

Incidence of Vitamin B12 and Folate Deficiency amongst Adolescents

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ABSTRACT

Introduction: Micronutrient deficiency is one of the commonly occurring problems worldwide. Deficiency of Vitamin B12 results in megaloblastic anaemia and this condition is difficult to distinguish it from folate deficiency. The present study was aimed at evaluating the prevalence of folate and Vitamin B12 deficiency amongst adolescents visited in Department of Paediatric, Pravara Institute of Medical Science, Loni.

Material and methods: The present study was a cross sectional school based survey conducted in city, India during a period of one year July 2016 to June 2017. In this study all the adolescents aged between 11-18 years were included in the study. Blood samples were obtained from antecubital vein under complete aseptic condition. Radioimmuno assay was used to determine serum folate level and levels less than 3 ng/ml were taken as efficient. Radioisotope method was used to determine level of serum Vitamin B12 and levels less than 200 pg/ml were taken as deficient. The results were arranged in a tabulated form and analyzed using SPSS software.

Results: A total of 373 subjects were enrolled in this study out of these 110 belonged to upper classes (high socioeconomic group), 118 belonged to middle class (middle socioeconomic group) and 145 belonged to lower (lower socioeconomic group). In total 40.2% adolescents had folate deficiency and 72.7% subjects had Vitamin B12 deficiency.

Conclusion: From the above study we can say that there is high prevalence of Vitamin B12 and folate deficiency amongst adolescents. Regular screening should be done to establish the micronutrient status. All the adolescents should be administrated balanced diet.

Keywords: Vitamin B12, Deficiency, Folate

INTRODUCTION

Micronutrient deficiency is one of the commonly occurring problems worldwide. This is chiefly due to lack of balanced diet and inadequate access to fruits, vegetables and animal foods, which are one of the major sources of micronutrients.¹ Deficiency of folate is due to decrease in intake of legumes, green leafy vegetables and meat products.² Various nutrition associated anaemia have been seen occurring in patients with deficiencies of folate and Vitamin B12.^{3,4} If this deficiency is seen during pregnancy than it is associated with neural tube defects^{5,6}, stunting^{7,8} and low birth weight infants. Adolescents of lower socioeconomic strata are generally the most commonly affected group because of inadequacy of diet.⁹

Deficiency of Vitamin B12 results in megaloblastic anaemia and this condition is difficult to distinguish it from folate deficiency. Features such as dementia, depression¹⁰ and memory loss have been associated with Vitamin B12 deficiency. There is paucity of data regarding folate and

vitamin B12 levels amongst adolescent population in India. A study in India reported that 90% of the adolescents suffer from anaemia.¹¹ The present study was aimed at evaluating the prevalence of folate and Vitamin B12 deficiency amongst adolescents visited in Department of Paediatric, Pravara Institute of Medical Science, Loni.

MATERIAL AND METHODS

The present study was a cross sectional school based survey conducted in city, India during a period of one year (July 2016 June 2017). In this study all the adolescents aged between 11-18 years were included in the study. All the individuals irrespective of the socioeconomic status were included in the study. Adolescents were grouped into socioeconomic status according to the schools they went. Adolescents who attended government or municipal schools were grouped into low income groups. Adolescents of Central School were considered in middle income groups and those studying in private schools were categorized into high income group. All the subjects and their parents were informed about the study and a written consent was obtained from all. The study was approved by the Institute's ethical board.

Blood samples were obtained from antecubital vein under complete aseptic condition. Radioimmuno assay was used to determine serum folate level and levels less than 3 ng/ml were taken as efficient. Radioisotope method was used to determine level of serum Vitamin B12 and levels less than 200 pg/ml were taken as deficient.

STATISTICAL ANALYSIS

The results were arranged in a tabulated form and analyzed using SPSS software using descriptive statistics.

RESULTS

A total of 373 subjects were enrolled in this study out of these 110 belonged to upper classes (high socioeconomic group), 118 belonged to middle class (middle socioeconomic group) and 145 belonged to lower (lower socioeconomic group). In upper class there were 23.6% adolescents (n=26) who had folate deficiency and 42.7% adolescents (n=47) had cobalmin deficiency. In middle class there were 41.5% adolescents (n=49) and 81.3% adolescents (n=96) who had folate and Vitamin B12 deficiency respectively. In lower class there were 51.7% subjects (n=75) who had deficiency

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Micronutrient deficiency	Upper class <Total = 110> (N/%)	Middle class <Total = 118> (N/%)	Lower class <Total = 145> (N/%)	Total <Total = 373> (N/%)
Folate	26/23.6%	49/41.5%	75/51.7%	150/40.2%
Vitamin B12	47/42.7%	96/81.3%	128/88.3%	271/72.7%

Table-1: Micronutrient levels amongst subjects

of folate and 88.3% subjects (n=128) who had Vitamin B12 deficiency. In total 40.2% adolescents had folate deficiency and 72.7% subjects had Vitamin B12 deficiency.

DISCUSSION

According to our study, there were 40.2% adolescents who had folate deficiency and 72.7% adolescents who had Vitamin B12 deficiency. According to a survey conducted by Kapoor D et al¹², amongst children of slum area in Delhi, they found that 88% of children who were less than 6 years of age had deficiency of ferritin. In a study conducted in a hospital in Delhi, there were 50% of the children aged between 6 months to 12 years who had deficiency of folate.¹³ In a study conducted by Black A K et al¹⁴, they found that 8% of the children under 5 years of age had deficiency of Vitamin B 12 in Mexico. Low serum levels of Vitamin B12 and folate are generally associated with low levels of these micronutrients in new born at birth. This is due to maternal deficiency of vitamin B12 and folate due to improper and inadequate dietary intake. Increased incidence of Vitamin B12 deficiency in school children is due to decreased absorption due to worm infestations or inadequate dietary intake.^{15,16} In a study conducted by Umesh et al¹⁷, deficiency of Vitamin B12 was found in 73.5% of school children which was comparable to our study. In a study conducted by Chandra et al¹³ there were 62% of the children who suffered from megaloblastic anemia. Since in India, majority of people are vegetarians so Indian vegetarians have lower level of Vitamin B12 than Indian Non vegetarians.¹⁸ In a similar study conducted amongst girls in Bangladesh deficiency of folic acid was done in 25% the females and 7% of girls had Vitamin B12 deficiency (<150p mol/L).¹⁹ Vitamin B12 deficiency amongst Kenyan school children was 70% and amongst Preschool children of India was 80%.²⁰ A study conducted by Kapil U et al, deficiency of folate, Vitamin B12 was high amongst children between 5-18 years of age.¹⁷

The results of our study show that Vitamin B12 deficiency was more prevalent amongst children of lower socioeconomic status. Limitation of our study was that it was conducted in a smaller demographic area. School fees were taken as a mark for socioeconomic status of family but even in government schools, some middle class students are admitted. So the criterion was partially correct.

CONCLUSION

From the above study we can say that there is high prevalence of Vitamin B12 and folate deficiency amongst adolescents. Regular screening should be done to establish the micronutrient status. All the adolescents should be

administrated balanced diet.

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