

Maternal vitamin D supplementation and its impact on allergy

To the Editor,

With great interest, we read the recent article by Gur et al. (1), "The effect of place of residence and lifestyle on vitamin D deficiency in pregnancy: Comparison of eastern and western parts of Turkey". The authors discussed the prevalence and the predictive factors of vitamin D deficiency in pregnancy and the compliance with "The National Vitamin D Support Program" in Turkey's easternmost and westernmost provinces. They found that clothing style, seaside holiday duration, consuming fish, living in high-altitude cold regions, and 1200 IU/day vitamin D supplementation affected vitamin D levels. They also showed that vitamin D deficiency in pregnancy is high in Turkey. They recommended increasing compliance with "The National Vitamin D Support Program" at the follow-up of all pregnant women.

Vitamin D supplementation in early life is recommended to prevent vitamin D deficiency in many countries, raising important questions about the safety and benefit for immune development and the implications for allergic risk. The impact of vitamin D deficiency on the risk of developing an allergy and a child's immune status in childhood has been controversial and lacking. We want to mention that vitamin D supplementation during pregnancy may promote the evolution of allergic diseases in offspring during childhood.

In recent studies, vitamin D was found to be positively associated with the risk for the development of allergic diseases in children during their first 2 years of life. Weisse et al. demonstrated that in pregnancy and at birth, higher levels of vitamin D may contribute to a higher risk for allergic outcomes. A questionnaire was answered by parents during pregnancy and yearly thereafter about children's atopic findings in the first 2 years of life. They also found a positive association between maternal and cord blood vitamin D concentrations with children's risk for food allergy within the first years of life (2).

In a prospective study, 596 pregnant women's vitamin D concentrations were evaluated in pregnancy, and their children were followed about allergic diseases and growth parameters. An association was not found between maternal vitamin D level and the child's anthropometric data or intelligence. Children whose mothers had a higher concentration of vitamin D had an increased risk of atopic dermatitis and asthma compared to children whose mothers had a lower concentration of vitamin D (3).

Rothers et al. (4) found that those with cord blood vitamin D ≥ 100 nmol/L, when compared to children with cord vitamin D 50-74.9 nmol/L, had a greater risk of a positive response to a skin prick test. They also reported a non-linear relationship between cord vitamin D and IgE (allergen-specific and total). The highest levels of IgE were identified in children with a cord vitamin D concentration < 50 nmol/L and ≥ 100 nmol/L. Increased risk of aeroallergen sensitization and elevated total IgE levels are associated with both low and high levels of vitamin D in cord blood.

Nielsen et al. (5) reported that postpartum depression is associated with high levels of 25(OH)D3. They speculated that 24-hydroxylase is the main determinant of this situation. High levels of 25(OH)D3 stimulate the 24-hydroxylase enzyme, which degrades the active form of vitamin D, 1,25(OH)2D3, to the inactive 1,24,25-trihydroxyvitamin D3 metabolite. This results in low concentrations of intracellular 1,25(OH)2D3. So, they propose that either a low level of 25(OH)D3 or high level of 25(OH)D3 cause a low level of 1,25(OH)2D and subsequent insufficient stimulation of vitamin D receptors.

Although the data to support this are still limited and heterogeneous, according to data, especially large doses of vitamin D supplementation during pregnancy should be used carefully.

We hope that the items mentioned above will add to the value of the well-written article of Gur et al. (1) regarding vitamin D deficiency in pregnancy.

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Author's Response

We appreciate and thank the authors, because they made an interpretation about the study we performed. There are studies indicating that high serum levels of vitamin D can lead to negative health outcomes, like low levels, as the writers state in this letter. However, there is very little information regarding the subject that a high maternal serum vitamin D level in pregnancy can have fetal or maternal side effects. In the study of Rother et al. that the writers give reference to, the relationship between high umbilical cord vitamin D level (≥ 100 nmol/L = 40 ng/mL) seen in 24 of 214 pregnant women and vitamin D replacement was not mentioned. Furthermore, cord blood vitamin D levels presented in this study are surprisingly high according to our national data. In the study performed by Halicioğlu et al., it was found that the mean cord blood vitamin D level was 11.5 ± 6.8 ng/mL, whereas they encountered normal (≥ 30 ng/mL) levels of vitamin D in only 2.3% of fetuses (1).

There are no clear data in pregnancy about the vitamin D replacement dose that will ensure normal maternal serum vitamin D levels. However, it was put forth that 400 IU/day of vitamin D replacement that the health authorities proposed is far from meeting the increasing need in pregnancy. The subject that the safe upper limit for pregnant women is 4000 IU/day has been reported by The National Health Institution. Wagner et al.

showed that the mean umbilical cord blood vitamin D level was 27.0 ± 13.3 ng/mL in pregnant women to whom they gave 4000 IU/day of vitamin D replacement in their prospective study (2). In addition, it was stated that there were no findings of toxicity in these pregnant subjects. The subject that vitamin D addition of 1000 IU/day during the last trimester of pregnancy resulted in only an augmentation of 5 to 6 ng/mL in moving around of vitamin D levels in maternal and cord serum was reported by Mallet et al. (3). It has been seen in pregnant and lactating women that it is necessary to take doses exceeding 1000 IU/day of vitamin D (2000-10,000 IU/d) for the purpose of obtaining robust nutritional vitamin D status (2).

As a result, new data are needed to find the ideal replacement dose of vitamin D during pregnancy. However, it is being seen that the dose replacement of 1200 IU/day proposed in the National Health Program in our country in the current conditions is an appropriate and logical approach.

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