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Prevalence of Iron Deficiency Anemia among Under Five Years Children in a Tertary Health Care Centre of Nepal

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ABSTRACT

Introduction

Globally 39.8% children under five years old are anemic, with prevalence of childhood anemia in Nepal reported to be 52.7% by 2016.The aim of this study is to analyze the prevalence of anemia among pediatric age group between 2 months to 60 months.

Methods

A prospective cross-sectional study was conducted from 15st March 2019 to 14th August 2019 at Nobel Medical College Teaching Hospital among children presenting to pediatric department between ages 2 to 60 months.Children with known history of hemolytic disorders, malignancies and chronic diseases were excluded from the study. Hemoglobin level and Mean Corpuscular Volume (MCV) was obtained. Data was analyzed by using SPSS-16.

Results

Total 500 children selected randomly for the study, 234 (46.8%) children were non-anemic while mild anemia was seen in 86 (17.2%), moderate anemia in 155 (31.0%) and severe anemia in 25(5.0%) children.Mean hemoglobin was 10.2 gm/dl with standard deviation of 1.847. Among male 45.6% were anemic whereas 42.7%female were anemic.Children of age group 2 to 12 months had higher percentage of anemia with 76.2% being anemic. Among 266 anemic children 219 (82.3%) had MCV below the normal range.

Conclusions

This study shows the higher prevalence of anemia in children between 2 to 60 months of age. Microcytic anemia was more common which represents higher prevalence of iron deficiency anemia among anemic children.

Keywords: anemia; children; iron deficiency; microcytic anemia.

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INTRODUCTION

Anemia is 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.[1]6 The most common causes of anemia include nutritional deficiencies, particularly iron deficiency, though deficiencies in folate and vitamin B12 and A are also important causes;hemoglobinopathies; and infectious diseases, such as malaria, tuberculosis, HIV and parasitic infections. The WHO has estimated that globally 39.8% children under five years old are anemic, with a prevalence of 49%in South-East Asia region with greatest number of children affected are in Africa region which is 60.2%.[2] In 2011 the prevalence of childhood anemia in Nepal was reported to be at 46.2%, which increased to 52.7% by 2016.[3] Anemia is an indicator of both poor nutrition and poor health. Anemia during the first two years of life adversely affects different aspects of child growth and development like cognitive performance, behavior, developmental milestones and subsequent preschool and school performance of child, as more than 90% of brain growth and most of development is completed by the age of 2 years.[4]

Breast milk is relatively low in iron so after 6 months of age there is increased risk of Iron Deficiency Anemia (IDA) if there is no sufficient iron in complementary diet. The main risk factors for IDA include a low intake of iron, poor absorption of iron from diets high in phytates or phenolic compounds, and period of life when iron requirements are especially high (growth and pregnancy). IDA is one of the common types of malnutrition in Nepal and is one of the leading cause of childhood morbidity and death but its prevention remains a significant challenge.[3] Although investigations for screening anemia are usually done among children visiting a hospital, data in children from tertiary centers is scarce. The aim of this study is to analyze the prevalence of anemia among pediatric age group between 2 months to 60 months. Moreover, this study can provide some insight for prevention of anemia among children's.

METHODS

A cross-sectional study was conducted in the Department of Pediatrics at Nobel Medical College Teaching Hospital (NMCTH) over the period of 15th March 2019 to 14th August 2019. Ethical approval for the study was obtained from the institutional review committee (IRC) of the institute (Ref No. IRC no:251/2019). Total 500 children between 2 months to 60 months of age who presented to Department of Pediatrics of Nobel Medical College were included in this study. Children with known history of hemolytic disorders, malignancies and chronic diseases were excluded from the study. Data of the children like age, sex, iron supplement or fortified food supplement was obtained.

Hemoglobin concentration of the children was measured from venous blood sample. Mean Corpuscular volume (MCV) which is mean volume of all the red blood cells in a sample was also noted. Normal MCV range is considered as 80-94 fL(femtolitres).[5]Anemia in children classified as non-anemic (≥11gm/dl), mild anemia (10gm/dl -10.9 gm/dl), moderate anemia (7gm/dl-9.9 gm/dl) and severe anemia (<7gm/dl) based on age group and altitude adjustment.[16] in the descriptive statistics mean and standard deviation were calculated for continuous variable while frequency and percentage for categorical variable. Data was analyzed by using SPSS (statistical package of social sciences) version 16.0.

RESULTS

Among 500 children majority 172(34%) of the children were in the age 2-12 month, followed by 13-24 month 103(21%) likewise in gender 54%

were male and reaming were female children (Table 1).

Table 1. Age and gender wise distribution of children (n=500).

Variable	No.(%)
Age (Month)	
2-12	172(34)
13-24	103(21)
25-36	97(19)
37-48	56(11)
49-60	72(14)
Gender	
Male	270(54)
Female	230(46)

This study showed that 234 (46.8%) children were found to be non-anemic. Mild anemia was seen in 86 (17.2%) children, moderate anemia in 155 (31.0%) and severe anemia in 25(5.0%) children as depicted. The Mean±SD of Hemoglobin was, 10.2 ±1.84 gm/dl (Table 2).

Table 2. Prevalence of Severity of Anemia (n=500)

Severity of Anemia	Number (%)
Non-anemic	234 (46.80)
Mild anemia	86 (17.20)
Moderate anemia	155 (31)
Severe Anemia	25 (5)

There were 270 male children in our study among which 123(45.6%) male were non anemic and 147(54.4%) were anemic. Among 230 female children under study 111(42.7%) were non anemic and 119 (51.7%) were anemic as shown in figure 1.

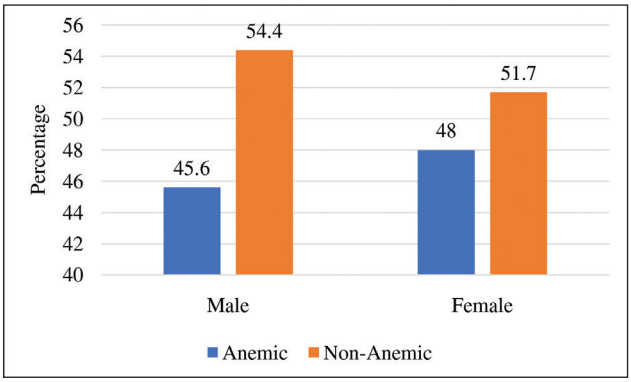

Figure 1. Anemia among gender wise

Among the children under study 172 were of age group 2 to 12 months of age with 131 (76.2%) being anemic. Similarly, 67 (65.0%) children of age group 13 to 24 months were anemic. Among children of age groups 25 to 36 months 24, (24.7%) children were anemic, 23(41.1%) were anemic among children of 37 to 48 months age group whereas 21 (29.2%) children were anemic among 49 to 60 months as shown in bar chart in figure 2.

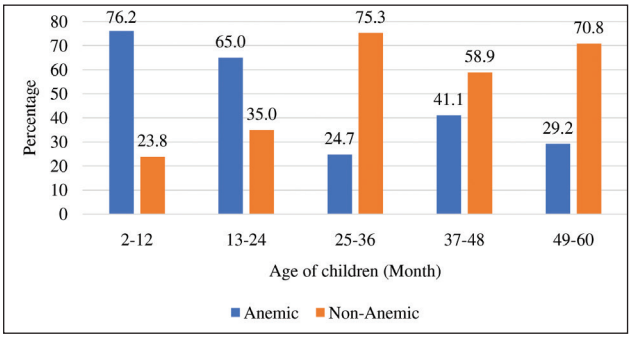

Figure 2. Anemia among children of different age groups.

Among 266 anemic children 219 (82.3%) had MCV below the normal range which are considered to be microcytic anemia. Among children under study 228 were taking iron supplement or fortified food supplement containing iron; 114 (50%) of which were anemic. No supplemental iron was being taken by 272 children among which 152 (55.9%) children were found to be anemic as shown in figure 3.

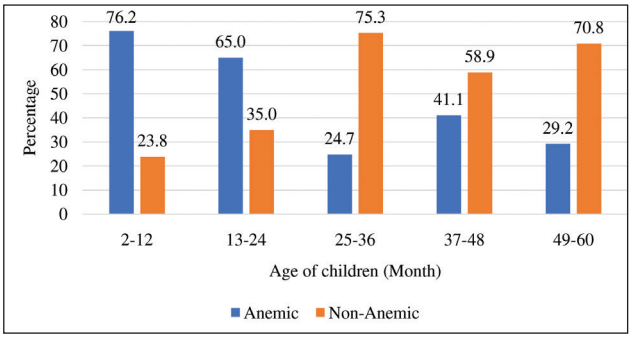

Figure 3. Anemia in children taking supplemental iron or fortified food and not taking any iron supplement.

DISCUSSION

In this study we observed the prevalence of anemia in under 5 years old children admitted to a tertiary care hospital and was compared to results from related studies. The prevalence of anemia was 53.2 % in our hospital which is comparable to the prevalence of anemia in our country (52.7%).[3] Similar study done by MathemaS et al shows the prevalence of anemia in 38.2% children between 6 months to 60 months of age whereas prevalence is comparatively high in some hospital study Saba et al 72.79% and Kanchana et al77.8%.[6–8]especially in the developing countries. This shows the high prevalence of anemia in children in south asian countries. Among the anemic children moderate anemia was most common (31.0%) in our study whereas mild anemia was most common in other similar hospital study (31.2%- 32.7%).[6,9] This increase in cases of moderate anemia is most likely due to undiagnosed cases of nutritional anemia due to lack of proper nutritious diet to children. In our study there was male predominance in anemia with 54.4% male being anemic while 42.7% female were anemic. There was male predominance of anemia in under 5 years old children in other similar hospital studies (58%-72%).[8,9] Higher percentage of females (42.4%) were anemic than males (34.8%) in study done in school going children in eastern Nepal.[10] This shows the increased risk of anemia in female with age during childhood which is likely due to poor feeding habit in female. Among anemia 82.3% cases were microcytic anemia which indicate the higher prevalence of iron deficiency anemia among the anemic children as iron deficiency anemia is most common cause of microcytic anemia.[11] Among age group there was higher percentage of anemia in infants (76.2%) compared to other age group in our study. Similarly, infants had higher prevalence of anemia in other hospital studies.[8,9]In age group of 13-24 months the percentage of anemia was 65% while 29.2% children were among 49-60 months age group. This shows the decreased prevalence of anemia with age in children. Among children taking iron supplement or fortified food supplement containing iron114 (50%) were anemic while more percentage of children were anemic 55.9% among those not taking any iron supplement. This shows lower risk of anemia in children taking iron as supplement or fortified food because iron deficiency anemia is the most common nutritional anemia. Despite taking iron supplement or fortified food many children are found to be anemic which is likely due to inadequate intake with proper dose and for proper duration according to the age and weight of the children. Regular intake of iron rich food throughout the year among children is necessary to prevent and reduce the risk of iron deficiency anemia.[12]

CONCLUSIONS

Our study shows the higher prevalence of anemia in children between 2 months to 60 months of age group which was most common among infants. Microcytic anemia was more common which represents higher prevalence of iron deficiency anemia among anemic children.

Iron deficiency anemia was preponderance in male. Thus this study comes to conclude that the regular iron rich diet could prevent the prevalence of iron deficiency anemia among under 5 years old children.

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