

Serum Vitamin B₁₂ Level: Physiological Effects in Pregnancy

Majid Malaki

Assistant Professor of Pediatric, 43 Skibhusvej, 5000c Odense, DENMARK.

Sir,

Vitamin B₁₂ (Cyanocobalamin), a water-soluble vitamin is an essential nutrient required for maintenance of normal erythropoiesis, nucleoprotein and myelin synthesis, cell reproduction and normal growth. Vitamin B₁₂ is a necessary cofactor in the methionine synthase reaction, which converts homocysteine into methionine. During pregnancy, Vitamin B₁₂ is concentrated in the fetus mostly in the liver. Vitamin B₁₂ deficiency is rare in the infant up to 4 months if mothers receive adequate Vitamin B₁₂.^[1,2]

Vitamin B₁₂ deficiency (serum or plasma B12 <150 pmol/L or 304 pg/mL) is common in women of reproductive age, but geographic, socio-economic and cultural properties including nutritional habit may influence the prevalence of Vitamin B₁₂ deficiency. It may reach up to 74% in rural Nepal pregnant women that affect in quality of their milk lead to adverse effects on growth and developmental of their infants.^[1]

In clinic 18% to 20% of clinical macrocytosis (defined as an MCV > 100) is related to B₁₂ deficiency. Vitamin B₁₂ deficiency play role in myelin damage, accounting for the neurologic deficits, such as neuropathy and ataxia, loss of proprioception, ataxia, the development of peripheral neuropathy, and dementia. Physical examination of affected case show fatigue and pallor, jaundice, glossitis, diarrhoea, headaches, and neuropsychiatric disturbances. Vitamin B₁₂ deficiency in mild or subclinical can be associated with cognition disorder especially in elderly and children while complications in pregnancy include abortion, preterm labour, secondary low birth weight, anencephaly, neural tube defects, deficiency of Vitamin B₁₂ has been linked to a variety of abnormal neurological symptoms such as hypotonic muscles, failure to thrive, cerebral atrophy and developmental regression. Maternal plasma B₁₂ in pregnancy is predictive of offspring cognitive performance at 9th year of age, Vitamin B₁₂ deficiency in pregnancy is reason for infertility, IUGR, preeclampsia and early pregnancy loss, preconception level lower than 258 pmol/L (349pg/mL) may increase the chance of preterm delivery.^[1-4]

A serum Vitamin B₁₂ above 300 pg/mL is interpreted as normal, levels between 200 and 300 pg/mL are considered borderline, and below 200 pg/mL are considered deficient. Vitamin B₁₂ insufficiency increases Risk of developing an autoimmune disorder. daily maternal Vitamin B₁₂ supplementation (50 µg/day) during pregnancy through 6 weeks postpartum substantially improved maternal Vitamin B₁₂ status, in spite of Vitamin B₁₂ importance 'WHO recommends just iron and folic acid to pregnant women.'^[2,4]

GUSTO study showed 48% of the women had Vitamin B₁₂ insufficiency, and those with lower Vitamin B₁₂ and high folate levels are prone to develop gestational diabetes.^[5] Early pregnancy B₁₂ values are predictive of high fasting blood sugar in late gestation. Low B₁₂ levels may be an independent risk factor for Gestational Diabetes Mellitus (GDM), particularly in obese women.^[6] Such mothers are older, more obese with lower mean B₁₂ values than controls (184 vs 225 pmol/L) (249 vs 304 pg/mL).^[7] There is an association with high folate(12.2 ng/mL or more) to serum Vitamin B₁₂ (306 pg/mL or more) and high plasma glucose.^[8]

Key points

There is a long time that researchers found the importance of Vitamin B₁₂ importance in a healthy pregnancy process while WHO has not any guidelines about how to supply such vitamin to risky and non-risky pregnancy.

Attention to nutrition (containing Vitamin B₁₂) and supply of adequate Vitamin B₁₂ is essential in pregnancy.

The best time for supplying is before conception and best level of serum B₁₂ is more than 306 pg/mL.

In low serum Vitamin B₁₂, all pregnancies should be considered high risk for preterm, GDM, and fetal anomalies.

Giving high folate dose to Vitamin B₁₂ deficient mothers can be hazardous.

A successful nursing with breast milk feeding and having healthy smart infant depends on attention to serum Vitamin B₁₂ level of mothers during nursing.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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*Correspondence:

Majid Malaki

Assistant Professor of Pediatric, 43
Skibhusvej, 5000c Odense, DANMARK.
Email: madjidmalaki@gmail.com

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