

Original article:

A Cross- Sectional Analysis of Prevalence of Iron Deficiency Anemia Among School Going Children

Satish Chandra Agarwal

Assistant Professor, Department of General Medicine, Santosh Medical College, Ghaziabad, Uttar Pradesh, India.

Corresponding Author: Dr. Satish Chandra Agarwal, Assistant Professor, Department of General Medicine, Santosh Medical College, Ghaziabad, Uttar Pradesh, India.

Date of Submission: 09 February 2011, Date of Acceptance: 27 March 2011

ABSTRACT

Background: Iron Deficiency (ID) and Iron Deficiency Anaemia (IDA) are considered the major public health problems and the most common nutritional deficiency. The present study was conducted to assess the prevalence of iron deficiency anemia among school going children.

Materials & Methods: The cross-sectional descriptive survey was conducted in the Department of General Medicine, Santosh Medical College, Ghaziabad, Uttar Pradesh (India) among school-age children aged 6-13 years old. The sample size was 200 children. Demographic and anthropometric data was recorded. Children were interviewed and hemoglobin estimation was done. Serum ferritin (SF) concentration, as a measure of iron status, was determined by the chemiluminescent microparticle immunoassay (CMIA). The statistical analysis was carried out using the SPSS 21.0 statistical software package for Windows. p values of 0.05 or less were considered to indicate statistical significance.

Results: In the present study total school children were 200 and equally divided into boys (50%) and girls (50%) in which maximum children were in the age group 6-9 yrs i.e. 62.5%. In this study iron deficiency anemia was present in 26% children.

Conclusion: The present study concluded that the prevalence of iron deficiency anemia among school going children was 26%.

Key words: Iron Deficiency, Anemia, School Children.

INTRODUCTION

Iron deficiency is the primary cause of anemia which results iron-deficiency anemia (IDA).¹ Iron deficiency is defined as a condition in which there are no mobilizable iron stores and in which signs of a compromised supply of iron to tissues, including the erythron, are noted.² Iron deficiency can exist with or without anemia. Some functional changes may occur in the absence of anemia, but the most functional deficits appear to occur with the development of anemia.³ The prevalence of anaemia in the world is 24.8%.⁴ Furthermore, it is estimated that iron deficiency contributes towards 50% of the approximated 600 million global anaemia cases in preschool and school-aged children.⁵ Despite the high prevalence and adverse health consequences reported internationally, there have been limited national representative findings on the prevalence and factors contributing to the development of anemia in School children. Anemia has been shown to contribute to mortality; a recent meta-analysis of nearly 12,000 children from six African countries aged 28 days to 12 years indicates that for each 1

g/dL increase in Hb, the risk of death falls by 24%.⁶ The present study was conducted to assess the prevalence of iron deficiency anemia among school going children.

MATERIALS & METHODS

The cross-sectional descriptive survey was conducted in the Department of General Medicine, Santosh Medical College, Ghaziabad, Uttar Pradesh (India) among school-age children aged 6-13 years old using a structured questionnaire. The sample size was 200 children. Informed consent was taken from parent/guardian of selected children after explaining the study. Demographic and anthropometric data was recorded. Children were interviewed and hemoglobin estimation was done. Anaemia was defined as hemoglobin level below 12 g/dL in children of 12-14 years and below 11.5 g/dL in children aged 6-11 years. The severity of anaemia was classified as mild ($Hb > 10.5$ g/dL), moderate ($Hb \leq 10.5$ g/dL) and severe ($Hb < 7.5$ g/dL).⁷ Iron deficiency was defined as serum ferritin < 15 μ g/l. Serum ferritin (SF) concentration, as a measure of iron status, was determined by the chemiluminescent microparticle immunoassay (CMIA). The statistical analysis was carried out using the SPSS 21.0 statistical software package for Windows. p values of 0.05 or less were considered to indicate statistical significance.

RESULTS

In the present study total school children were 200 and equally divided into boys (50%) and girls (50%) in which maximum children were in the age group 6-9 yrs i.e. 62.5%. In this study iron deficiency anemia was present in 26% children.

Table 1: Distribution according to age group

Age group(years)	N(%)
6-9	125(62.5%)
10-13	75(37.5%)
Total	200(100%)

Table 2: Prevalence of iron deficiency in women

Prevalence of iron deficiency in women	N(%)
Present	52(26%)
Absent	148(74%)
Total	200(100%)

DISCUSSION

Iron deficiency is the most widespread and common nutritional disorder in the world. In spite of the efforts to decrease the frequency, the prevalence varies in different parts of the world with higher rates in the developing countries.^{8,9}

In the present study total school children were 200 and equally divided into boys (50%) and girls (50%) in which maximum children were in the age group 6-9 yrs i.e. 62.5%. In this study iron deficiency anemia was present in 26% of children.

Anemia was more highly prevalence in many of the previous studies which showed that it was 24.8% of school going children (5-15 years) in Aligarh city in India¹⁰, 36.4% among Vietnamese school age children¹¹, 36.9% in a group of 250 school-age children in Leyte, Philippines¹². This difference in the prevalence of anemia in these regions may be due to differences in the study area, sample size, the food consumption and other factors.

According to Herceberg et al.,¹³ three stages of iron deficiency, allow describing the deficit of iron in the body. First, the simple depletion of tissue iron stores without deficit of erythropoiesis that is characterized by an isolated decrease of serum ferritin below 15 mg/l (in children). Then, the depletion of reserves, with deficiency of erythropoiesis is accompanied by a decrease in the coefficient saturation of transferrin, increased transferrin and total iron binding capacity, a decrease in serum iron and disruption of conventional erythrocyte parameters. The last stage is iron deficiency anaemia, where the fall in hemoglobin below the threshold limit, allows recognizing anaemia.

Iron deficiency results from an imbalance in the balance of iron in the body; in children, it is most often an insufficient of contributions to the needs more important deal with especially in infancy than in adults. Low iron intake, iron mal-absorption and iron loss lead to IDA, and iron deficiency due to malnutrition is a most frequent affecting about of population 30% - health problem in the world. WHO reported recently that 1.62 billion of the world population is anemic. IDA main cause is a poor diet and/or certain intestinal diseases that affect adversely iron absorption or nutrient consumption by parasitic infestation. Iron fortified food is effective in improving and maintenance of Hb in general population especially during childbearing age.¹⁴

CONCLUSION

The present study concluded that the prevalence of iron deficiency anemia among school going children was 26%.

REFERENCES

1. Benoist BD, McLean E, Egll I, Cogswell M. Worldwide prevalence of anaemia 1993-2005: WHO global database on anaemia. Geneva: WHO global database on anaemia; 2008.
2. Geneva: Switzerland: World Health Organization; 2001. WHO/UNICEF/UNU. Iron Deficiency Anemia Assessment, Prevention, and Control; p. 114.
3. Wood RJ, Ronnenberg A. Iron. In: Shils ME, Shike M, Ross AC, Caballero B, Cousins RJ, editors. Modern Nutrition in Health and Disease. 10th ed. Baltimore: Lippincott Williams & Wilkins; 2005. pp. 248-70.
4. WHO., 2008. Worldwide Prevalence of Anaemia 1993-2005: WHO Global Database on Anaemia. World Health Organization, Rome, Italy, ISBN-13: 9789241596657, Pages: 48.
5. WHO. Intermittent Iron Supplementation in Preschool and School-Aged Children. World Health

Organization, Geneva, Switzerland.

6. Greisen, G. (1986) Mild Anemia in African School Children: Effects on Running Performance and an Intervention Trial. *Acta Paediatrica Scandinavica*, 75, 662-667. <https://doi.org/10.1111/j.1651-2227.1986.tb10268.x>
7. WHO., 2001. Iron Deficiency Anaemia Assessment Prevention and Control. A Guide for Programme Managers. World Health Organization, Geneva, Switzerland.
8. Lerner, N.B. and R. Sills. Iron Deficiency Anemia. In: Nelson Textbook of Pediatrics, Kliegman, R. and W.E. Nelson (Eds.). 19th Edn., Elsevier/Saunders, Philadelphia, PA., ISBN-13: 9780808924203.
9. WHO., 1989. Preventing and Controlling Iron Deficiency Anemia through Primary Health Care. WHO Publications, Geneva, Switzerland.
10. Hassan, M.A. and Khalique N. Health status and anthropometric profile of school going children (5-15 years) in Aligarh city. Proceedings of the 29th Annual Conference of IAPSM and 9th. Annual Conference of Maharashtra, 2002; 125: 10.
11. Thi LH, Brouwer ID, Burema J, Nguyen KC, and Kok FJ. Efficacy of iron fortification compared to iron supplementation among Vietnamese schoolchildren. *Nutr J.*, 2006; 5:32.
12. Leenstra T, Acosta LP, Langdon GC, Manalo DL, Olveda RM, McGarvey ST, et al. Schistosomiasis japonica, anemia, and iron status in children, adolescents, and young adults in Leyte, Philippines. *Am J Clin Nutr.*, 2006; 83: 371–379.
13. Hercberg, S., Galan P., Prual, A. and Preziosi, P. Epidemiology of iron deficiency and iron deficiency anemia in the French population. *Annales de Biologie Clinique*, 1998; 56(1), 49-52.
14. United Nations Children’s Fund/United Nations University/WHO: Iron deficiency anaemia. Assessment, prevention and control. A guide for programme managers (WHO/NHD/01.3). Geneva: World Health Organization; 2001: 15–31.