

A Cross-Sectional Study to Determine the Prevalence of Nutritional Anaemia in Children of Age Between 6 Months to 18 Years

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Received: 05-11-2021 / Revised: 22-11-2021 / Accepted: 26-12-2021

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Conflict of interest: Nil

Abstract

Aim: To study the prevalence of nutritional anaemia in children of 6 months to 18 years of age.

Methodology: A cross-sectional study was conducted in the Department of Paediatrics, SNMMCH, Dhanbad, Jharkhand, India for a period of 6 months. Children of age between 6 months to 18 years were included in this study. Systematic random sampling technique was used to select the study participants. Every second children under 18 years of age in the department during study period was selected for assessment. Total approximately 420 patients visited the department during study period. With 5% non-response rate, 200 children were selected for the study. Based on WHO cut-off values, Children with Hb level <110 g/L were considered anemic. Anemic children were further categorized as children with mild anemia, moderate anemia and severe anemia which corresponds to Hb value 100–109 g/l, 70–99 g/l, and lower than 70 g/l respectively. Values were recorded on the questionnaire Performa and later analyzed.

Results: Out of the 200 children studied, majority were females and accounted for 106 (53%) of the subjects with males accounting for 94 (47%). 71 (35.5%) children belong to 6 months to 6 years of age group, 92 (46%) children belonged to the age group of 7 years to 14 years, and 37 (18.5%) children belongs to 15 years to 18 years of age group. Majority (73 cases, 36.5%) belonged to class IV (upper lower), with 61 cases (30.5%) belonging to class III (lower middle) socio-economic status according to Modified Kuppusswamy classification 2021. Majority were vegetarians constituting 134 cases (67%) and the rest 66 cases (33%) belong to non-vegetarians. 67.5% patients reported with pallor, 34% platonychia, 18.5% bald tongue, and 7% patients reported with murmur. 95 (47.5%) patients had normal range of Hb values, 56 (28%) had moderate anaemia followed by 28 (14%) patients with severe anaemia, while only 21 (10.5%) patients had mild type of anaemia.

Conclusion: This study has revealed that the prevalence of anemia in children is high and a matter of concern in the study area. Age, socio-economic status, and nutritional status are the factors significantly associated with anemia.

Keywords: Anaemia, Haemoglobin (Hb), Malnutrition, Platonychia, Pallor.

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Introduction

Anemia can be defined as a reduction in hemoglobin (Hb) concentration, hematocrit, or a number of red blood cells per litre below the reference interval for healthy individuals of similar age, sex, and race under similar environmental conditions [1]. In easy language, Anaemia is defined as a reduction of the hemoglobin concentration or RBC volume below the range of values occurring in healthy persons [2]. According to the World Health Organization (WHO), for under five children, the threshold Hb level for being anemic is less than 110 g/l [3].

Anemia is a global public health problem affecting 1.62 billion people globally, which corresponds to 24.8% of the population as per World Health Organization (WHO) [4, 5]. It occurs at all stages of the life cycle but is more prevalent in pre-school aged children (under five years). Globally, 293.1 million (47.4%) under five year's children are anemic. Several factors contribute to the occurrence of anemia and nearly half of (43%) the anemia cases in childhood are due to iron deficiency [6].

The causes of anemia are multifactorial, including the shortage of hematopoietic materials, infectious diseases, and inherited hemoglobin diseases [7]. The deficiency may result from inadequate dietary intake of iron, malabsorption of iron, an increased iron demand during rapid growth in children and chronic blood loss. Other causes of anemia include folate and vitamin B12 and A deficiencies, malaria, intestinal helminths, viral infections, chronic disease, hemoglobinopathies, hemolysis, and bone marrow disorders [8-11]. Different studies also claimed that factors such as age, sex, residence, early initiation of complementary food, under-nutrition, maternal health status, maternal education, and poor socioeconomic status are significantly associated with anemia [12-14].

Many observational studies indicate that the independent risk factors of anemia in children include preterm birth, low birth weight, and maternal anemia [15, 16]. Moreover, childhood anemia is closely related with feeding practice, complementary food introduction, social demographic characteristics, and family income [17, 18]. Childhood anemia will adversely affect the health of children, including physical development, and may cause irreversible damages to motion, cognitional and behavioral development [7, 19, 20]. Childhood anaemia is a preventable condition, which has serious consequences including growth retardation, poor immune system and increased susceptibility to diseases [21], and death [22].

Materials and Methods

A cross-sectional study was conducted in the Department of Paediatrics, SNMMCH, Dhanbad, Jharkhand, India for a period of 6 months. Children of age between 6 months to 18 years were included in this study. Systematic random sampling technique was used to select the study participants. Every second children under 18 years of age in the department during study period was selected for assessment. Total approximately 420 patients visited the department during study period. With 5% non-response rate, 200 children were selected for the study.

Inclusion criteria

Children with nutritional anaemia attending Department of Paediatrics SNNMCH Dhanbad.

Exclusion criteria

Children with congenital disease, or children who lost blood by traumatic injury or surgery, taking iron and Vitamin-A supplements during the last 3 months and those who were taking antihelmintic drugs in 3 months were excluded from the study.

Pretested and structured questionnaires were used to collect socioeconomic and demographic characteristics of the family and child, feeding practice and other risk factors by interviewing mother/caregivers of the child. Haemoglobin concentrations were measured using photometric method. Based on WHO cut-off values, Children with Hb level <110 g/L were considered anemic. Anemic children were further categorized as children with mild anemia, moderate anemia and severe anemia which corresponds to Hb value 100–109 g/l, 70–99 g/l, and lower than 70 g/l respectively. Values were recorded on the questionnaire perform and later analyzed.

Out of the 200 children studied, majority were females and accounted for 106 (53%) of the subjects with males accounting for 94 (47%). 71 (35.5%) children belong to 6 months to 6 years of age group, 92 (46%) children belonged to the age group of 7 years to 14 years, and 37 (18.5%) children belongs to 15 years to 18 years of age group. Majority (73 cases, 36.5%) belonged to class IV (upper lower), with 61 cases (30.5%) belonging to class III (lower middle) socio-economic status according to Modified Kuppaswamy classification 2021. Majority were vegetarians constituting 134 cases (67%) and the rest 66 cases (33%) belong to non-vegetarians.

Results

Table 1: Demographic details

Variables		Number	%
Gender	Male	94	47%
	Female	106	53%
Age	6 months-6 years	71	35.5%
	7-14 years	92	46%
	15-18 years	37	18.5%
Socio-economic status	Class I	19	9.5%
	Class II	26	13%
	Class III	61	30.5%
	Class IV	73	36.5%
	Class V	21	10.5%
Dietary habits	Vegetarian	134	67%
	Non-vegetarian	66	33%

67.5% patients reported with pallor, 34% platonychia, 18.5% bald tongue, and 7% patients reported with murmur. 95 (47.5%) patients had normal range of HB values, 56

(28%) had moderate anaemia followed by 28 (14%) patients with severe anaemia, while only 21 (10.5%) patients had mild type of anaemia.

Table 2: Signs, symptoms and type of anemia of patients

Variables		Number	%
Signs & Symptoms	Pallor	135	67.5%
	Platonychia	68	34%
	Bald tongue	37	18.5%
	Murmur	14	7%
Type of anaemia	Normal	95	47.5%
	Mild (Hb value-100–109 g/L)	21	10.5%
	Moderate (Hb value-70-99 g/L)	56	28%
	Severe (Hb value-<70 g/L)	28	14%

Discussion

Anemia, which is the most prevalent nutritional problem worldwide occurs more commonly in young children, pregnant women and women of childbearing age. The prevalence of iron deficiency anemia, which is the commonest cause for anemia is 52% in Indian women aged 15–49 years, as per WHO statistics [23]. In our study 105 patients had anaemia out of 200 patients which means a prevalence of 52.5%, it is approximately same as of WHO statistics of anemia in Indian women.

Many of the published observational studies have confirmed that child age is a key determinant factor on anemia [24-27]. An epidemiological investigation in Iran reported that the older age of children was a protective factor for childhood anemia and the risk of anemia decreased by 12% with the rise of 1 month of age [26]. A cross-sectional study conducted by Endidaye in Ethiopia found that the risks of anemia in age groups of 6–11 months and 12–23 months were 5.67 and 5.80 times of the age group of 48–59 months respectively [27]. The association of child age with anemia in our study was consistent with the above researchers found that as the child getting older, the overall anemia prevalence decreased from 22.3% (in the age group of 6–11 months) to 6.2% (in the age group of 60–71 months) which meant that children at younger age were the most vulnerable group for anemia.

Like the overall anemia prevalence, age group was also associated with the anemia severity, as younger age was a risk factor of both mild anemia and moderate/severe anemia. In our study also, majority of patients (28%) had moderate anaemia followed by 14% patients with severe anaemia, while only 10.5% patients had mild type of anaemia. Since the age group of 6–23 months was the key period for complementary food introduction and

eating habits nurturance, inappropriate complementary food introduction or poor eating habits in this age group would easily cause insufficient intake of iron nutrient and led to iron-deficiency anemia [25, 28, 29].

Malnutrition often coexists with other micronutrient deficiencies (e.g. iron, zinc, folate, vitamin A, vitamin B₁₂) which may increase the development of anemia by a synergistic association. Rachana Bhoite, Uma Iyer et al (2011) studied the magnitude of malnutrition and anaemia in rural school children of Vadodara. 3010 rural school children from 1 to 7 standard. Malnutrition was highly prevalent with 70% of children being underweight. Stunting was evident in 32.4% of girls and 30.8% boys. The prevalence of severe underweight children was 37% by CDC standards while it was 27% by WHO 2007 standards. Clinical signs and symptoms of various micronutrient deficiencies like Iron (33.5%), vitamin A (8.12%) were also seen. Dietary pattern showed that majority of the children skipped the breakfast and consumption of MDM was intermittent. Prevalence of anaemia was 73% and the severity was more in undernourished children. Sensitivity of 64% and specificity of 44 % was obtained for correlation between haemoglobin and clinical signs and symptoms of iron deficiency anaemia [30]. Usually, the causes of anemia and underweight (malnutrition) are similar and aggravated by poverty and food insecurity. Food insecurity affects the nutritional status of children by compromising the quantity and quality of dietary intake, which contributes for development of anemia [31].

Conclusion

This study has revealed that the prevalence of anemia in children is high and a matter of concern in the study area. Age, socio-economic status, and nutritional status are

the factors significantly associated with anemia. Therefore, the policymakers should make a strategy that can reduce poverty and increase the awareness of women on breastfeeding, nutrition, and other associated factors to reduce anemia.

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