



PREVALENCE OF ANEMIA AMONG INFANTS: A TERTIARY CENTER STUDY

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ABSTRACT

Introduction: Anemia is a major health problem affect worldwide population at an epidemiological scale with 25% of population suffers from anemia. According to WHO every other pre-school child suffers from anemia. The aim of the study is to determine the prevalence of anemia in infants up to one year of age from birth. **Materials & Methods:** The study was conducted in a tertiary care hospital in Belgavi, Karnataka between January to March 2016. A total of 231 infants were registered in the study. **Results:** High prevalence of anemia was detected in the study population. At birth, 9.8% of cases show anemia, which steadily increased to 49.1% at 6 months and 86.7% by the end of one year of life with slight difference between the sexes **Conclusion:** This study highlights the fact that there is an increasing trend of anemia with increasing age in infancy and urgent steps has to be taken so as to prevent permanent disabilities.

KEYWORDS

Anemia, infancy, iron deficiency anemia

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Introduction

Anemia is defined as "a condition in which the blood is deficient in red blood cells, in hemoglobin, or in total volume". (1) It signifies poor nutrition and poor health. Anemia continues to be the major public health problem worldwide. It is a global problem that affects developed as well developing countries across the globe. Anemia due to nutritional deficiencies is a major health problem around the world and particularly in the developing countries. World Health Organisation (WHO) conducted a survey in ninety three countries around the world and the result showed that anemia affects 1.62 billion people, corresponding to nearly 25% of global population. Approximately, every second child in the preschool age group, 25% of school-aged children, 42% of pregnant females and around 30% of non-pregnant females between the ages of 15 - 50 years around the world suffer from anemia. (2) The prevalence of anemia in preschool children (0 - 4.9 years) is highest in Africa (67.6%) followed by Southeast Asia (65.5%). (3) According to National Family Health Survey (NFHS-4), prevalence of anemia among children less than five years of age was 58.5%. (4)

Iron deficiency is the most common cause of anemia around the world and in India. Iron Deficiency Anemia (IDA) accounts for around 50% of the cases of anemia worldwide. (2) It is also the most common nutritional deficiency seen globally. IDA is a serious public health problem, as it affects psychological as well as physical development. (2, 5-7) Correction of nutritional deficiencies results in improvement in linear growth, psychomotor development and other biochemical anomalies. (7-9) IDA could be easily corrected by starting oral iron supplements and marked improvement is noted by addition of iron supplements alone. (6) Anemic children who received iron supplements had better weight gain, higher weight for height ratio than the ones given placebo; implying improvement in overall health status following correction of iron deficiency. (10)

Materials & Methods:

The study was conducted in a tertiary care hospital in Belagavi, Karnataka. All the infants below the age of 1 year who visited the OPD

or was admitted in the hospital over a period of 3 months (January – March 2016) was included in the study. Respective parents of the child were counselled regarding the aims and method of the study. Consent was obtained from them after due explanation regarding the nature of study. Only infants from day one of birth till 12 months of age were included in the study. Pre- term babies and children beyond 1 year of age were excluded from the study. Ethical clearance was obtained from the Ethics committee.

Anemia is defined by WHO in age group of 6 – 59 months as haemoglobin level <11.0 g/dl. Hemoglobin levels between 10.0 – 10.9g/dl was classified as mild anemia, between 7.0 – 9.9 g/dl as moderate and less than 7.0 g/dl as severe anemia. (11) Anemia in newborns is defined as hemoglobin levels below 14 g/dl at birth, less than 12 g/dl at 1 month of age and below 10.5 g/dl for children between 2–6 months of age. (12)

A total of 231 infants were registered in the study by the end of study duration. From each participant 2 ml of venous blood was collected in an EDTA vacutainer. The sample was processed within four hours after collection. Re-sampling was done in case the sample was clotted. All the samples were processed in a five part hematology analyser for haemoglobin data. The results were analysed using appropriate statistical software.

Results:

Total of 231 infants up to the age of 1 year were enrolled in the study. Out of the 231 cases, 153 (66.2%) were males and 78 (33.8%) were females with infants less than 1 month forming the majority of cases. (Table 1, Graph 1).

The mean hemoglobin at birth was 16.3 g/dl for males and 16.6 g/dl for females. Prevalence of anemia was seen to rise with rising age in both male and female group. Among males 13.3% were anemia at birth. It increased to 46.4% by end of one month of life, 50% by 6 months and 88.1% by end of one year of life. Results were slightly better for females as only 4.6% suffered from anemia at birth and increased to 23.8%,

47.6% and 83.3% at one month, 6 months and 12 months, respectively. (Table 2, Graph 2) All the results were statistically significant with a p value of <0.001.

Discussion:

In the current study the prevalence of anemia among the neonates is seen steadily increasing with age. According to a study conducted in Mexico, the prevalence of anemia in infants less than 2 years was 50%.⁽¹³⁾ Another study conducted in Mexico by Ferreira dos Santos et al, the prevalence of anemia was 56.6% in children between 6 – 59 months of age.⁽¹⁴⁾ A study conducted in Nepal among 4 to 17 month old infants found 58% infants with hemoglobin of less than 10.5 g/dl with iron deficiency in 43% of participants.⁽¹⁵⁾ Study done in India by P Kotecha, showed high prevalence of anemia (69.5%) among children in various parts of India. The prevalence was highest in Bihar (78%) and lowest in Goa (38.2%), while Karnataka showed 70.4% anemia among children 6 to 59 months of age.⁽¹⁶⁾

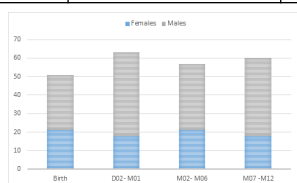
In the present study, the prevalence of anemia in infants was more than 50%. At the age of up to 6 months of age; however the percentage of anemics crossed 80% after 6 months of age. Anemia was less frequently seen in females as compared to the males in the study up to 1 month after birth. However, after one month of age, there is only a slight difference in prevalence of anemia between the two sexes. Iron deficiency anemia (IDA) is the leading cause of anemia worldwide. Infants are at highest risk for development of IDA as iron is consumed for rapid growth and increasing of blood volume. At birth, a neonate is born with sufficient iron stores to last up to 6 months of life.⁽¹⁷⁾ Lack of iron in the diet could lead to irreversible behavioural, cognitive and motor impairments.⁽¹⁸⁾ Exacerbating factors which could contribute to anemia in infancy are maternal anemia, low birth weight, early cord clamping, infections like malaria and worm infestations, poor socio-economic background and lack to access to nutrient rich foods.⁽¹⁹⁾ Iron deficiency could be prevented by exclusive breast feeding for at least 6 months of age, by using iron fortified infant formulas and cereals and by providing supplemental iron in low birth weight babies.⁽²⁰⁾

Conclusion:

The study highlights the fact that anemia is highly prevalent in infants and it seems to increase with increasing age. Corrective steps have to be initiated well in infancy and at the earliest, so as to assure mental, physical and social wellbeing of the population.

Table 1: Age and sex wise distribution

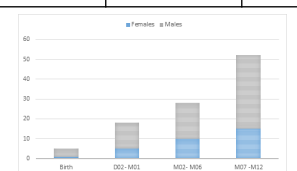
	Females	Males
Birth	21	30
D02- M01	18	45
M02- M06	21	36
M07 -M12	18	42



Graph 1: Age and sex wise distribution

Table 2: Age and sex wise distribution of anemic children

	Females		Males	
	No.	Percentage	No.	Percentage
Birth	1	4.6	4	13.3
D02- M01	5	23.8	13	46.4
M02- M06	10	47.6	18	50
M07 -M12	15	83.3	37	88.1



Graph 2: Age and sex wise distribution of anemic children

References:

1. Anemia: Merriam-Webster.com; 2015 [cited 2018 08-05-2018]. Available from: <http://www.merriam-webster.com/dictionary/anemia>.
2. Worldwide prevalence of anemia 1993-2005: WHO Global Database on Anaemia. Atlanta: World Health Organization; 2008.
3. Ghasemi A, Keikhaei B. Effects of nutritional variable in children with iron deficiency anemia. International Journal of Pediatrics. 2014;2(3.1):183-87.
4. Key findings from NFHS [cited 2018 15-04-2018]. Available from: http://www.rchiips.org/NFHS/factsheet_NFHS-4.shtml.
5. Preventing and controlling Iron deficiency anaemia through primary health care: A guide for health administrators and programme managers. DeMaeyer EM, editor. Geneva, Switzerland: World Health Organization; 1989.
6. Iron Deficiency Anemia - Report of a study group. Geneva, Switzerland: World Health Organization, 1959.
7. Bhanushali MM, Shirode AR, Joshi YM, Kadam VJ. An intervention on iron deficiency anaemia and change in dietary behavior among adolescent girls. Int J Pharm Pharm Sci. 2011;3(1):40-2.
8. Bhandari N, Bahl R, Taneja S. Effect of micronutrient supplementation on linear growth of children. British Journal of Nutrition. 2001;85(Suppl 2):S131-S7.
9. Jahari AB, Haas J, Husaini MA, Pollitt E. Effects of an energy and micronutrient supplement on skeletal maturation in undernourished children in Indonesia. Eur J Clin Nutr. 2000;54(Supplement 2):S60-8.
10. Bhatia D, Sheshadri S. Growth performance in anemia and following iron supplementation. Indian Pediatrics. 1993;30:195-200.
11. WHO. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System. (WHO/NMH/NHD/MNM/11.1) Geneva 2011 [cited 2018 09-04-2018]. Available from: <http://www.who.int/vmnis/indicators/haemoglobin.pdf>.
12. Means-Jr RT, Glader B. Anemia: General considerations. In: Greer JP, Forster J, Rodgers GM, Paraskevas F, Glader B, Arber DA, et al., editors. Wintrobe's Clinical Hematology. 12 ed. Philadelphia: Lippincott Williams & Wilkins; 2009. p. 779-810.
13. Villalpando S, Shamah-Levy T, Ramirez-Silva CI, Mejia-Rodriguez F, Rivera JA. Prevalence of anemia in children 1 to 12 years of age. Results from a nationwide probabilistic survey in Mexico. Salud Publica Mex. 2003;45 Suppl 4:S490-98.
14. dos Santos RF, Gonzalez ESC, de Albuquerque EC, de Arruda IKG, Diniz AdS, Figueroa JN, et al. Prevalence of anemia in under five-year-old children in a children's hospital in Recife, Brazil. Revista Brasileira de Hematologia e Hemoterapia. 2011;33(2):100-4.
15. Siegel EH, Stoltzfus RJ, Khatry SK, LeClerq S, Katz J, Tielsch JM. EPIDEMIOLOGY OF ANEMIA AMONG 4- TO 17-MONTH CHILDREN LIVING IN SOUTH CENTRAL NEPAL. European journal of clinical nutrition. 2006;60(2):228-35.
16. Kotecha PV. Nutritional Anemia in Young Children with Focus on Asia and India. Indian Journal of Community Medicine : Official Publication of Indian Association of Preventive & Social Medicine. 2011;36(1):8-16.
17. Dallmann PR. Iron deficiency in the weanling: a nutritional problem on the way to resolution. Acta Paediatr Scand Suppl. 1986;323:59-67.
18. Grantham-McGregor S, Ani C. A review of studies on the effect of iron deficiency on cognitive development in children. J Nutr. 2001 feb;131(2S-2):649S-66S.
19. Schauer C, Zlotkin S. Home fortification with micronutrient sprinkles – A new approach for the prevention and treatment of nutritional anemias. Paediatrics & Child Health. 2003;8(2):87-90.
20. Dallmann PR. Progress in the prevention of iron deficiency in infants. Acta Paediatr Scand Suppl. 1990;365:28-37.