Research Paper Medical Science

Clinical Study of Anaemia in Children Under 5 Years of Age and its Awareness Amongst Their Parents

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ABSTRACT

Background: Even though more than 75% of toddlers are said to be anaemic according to the NHFS-3 of 2005-06, the available data on factors associated with it in India is limited.
The objective of this study was to know the clinical profile, pattern and cause of anaemia along with the nutritional status in children under five years of age and also to know the awareness about anaemia amongst their parents.
Materials and Methods: A cross-sectional study was conducted over a period of four months at SKNMC&GH, Pune, Maharashtra, India.
All anaemic children between ages 12 to 60 months having haemoglobin less than 11 g/dl, admitted to the Pediatric ward were enrolled for the study. Critically ill children or those who had received a blood transfusion or had hemoglobinopathy, malarial infection or hookworm infestation were excluded from the study. Anthropometric measurements, nutritional intake were recorded. In addition, a questionnaire was given to the parents to know their awareness about anaemia.
Results: Out of 100 anaemic children studied 74%(n=74) had microcytic hypochromic anaemia, 9 children had haemoglobin less than 7 g/dl. 24 children were undernourished, 21 had moderate acute malnutrition (MAM) and 14 children had severe acute malnutrition (SAM). 5% (n=7) of the mothers knew what anaemia is and only 1 % (n=2) of mothers knew the cause of anaemia.
Conclusion: It is seen that undiagnosed and untreated anaemia can have serious ramifications in the growth phase of children. It is imperative that anaemia is diagnosed at an early stage. Strategies for minimizing childhood anaemia must include optimized iron intake along with maternal education involving its awareness and its prevention.

KEYWORDS Anaemia, Maternal education.

INTRODUCTION:

The World Health Organisation (WHO) defines Anaemia as a condition in which the number of red blood cells (and consequently their oxygen-carrying capacity) is insufficient to meet the body's physiologic needs. The specific physiological needs in an individual vary amongst which age, gender, altitude and pregnancy play a major role. In children below five years of age, a haemoglobin level of below 11g/dl is considered as anaemic.[1] It has been estimated by the WHO that anaemia shows highest prevalence among pre-school children and out of 293 million children worldwide, about 89 million are in India.[2] The third National Family Health Survey (NFHS-3) of 2005-06 revealed that the prevalence of anaemia was 78.9% in children between 6-35 months of age and 70% in children below five years of which the rural population showed a predominance of 80.9%. Alleviating childhood anaemia is a public health priority, because it is associated with impaired cognitive and psychomotor development,[3,4] and functional abnormalities of lymphocytes and neutrophils.[5-7]. Once afflicted, this impairment is difficult to eradicate even after treatment of anaemia thus affecting the child's immunity, and mental development in adulthood.

The aim of this study was to know the clinical profile, pattern and cause of anaemia along with the nutritional status in children under five years of age who were admitted in Paediatric ward of Smt Kashibai Navale Medical College and General Hospital (SKNMC&GH), Pune and also to know the awareness about anaemia and its prevention; amongst their parents.

MATERIALS AND METHODS:

A cross sectional study was conducted on 100 anaemic children admitted to the Pediatric ward of SKNMC&GH Pune, Maharashtra, India. The inclusion criteria was anaemic children aged five years or below, admitted to this ward. Children- who were critically ill; with known haematological disorders; on iron supplements; with known haemolytic anaemias; malignancies and children with haemoglobin more than 11g/dl were excluded from the study. The details of their clinical profile, presentation and blood investigations were recorded from the case file. Complete general and systemic examination was done and anthropometric measurements of height and weight were recorded. A pre- decided questionnaire in both Marathi and English to know the awareness and knowledge regarding anaemia was given to the parents of these children. The data was then tabulated and statistically analyzed using appropriate software with the help of a statistician. All necessary facilities were available at SKNMC and GH, Pune. The Institutional Ethics Committee approved the entire experimental protocol. 2ml of venous blood was collected by venipuncture in dried EDTA containers for hematological estimation, All hematological parameters were measured by using a fully automated analyser Sysmax KX-21 and readings were recorded from children's files.

RESULT:

For this study, a total of 100 children were included. The number of male and female children was 60 and 40 respectively (ratio of males to females was 3:2) with an age range of 1 to 5 years as shown in *Table 1*.

Table 2 **shows haemoglobin level and number of children. On the basis of haemoglobin levels, they were classified into three categories mild, moderate and severe.**

Table 3 **shows association of anaemia with commonly occurring complaints.**

Table 1- Ratio of Male: Female Children

No. of Male Children	60
No. of Female Children	40
Ratio of Male: Female	3:2

Table 2- Showing levels of Haemoglobin and number of children

The definitions of anaemia and guidelines for haemoglobin level were taken from the WHO recommendations. [8]

Hb Level (g%)	No. of Children (n)
Less than 7 (Severe)	9
Between 7-9.9 (Moderate)	44
Between 10-10.9 (Mild)	47

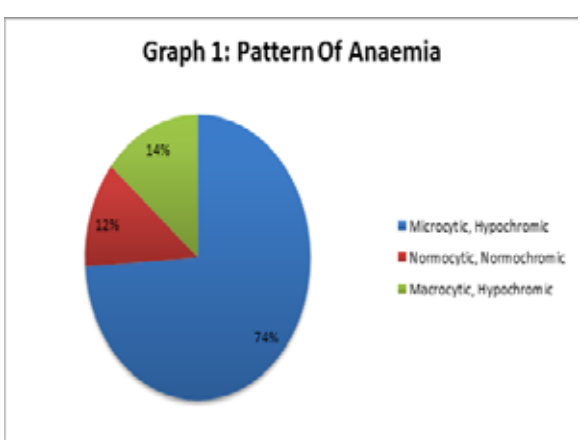
Table 3- Associated common complaints found in anaemic children:-

Anaemia associated with:	No. of Children (n)
1. Cough, cold, fever	35
2. Loose motions, Vomiting, Abdominal pain	15
3. Fever, Vomiting	8
4.CNS complaints	23
5. Difficulty in gaining weight	1
6. Skin infections	2
7. Renal Complaints	16

Thus, it is seen that anaemia is a hidden deficiency as all the children were admitted for some complaints and anaemia was an incidental finding in their routine blood report.

Out of 100 anaemic children, it was shown from their blood reports (*Graph 1*) that- 74% (n=74) had microcytic hypochromic anaemia; 14% (n=14) had macrocytic, hypochromic anaemia; and 12% (n=12) had normocytic, normochromic anaemia. Thus prevalence of microcytic hypochromic was seen to be the most common and normocytic and macrocytic was uncommon.

Graph 1 - Peripheral Blood Smear findings and pattern of anaemia



From a total of 100 children, it was found that- amongst 60 boys 40 girls, 25 boys and 16 girls were categorized as "Normal" i.e. those having Z scores that fell within Median and a Standard Deviation (SD) of -1; 13 boys and 11 girls as "Under Nourished" i.e. those having Z scores that fell within SD -1 to -2; 15 boys and 6 girls as "Moderate Acute Malnutrition (MAM) i.e. those having Z scores that fell within SD -2 to -3; 7 boys and 7 girls as "Severe Acute Malnutrition (SAM) i.e. those having Z scores that fell within -3 to -4 ***(Graph 2).***

Using the WHO Weight for Length Reference Card for Boys and Girls [9] the Nutritional Status can be known by obtaining the Z scores as:

Graph 2 – Categorization of children studied into Normal, Undernourished, MAM, SAM.

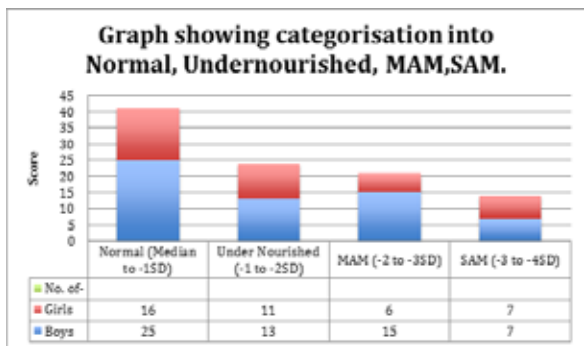
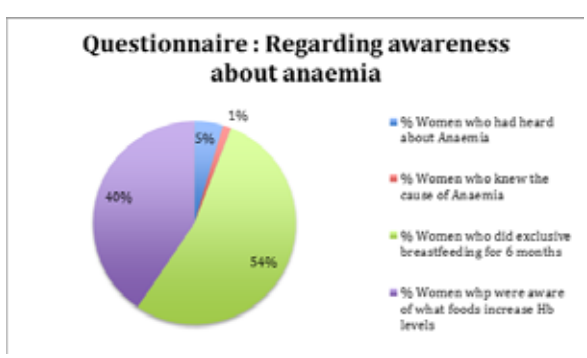


Table 3 and Graph 3 show the awareness and knowledge of the parents regarding the cause of anaemia, role of diet in its prevention and knowledge about breast-feeding pattern.

Table 3:

	(n)
No. Of Women who had heard about Anaemia	7
No. Of Women who knew the cause of Anaemia	2
No. Of Women who did exclusive breastfeeding for 6 months	82
No. Of Women who were aware of what foods increase Hb levels	62

Graph 3: Questionnaire asked to parents to know about knowledge of Anaemia.



DISCUSSION-

Out of 100 children studied, who were found to be anaemic, most of them- (35%) had been admitted for Respiratory tract infections and (23%) for CNS manifestations, which mainly included febrile convulsions. Other illnesses included- GIT disturbances (15%), fever (8%), skin infections (2%), difficulty in gaining weight (8%) and urinary tract infections (16%). Thus, it is seen that anaemia by itself predisposes a child to recurrent infections. [3-7]

Using the WHO guidelines for haemoglobin concentrations, [8] 47 children had mild anaemia, 44 had moderate anaemia and 9 had severe anaemia.

Severe anemia is a very serious problem because complete recovery and restoration of health is very rare, and there is a high risk of child mortality. The reason of high prevalence of severe anemia in this study could be a lack of adequate dietary intake of micronutrients like Iron, Vitamin B12, and low protein diet. [10] Further, a weak economical status declines the availability and accessibility of nutrient rich food to the community. [10, 11] This is of further concern as the cases found to be severely anaemic in this study had been admitted for other diseases and the anaemia would have gone undiagnosed and untreated as it turned out to be an incidental finding in the course of the routine investigations.

The calculations for assessing the nutritional status of the children done using WHO weight for length reference charts, [9] revealed that out of 100 children, amongst 60 boys and 40 girls, 25 boys and 16 girls were normal and had adequate nutritional status, 13 boys and 11 girls were under nourished, 15 boys and 6 girls suffered from MAM and 7 boys and 7 girls had SAM.

Most of the children showed predominance of microcytic, hypochromic anaemia (74%) the others had macrocytic, hypochromic (14%) and normocytic normochromic anaemia (12%).

The results of the questionnaire given to the parents of the children revealed that only 5% (n=7) of the women had heard about anaemia, only 1%(n=2) were aware of its cause, 40% (n=62) of women were aware of what food to take to increase haemoglobin levels in blood and 54% (n=82) women did exclusive breastfeeding for the first 6 months.

The WHO recommends introducing solid and semisolid food at the age of six months because breastfeeding does not suffice to maintain optimal growth after this age. From the questionnaire, 100% of the women said that they supplemented the breast milk with solid/ semisolid food after 6 months of age [12,13]. Iron deficiency is said to be the leading cause of anaemia globally. [14]

From the assessment of nutritional status and the clear predominance of microcytic hypochromic anaemia, it can be assumed that most of the children suffered from Iron deficiency anaemia [15]. Iron deficiency anemia among preschool children is a major public health problem in Southeast Asia [16,17] as was seen in our study. Anaemia is a late indicator of iron deficiency and its most common manifestation [18] so it is estimated that the prevalence of iron deficiency is 2.5 times that of anemia. [19,20] Iron deficiency adversely affects the cognitive performance, [21] behavior, and physical growth of infants, preschool and school-aged children; the immune status and morbidity from infections of all age groups; and the use of energy sources by muscles and thus the physical capacity and work performance of adolescents and adults of all age groups. [22]

Since this study was conducted in a large rural, charitable hospital, most of the patients included in this study came from low socio-economic strata. This factor probably added to the increased incidence of anaemia in the hospitalized patients. Since all the patients were admitted for an apparently unrelated illness, the prevalence of anaemia was probably over estimated. To avoid imposing additional financial burden on the parents and due to unavailability of funding resources, investigations like serum Iron studies, Ferritin levels, VitB12 levels were not done.

CONCLUSION-

In this study, it was seen that most children who were admitted for illnesses other that anaemia had low haemoglobin. 74% of them had microcytic hypochromic anaemia, which was most probably nutritional. 9% had severe anaemia. It is important to note that 95% of the interviewed parents were not aware of anaemia and its repercussions on health of the child. Since undiagnosed and untreated anaemia can lead to other serious ramifications in the growing up phase in children, it is imperative that it is diagnosed at an early stage and appropriate and timely measures be taken to prevent anaemia by increasing its awareness amongst the parents.

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