

**PREVALENCE OF ANAEMIA AMONG ADOLESCENT SCHOOL GOING CHILDREN IN GUNTUR**Phanindra Dulipala<sup>1</sup>, Chaitanya Gujjarlupudi<sup>2</sup><sup>1</sup>Assistant Professor, Department of Community Medicine, Katuri Medical College, Guntur.<sup>2</sup>Associate Professor, Department of Community Medicine, Katuri Medical College, Guntur.**ABSTRACT****BACKGROUND**

Anaemia is a nutritional problem worldwide and its prevalence is higher in developing countries when compared to the developed countries. Anaemia, a manifestation of under-nutrition and poor dietary intake of iron is a public health problem, not only among pregnant women, infants and young children, but also among adolescents. Recent studies on the prevalence of anaemia have been conducted on preschool children only, so there is a need for more studies related to anaemia among school children. The present study was done to estimate the prevalence of anaemia among school children aged 10-15 years from Guntur, Andhra Pradesh.

**MATERIALS AND METHODS**

A cross-sectional study was conducted among 500 school children aged 10 to 15 years. Purposive sampling was used to include 250 boys and 250 girls. Haemoglobin estimation was done by cyanmethaemoglobin method. The severity of anaemia was classified on the basis of WHO criteria into Mild, Moderate and Severe. Data analysis was done by SPSS version 21.

**RESULTS**

The overall prevalence of anaemia was 27.4% in the present study. A higher prevalence of anaemia was observed among girls (42.4%) than boys (12.4%). The prevalence of mild anaemia was 34.4% and 9.6% among girls and boys respectively.

**CONCLUSION**

The prevalence of anaemia is high among school going adolescents. Special emphasis should be given on nutritional supplementation with iron and health education for this age group.

**KEYWORDS**

Adolescent, Anaemia, School Children.

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**INTRODUCTION**

Anaemia is a condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiologic needs which vary by age, sex, altitude, smoking and pregnancy status.<sup>[1]</sup> In clinical terms, anaemia is defined as an insufficient mass of RBCs circulating in the blood. In public health terms, anaemia is defined as a haemoglobin concentration below the threshold levels given by WHO.<sup>[2]</sup> Nutritional anaemia refers to a condition, in which the haemoglobin content of the blood is lower than normal due to a deficiency of one or more essential nutrients regardless of the cause of such deficiency.<sup>[3]</sup>

Globally, the most significant contributor to the onset of anaemia is iron deficiency, so that Iron Deficiency Anaemia (IDA) and anaemia are often used synonymously and the prevalence of anaemia has often been used as a proxy for IDA. It is generally assumed that 50% of the cases of anaemia are due to iron deficiency, but the proportion may vary among population groups and in different areas according to the local conditions.<sup>[4]</sup>

The main risk factors for IDA include a low intake of iron, poor absorption of iron from diets and periods of increased demand for iron, i.e. puberty and pregnancy. Among the other causes of anaemia, heavy blood loss during menstruation or parasitic infections such as hookworms, ascaris and schistosomiasis can lower blood haemoglobin (Hb) concentrations.<sup>[2]</sup>

Anaemia is an indicator of both poor nutrition and poor health. The most dramatic health effects of anaemia, i.e. increased risk of maternal and child mortality due to severe anaemia have been well documented.<sup>[5-7]</sup> In addition, the negative consequences of IDA on cognitive and physical development of children and on physical performance—particularly work productivity in adults—are of major concern.<sup>[6]</sup> Since the technological advancement and economic development of a nation depend heavily on its trained human resources, the behavioural effects of anaemia are highly relevant. Consequently, if anaemia is highly prevalent in a country, it can substantially affect its intellectual and economical potential.

Anaemia is a global public health problem affecting both developing and developed countries with three to four times higher prevalence in developing countries.<sup>[8]</sup> Pregnant women, infants, young children and adolescents are more vulnerable for this problem.

The World Health Organization has defined adolescence as the age period between 10 to 19 years of age for both the sexes (Married and unmarried).<sup>[9]</sup> The word adolescence is derived from the Latin word, “adolescere,” which means “to grow, to mature.”<sup>[10]</sup>

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This is the formative period of life when the maximum amount of physical, psychological and behavioural changes take place. This is a vulnerable period in the human life cycle for the development of nutritional anaemia, which has been constantly neglected by public health programs. Adolescents are at high risk of iron deficiency and anaemia due to accelerated increase in requirements for iron, poor dietary intake of iron, high rate of infection and worm infestation as well as the social norm of early marriage and adolescent pregnancy. During this stage the requirement of nutrition and micronutrients is relatively high. Therefore, adolescents, especially girls are vulnerable to iron deficiency mainly because requirements are at a peak.<sup>[11]</sup>

The magnitude of the anaemia has been well-documented in pregnant women and infants; however, there is scarce data on the prevalence of anaemia in school children.<sup>[12]</sup> The present study was undertaken to estimate the prevalence of anaemia among school children aged 10-15 years from Guntur, Andhra Pradesh.

### MATERIALS AND METHODS

The present cross-sectional study was conducted during the months of October and November 2015 in a missionary school, Guntur city, after obtaining approval from the Institutional Ethics Committee. The investigator contacted the principal of school personally. The objective and nature of the study was explained and a verbal consent was sought to carry out the survey in the school.

The study included only school going adolescent children aged 10-15 years. A total of 500 children (250 boys and 250 girls) included in the study were selected by purposive sampling. The study was explained to the school authorities, confidentiality was assured and informed oral consent was obtained.

The informed written consent was obtained from each student and in case of any student who was not willing to participate in study the next student was involved. Every selected student was called one by one in the separate room with the help of school personnel without any interference in studies and other routine activity. While collecting the sample from the female students, the help from female teacher was sought and she was asked to stay in the class room.

The purpose of the survey was explained and assurance about the confidentiality of the information was given to the students. Interview was started with general discussion to build up a rapport with respondents and to gain their confidence.

Haemoglobin estimation was done by cyanmethaemoglobin method.<sup>[13]</sup> The haemoglobin estimation was obtained by finger prick method using sterile needles; 20 µL of blood sample was collected in 5 mL Drabkin solution. Haemoglobin in the blood is converted into cyanmethaemoglobin. The absorbance of cyanmethaemoglobin was measured at 540 nm by photoelectric colorimeter on the same day of sample collection. The severity of anaemia was classified on the basis of WHO criteria, i.e. Severe anaemia (Hb% <7 g/dL), Moderate anaemia (Hb% - 7-9.9 g/dL) and Mild anaemia (Hb% of 10-12.9 g/dL in boys and 10-11.9 g/dL in girls).<sup>(1)</sup> The complete data was compiled into MS EXCEL 2007 and analysis was done by SPSS version 21.

### RESULTS

The present cross-sectional study was conducted in a missionary school in Guntur among children aged 10-15 years. Age wise distribution was shown in Table 1. The overall prevalence of anaemia was 27.4% in the present study and 72.6% of the 500 participants were non-anaemic. Children who participated in the study did not show any symptoms like easy fatigue or dizziness. A total of 137 children out of 500 were having varying severity of anaemia. A higher prevalence of anaemia was observed among girls (42.4%) than boys (12.4%) (Table 2). The difference was highly significant statistically (p value >0.05).

Out of 250 girls, 42.4% girls have varying degree of severity of anaemia, which includes 34.4% mildly anaemic, 6.8% moderately anaemic and 1.2% were severely anaemic. On the other hand out of 250 boys, 12.4% have varying degree of severity of anaemia, which includes 9.6% mildly anaemic, 2.4% moderately anaemic and 0.4% were severely anaemic. Thus the prevalence of mild, moderate and severe anaemia was observed to be higher among girls than boys. (Table 3).

Age in Years	Boys (%)	Girls (%)
10-11	72 (28.8)	82 (32.8)
12-13	87 (34.8)	83 (33.2)
14-15	91 (36.4)	85 (34.0)
<b>Total</b>	<b>250(100)</b>	<b>250(100)</b>

**Table 1: Age Wise Distribution**

Gender	Boys (%)	Girls (%)
Anaemia	31 (12.4)	106 (42.4)
No Anaemia	219 (87.6)	144 (57.6)
<b>Total</b>	<b>250 (100)</b>	<b>250 (100)</b>

**Table 2: Gender wise Prevalence of Anaemia**

$\chi^2 = 56.55$ ; p value < 0.001; highly significant

Grade of Anaemia	Boys (%)	Girls (%)
Severe Anaemia	1 (0.4)	3 (1.2)
Moderate Anaemia	6 (2.4)	17 (6.8)
Mild Anaemia	24 (9.6)	86 (34.4)
No Anaemia	219 (87.6)	144 (57.6)
<b>Total</b>	<b>250(100)</b>	<b>250(100)</b>

**Table 3: Distribution by Severity Grade of Anaemia**

### DISCUSSION

The overall prevalence of anaemia was found to be 27.4% in the present study. This is similar to the finding observed in a study conducted in rural south India by Joseph AG and others.<sup>[14]</sup> In a multi-country study on the nutritional status of adolescents, which was carried out by the International Centre for Research on Women (ICRW), anaemia was found to be the most widespread nutritional problem and its prevalence ranged from 32-55%.<sup>[15]</sup>

Higher prevalence of anaemia was observed in girls in comparison to boys. This variation was highly significant. Similar findings have been reported in studies conducted by Basu et al<sup>[15]</sup> and Jai Prabhakar et al<sup>[16]</sup> in other parts of India. The prevalence of anaemia among girls was 42.4%. Similar finding was reported from a study conducted in rural Tamil

Nadu by Rajaratnam et al where the overall prevalence of anaemia was 44.8%.<sup>[17]</sup> A variable prevalence (23.9% - 81.8%) of anaemia in adolescent girls has been reported in different studies conducted in India.<sup>[18]</sup>

National Family Health Survey (NFHS), 3 estimates reveal the prevalence of anaemia to be 65-75% in adolescent girls.<sup>[19]</sup>

The following cut off points, which were suggested by the WHO were used to determine whether iron deficiency anaemia was a major problem among the general population.<sup>[20]</sup>

Prevalence	Public Health Problem
<5%	Not a problem
5-14.9%	Low magnitude
15-39.9%	Moderate magnitude
40% and above	High magnitude

The problem of anaemia is of very high magnitude in a community when prevalence rate exceeds 40%. This is a serious public health problem. Thus, the prevalence of 42.4% among adolescent school going girls as observed in our study is a serious public health problem and the prevalence of 12.4% of anaemia among boys considered as a problem of low magnitude.

On the basis of severity, mild anaemia was observed among most of the participants. Similar observation was reported by Shanti et al, in a school based study done in Haryana.<sup>[20]</sup> The prevalence of mild, moderate and severe anaemia was observed to be higher among girls than boys. Similar findings were observed in the studies conducted by Sudhagandhi et al<sup>[16]</sup> and Muthayya et al.<sup>[21]</sup>

The overall prevalence of severe, moderate and mild anaemia in the present study was 0.8%, 4.6% and 22% respectively. This was lower than the findings reported by Verma et al from their study conducted among college going youths in rural northern India where the prevalence of severe, moderate and mild anaemia were 3.58%, 11.16% and 29% respectively.<sup>[22]</sup> The prevalence of severe, moderate and mild anaemia among girls in the present study was 1.2%, 6.8% and 34.4% respectively. These findings were almost consistent to those reported from a study conducted in rural Tamil Nadu where severe anaemia was 2%, moderate anaemia was 6.3% and mild anaemia was 36.5%.<sup>[17]</sup>

#### LIMITATION

This study was conducted in only one missionary school and if it is done in other settings like government schools, results may vary. So the results cannot be generalized.

#### STRENGTHS

Haemoglobin estimation was done by cyanmethaemoglobin method.

#### CONCLUSION

The present study revealed that anaemia continues to be a major health problem among the adolescents. There was a higher prevalence of mild anaemia as compared to moderate and severe anaemia. There is a significant difference observed among adolescent boys and girls with respect to the prevalence of anaemia. This age group should be screened regularly and appropriate measures taken for correction of anaemia.

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