ORIGINAL ARTICLE

Frequency of Iron Deficiency Anemia in Children from 6 months to 6 years

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ABSTRACT

Aim: To determine the frequency of iron deficiency among children with anemia aged sixmonths to sixty months.
Material: This cross-sectional descriptive study including200children with anemia of both genders aged between 6 to 60 months was conducted a Department of Pediatric Medicine, DHQ Teaching Hospital Sargodha from 3rd July 2017 to 2nd January 2018. Serum ferritin levels were estimated for diagnosis of iron deficiency anemia.
Results: Mean age of the children was 17.6±11.5 months. There were 107(53.5%) male and 93(46.5%) female children. The mean weight of the children was 10.6±2.2 Kg while the mean height was 82.6±9.5 cm, respectively. Majority (47.5%) of the children belonged to lower class. Iron deficiency was diagnosed in 75 (37.5%) children with anemia. The frequency of iron deficiency was significantly higher in children from rural areas (43.6% vs. 25.4%; p-value=0.012) and those belonging to poor class as compared to middle and high class (48.4% vs. 38.5% vs. 21.2%; p-value=0.002), while there was no significant difference across age (p-value=0.963), gender (p-value=0.971), height (p-value=0.936) and weight (p-value=1.000) groups.
Conclusions: A substantial proportion of children with anemia had iron deficiency particularly those from rural areas and lower socioeconomic class which warrants routine screening of such children in future practice so that timely identification and iron supplementation may improve the outcome.
Keywords: Anemia, Under 5 Children, Iron Deficiency

INTRODUCTION

The world famous iron deficiency anemia is a gigantic community health problem in the unindustrializednations.[1] It is estimated that this kind of anemia has affected approximately 500 million people.[2] The prevalence of iron deficiency anemia ranges from 0.94 to 59.9% and this wide range is due to a large gap between public health status in developing and developed countries[3].

Deficiency of iron is most common in first two years of life because of brain development[4]. Lack of brain development leads to poor working skills in adults.[5]Consequences of iron deficiency anemia are low birth weight, poor weight gain, premature birth and malabsorption.[6]Low hemoglobin along with low serum ferritin levels are laboratory diagnostic criteria of iron deficiency anemia. Assessment of bone marrow iron stores is the gold standard investigation.[7]Establishment of diagnosis of iron deficiency anemia in infants is difficult because of struggle of obtaining adequate blood sample and nonspecific anemia symptoms[8].

The aim of this study was to determine the frequency of iron deficiency anemia in children under 5 months to 6 years. This would help in identifying the iron deficiency anemia in pre-school children and to lessen the adverse effect of iron deficiency anemia on growth and development of children.

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MATERIAL AND METHODS

This cross-sectional descriptive study including 200 children of both genders aged between 6 to 60 months who were diagnosed of anemia (Hb<11g/dl) conducted at Department of Pediatric Medicine, DHQ Teaching Hospital Sargodha from 3rd July 2017 to 2nd January 2018. Children with hepatosplenomegaly, lymphadenopathy, petechiae and bruises, chronic medical or surgical ailment, family history of bleeding disorder, gastritis and dehydration were excluded from study. Their parents were counseled and explained the details of study and written informed consent and detailed history was taken from parents. Blood samples were taken and sent to lab for estimation of serum ferritin level. A cut off value of <60 ng/ml was taken as diagnostic of iron deficiency. Demographic features, history and physical examination were noted. The data was entered into SPSS version 20, computer program and analyzed accordingly. Quantitative variables e.g. age, height, weight and hemoglobin level were presented by mean ±SD. Categorical variables e.g. gender, socioeconomic status, residence and iron deficiency were presented by frequency and percentage. Data was stratified for age, gender, height, weight, socioeconomic status and residence to address affect modifiers. Post stratification chi-square test was applied taking p≤0.05 as significant.

RESULTS

The age of the children ranged from 6 months to 60 months with a mean of 17.6±11.5 months. Majority (n=93, 46.5%) of the children were aged between 13-24 months followed by ≤12 months (29.0%) and 25-60 months (24.5%). There were 107 (53.5%) male and 93 (46.5%) female children with a male to female ratio of 1.2:1. The characteristics of patients are shown in Table1. Iron deficiency was diagnosed in 75 (37.5%) children (Figure 1). The frequency of iron deficiency was significantly higher in children from rural areas (43.6% vs. 25.4%; p-value=0.012) and those belonging to poor class as compared to middle and high class (48.4% vs. 38.5% vs. 21.2%; p-value=0.002), while there was no significant difference across age (p-value=0.963), gender (p-value=0.971), height (p-value=0.936) and weight (p-value=1.000) groups as shown in Table II.

Figure 1: Frequency of Iron Deficiency in Anemic Children (n=200)

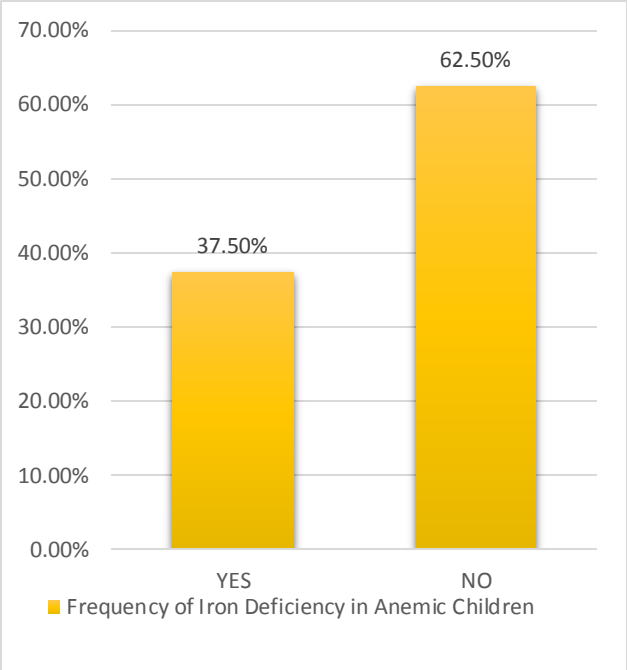

Table I: Characteristics of patients (n=200)

Characteristics		**N (%)**
Age (mean ±SD)		17.6±11.5 **months**
Gender	Male	107 (53.5%)
	Female	93 (46.5%)
Height (mean ±SD)		82.6±9.5 **cm**
Weight (mean ±SD)		10.6±2.2 **kg**
Residence	Rural	133 (66.5%)
	Urban	67 (33.5%)
Socioeconomic Status	Lower Class	95 (47.5%)
	Middle Class	39 (19.5%)
	High Class	66 (33.0%)

Table II: Stratification of Iron Deficiency in Various Subgroups of Anemic Children (n=200)

Parameters		**N**	**Iron Deficiency**	**P-value**
Age (months)	<12 months	58	21 (36.2%)	0.963
	13-24 months	93	35 (37.6%)	
	25-60 months	49	19 (38.8%)	
Gender	Male	107	40 (37.4%)	0.971
	Female	93	35 (37.6%)	
Height (cm)	62-78 cm	58	22 (37.9%)	0.936
	79-95 cm	142	53 (37.3%)	
Weight (kg)	7-12 kg	152	57 (37.5%)	1.000
	12-18 kg	48	18 (37.5%)	
Residence	Rural	133	58 (43.6%)	0.012*
	Urban	67	17 (25.4%)	
Socioeconomic Status	Lower Class	95	46 (48.4%)	0.002*
	Middle Class	39	15 (38.5%)	
	High Class	66	14 (21.2%)	

*Significant

DISCUSSION

In the present study, the mean age of the children was of 17.6±11.5 months and majority (n=93, 46.5%) of the children were aged between 13-24 months followed by ≤12 months (29.0%) and 25-60 months (24.5%). A similar mean age of 17.2±8.9 months has been reported by Pasricha et al[9], in Sweden while Kumar et al,[10] reported it to be 16.1±7 months in Indian such children. Harding et al,[11] reported relatively higher mean age of 24.9±16.2 months in Nepali children with anemia. A similar frequency of ≤12 months, 13-24 months and 25-60 months age groups was observed by Habib et al[12] who reported it to be to 28%, 48% and 24% respectively in children presenting at Agha Khan University Hospital Karachi with anemia. Goswmai et al[13] reported similar frequency of ≤12 months (32.1%), 13-24 months (48.4%) and 25-60 months (19.5%) age groups in Indian anemic children .

We observed that there was no significant difference in iron deficiency with respect of age. But we observed that most of the children affected from anemia were from age group 13 – 24 months. This may be due to the reason, that children are switched from mother feed or milk to solid feed and their diet may not be rich in iron supplement which may ultimately lead to anemia.

We observed that there were 53.5% male and 46.5% female children with a male to female ratio of 1.2:1. Our observation is in line with that of Rahbar et al, [14] who also reported similar male predominance with male to female ratio of 1.2:1 among anemic children from different areas of Karachi. A similar male to female ratio of 1.2:1 has also been reported by Rashid et al, [15]at University of Health Sciences, Lahore. Goswmai et al[13] reported similar male predominance with male to female ratio of 1.2:1 in Indian such children while Sop et al,[16] reported it to be 1.2:1 in Africa. A slight male dominance trend may due to increased activity of erythropoietic activity which may result in lower iron resulting in a low iron storage state.

In the present study, majority (66.5%) of the children were residing rural areas. A similar frequency of rural back ground in anemic children has been reported by Habib et al[12] who observed that 70.3% children presenting with anemia at Agha Khan University Hospital, Karachi were residing rural areas. Goswmai et al[13] reported this frequency to be 75.7% in India while Harding et al[11] reported it to be 60.6% in Nepal.

We observed that majority (47.5%) of the children belonged to lower class followed by high class (33%) and middle class (19.5%) children. Our observation is in line with that of Habib et al[12] who reported similar frequency of lower (43.2%), middle (20.8%) and higher (36.0%) class children presenting with anemia at Agha Khan University Hospital, Karachi. A comparable frequency of lower, middle and high class has also been reported by Goswmai et al[13] in Indian such children who reported it to be 47.9%, 19.9% and 32.2% respectively. Khan et al,[17] reported comparable frequency of 37.1%, 31.8% and 31.1% for lower, middle and high class in anemic Children in Bangladesh. This higher incidence of iron deficiency anemia may be explained due to poor nutritional status in lower socioeconomic group.

In the present study, iron deficiency was diagnosed in 75(37.5%) children with anemia. Our observation is in line with that of Rashid et al[15] who reported similar frequency of 36.7% for iron deficiency in anemic children from various areas of Karachi and Kazmi et al[18] who reported it to be 38.0% at Benazir Bhutto Hospital, Rawalpindi. A comparable frequency of iron deficiency in Indian anemic children has been reported by Kumar et al,[10] who observed it to be 31%. However a relatively higher frequency of 58.9 in India and 59.4% in Bangladesh has been reported by Paranjape et al[19] and Hoque et al[20] respectively. Thus a substantial proportion of children with anemia had iron deficiency which warrants routine screening of such children in future practice so that timely identification and iron supplementation may improve the outcome. We also observed that the frequency of iron deficiency was significantly higher in children from rural areas (43.6% vs. 25.4%; p-value=0.012) and those belonging to poor class as compared to middle and high class (48.4% vs. 38.5% vs. 21.2%; p-value=0.002). In the light of this evidence, it can be advocated that children presenting from rural areas and those belonging to poor socioeconomic class are at higher risk of iron deficiency and therefore such anemic children should always be screened for iron deficiency. Further, an addition of egg, fish or chicken may be included in diet plan.

A very important limitation to the present study was that we didn't consider the effect of iron supplementation on blood hemoglobin level nor we compared various iron formulations in this regard. This information would have helped in the appropriate treatment of such children. Such a study is highly recommended in future research.

CONCLUSION

It is concluded that a substantial proportion of children with anemia had iron deficiency particularly those from rural areas and lower socioeconomic class which warrants routine screening of such children in future practice so that timely identification and iron supplementation may improve the outcome.

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