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Original Research Article

High Prevalence of Vitamin B12 Deficiency in Preschool Children

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ABSTRACT

Deficiency of Vitamin B12 is emerging as Public Health Concern in many low income countries and is a common cause of megaloblastic anemia, various neuropsychiatric symptoms and other clinical manifestations. WHO has identified infants, preschool children, and pregnant and lactating women as most vulnerable groups. Very little information is available on the prevalence of B 12 deficiency in preschool children in this part of country. The status of B 12 was therefore evaluated in a group of 190 children below the five years of age. 80 (30.5%) children were found to have B12 levels below 200 pgm/ml. The incidence of B 12 deficiency was 33.7% in children below one year of age and was 40% in four to five years of age group. Our study has shown high prevalence of B 12 deficiency in preschool children. Improving weaning practices in children and dietary habits of pregnant and lactating mothers including consumption of rich sources of vitamin B12, such as food derived from animal sources and fortified foods may help decrease B12 deficiency in preschool children

Key words: Vitamin B 12, cobalamin, preschool children, deficiency
Key Message: Vitamin B12 (cobalamin) deficiency is relatively common among preschool Children, affecting haemotological and neurological system. Low levels of B12 in pregnant and lactating mothers may have an impact on fetal and child development.

INTRODUCTION

Vitamin B12 (cobalamin) is a water soluble vitamin having an important role in cellular metabolism like DNA synthesis, methylation and maintenance of genomic stability. Vitamin B12 deficiency was previously considered to be a nutritional disease caused mainly due to malabsorption and was restricted to older people, but now it is considered to be a problem of global dimensions, frequently caused by dietary inadequacy, particularly among children and in women of reproductive age group. [1] The demand for Vitamin B12 is very high in infancy, childhood and adolescence, which are times of rapid growth and vitamin B12 undergoes marked changes during this period. [2,3] Several studies conducted in low and middle income countries have reported a high prevalence of Vitamin B 12 deficiency, in pregnant women and young children [4] especially due to inadequate dietary intake. [5,6] Vitamin B 12 is synthesized by microorganism and primary dietary source is animal source foods. [7] Vitamin n B 12 deficiency mainly affects hematological and neurological systems. The classic presentation of Vitamin B12 deficiency is hematological, as pernicious anemia. Intrinsic Factor, a glycoprotein secreted by gastric cells is required for vitamin B12 transport and absorption. [8] In addition to its classic presentation, cobalamin deficiency also affects

neuropsychiatric and cognitive function in young children and elderly population. [9]

MATERIALS AND METHODS

This study was conducted in the department of Biochemistry Government Medical College Jammu. A total of 190 children below the age of Five years, attending a Govt. run hospital Jammu were included in this study for determining Vitamin B12 levels in their blood. Out of these 190 children , 80 were below one year of age, 55 children were in one to two year age group, 25 were between two to three years and 15 children were each in three to four and four to five years of age group. Blood samples were obtained from antecubital vein under complete aseptic conditions and vitamin B 12 levels were measured by fully automated chemiluminescence immunometric analyzers. Cases with serum cobalamin levels of less than 200 pgm / ml were considered as deficient.

RESULTS

In this study, a total of 190 children below the age of five years were screened for vitamin B12 levels and all those having serum levels of Vitamin B12 less than 200 pg/ml were considered B 12 deficient. 80 children were below one year of age, 55 belonged to age group between one to two years of age, 25 children were between two to three years of age and 15 children each were amongst the three to four years and four to five years age group respectively.

Amongst the 190 children assessed for B 12 deficiency, 80 (30.5%) were found to be deficient in vitamin B 12 , 27 out of 80 (33.75 %) below one year of age, 16 out of 55 (29.0%) in one to two years of age, 04 out of 25 (16%) amongst two to three years of age, 05 out of 15 (33.3%) in three to four years of age and 06 out of 15 (40%) from four to five years of age were found to be vitamin B 12 deficient . Out of a total of 80 (30.5%) vitamin B 12 deficient children, 18 children (22.5%) were having vitamin B12 levels below83 pg/ml.

DISCUSSION

This study showed high rate of vitamin B 12 deficiency in preschool children in this part of the country. Studies from India has consistently shown a high prevalence of vitamin B 12 deficiency in our population, but the number of studies is very limited and many regions are not represented in these studies. In this study a total of 190 children below the age of five years were screened for vitamin B 12 (cobalamin) levels in their blood and a total of 80 (30.5 %) were found to have low levels of B 12 in their blood . In our study 33.7 % of infants aged one month to twelve months were having low levels of B12. Similar results have been reported from 2 population based studies in children in India. Taneja et al studied B12 levels in a community sample of infants aged 6 to 30 months from New Delhi and reported a prevalence of B 12 deficiency of 28%.The deficiency was attributed to prolonged breast feeding, high rate of gastrointestinal infections interfering with the absorption of the vitamin. [10] Hanumante et al has reported a prevalence rate B 12 deficiency of 14 % in toddlers with mean age of 2. 4 years But the sample size of 51 was, however small. [11]

Studies from other parts of world have also shown high prevalence of B 12 deficiency in early childhood. In a study from Kenyan school children the deficiency was 70 % and 80% in preschool children. Koc A et al have reported 72% mothers and 41 % babies were deficient in a study conducted on 180 pregnant women and their term babies in Turkey. [12] Inadequate intake of vitamin B 12 during pregnancy and early childhood has been implicated in various adverse child health outcomes. WHO has identified infants, preschool children and pregnant and lactating women as most vulnerable groups. [13] Maternal status of B12 during pregnancy can predict B 12 status of offsprings.

Low levels of B 12 are linked to a variety of medical condition including haematological and neurological disorders.

Vitamin B 12 insufficiency in utero has been associated with impaired growth, Psychomotor functions and brain development in various epidemiological studied, early deficits of which may be irreversible. [14,15] Micronutrient supplementation is common to prevent and treat cobalamin deficiency [16] and there is emerging interest in mandatory food fortification with B 12 Oral supplementation of urban Indian women with B12 (50 ugm /day) throughout pregnancy and early lactation significantly increased the B 12 status of mothers and infants compared with non supplemented controls. [17,18]

The results of our study show that vitamin B 12 deficiency was very prevalent among children of preschool age group. Limitation of this study was that this was carried on patients attending outpatient services of a Government run tertiary care hospital in public domain. It is likely that lower socioeconomic group of the society may have been over represented in this study.

CONCLUSION

The analysis revealed a high prevalence of Vitamin B12 deficiency among young children below five years of age. It is likely that vitamin B 12 deficiency may represent other underlying public health problem in this part of country. The importance of adequate vitamin B12 status particularly during pregnancy and early childhood cannot be overemphasized in view of the role of B12 in DNA synthesis, methylation and maintenance of genomic stability along with fetal and child growth. Further studies are needed to support a recommendation for screening all pregnant women and lactating women along with their infants for vitamin B12 deficiency.

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