolescents and similar findings were reported by authors<sup>14,15</sup> where the overall prevalence of anemia was found higher among adolescent girls who belong to lower socioeconomic status. In our study the adolescent girls who did not wear slippers was found to be at higher risk of developing anaemia; Sampathkumar Vet al<sup>16</sup> reported that 48.5% of anemic adolescent girls did not wear slippers when they went outside.

In our study 48.5% of the adolescent girls did not use latrine and the prevalence of anaemia was higher among them compared to those adolescent girls who used sanitary latrine and similar findings were reported by Jemal Haidar et al<sup>17</sup> where 49.7% of the women used open field for toilet and the prevalence of anaemia was slightly higher among them compared to those women who used sanitary latrine.

In our study those adolescent girls who consumed animal foods (milk, egg and meat) for 3 or more days in a week were at lesser risk of developing anaemia compared to those who consumed for less than 3 days. A similar finding was observed by Balci YI et al<sup>18</sup> where nearly 84% of the adolescents who consumed animal food weekly or less often were anaemic. Those adolescent girls who consumed vegetables and green leafy vegetables were comparatively at lesser risk of getting anaemia compared to those adolescent girls who consumed the same for less than 3 days a week but it was not statistically significant. A Verma et al<sup>19</sup> reported that the prevalence of anaemia was significantly lower in girls consuming green leafy vegetables.

## CONCLUSION

The prevalence of anaemia among the school going adolescent girls of Chidambaram was relatively high with 63 percent. The various risk factors like mother education, socio economic status, family size, and dietary habits (consumption of animal food, vegetables and

fruits) and hygienic practices were associated with prevalence of anemia. Thus the present study emphasizes the need for developmental and health education strategies to improve dietary habits, hygienic practices of adolescent girls with intensifying adolescents anemia prophylaxis programs covering school going adolescents would pave a long way in reducing the prevalence of anaemia in the vulnerable adolescent population.

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