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Original Research Article

Prevalence of anemia in school children in the age group of 8 to 14 years in Thiruvarur, Tamilnadu, India

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ABSTRACT

Background: Iron deficiency is responsible for most of the nutritional anemia. Hemoglobin concentration is a reliable indicator of anemia at the population level, as opposed to clinical measures which are subjective and therefore have more room for error. Measuring Hemoglobin concentration is relatively easy and inexpensive, and this measurement is frequently used as a proxy indicator of iron deficiency. To study the association of certain risk factors with the prevalence of anemia in school children in the age group of 8-14 years.
Methods: The study was conducted from April 2017 to March 2018 in Department of Paediatrics, Government Thiruvarur Medical College, Thiruvarur. The study population consisted of school children in the age group of 8 to 14 years fulfilling the inclusion and exclusion criteria. The sample size was 250. Complete hematological investigations was done to each child for differential diagnosis of anemia.
Results: Majority of the children studied had a normal BMI 38.4% (n=96), 16.8% (n=42) were classified as overweight, 9.2% (n=23) were classified as obese. 22.8% (n=57) were classified as having thinness. 12.8% (n=32) were classified as having severe thinness. Of the 132 children with anemia, majority had mild anemia 64.39% (n=85) followed by moderate 28.03% (n=37) and severe anemia 7.58% (n=10). Of the 132 children with anemia, majority had mild anemia 64.39% (n=85) followed by moderate 28.03% (n=37) and severe anemia 7.58% (n=10).
Conclusions: The prevalence of anemia was significantly higher in female children (64.91%) compared to male children (42.65%). The prevalence of anemia is highest in children with severe thinness (78.13%) followed by children with obesity (73.91%). The most common type of anemia in our study was iron deficiency anemia. Majority of the children were suffering from anemia of mild severity. There was no statistically significant correlation between the prevalence of anemia in children and age and socioeconomic status.

Keywords: Anemia, Grades of anemia, Low socio-economic status, Obesity

INTRODUCTION

Anemia is defined as a reduction in the red blood cell volume or hemoglobin concentration below the normal range of values occurring in the healthy population (2 SD below the mean for normal population) with respect to age and sex.[1] Normal hemoglobin vary substantially with age and sex. There are also significant racial differences. 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] It occurs at all stages of the life cycle but is more prevalent in pregnant women and young children.[3] Anemia is a widespread nutritional problem affecting children in their crucial period of growth. Nutritional Anemia is one of the major public health problems in India.[4] Anemia is an indicator of both poor nutrition and poor health. The negative

consequences of anemia on cognitive and physical development, physical performance and productivity of children are of major concern.[5] Hemoglobin concentration is a reliable indicator of anemia at the population level, as opposed to clinical measures which are subjective and therefore have more room for error. Measuring Hemoglobin concentration is relatively easy and inexpensive, and this measurement is frequently used as a proxy indicator of iron deficiency.[6] A study of the prevalence of anemia in school children will help to accurately estimate the magnitude of the problem in the study population and help to plan and implement strategies for the prevention and treatment of anemia.[7]

METHODS

This study was a Cross-Sectional Study. The study was conducted from April 2017 to March 2018. Department of Pediatrics, Government Thiruvarur Medical College, Thiruvarur. The study population consisted of school children in the age group of 8 to 14 years fulfilling the inclusion and exclusion criteria. The sample size was 250 complete hematological investigations were done to each child for differential diagnosis of anemia.

Inclusion criteria

School children in the age group of 8 to 14 years.

Exclusion Criteria

Children below 8 years of age, above 14 years of age, with chronic diseases. Children previously diagnosed and on treatment for anemia. Children with previous blood transfusion.

Statistical analysis

Data was collected on predesigned proforma for each individual case. Descriptive statistics were done for all data. Suitable statistical tests of comparison were done. Categorical variables were analyzed with the Chi-Square Test. Results on categorical measurements were presented in Number (%). Significance is assessed at 5% level of significance. Chi-square has been used to find the significance of study parameters on a categorical scale between two or more groups. A P-value <0.005 was taken as significant. The data was analyzed using SPSS version 16 was used for statistical analysis.

RESULTS

The present study is a prevalence study carried out in schools in Chennai. 250 children in the age group of 8 to 14 years were screened for anemia.

Table 1 shows 66 children in the age group of 8 to 9 years, 48.48% (n=32) were male and 51.52% (n=34) were female. Of the 76 children in the age group of 10 to 11 years, 60.53% (n=46) were male and 39.47% (n=30) were female. Among the 108 children in the age group of 12 to 14 years, 53.70% (n=58) were male and 46.30% (n=50) were female.

Table 1: Distribution according to gender.

Gender Distribution	Number	%
Male	136	54.4
Female	114	45.6
Total	250	100

Table 2 shows in our study, of the 250 children 26.4% (n=66) were in the age group of 8-9 years, 30.4% (n=76) were in the age group 10-11 years and 43.2% (n=108) were in the age group 12-14 years.

Table 2: Distribution according to age.

Age (years)	Number	%
8-9	66	26.4
10-11	76	30.4
12-14	108	43.2
Total	250	100

Table 3 shows in our study, of the 250 children 14% (n=35) belonged to the upper class, 26.4% (n=66) to upper middle, 19.6% (n=49) belonged to middle, 24% (n=60) belong to upper lower and 16% (n=40) belonged to lower class.

Table 3: Distribution according to socioeconomic status.

Socioeconomic class	Number	%
Upper	35	14
Upper middle	66	26.4
Middle	49	19.6
Upper lower	60	24
Lower	40	16
Total	250	100

Table 4 shows, majority of the children studied had a normal BMI 38.4% (n=96), 16.8% (n=42) were classified as overweight, 9.2% (n = 23) were classified as obese. 22.8% (n=57) were classified as having thinness. 12.8% (n=32) were classified as having severe thinness.

Table 4: Distribution according to BMI.

BMI	Number	%
Normal	96	38.4
Overweight	42	16.8
Obesity	23	9.2
Thinness	57	22.8
Severe thinness	32	12.8
Total	250	100

DISCUSSION

Anemia is an important nutritional problem encountered in children. The present study was undertaken in 250 school children in the age group of 8 to 14 years to study the prevalence of anemia and to study the association of certain risk factors with the prevalence of Anemia.[8] Our study revealed that the overall prevalence of anemia in the age group of 8 to 14 years was 52.8%. Goel S, et al in their study in southern Kerala found that the prevalence of anemia in school children was 31.4%. The lesser incidence could be attributed to weekly iron and folic acid supplementation programme. Low anemia prevalence (13.6%) was also noted in schools of Bangalore where deworming and vitamin A supplementation was given twice yearly in children aged 5-15. The prevalence of anemia in male children in our study was 42.65% and in female children was 64.91%. The higher prevalence of anemia in female children, when compared to male, was found to be statistically significant.[9] A study by Shah BK et al, found a higher prevalence of 81.7% in adolescent girls when compared to boys 41.6% and boys respectively. No significant correlation was found between age and the prevalence of anemia in our study.[10] Similar findings were noted by Jackson RT et.al. In our study, 90.91% of the children who were anemic were iron deficient. The reasons may be nutritional, associated with irregular dietary habits and food fads which are very common in the 8 to 14 year age group. Majority of the children in our study were suffering from anemia of mild severity.[11] The prevalence of severe anemia was very less. A similar observation was noted by Rajarathnam A et al in their studies. The prevalence of anemia was highest in children with severe thinness (78.13%) followed by children with obesity (73.91%).[12] Similar findings were noted by Kapoor G et.al in their study were higher prevalence of anemia was noted in children who were underweight, obese and preobese.[13] Our finding is in contrast to the finding of Kleigman RM et al who mentions that there is no impact of anthropometric measurement on the prevalence of anemia. The higher prevalence of anemia in children with severe thinness can be explained by long-standing nutritional deprivation while the higher prevalence in obese children can be explained by the intake of predominantly non-nutritious food in this group. No significant correlation was found between socioeconomic status and the prevalence of anemia in the present study.[14] The findings of the present study contradict the results of Muthayya S et.al in which the prevalence of anemia was found to be highest in the lower socioeconomic class and decreased with an increase in socioeconomic status.[15]

CONCLUSION

Since the prevalence of anemia is very high in school children in the age group of 8 to 14 years, it is important to develop public health strategies to screen school children in this age group for anemia and to treat children found to be anemic at the earliest. As iron deficiency anemia is the commonest cause of anemia in school children in the age group of 8 to 14 years, it is important to implement preventive measure including diet and iron supplementation to prevent anemia at a social level especially in female children.

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