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ORIGINAL ARTICLE

Factors Responsible for Iron Deficiency Anemia in Children Under Five Years

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ABSTRACT

Objective: To determine the frequency of factors responsible for iron deficiency anemia in children under five years of age at tertiary care Hospital.

Methodology: This cross-sectional study was done at the paediatric department of Muhammad Medical College MirpurKhas, during six months from October 2020 to March 2021. All the children with of (<5 years), presented at Paediatric OPD and of either gender were included. After taking complete clinical examination, parents were interviewed reading history of diet. After obtaining informed consent from the parents, a 3ml blood sample was taken from each case and was immediately sent to the Hospital diagnostic laboratory for the complete blood count (CBC). Anemia was defined as hemoglobin level <11g/dl. All the data was gathered via self-made study proforma and SPSS version 26 was used for the purpose of data analysis.

Results: A total of 58 children with anemia were studied, their mean age was 02.91±1.29 years, mean Hb was 7.22±1.27mg/dl. Males were 56.9% and females were 40.1%. History of Buffalo milk consumption was in 53.4% children, history of pica was in 27.6%, Caffeine containing food history was in 84.5% of the cases, age of weaning <12 months was in most of the cases and non-iron containing food consumption was also commonest. Most of the cases 55.20% had moderate anemia and 43.10% had severe anemia. The severity of childhood anemia was statically significant according to the type of milk consumption, type of food and caffeine containing food (p-<0.05), while it was statistically insignificant according to the gender and age of weaning (P->0.05).

Conclusion: As per study conclusion the Buffalo milk consumption, history of pica, caffeine containing food, age of weaning <12 months and non-iron containing food consumption were observed to be the commonest factors responsible for childhood anemia.

Key words: Iron deficiency anemia, factors, diet

INTRODUCTION

Iron deficiency anaemia in children is a serious nutritional problem in low- and middle-income nations, particularly in Asia and Africa, where it accounts for about half of all cases.[1,2] According to the World Health Organization (WHO), approximately 293 million children under the age of five are anaemic worldwide, with a frequency of 47.4% estimately.[1,3] Anemia is caused by a variety of factors, the most common of which are infectious illnesses and nutritional deficits.[4,5] Iron deficiency anaemia is a serious nutritional problem that affects people all over the world.[6] Anaemia is caused by a lack of iron in the diet, poor iron absorption, increased iron requirements, and raised iron loss from the body.[6] Though nutritional variables are thought to be the primary cause of paediatric anaemia, their exact contribution to the risk of anaemia is unknown and may vary depending on the severity of infection and the quality of the food.[7] It is projected that controlling nutrition-related factors alone could prevent roughly 37% of anaemia children of preschool in the three West African countries.[7,8] 1st stage of the iron deficiency the loss of stored iron (prelatent iron deficiency), which is manifested by a decrease in plasma ferritin content. When the storage of the iron are nearly depleted, a latent iron deficit develops, which may result in the onset of IDA.[9] The majority of anaemia research in children under the age of five focused on the relationship between maternal variables, failure to thrive and socioeconomic related factors.[10] Less than 5 years old children's anemia is linked to a lack of nutritional diversity, as well as failure to thrive, food instability, and not being dewormed, according to a systematic study.[10,11] Growth retardation, decreased motor and cognitive development, as well as increased morbidity and death are all linked to childhood anaemia.[12] Childhood anaemia is a widespread disease among children, especially in developing nations, and addressing it is one of Pakistan's key public health challenges. After taking adequate concern on causative factors, this study has been done to assess the frequency of factors responsible for iron deficiency anemia among children those were less than five years old at a tertiary care Hospital.

MATERIAL AND METHODS

This cross-sectional study was done at paediatric department of Muhammad Medical College MirpurKhas, during six months from October 2020 to March 2021. All the children with of (<5 years), presented at Paediatric OPD and of either gender were included. All the anemic children more than 5 years of age, having severe systemic disease and those who were not agreeing to participate in the study were excluded. After taking complete clinical examination parents were interviewed reading history of milk, food, pica, caffeine containing food and age of weaning. After taking informed consent from the parents a 3ml blood sample was taken from each case and was immediately sent to the Hospital diagnostic laboratory for

the complete blood count (CBC). Anemia was defined as hemoglobin level <11g/dl and was categorized as mild, moderate and severe as per hemoglobin concentration as (Hb 10.9 to 10mg/dl), (Hb 7 to 9.9 g/dl) and (Hb < 7 g/dl) respectively. All the data was gathered via self-made study proforma. SPSS version 26 was used for purpose of data analysis. Categorical variables were computed in the form of frequency and percentage. Mean and standard deviation were computed for numerical variables. Chi-square test was applied and a p-value <0.05 was taken as significant.

RESULTS

A total of 58 anemic children were studied, their mean age was 02.91±1.29 years, mean Hb was 7.22±1.27mg/dl. Males were 56.9% and females were 40.1%. History of Buffalo milk consumption was in 53.4% children, history of pica was in 27.6%, Caffeine containing food history was in 84.5% of the cases, age of weaning <12 months was in most of the cases and non-iron containing food consumption was also commonest. Table.1

Table 2. Descriptive statistics of demographic characteristics n=58

Variables		Statistics	
Age (years)		02.91±1.29	
Hemoglobin level (HB)		7.22±1.27	
RBC		4.23±0.61	
MCV		60.16±8.27	
MCHC		27.14±3.91	
Platelets		258965.86±225880.01	
Gender	Males	33	56.9%
	Females	25	43.1%
Type of milk	Buffalo milk	31	53.4%
	Mother milk	18	31.0%
	Formula milk	04	06.9%
	Not taking	05	08.6%
History of pica	Yes	16	27.6
	No	42	72.4
Caffeine containing food	Yes	49	84.5
	No	9	15.5
Age of weaning	1-3 months	3	5.2
	4-6 months	16	27.6
	7-12 months	37	63.8
	13-24 months	2	3.4
Food frequency	1-3	54	93.1
	3-5	02	03.4
	>5	02	03.4

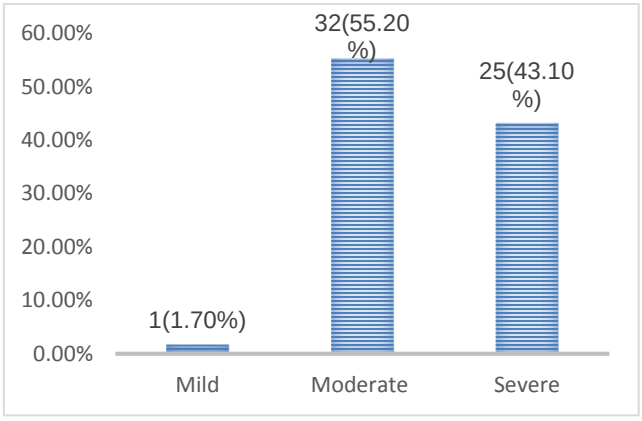

Fig:1. Severity of anemia among study subjects n=58

Most of the cases 55.20% had moderate anemia and 43.10% had severe anemia, while mild anemia was only in one case. Fig:1

Severity of childhood anemia was statically significant according to the type of milk consumption, type of food and caffeine containing food (p-<0.05), while it was statistically insignificant according to the gender and age of weaning (P->0.05). Table.2

Table.2 Factors association with severity of anemia n=58

Variables		Severity anemia			p-value
		Mild	Moderate	Severe	
Gender	Males	0	20	13	
	Females	1	12	12	0.373
Type of milk	Buffalo milk	0	15	16	
	Mother milk	0	10	8	
	Formula milk	0	3	1	0.023
	Not taking	1	4	0	
Types of food	No iron containing	0	27	22	0.001
	Fruits	0	2	1	
	Vegetables	1	1	0	
	Others	0	1	2	
History of pica	Yes	0	7	9	
	No	1	25	16	0.409
Caffeine contain food	Yes	0	29	20	
	No	1	3	5	0.034
Age of weaning	1-3 months	0	2	1	
	4-6 months	0	10	6	0.978
	7-12 months	1	19	17	
	13-24 months	0	1	1	

DISCUSSION

Deficiency of iron Anemia among children is a well-known public health issue that has a negative influence on child morbidity, mortality, and brain development.[13] In Pakistan, there is a scarcity of data on the true frequency and predictors of IDA.[13] In this study a total of 58 anemic children were studied, their mean age was 02.91±1.29 years and males were 56.9% and females were 40.1%. Consistently Melku M et al[12] reported that the majority of the cases 378 (53.5%) of children were males and the children's median age was 30 months. On other hand Sunardi D et al[10] demonstrated that the most of the cases 83 (44.9%) presented with age of 24–36 month, while inconsistently they found female children in majority as 95 (51.4%). There was some difference in average age and gender with other studies and this difference may because of difference in sample size and selection criteria.

In this study most of the cases 55.20% had moderate anemia and 43.10% had severe anemia, while mild anemia was only in one case. Although the Orsango AZ et al[14] reported that the Only 1 (0.9 percent) of the anaemic children had severe anaemia, 35 (32.7 percent) had moderate anaemia, and 71 (66.4 percent) had mild anaemia. In the study of Melku M et al[12] stated that the mild, moderate, and severe anaemia were found to be prevalent in 124 (17.5%), 73 (10.3%), and 5 (0.7%) of the population, respectively. In another study of Habib MA et al[13] reported that the anemia affects 47.9% of teenage girls, with mild anaemia accounting for 47.7%, moderate anaemia for 51.7 percent, and severe anaemia accounting for 5.7 percent.

In this study the history of Buffalo milk consumption was in 53.4% children. Consistently Ziegler EE et al[15] observed that the Cow milk feeding to infants and toddlers has been linked to a reduction in iron nutritional status and a raised risk of iron deficiency. Cow milk is linked to occult intestinal loss of blood and obstruction of dietary absorption of iron by calcium and casein, additionally to its low iron concentration and poor bioavailability.[16,17] Some studies have also found a link between cow milk consumption to children when they are young and delays in developmental milestones. As a result, cow milk feeding in infancy is severely discouraged due to its negative health effects, and if it is necessary, it must be accompanied by iron supplementation.[16,17] Furthermore in this study the history of pica was 27.6%, Caffeine containing food history was in 84.5% of the cases, age of weaning <12 months was in most of the cases and non-iron containing food consumption was also commonest. Najeeb S et al[18] also concluded that the Pica is the commonest factor of iron deficiency anaemia, and most parents dismiss it as a child's habit rather than a sign of disease. Anaemia, a symptom of malnutrition and inadequate iron intake in the diet, is a severe public health issue that affects infants, young children, and adolescents. This was a small sample size and single center study containing several other limitations. Therefore, further large-scale studies are recommended, to evaluate the proper responsible factors to decrease the increasing childhood anemia in our country.

CONCLUSION

As per study conclusion the Buffalo milk consumption, history of pica, caffeine containing food, age of weaning <12 months and non-iron containing food consumption were observed to be the commonest factors responsible for childhood anemia. Further large-scale studies are suggested on this subject.

REFERENCES

1. Chowdhury MR, Khan MM, Khan HT, Rahman MS, Islam MR, Islam MM, Billah B. Prevalence and risk factors of childhood anemia in Nepal: A multilevel analysis. Plos one. 2020;6;15(10):e0239409.
2. The World Bank. Prevalence of anemia among children (% of children under 5). World Development Indicators. World Bank, IBRD and IDA; 2016
3. De Benoist B, McLean E, Egli I, Cogswell M. The World Health Report: Worldwide prevalence of anemia 1993–2005: WHO global database on anemia. Geneva: World Health Organization; 2008
4. Tesema GA, Worku MG, Tessema ZT, Teshale AB, Alem AZ, Yeshaw Y, Alamneh TS, Liyew AM. Prevalence and determinants of severity levels of anemia among children aged 6–59 months in sub-Saharan Africa: A multilevel ordinal logistic regression analysis. PloS one. 2021 Apr 23;16(4):e0249978.
5. Shaw JG, Friedman JF. Iron deficiency anemia: focus on infectious diseases in lesser developed countries. Anemia. 2011 Oct;2011.
6. Din JU, Yousafzai AM, Khan RA, Ullah M, Khan SU, Khan S, Ullah R. Iron deficiency anaemia in school age children of District Tank Khyber Pakhtunkhwa Province, Pakistan. children. 2019;12:13.
7. Endris BS, Dinant GJ, Gebreyesus SH, Spigt M. Risk factors of anemia among preschool children in Ethiopia: a Bayesian geo-statistical model. BMC nutrition. 2022 Dec;8(1):1-1.
8. Magalhaes RJS, Clements AC. Mapping the risk of anaemia in preschool-age children: the contribution of malnutrition, malaria, and helminth infections in West Africa. PLoS Med. 2011;8(6).
9. Vendt N, Grünberg H, Leedo S, Tillmann V, Talvik T. Prevalence and causes of iron deficiency anemias in infants aged 9 to 12 months in Estonia. Medicina. 2007 Dec;43(12):947.
10. Sunardi D, Bardosono S, Basrowi RW, Wasito E, Vandenplas Y. Dietary determinants of anemia in children aged 6–36 months: a cross-sectional study in Indonesia. Nutrients. 2021 Jul;13(7):2397.
11. Belachew, A.; Tewabe, T. Under-five anemia and its associated factors with dietary diversity, food security, stunted, and deworming in Ethiopia: Systematic review and meta-analysis. Syst Rev 2020, 9, 31
12. Melku M, Alene KA, Terefe B, Enawgaw B, Biadgo B, Abebe M, Muchie KF, Kebede A, Melak T, Melku T. Anemia severity among children aged 6–59 months in Gondar town, Ethiopia: a community-based cross-sectional study. Italian journal of pediatrics. 2018 Dec;44(1):1-2.
13. Habib MA, Black K, Soofi SB, Hussain I, Bhatti Z, Bhutta ZA, Raynes-Greenow C. Prevalence and predictors of iron deficiency anemia in children under five years of age in Pakistan, a secondary analysis of national nutrition survey data 2011–2012. PloS one. 2016 May 12;11(5):e0155051.
14. Orsango AZ, Habtu W, Lejisa T, Loha E, Lindtjørn B, Engebretsen IM. Iron deficiency anemia among children aged 2–5 years in southern Ethiopia: a community-based cross-sectional study. PeerJ. 2021 Jun 28;9:e11649.
15. Ziegler EE. Consumption of cow's milk as a cause of iron deficiency in infants and toddlers. Nutrition reviews. 2011 Nov 1;69(suppl_1):S37-42.
16. Ziegler EE. Consumption of cow's milk as a cause of iron deficiency in infants and toddlers. Nutr Rev 2011; 69(1): S37-42
17. Siddique AW, Basheer F, Ashraf T, Naseem S. Comparison of frequency of iron deficiency anemia in infants on exclusive breast feed, fortified milk and cow's milk. PAFMJ. 2021; 24;71(1):201-05.
18. Najeeb S, Shah SH, Aalia B, Sarwar S, Khan A, Hussain E. Assessment of children presenting with history of pica for iron deficiency anaemia by serum ferritin estimation. Pakistan Journal of Physiology. 2020 Jun 29;16(2):48-51.