ORIGINAL RESEARCH PAPER

Volume-8 | Issue-3 | March-2019 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ANEMIA: RISK FACTORS AND PREVALENCE IN CHILDREN UNDER FIVE YEARS OF AGE

Paediatrics

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ABSTRACT

Background: Anemia is one of the most common and under treated problem encountered in South East Asian countries in children under five year of age. Present study has been done to assess the burden and proportion of anemia in children aged between 6 to 59 months of age and to create awareness among people and health care providers about the problems due to anemia.

Methods: A cross sectional study was conducted in the government and government aided hospitals in the Bijnor district in western Uttar Pradesh over a period of 3 months during August 2018-October 2018. 200 children aged between 6 months to 59 months who presented to the OPD with some problem and for vaccination were examined. Appropriate inclusion and exclusion criteria were applied for screening of cases. Anemia was diagnosed as per the WHO cut off of Hemoglobin (Hb) level and anemia was categorized as mild, moderate and severe according to the hemoglobin (Hb) level being in the range 10.0-10.9 g/dL;7.0-9.9g/dL and< 7 g/dL respectively.

Results: Among 200 children screened, 18.5% did not have anemia, 24% had mild anemia, 48% had moderate anemia, and 9.5% had severe anemia. Similar finding of high prevalence of anemia in children below 5 years age has been reported by Sahu T et al (14), Saba F et al (15) and NFHS-3 (7). Males to Females ratio of children having anemia is 1: 1.03 in the present study which is in contrast with the study of Saba F et al(15) who have reported a male: female ratio of 1.4:1. Also Ferreira et al in a study conducted in Brazil showed higher incidence of anemia in male children (16).

Around 95% children belonged to lower and lower middle class. Similar results were obtained by Kanchana et al (17) and Mehrotra SK et al (18).

Summary : There is high prevalence of anemia in children belonging to lower and lower middle class in India irrespective of gender. Iron and other micronutrient rich diet should be provided to the children. Regular deworming and proper sanitary facilities to be provided in the residential area of lower socio economic families.

KEYWORDS

Mild, Moderate, Severe Anemia, Children, Age , Socioeconomic

INTRODUCTION:

Nutritional anemia is one of the major problem affecting the under five children of developing world. Anemia is one of the most common and undertreated problem encountered in South East Asian countries in children under five year of age. The World Health Organization (WHO) has estimated that globally 1.62 billion people are anemic, with the highest prevalence of anemia (47.4%) among preschool-aged children; of these 293 million children, 89 million live in India(1).

According to World Health Organization (WHO), the prevalence of iron deficiency anemia (IDA) in industrialized countries and in non-industrialized countries is 10-20% and 50- 60%, respectively (2). According to another study, anemia in children is an important health problem in almost all the developing countries of the world with an estimated prevalence of 43% (3). In India, anemia is a serious public health challenge with more than 50% prevalence across vulnerable groups such as pregnant women, infants, young children and adolescents (4, 5).

Apart from health related morbidities, socio-economic losses are also associated with anemia in developing countries. In India, where anemia is significantly prevalent, the lifetime costs of iron-deficiency anemia between the ages of 6 and 59 months amounted to 8.3 million disability-adjusted life-years (DALYs) and annual production loss of US$ 24 billion in 2013 (corresponding to 1.3% of GDP) (6)..The third National Family Health Survey (NFHS) 2005-2006 revealed that at least 80% of Indian children aged 12-23 months are anemic(7). Anemia has a variable impact on physical development and children show poor attentiveness, memory and academic performance (8). Children who suffer from anemia have delayed psychomotor development and impaired performance; in addition, they experience impaired coordination of language and motor skills, equivalent to a 5-10-point deficit in intelligence quotient (9-12). Present study has been done to assess the burden and proportion of anemia in children aged between 6 to 59 months of age and to create awareness among people and health care providers about the problems due to anemia.

METHODS:

This cross sectional study was conducted in the government and government aided hospitals in the Bijnor district in western Uttar Pradesh over a period of 3 months from August 2018-October 2018. 200 children aged between 6 months to 59 months were screened who presented to the OPD with some problem and for vaccination. Informed consent was taken from the child attender for investigation and for obtaining relevant information. Following inclusion and exclusion criteria were applied for screening the cases

Inclusion criteria

1. Age between 6 months to 59 months.
2. Hemoglobin level less than 11 gm/dl
3. Serum ferritin level less than 12µg/L

Exclusion criteria

1. History of blood transfusion.
2. History hemolytic anemia or any blood disorder in family.
3. History of any chronic disease.
4. Anemia secondary to any hematological malignancy, leukemia, aplastic anemia.

After screening children on the basis of exclusion criteria, information on case history was obtained and physical examination of children was carried out. History, examination findings and reports were recorded in a predesigned pro forma. Blood investigation consisted of hemoglobin and haematocrit estimation, total red blood cell count, reticulocyte count, mean corpuscular volume, mean corpuscular hemoglobin concentration, red cell distribution width, white blood cell count: total and differential, erythrocyte sedimentation rate, peripheral blood smear examination. Iron studies like serum iron, serum ferritin, transferrin saturation and TIBC were done. Anemia was diagnosed as per the WHO cut off of Hemoglobin (Hb) level. Hb < 7 g/dL in 6-59 months and to categorize the degree of anemia, following cut-off points were used (13):

Mild anemia: 10.0-10.9 g/dL,
Moderate anemia:7.0-9.9g/dL,
Severe anemia: < 7 g/dL .

Data were entered into a Microsoft excel spreadsheet and then analyzed by SPSS 23 .

RESULTS:

Association of Socio-demographic profile of children with anemia is depicted in table 1.The proportion of anemia in children between 6 months and 5 years of age was 81.5%. Males to Females ratio of

children having anemia was 1: 1.03

Among 200 children screened, 37 children (18.5%) had a normal level of Hb, 48 children (24%) had mild anemia, 96 children (48%) had moderate anemia, and 19 children (9.5%) had severe anemia.

Pallor was one of the most evident sign during examination, although not all children with anemia had clinically significant pallor. Out of 200 children, clinical evidence of pallor was not seen in children with Hb >11 g/dl indicating no anemia. Children having mild anemia 50 % had clinical evidence of pallor. Ninety Seven percent children with moderate anemia had clinical evidence of pallor. In children with severe anemia all had evidence of pallor. Sixteen percent of the children could be missed if pallor alone was used as clinical sign to diagnose anemia.

Table 2 shows relative prevalence of anemia in male & female children.

Table 3 shows relative prevalence of anemia in children of different age group. In 6 months to 24 month age group. 93.2 % of children had anemia, and between the age group of 25 - 48 month and 49 - 59 month, 77.9% and 72.4 % of children had anemia respectively.

Complete blood count and peripheral blood smear examination were the most informative laboratory screening investigation. Reduction of mean packed cell volume (PCV) (21.92%), mean corpuscular volume (MCV) (63.95 fl) was seen in. Serum iron studies revealed, serum iron level (50.16mcg/dI) and mean transferrin iron-binding capacity (TIBC) level was increased (384.92 mcg/dI). Hypochromic anemia was seen in 78% whereas dimorphic anemia seen in 22 % cases.

Table 1: Association of Socio-demographic profile of children with anemia

Variable	Group	Number (%)
Gender	Male	100
	Female	100
Age (months)	6-24months	74(37%)
	25-48 months	68(34%)
	49-59 months	58(29%)
Anemia	No anemia	37 (18.5%)
	Mild Anemia	48 (24%)
	Moderate Anemia	96 (48%)
	Severe Anemia	19 (9.5%)
Socioeconomic Status	Lower	78 (39%)
	Upper lower	69 (34.5%)
	Lower middle	44 (22%)
	Middle	7 (3.5%)
	Upper middle	2 (1%)
Residence	Rural	114 (57%)
	Urban	86 (43%)

Table 2: Prevalence of anemia in male & female children

Gender	Anemia		
	Mild	Moderate	Severe
	No. (%)	No. (%)	No. (%)
Male	30(62.5%)	43(44.8%)	7(36.9%)
Female	18(37.5%)	53(55.2%)	12(63.9%)
Total	48	96	19

Table 3: Prevalence of anemia in children in different groups

Age	Anemia		
	Mild	Moderate	Severe
6-24 months	12(25%)	50 (52.08%)	7 (36.84%)
25- 48 months	14 (29.2%)	28 (29.16%)	11 (57.89%)
49-59 months	22 (45.8%)	18 (18.75%)	2 (10.52%)
Total	48	96	19

DISCUSSION:

Eighty two percent children were diagnosed to have anemia after the investigations in the current study. In a study done in the tribal area of Orissa, Sahu T et al has reported anemia in 93.8% of children below 5 years (14). Similar finding of high prevalence of anemia was seen in the study conducted by Saba F et al who reported anemia in 72.79% of children below 5 years of age (15) .Seventy eight percent of children under five had anemia according to NFHS-3 (7). According to WHO global database of anemia 1993- 2005, 74.3% of under five children are anemic. The ratio of anemia in males was less than in females, the ratio being 1:1.03 in the present study. This is in contrast with the study of Saba F et al who have reported a male: female ratio of 1.4:1. Also Ferreira et al in a study conducted in Brazil showed higher incidence of anemia in male children (16).

The higher incidence of anemia in female children in this part of world may be due to the ignorance in the care of female child as compared to the male child.

The present study has shown that around 95% children belonged to lower and lower middle class. In a similar study conducted by Kanchana et al 90% belonged to lower class and10% belonged to lower middle class who were having anemia (17). Mehrotra SK et al have reported that 78.4% of anemic children in their study belonged to lower socio-economic status (18).All children belonging to lower socio-economic status are prone for recurrent diarrhea, repeated respiratory tract and other infections. They are also prone for parasitic infestations. Their diet is also deficient in iron content. All these factors have contributed to development of anemia in these children. In the present study, 93% children had anemia, between the age group of 6 to 24 months. Sailaja et al(19) found similar results with 91.5% children suffering from various grades of anemia. (14.6%) children had mild anemia, 80 (61.5%) children had moderate anemia, and (15.4%) children were suffering from severe anemia (19). The main reason for such a high percentage of children with anemia in this age group is prolonged breast feeding, inadequate weaning practices.

Limitations of this study:

This study is based on a sample size of 200 which could be small for generalization of findings.

Only those patients who presented to the OPD with some problem have been investigated for anemia,

Any underlying diseases and confounding factors may be the contributing factors for anemia in patients which might have been missed.

CONCLUSION:

Iron and other micronutrient rich diet should be provided to the children. Prolonged breast feeding should be discouraged with introduction of complimentary feeding and weaning off practice to start after first 6 months of age. Regular de worming and proper sanitary facilities to be provided in the residential area of lower socio economic families.

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