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Original Research

Assessment of vitamin B- 12 level among pregnant women

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ABSTRACT:
Background: Pregnancy is a critical stage during the life cycle when the requirement for vitamin B12 increases due to the rapid cell multiplication resulting from the enlargement of the uterus, placental development and fetal growth. The present study assessed vitamin B- 12 level among pregnant women. **Materials & Methods:** 156 pregnant women of all trimester were enrolled and total vitamin B12 was measured using the IMMULITE 2500 analyzer. **Results:** 1st trimester had 45, 2nd had 50 and 3rd had 61 subjects. The difference was non- significant (P< 0.05). The mean Vit B- 12 (pmol/L) in 1st, 2nd and 3rd trimester was 320.4, 194.2 and 162.0 respectively and serum folate (nmol/L) level was 30.2, 18.6 and 15.2 in 1st, 2nd and 3rd trimester. The difference was significant (P< 0.05). **Conclusion:** Among all trimester, vitamin B- 12 level was lowered in pregnant women in third trimester, therefore oral supplement of vitamin B- 12 is necessary.
Key words: Pregnancy, fetal growth, vitamin B- 12 level.

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INTRODUCTION

Deficiency of vitamin B12 is considered to be highly prevalent in India and the metabolic signs of vitamin B12 deficiency have been reported in 75% of adult men and women from urban areas of West India.[1] Pregnancy is a critical stage during the life cycle when the requirement for vitamin B12 increases due to the rapid cell multiplication resulting from the enlargement of the uterus, placental development and fetal growth.[2] Vitamin B12 deficiency during pregnancy may elevate plasma Hcy levels and is associated with an increased risk for adverse outcomes including neural tube defects, small-for gestational-age, intrauterine growth retardation, early miscarriage and pre-eclampsia.[3]

Vitamin B-12 insufficiency was previously perceived to be a problem that affected the elderly, due to malnutrition or intrinsic factor–mediated malabsorption and has been related to anemia, dementia, and cognitive dysfunction.[4] Both low vitamin B-12 and folate concentrations have been associated with pregnancy complications such as neural tube defects (NTDs), spontaneous abortion, pre-eclampsia and preterm birth with the latter 2 conditions mediated in part by elevated homocysteine.[5] Folic acid supplementation is effective in reducing the risk of NTDs by 40% but because more than half of pregnancies are unplanned, mandatory folic acid fortification of wheat flour and cereal products.[6] The present study assessed vitamin B- 12 level among pregnant women.

MATERIALS & METHODS

The present study comprised of 156 pregnant women. All were enrolled in the study after they gave written consent to participate.

Particulars of all women such as age, gravidity, parity, occupation, educational, vitamin supplementation and fever was recorded. In each patient, 5 ml of venour blood was collected for biochemical analysis. Hemoglobin concentration was determined by colorimetric analysis of lysed whole blood using the

Hemoglobin B test kit. Total vitamin B12 was measured using the IMMULITE 2500 Vitamin B12 solid phase, two-site chemiluminescent enzyme immunoassay in the IMMULITE 2500 analyzer. The results were clubbed and subjected for statistics. P value <0.05 was considered significant.

RESULTS

Table I Distribution of subjects based on trimester

Trimester	Number	P value
1st	45	0.14
2nd	50	
3rd	61	

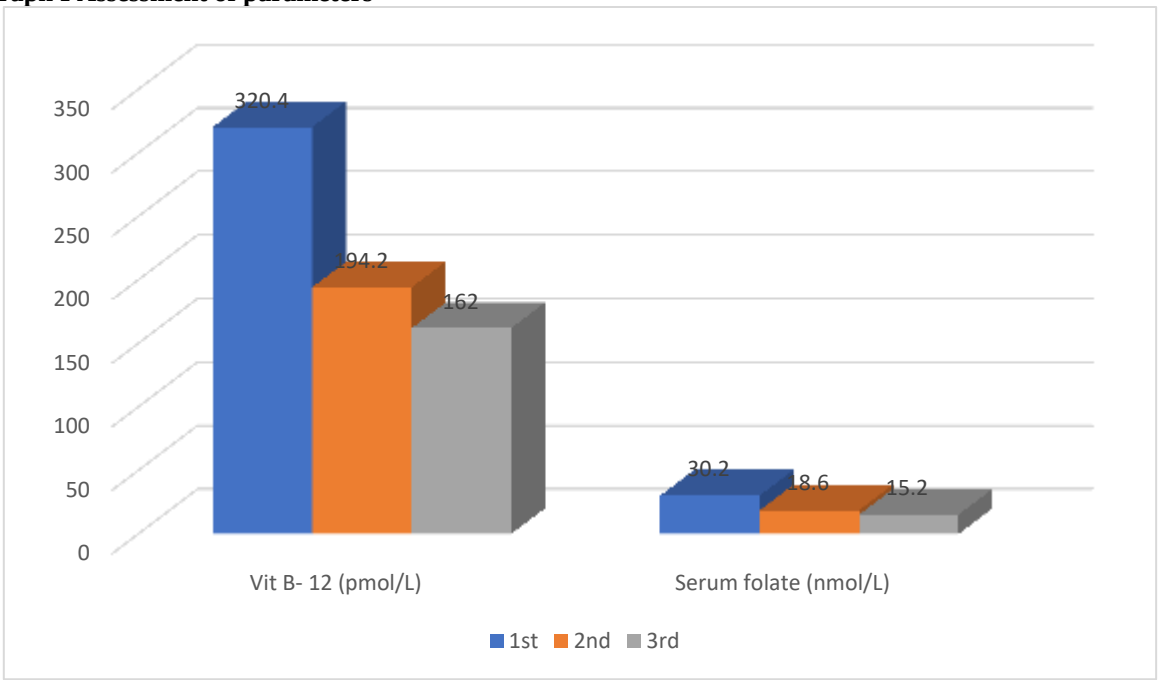
Table I shows that 1st trimester had 45, 2nd had 50 and 3rd had 61 subjects. The difference was non- significant (P< 0.05).

Table II Assessment of parameters

Parameters	1st	2nd	3rd	P value
Vit B- 12 (pmol/L)	320.4	194.2	162.0	0.02
Serum folate (nmol/L)	30.2	18.6	15.2	0.01

Table II, graph I shows that mean Vit B- 12 (pmol/L) in 1st, 2nd and 3rd trimester was 320.4, 194.2 and 162.0 respectively and serum folate (nmol/L) level was 30.2, 18.6 and 15.2 in 1st, 2nd and 3rd trimester. The difference was significant (P< 0.05).

Graph I Assessment of parameters



DISCUSSION

Adequate vitamin B12 status during pregnancy is critical since maternal vitamin B12 deficiency is associated with increased risk for several adverse pregnancy outcomes for both mother and fetus.[7] These risks include neural tube defects, intrauterine growth retardation, preeclampsia and early miscarriage. Furthermore, fetal vitamin B12 accumulation during gestation is the major determinant of the B12 status of the newborn and of stores in infancy.[8] Even though a mother may not exhibit any hematological or neurological symptoms of B12 deficiency, an exclusively breast-fed infant born to a mother who is deficient in vitamin B12 can develop symptoms within several months following delivery. These include failure-to-thrive, megaloblastic anemia, and neurological symptoms.[9] The present study assessed vitamin B- 12 level among pregnant women.

In present study we found that 1st trimester had 45, 2nd had 50 and 3rd had 61 subjects. Muthayya et al [10]in their study 140 pregnant women were enrolled. In each subject, total vitamin B12 was measured using the IMMULITE 2500. 20 patients were in first

trimester, 70 in second and 50 in third trimester. The mean age was 24.5 years, 26.3 years and 28.2 years in first, second and third trimester respectively. The mean height was 158.4 cm, 159.4 cm and 161.2 cm in first, second and third trimester respectively. The mean hemoglobin level in first trimester was 112.4 g/L, in second trimester was 106.5 g/L and in third trimester was 105.2 g/L. The mean Vitamin B12 level in first trimester was 328.6 pmol/L, in second trimester was 198.2 pmol/L and in third trimester was 165.3 pmol/L. The mean serum folate level in first trimester was 28.4 pmol/L, in second trimester was 19.3 pmol/L and in third trimester was 15.1 pmol/L.

We found that mean Vit B- 12 (pmol/L) in 1st, 2nd and 3rd trimester was 320.4, 194.2 and 162.0 respectively and serum folate (nmol/L) level was 30.2, 18.6 and 15.2 in 1st, 2nd and 3rd trimester. Samuel et al[11] evaluated the vitamin B12 status of 366 pregnant South Indian women in early pregnancy and its relationship with sociodemographic, anthropometry and dietary intake. Low plasma vitamin B12 concentration was observed in 51.1% of the women, while 42.4% had impaired B12 status. Elevated MMA, elevated homocysteine (>10 μmol/L) and low erythrocyte folate 283 nmol/L) was observed among 75.8%, 43.3% and 22.2% of women, respectively. The median (25th, 75th percentile) dietary intake of vitamin B12 was 1.25 (0.86, 1.96) μg/day. Lower maternal body weight was associated with higher vitamin B12 concentration prevalence ratios (PR) (95% CI) 0.57 (0.39, 0.84)). The predictors of impaired vitamin B12 status were non-use of yoghurt [PR (95%CI) 1.63 (1.03, 2.58)], non-use of fish [PR (95% CI) 1.32 (1.01, 1.71)] and primiparity [PR (95% CI) 1.41 (1.05, 1.90)].

Vanderjagt et al[12] determined the vitamin B12 status of 143 pregnant women. The holoTCII concentration ranged from 13 to 128 pmol/L. Using a cutoff of 40 pmol/L, 36% of the women were classified as vitamin B12-deficient. HoloTCII concentrations correlated negatively with plasma homocysteine levels ($r = -0.24$, $P = 0.003$) and positively with red blood cell folate concentrations ($r = 0.28$, $P < 0.001$). These data underscore the importance of supplementing pregnant women in Nigeria with vitamin B12 in order to ensure adequate vitamin B12 status and decrease the risk for neural tube defects.

CONCLUSION

Authors found that among all trimester, vitamin B- 12 level was lowered in pregnant women in third trimester, therefore oral supplement of vitamin B- 12 is necessary.

REFERENCES

1. Giugliani, S. M. Jorge, and A. L. Goncalves. Serum vitamin B12 levels in parturients, in the intervillous space of the placenta and in full-term newborns and their interrelationships with folate levels. American Journal of Clinical Nutrition 1985; 330–335.
2. Ronnenberg AG, Goldman MB, Chen D, Aitken IW, Willett WC, Selhub J, Xu X. Preconception homocysteine and B vitamin status and birth outcomes in Chinese women. Am J Clin Nutr 2002;76: 1385–91.
3. de Jong-van den Berg LT. Monitoring of the folic acid supplementation program in the Netherlands. Food Nutr Bull 2008;29(2 Suppl): S210–3.
4. Ray JG, Wyatt PR, Thompson MD, Vermeulen MJ, Meier C, Wong PY, Farrell SA, Cole DE. Vitamin B12 and the risk of neural tube defects in a folic-acid-fortified population. Epidemiology 2007;18: 362–6.
5. Yajnik CS, Fall CH, Vaidya U, Pandit AN, Bavdekar A, Bhat DS, Osmond C, Hales CN, Barker DJ. Fetal growth and glucose and insulin metabolism in four-year-old Indian children. Diabet Med 1995; 12:330–6.
6. Adaikalakoteswari A, Vatish M, Lawson A, Wood C, Sivakumar K, McTernan PG, Webster C, Anderson N, Yajnik CS, Tripathi G, et al. Low maternal vitamin B12 status is associated with lower cord blood HDL cholesterol in white caucasians living in the UK. Nutrients 2015;7:2401–14.
7. Yajnik CS, Deshpande SS, Jackson AA, Refsum H, Rao S, Fisher DJ, Bhat DS, Naik SS, Coyaji KJ, Joglekar CV, et al. Vitamin B12 and folate concentrations during pregnancy and insulin resistance in the offspring: the Pune Maternal Nutrition Study. Diabetologia 2008;51:29–38.
8. Hales CN, Barker DJ. The thrifty phenotype hypothesis. Br Med Bull 2001;60:5–20.
9. Whincup PH, Kaye SJ, Owen CG, Huxley R, Cook DG, Anazawa S, Barrett-Connor E, Bhargava SK, Birgisdottir BE, Carlsson S, et al. Birth weight and risk of type 2 diabetes: a systematic review. JAMA 2008;300:2886–97.
10. Muthayya S, Dwarkanath P, Mhaskar M, Mhaskar R, Thomas A, Duggan C, Fawzi WW, Bhat S, Vaz M, Kurpad A. The relationship of neonatal serum vitamin B12 status with birth weight. Asia Pac J Clin Nutr 2006;15:538–43.
11. Samuel TM, Duggan C, Thomas T, Bosch R, Rajendran R, Virtanen SM, Srinivasan K, Kurpad AV. Vitamin B12 intake and status in early pregnancy among urban South Indian women. Annals of Nutrition and Metabolism. 2013;62(2):113-22.
12. VanderJagt DJ, Ujah IA, Ikeh EI, Bryant J, Pam V, Hilgart A, Crossey MJ, Glew RH. Assessment of the vitamin B12 status of pregnant women in Nigeria using plasma holotranscobalamin. International Scholarly Research Notices. 2011;2011.