

Determination of Iron Deficiency Anemia in Infants in Ahmed Gasim Hospital, Khartoum North (KN), Sudan in the Period from January to June 2011

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ABSTRACT: Iron deficiency anemia (IDA) among young children is a great health problem. The aim of this study to determine the characteristic of iron deficiency anemia in children of Ahmed Gasim Children Hospital, Sudan. This is a prospective cross sectional cohort. Blood samples from 150 children aged between 2 -24months were examined, and their haematologic and red cell indices were determined. Mothers of these children were interviewed. Red cell indices were used to classify anaemia. Thin blood films were reviewed to detect abnormal cell morphologies. All children were anaemic (Hb < 11.2 g/dl). Red cell indices were used to classify anaemia. The means of the haemoglobin concentration Hb 8.4 g/dl, packed cell volume (PCV) 28.6 %, mean cell volume (MCV) 68fl, mean cell haemoglobin (MCH) 20.7 pg, mean cell hemoglobin concentration (MCHC) 28.9g/dl and red cell distribution width (RDW) 18.5 %,reticulocyte count 2.4. Mean platelets counts 385($10^3/\mu\text{l}$). Mean total red blood cells 3.9($10^6/\mu\text{l}$), The reticulocyte count among study population has mean value 2.4% in samples ,the blood films shows microcytic hypochromic, pokylocytosis, target and pencil cells. Conclusion: IDA is common in Sudanese children. Fifty eight percent of mothers gave history of anaemia during pregnancy and 67% gave history of poor nutrition indicating low income.

KEYWORDS: Anemia, hemoglobin, infants, Iron, microcytic hypochromic

LINTRODUCTION

Anemia is common in both developing and industrialized nations. It affects about two billion people worldwide, i.e. 30% of the inhabitants of the planet, according to data from the World Health Organization-WHO. [1]. Hence it is considered a public health problem. It greatly affects a person's life, especially in its more severe forms. Anemia causes tiredness, weakness, malaise, and making routine tasks more difficult and painful [1]. Anaemia is a common problem in Africa, with prevalence ranging from 21.1% to 64.4% [2]. It has significant impact on morbidity and mortality [3, 4]. The affected person may be drowsy, with less resistance to physical activities and deterioration in cognitive function and immunity [5]. Nutritional iron deficiency is responsible for the great majority of cases of anemia.

Nigeria has a population of 155 million, with iron deficiency affecting 69% of children under age 5, and 67% of pregnant women [6]. Infants and toddlers 6-24 months of age need a lot of iron to grow and develop. The iron that full-term infants have stored in their bodies from their mothers is used up in the first 4-6 months of life. After that, infants need to get iron from food or supplements. Because of this, iron deficiency anemia does not usually develop until the baby is about 9 months old. Premature and low-birth-weight are at even greater risk for iron deficiency anemia because they don't have as much iron stored in their bodies [7].

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In Sudan seasonal food shortage often evolves into chronic food insecurity. (UNICIF 2004) In the Sudan nutritional anemia is common among children with protein calorie malnutrition, especially in rural areas, refugees and displaced people [8].

Sudanese children under five years have high prevalence of H.pylori infection similar to many other developing countries. This infection is highly associated with low serum ferritin levels that lead to iron deficiency anemia [9].

It was found that causes of anemia in Kassala region Eastern Sudan as in other tropical areas is usually multifactorial. Common causes of anemia in this area were chronic illness, followed by nutritional and repeated malaria infection. Nutritional anemia was found in 17 % of children less than five years old [10].

II.OBJECTIVES

To determine characteristic of iron deficiency anemia among the infants and children in Ahmed Gasim Hospital, Khartoum North (KN), Sudan during the period from (January 2011 to June 2011).

III.METHODS

This is cross sectional analytical study conducted in Ahmed Gasim Hospital, Khartoum North (KN); Sudan. A total of 150 children were selected for the study aged from two to twenty month.

-Inclusion criteria: Children admitted with nutritional disorders.

-Exclusion: Children outside the age range of the study and those admitted with other chronic diseases.

-Blood samples: From each child about 5ml of venous blood were withdrawn using sterile disposable syringes.

-Analysis: In each specimen, the following tests were conducted: Hb, PCV, red cell counts, MCV, MCH, MCHC, WBC, platelet counts, reticulocyte counts, (RWD),

-Techniques used for analysis: Sysmex analyzer is used (Sysmex KX-21/KX21N. German)

-Ethical clearance: Verbal consent from each child's mother.

IV.RESULTS AND DISCUSSION

According to the Centers for Disease Control and Prevention (CDC), Children from 1-3 years of age have a higher risk of iron deficiency (Brotanek JM, Gosz J, et al 2007) Monajemzadeh SM, Zarkesh MR 2009 reported that IDA is common in infants aged 12-15 months living in Ahwaz (26.2%). However MMR 1998 reported that children less than two years old are at the highest risk for developing iron deficiency anemia. All the means of the hemoglobin concentration (Hb 8.4 g/dl), packed cell volume (PCV 28.6 %), mean Red cell volume (MCV 68fl), mean cell hemoglobin (MCH 20.7 pg), mean cell hemoglobin concentration (MCHC 28.9g/dl) RDW (18.5 %), reticulocyte count (2.4) total red blood cells 3.9 (10⁶/μl), (Table (1)).

Table (1): The means of some hematological parameters

Test	Mean	±SD
Hb	8.4g/dl	2.8
PCV	28.6%	9.3
MCV	68fl	11.5
MCH	20.7 pg	5.6
MCHC	28.9g/dl	3.6
RBCs	3.9X10 ⁶ /μl	1
WBCs	10.8X10 ³ /μl	8.4
Platelet	385X10 ³ /μl	215
RDW	18.5%,	4.9
Reticulocyte count	2.4%,	5.8

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The blood films shows microcytic hypochromic, pokylocytosis, target and pencil cells variable degree denote that the sample of children we have studied suffers of IDA and is in keeping with the MMR reports. However, sample results seems to contradict reports by Thorsdottir, B. S. Gunnarsson, et al (2003) study on Icelandic infants IDA (haemoglobin (Hb) < 105 g/L, MCV < 74 fl. This could be explained by the differences in economic developments. Blood smears are similar to those published by Stephen J. McPhee, Maxine A. et al. 2009. The blood smear of a patient with iron deficiency shows many hypo chromatic and rather small RBCs, and also show poikilocytosis and anisocytosis . With more severe iron deficiency anemia the peripheral blood smear show target cells, hypochromic pencil-shaped cells, and occasionally small numbers of nucleated red blood cells.

Mild microcytic hypochromic anaemia in the study group characterized by haemoglobin levels between 9.7 to 11.2 g/dL, moderate microcytic hypochromic anemia characterized by hemoglobin levels between 8.4 to 9 g/dL severe microcytic hypochromic anemia hemoglobin levels below 7.0 g/dL .According to Tulio konstantyner, et al, 2011) mild and moderate anaemia werecharacterized by haemoglobin levels below 11.0 and 9.5 g/dl, respectively. According to (R. M. Neves, 2005) the WHO defines mild, moderate, and severe anemia according to hemoglobin values. Mild anemia is characterized by hemoglobin values between 11.0 and 11.9mg/dL in children. According to (D. G. Silva, S. E. Priore, et al 2007) (T. Konstantyner, J. A. A. C. Taddei, et al 2009) (M. Osório, “2002) age less than 12 months also was reported as a risk factor for mild anemia.

We found that 58 percent of mothers have history of anaemia during pregnancy. This is consistant with findings of Q. Zhang, C. V. Ananth, Z. Li, et al. (2009) that the impact of anemia in pregnancy affects both mother and fetus. (Table: (2))

Table (2) Mothers gave history of anemia during pregnancy

Mothers	No	Percent
Anemia during pregnancy	87	58%
No Anemia during pregnancy	63	%42
Total	150	100

This is confirmed in this study by the fact that the socioeconomic variables and the residence area (urban or rural) Reflect that 67% of the mothers and children had poor nutrition (low income).(Table: (3)).

Table (3): History of poor nutrition indicating low income

Parent income	No	Percent %
Low income	101	67
Others	49	33
Total	150	100

V.CONCLUSION

Iron deficiency anaemia is common among young children and 58% of mothers gave history of anaemia during pregnancy while 67% gave history of poor nutrition indicating low income.

Other cause of microcytic such as thalasseмииs are not completely ruled out but we need to do iron profile and hb electrophoreses with include such.

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