ORIGINAL ARTICLE

MEGALOBLASTIC ANEMIA AND PATTERN OF ITS PRESENTATION IN CHILDREN

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ABSTRACT

Background: Megaloblastic anemia is common in clinical practice in children in Pakistan. Vitamin B12 and folate deficiency are the established causes. The aim of this study was to find the frequency of megaloblastic anemia, its clinical presentation and cause in children in our set-up.

Material & Methods: This was a retrospective study conducted at Rehman Medical Institute, Peshawar. Forty-eight children between 6 months to 14 years were studied for the causes of megaloblastic anemia.

Results: Among 48 patients there was male to female dominancy (1.64:1), mostly in the age group of 11-14 years. Megaloblastic erthyroid hyperplasia was the most common finding of bone marrow. Folate deficiency was seen in 33.34% of cases and vitamin B12 deficiency in 52.08% cases while 14.58% of cases had both folate and vitamin B12 deficiency.

Conclusion: Vitamin B12 deficiency is the major cause of megaloblastic anemia in children in our population. Proper dietary care should be taken in order to avoid it.

KEY WORDS: Megaloblastic; Anemia; Vitamin B12; Folate.

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INTRODUCTION

Anemia affects approximately two billion people worldwide mostly affecting women and children; Pakistan has lagged behind other low-income countries in terms of health and population outcomes[1]. Children under five-years are 18 % of population and 45-60 % is anemic due to poor diet[1]. Ten percent of the children die before the 1st birthday reflecting alarming level of infant mortality and another 14 percent before reaching 5 years of their age[1]. One child out of three children suffers from malnutrition and anemia. Seventy percent of all under 5 years deaths are attributed to food deficiencies[2].Anemia is a blood condition in which there is too few red blood cells or is also defined as Hb <11.5 g/dl and severe anemia is defined as Hb< 8.0 gm/dl[1]. Anemia appears in different symptoms as faint skin, cold hands and feet, lack of sensation or itching in hands, feet and legs, problem in appetite, sore tongue and mouth etc. There are primary and secondary factors of anemia. Primary Factors basically have two types as exogenous and endogenous factors. Exogenous causes are social dimensions of illness and are potentially preventable[3] and it is one of the problems with which children are hospitalized for proper work up and management. It is one of the important health problems in most of the developing countries like Pakistan and invariably a common accompanying feature of protein energy malnutrition.

Vitamin B12 is present as cobalamine in animal source of food and is not synthesized by humans. Megaloblastic anemia is an anemia that is characterized by the presence of precursor cells, megaloblast in the bone marrow and macrocytic red cells in the peripheral blood.[4] These megaloblasts arise because of impaired DNA synthesis followed by ineffective erythropoiesis.[4]

Megaloblastic anemia is common in clinical practice in Pakistan[5,6]. Vitamin B12 deficiency in infants is mostly due to maternal dietary deficiency and is generally observed in infants exclusively breast fed by mothers who are strict vegetarians[7,8]. However regarding the prevalence, causative factors and associated symptoms in Indo-Pak subcontinent we have very limited data available.[5,6,9,10,11]

The aim of the present study was to find the incidence of megaloblastic anemia, its clinical presentation in children in our set-up.

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MATERIAL AND METHODS

The study was conducted at Pediatric Department of Rehman Medical Institute Peshawar, Pakistan on data of 6 years from January 1, 2006 to December 31, 2011.

A total of 48 cases were included in the study. The inclusion criteria was, children in the age group 6 months to 14 years admitted in the hospital with features suggestive of anemia, hemoglobin less than 11 gm/dl in children less than 6 years of age and hemoglobin less than 12 gm/dl in children 6-14 years age (WHO criteria). Children who received blood transfusion were excluded from the study. Detailed history was taken including dietary intake, ingestion of any drugs, worm infestation, and loss of blood and duration of onset of anemia. These patients were investigated for CBC, Peripheral smear, Serum ferritin, serum folate, serum vitamin B12 and bone marrow specimen being taken by a consultant pathologists under strict hygienic condition.

RESULTS

Forty-eight children with a male predominance (1.64:1) were observed. The majority of patients were in the age group of 11-14 years (49% and only few cases (12%) were seen in infancy. (Figure 1)

On bone marrow examination frank megaloblastic erythroid hyperplasia was seen in 49% of cases. Mild megaloblastic changes in 35% cases while it was dimorphic in 11% cases and normoblastic in 5% cases. (Fig. 2)

Among these, folate deficiency was seen in

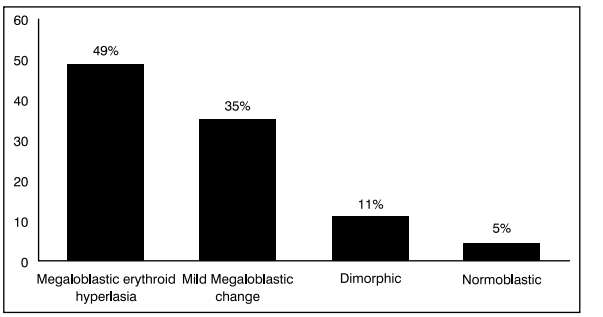

Figure 1: Age-wise distribution of cases (n=48)

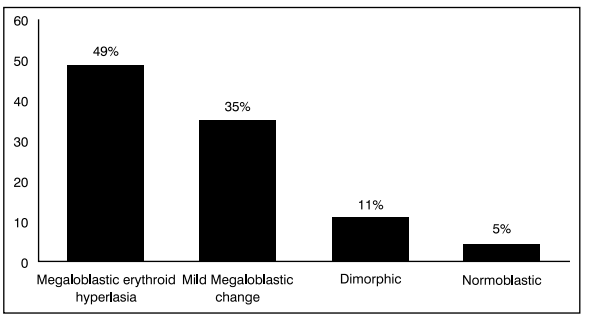

Figure 2: Results of bone marrow examination (n=48).

33.34% of cases and Vitamin B12 deficiency was seen in 52.08% of cases while 14.58% of cases had both folate and vitamin B12 deficiency. (Fig. 3)

DISCUSSION

Folic acid and vitamin B12 are essential dietary components for human because they play a vital role

Table 1: Prevalence of vitamin B12 and folate deficiency in children

Indian Series	Year, Country	Folate Def. (%)	B12 def. (%)	Combined deficiency (%)
Bhende et al	1965, India	54.9	7	5.3
Mittal et al	1969, India	57.1	22.4	10.2
Sarode et al11	1989, India	6.8	76.4	8.8
Mukibi et al	1992, Zimbabwe	17	51	32
Maddood-ul-Mannan et al	1995, Pakistan	8	56	20
Allen et al8	1995, Mexico	-	19-41	-
Casterline etal	1997, Guatemala	9	46.7	-
Gomber et al	1998, India	10	50	20
Chaudhry MW	2001, India	12	19	14
Chandra et al	2002, India	20	32	20
Khanduri et al10	2005, India	6.8	33	8.3
Garcia-Casal et al	2005, Venezuela	30 36.3	11.4 61.3	-
Saira PI et al	2009, Pakistan	43.4	78.5	-
Our study	2013, Pakistan	33.34	52.08	14.58

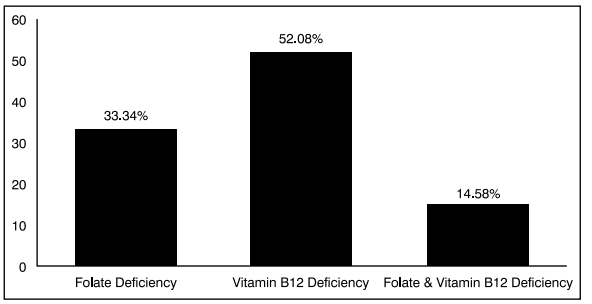

Figure 3: Folate and vitamin B12 deficiency (n-48).

in DNA synthesis.[12] In our community we can see many cases of folate and vitamin B12 deficiency most probably due to imbalance of dietary products and inadequate calories intake. Anemia mostly due to poor dietary intake usually occurs in undernourished or malnourished children being in the age group of 3-18 months with maximum number of cases being between 9-12 months.[13]

The findings of our study are in consistence with other studies.[14,15]

In the past as shown in table, the studies have shown folate deficiency to be more common than vitamin B12 deficiency. This trend was observed both in the developed and developing countries but this trend has changed and now vitamin B12 deficiency is commoner as compared to folate deficiency. In our study 52.08% of cases had vitamin B12 deficiency, this finding of our study is consistent with the study done in Mexico[8] who reported the deficiency of vitamin B12 to be 41%, a study done in India[15] showed much higher incidence of vitamin B12 deficiency reported to be 88%, while another study done in India by Sarode reported it to be 74%. In our study folate deficiency was seem in 33% of cases which in contrast to other study is much higher, it was reported to be 8.4% in a study done by Sarode in India.[26] In our study combined folate and vitamin B12 deficiency was seen in 16% of cases which is much low as compared to a study done in India[15] who reported it to be 44%.

CONCLUSION

Vitamin B12 deficiency is a major cause of megaloblastic anemia in children in our set-up. Proper dietary care should be taken in order to avoid it.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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None declared.

AUTHORS' CONTRIBUTION

Conception and Design:	AZJ, ZG, FL
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