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Original Research Article

Study on incidence and clinical profile of anemia in children aged 1 years to 15 years attending tertiary care hospital

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ABSTRACT

Background: Children are considered as an important asset for any country and their health as one of the important indicators of a healthy country. There are various factors influencing children's health, with anemia being one of them. Anemia is a major global health problem, especially in developing countries like India, despite the fact that this problem is largely preventable and easily treatable.
Methods: It is a descriptive study conducted in 140 children aged 1 year to 15 years who presented with anemia in the department of pediatrics at Navodaya Medical College Hospital and Research Center, Raichur. Aim was to study the incidence and profile of anemia in children aged 1 years to 15 years.
Results: A total 0f 140 cases aged between 1- 15 years were included in the study. The highest number of cases occurred in the 11-15 years age group (38.5%), followed by the 6-10 years group (35.0%). There is more female preponderance in this study (55.7%) compared to males (44.2%). Moderate degree of anemia was the commonest grade of anemia (42.8%) The most common cause of anemia in this study was iron deficiency, accounting for 58 cases (41.4%) followed by 17 cases (12.1%) had megaloblastic anemia.
Conclusions: Iron deficiency anemia is a preventable cause of cognitive impairment, and early interventions can prevent the morbidity and mortality associated with anemia. Despite the implementation of national programs to combat iron deficiency, the problem persists. Early detection of anemia among these children enables the planning of suitable interventions, such as nutritional education for mothers, growth monitoring, nutritional supplementation, deworming, and more, to effectively address and mitigate the issue.

Keywords: Anemia, Iron deficiency anemia, Megaloblastic anemia

INTRODUCTION

Anemia is the most prevalent hematologic issue found in infants and children. Approximately a quarter of the world's population suffers from anemia, almost 2 billion people, with almost half of children <5 years of age affected in 2016.[1] Anemia remains a significant global health issue, particularly in developing nations such as India, even though it is largely preventable and treatable. 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.[2] According to National Family Health Survey, India (NFHS V 2019-21), the prevalence of anemia in Indian children is 67.1%.[3] Nutritional anemia is the most common form with nearly half of all cases resulting from iron deficiency.[4] The deficiency can be caused by insufficient dietary iron, poor iron absorption, increased iron requirements during periods of rapid growth in children, and chronic blood loss. Deficiencies in vitamin B12 and folate also play significant roles in the development of anemia.[5] Other causes of anemia include malaria, intestinal helminthes, viral infections, chronic disease, hemoglobinopathies, hemolysis, and bone marrow disorders.[6] Anemia in infancy and early childhood is

associated with behavioral and cognitive delays, including impaired learning, decreased social achievement.[7] Due to the severe long-term impacts and high prevalence of nutritional deficiencies, preventing them in early childhood is a critical public health concern. The early detection of anemia in these children has facilitated the planning of suitable interventions. This proactive approach is expected to positively impact their overall growth and development in the long term. The main objective is to study the Incidence and profile of anemia in children aged 1 years to 15 years.

METHODS

Hospital based cross-sectional study design was conducted from august 2023 to December 2023 at Navodaya Medical College Hospital and Research Center, Raichur involving 140 children aged 1 year to 15 years by employing convenient sampling technique.

Selection criteria

Children aged 1-15 years who were admitted in pediatric ward with history of pallor were selected.

Inclusion criteria

Patients with anemia in age group of 1 year to 15 years admitted in pediatric ward were included.

Exclusion criteria

Children less than 1 years and teenagers more than 15 years, patients collapsed due to congestive cardiac failure after admission, malnutrition, patients with communicable diseases were excluded.

Procedure

An informed consent was taken from parents of all children who were included in the study. A detailed history was recorded and a thorough clinical examination of every child was done. Data of socio-demographic characteristics were collected using a questionnaire. Routine investigations for anemia and for its causes was done. WHO criteria for anemia and to grade of severity is used for diagnosing anemia.

Statistical analysis

All statistical analysis was performed according to intention to treat principle by statistical package for the social sciences (SPSS) software version 27 for Windows (SPSS Inc., Chicago, IL, USA). Data was entered into Microsoft excel data sheet and was analyzed using SPSS 27 version software. Categorical data was represented in the form of frequencies and percentage. Chi-square test/pooled Chi square was used as test of significance for qualitative data.

RESULTS

A total 0f 140 cases aged between 1-15 years were included in the study. The highest number of cases occurred in the 11-15 years age group (38.5%), followed by the 6-10 years group (35.0%), and the 1-5 years group (26.4%). There is more female preponderance in this study (55.7%) compared to males (44.2%) as shown in Table 1.

Table 1: Distribution of study participants according to socio-demographic characteristics (n=140).

Variables	Number	Percentage
Age (years)		
1-5	37	26.4
6-10	49	35
11-15	54	38.5
Sex		
Male	62	44.2
Female	78	55.7

From Table 2, we can conclude that about 51 (36.4%) children had severe anemia. 60 (42.8%) moderate anemia and 29 (20.7%) mild anemia. On application of Chi-square test, there was no significant association with Chi square value of 1.73 and p value of 0.785.

Table 2: Severity of anemia by age.

Grade of anemia	1-5 years	6-10 years	11-15 years	Total (%)
Mild	5	11	13	29 (20.7)
Moderate	18	20	22	60 (42.8)
Severe	14	18	19	51 (36.4)
Total	37	49	54	140 (100)

Weakness and fatigability were the most common presenting symptom observed in 64.2% of children. On general examination, pallor was seen in 100% of patients (Table 3).

Table 3: Significant history and examination findings of children.

Clinical signs and symptoms	No. of cases	%
Pallor	140	100
Jaundice	18	12.8
Fever	10	7.1
Cough/difficulty in feeding	30	27.2
Siblings with similar complaints	8	5.7
Weakness and fatigability	90	64.2
History of Pica	30	21.4
History of worm infestation	16	11.4
Splenomegaly	20	14.2
Hepatomegaly	30	21.4
Koilonychia	20	14.2

The most common cause of anemia in this study was iron deficiency 58 (41.4%), followed by 17 (12.1%) had megaloblastic anemia and 16 (11.4%) cases were diagnosed as thalassemia (Table 4).

Table 4: Etiological diagnosis in children.

Anemia type	Frequency (%)
Iron deficiency anemia	58 (41.4)
Megaloblastic anemia	17 (12.1)
Malaria	12 (8.5)
Anemia of chronic disease	11 (7.8)
Beta thalassemia	16 (11.4)
Sickle cell anemia	2 (1.42)
Aplastic anemia	4 (2.8)
Worm infestion	9 (6.4)
Renal disease	7 (5.0)
Malignancy	4 (2.8)

DISCUSSION

Anemia is a major health problem affecting children of all age groups causing significant mortality and morbidity. This study assessed the incidence and factors of anemia among children aged 1-15 years. About 140 patients of anemia between the age group of 1 year to 15 years have been studied. The highest number of cases occurred in the 11-15 years age group (38.5%), followed by the 6-10 years group (35.0%), and the 1-5 years group (26.4%). In the present study, the majority (55.7%) of participants were female, while male contributed around 44.2% of study population. In the study by Jain et al, out of the 113 subjects in the 5 years to 16 years category, 33.4% were males and 66.6% were females.[8] In the study by Singh et al, out of the 412 subjects in the 6 years to 11 years category, 43.9% were males and 56.1% were females.[9]

In this study, the moderate degree of anemia (42.8%) was high when compared with the mild anemia and severe anemia which were found to be 20.7% and 36.4%, respectively. In another study conducted by Vishwanath et al· it was found that of the 100 children evaluated 89 children had iron deficiency anemia and 48% had mild, 42% had moderate, and 10% had severe anemia.[10]

The most common cause of anemia in this study was iron deficiency, accounting for 58 cases (41.4%). 17 cases (12.1%) had megaloblastic anemia, 16 cases (11.4%) were diagnosed as thalassemia, 12 cases (8.5%) had malaria, 11 cases (7.8%) had anemia of chronic disease, and 2 cases (1.42%) had sickle cell disorders. Worm infestation was seen in 9 cases (9.6%), and aplastic anemia and malignancy were seen in 2.8% of cases. Madoori et al found that of 58% (183) children were anemic due to iron deficiency anemia while 9 % (29) were thalassemic and 27% (85) were sickle cell disorder. 5% (16) cases had megaloblastic anemia and 2% (6) with aplastic anemia.[11] Venkatesh et al reported iron deficiency anemia the most common followed by dimorphic anemia and megaloblastic anemia.[12]

Limitations

In this study, children less than 1 years and teenagers more than 15 years were not included. Sample size is small. Also, study is conducted over a limited period of time.

CONCLUSION

In the present study the most common cause of anemia among children aged 1 years to 15 years is Iron deficiency anemia followed by megaloblastic anemia. Despite the implementation of national program to combat iron deficiency, the problem persists. Providing timely weaning foods, reducing infections through proper immunization, regular deworming, and maintaining good personal hygiene will help prevent anemia. Fortification of food items with iron and iron supplementation is recommended to prevent IDA in all the age groups.

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