Brief communication

Vitamin B_6 status of pregnant women attending antenatal clinic in northwestern Ethiopia

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Abstract

Vitamin B_6 has been recognized as an essential micronutrients involved in normal fetal development, and positive pregnancy outcome. Its deficiency may lead to undesired pregnancy outcomes. There are no reports on the vitamin B_6 status of East African pregnant mothers so far. The objective of this study is to evaluate the vitamin B_6 status of pregnant mothers by measuring the serum levels of pyrodoxal-5-phosphate, and pyridoxal. One hundred and thirty one healthy third trimester pregnant women attending ANC were enrolled in the study. Their serum levels of pyridoxal-5-phosphate, and pyridoxal were analyzed by high performance liquid chromatography. The mean serum, and pyridoxal-5-phosphate and pyradoxal were found to be 16.7 nmol/L and 0.47 nmol/L, respectively. The findings in this survey provide evidence that the serum levels of vitamin B_6 were low among anti-natal clinic attendants in northwestern Ethiopia. [*Ethiop.J.Health Dev.* 2005;19(1):63-64]

Introduction

Because of Pyriodxal-5-phosphate (PLP) reactivity with amino acids and several nitrogen containing compounds, the biochemical functions of vitamin B_6 centers around these molecules as cofactor for more than 100 enzymes, including for transaminases in erythrocytes (1). The determination of the vitamin B_6 status of an individual is of paramount importance in understanding the relationship between health and nutritional intake, and factors that influence the requirement of vitamin B_6. Pregnancy is characterized by increased nutritional requirements as result of pregnancy related physiologic alterations, and superimposed fetal metabolism and its needs. Vitamin B_6 has been recognized as an essential micronutrient involved in normal fetal development, and positive pregnancy outcomes. It is essential for homocysteine metabolism. Its deficiency may lead to hyperhomocysteinaemia (2), which is an established factor in undesired pregnancy outcomes. There are no reports on the vitamin B_6 status of East African pregnant women so far. Therefore, the principal objective of this study is to evaluate the serum level of PLP, and pyridoxal (PL) in pregnant Ethiopians at the third trimester as status indicators of vitamin B_6.

Methods

Women appearing in the third trimester to attend the antenatal clinic (ANC) of the Gondar teaching hospital (Gondar, Ethiopia) were recruited for the study after obtaining their informed consent. All the new attendants of the clinic for a period of two months were enlisted consecutively. The criteria for recruitment included age above 15 years, gestational age 28 to 42 weeks, first ANC attendance in the present pregnancy, singleton pregnancy, and absence of any debilitating chronic illness or any other medical complication. The study protocol was approved by the ethics committee. Their socio-demographic and economic status, anthropometric, and maternity data were collected using structured questionnaires. Fasting blood samples were taken form the antecubital vein of each woman. Samples were then centrifuged and frozen at 25^0C till they were transported to the Chemical Pathology Department, Leicester University, England, where the serum levels of pyridoxal-5-phosphate were analyzed by high-performance liquid chromatography. Because Pyridoxal is the form that crosses into the cell, its plasma level was also measured. All data are expressed as means ± SD. Statistical analysis was done using the statistical programme EPI 6.0.

Results

A total of 131 women attending the ANC were selected based on the inclusion criteria and enrolled in the study. All subjects were residents of Gondar town and surrounding areas. The reported monthly household income was between Birr 420-727, with a mean income of birr 573 ± 98. The mean age of the participants was 24.9 ± 5.3 years with an average household of 3.7 ± 1. Twenty one point two percent of them were illiterate and 52.6% had less than six years of school. Almost all of the women (98%) were married. All of them reported regular consumption (3 times/day) of a typical highland Ethiopian traditional diet. This consisted mainly of flat bread made from *teff* as a basic food along with sauce made from cereal flour (beans, peas, grass-pea, or/and chickpeas), oil from oily seeds, pepper and spices. The women stated that they did not regularly supplement their diet in the course of pregnancy. None of them were receiving multivitamins or iron tablets prior to or during pregnancy. There were no pregnancy-related illnesses or premature labour prior to the study period. The mean PLP, and PL values were 16.7 ± 1.4 and 0.47 ± 0.05, respectively.

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Table 1: **Serum values of vitamins and other biochemical parameters that are indicator of nutritional status**

Serum Parameters	Mean value (n=131)
Pyridoxal-5`-phosphate (nmol/L)	16.7 ± 1.4
Pyridoxal (nmol/L)	0.47 ± 0.05
total protein (g/L)	61.6 ± 7
Cholesterol (g/L)	1.73 ± 3.13
hematocrit	42.6 ± 1.9*

* Three women have hematocrit value below 37.

Discussion

This study is the first cross-sectional study in which the serum level of vitamin B_6 has been determined in east African pregnant women in the third trimester. Cut-offs pregnant women is not well defined in literature. However, indices used to assess vitamin B_6 suggest 30 nmol/L as a minimal value for adequate status in normal adults (1). The findings in this survey (PLP = 16.7 nmol/L) provide evidence that the serum levels of vitamin B_6 are low. In similar studies, PLP in Dutch and black South African were found to be about 45 μnmol/L (4) and 16.65 + 7.3 nmol/L (3), respectively. The mean serum level of PLP found among the study subjects of this study is almost equivalent to the results of the South African women. Other parameters, such as maternal age and parity versus serum level could not be analyzed because the study population was relatively young, and the parameters were weakened when stratified further. Depressed vitamin B_6 (increased homocysteine level) is a risk factor for recurrent spontaneous abortion, abruptio placenta and intrauterine fetal death (2,4,5). In this study, three mildly anemic patients were identified. However, a severe vitamin B_6 deficiency can lead to hypochromic microcytic anaemia which responds favorably to pyridoxine therapy. The result of this study agreed with those of most other nutritional studies done in pregnant Ethiopian women i.e. it is a constant feature that a significant proportion of women in reproductive age have some forms of micro-nutritional deficiency including retinol, calciderol and iodine (6-8). However, further studies are recommended to understand the magnitude of deficiency, and the associated dietary factors and whether the deficiency is accompanied with the described pregnancy related disorders. Yet, there is a need to strengthen programmes of multivitamin supplementation to pregnant women along with health education, and the promotion of healthy dietary habitudes.

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