



Is the lower serum level of vitamin E associated with pregnant women with allergic rhinitis?

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It is well known that adequate maintenance or support of nutrition during pregnancy, including essential and trace elements and calorie intake, is a critical dimension not only to maintain peak health and performance of themselves but also for the lifelong health of the offspring.¹⁻⁷ Malnutrition often results in inadequate protein intake, fewer calories, and deficiency of certain-type essential trace elements. Intake of enough calorie can be easily monitored by measuring gestational weight gain (GWG) in the entire pregnancy period or more accurately estimated by separating GWG according to the different trimesters³; however, it is hard to define whether these pregnant women have adequate dietary intake or meet recommendations for vitamins D, C, A, B complex, K, and E, as well as folate, choline, iron, calcium, potassium, magnesium, zinc, and other essential trace elements (minerals or essential amino acids and so on), partly because of difficulty to measure and monitor these essential trace elements, and partly because of overlooking its important and critical role on both maternal and offspring's outcome.^{1,2,4-6} Additionally, these certain-type essential trace elements sometimes make physicians or healthcares confused, based on the presence of multifaced functions of these elements. It has been reported that continuous supplementation of vitamin E throughout offspring lifespan provides beneficial effects to the offspring, but one meta-analysis using experimental models and observational investigations, which are involved with more than 135 000 participants in 19 trials carried out between 1966 and 2004 did not support the above-mentioned findings, based on a significantly increasing mortality from all causes when high dosage vitamin E supplements are given as a supplement throughout their lifespan.⁸

Moreover, some of them exist in many isoforms, and all may be involved in different functions for biological processes.

Among these, carotenoids and vitamin E are a good example, because both are composed of complex mixtures and isoforms. Carotenoids can be a α -carotene, β -carotene, β -cryptoxanthin, lutein, lycopene, and zeaxanthin.⁹ Similar to carotenoids, vitamin E compound family includes two subgroups, four tocopherols, such as α -, γ -, and δ - tocopherols, as well as four tocotrienols, including α -, γ -, and δ -tocotrienols.⁹ All contribute to challenge the claim of the beneficial or protective effects of supplementation of these essential trace elements during pregnancy. Therefore, recent studies have focused on the direct measurement of these essential trace elements in pregnant women to evaluate their roles on women's health or fetal well-being and subsequent lifelong of the fetuses.^{1,10-12} In the coming issue of the *Journal of the Chinese Medical Association*, Drs Wu and Wang attempted to investigate the relationship between the maternal serum level of vitamin E and the occurrence of pregnant women with allergic rhinitis.¹⁰

This retrospective case-controlled study enrolled 37 pregnant women with allergic rhinitis and 35 healthy women as controls, and the authors found that the serum level of vitamin E in pregnant women with allergic rhinitis was statistically significantly lower than that in pregnant women without, and additionally, the serum level of vitamin E was negatively correlated with the total nasal symptom score, reaching the conclusion that the decreased vitamin E may be correlated with the pathogenesis of allergic rhinitis in pregnant women.¹⁰ Their finding of the current article is interesting and worth of discussion.

Allergic rhinitis (hay fever), a hypersensitivity disease mediated by specific immunoglobulin E (IgE) in response to allergens, characterized by a destructive balance of T helper type 1 (Th1)/Th2 cytokine with Th2 cytokines' force, especially interleukin 4 (IL-4) and IgE to bind to the high-affinity IgE receptor (Fc region of IgE, also known as FcεRI) on mast cells, resulting in the cross-linking of allergens with the IgE bound to the IgE receptor triggering allergic reactions and inducing the release of the allergic and inflammatory biochemical mediators stored in the preformed granules of mast cells and the new synthesis of leukotrienes and other cytokines, is one of the most common respiratory allergic diseases with a prevalence as 18%–30% of women in the childbearing age, contributing to around 20% of pregnant women are affected by allergic rhinitis.^{13,14} The oxidant agents produced during the aforementioned reactions can increase the extent of tissue damage and create complicated circumstances.¹⁴ All contribute the established concept that

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antioxidant agents may provide a protective role or therapeutic effect on allergic rhinitis. Vitamin E, a most abundant liposoluble antioxidant compound in the human body, is a supplementary factor, which has immune-modulatory and antioxidant effects.¹⁵ That is the basic rationale of Drs Wu and Wang's aims to investigate whether the serum level of vitamin E exhibited clinical significance in pregnant women with allergic rhinitis.¹⁰ As predicted, the authors found low serum level of vitamin E, as well as high serum level of IL-4, IL-13, and IgE in pregnant women with allergic rhinitis compared to those without.¹⁰ However, it is still uncertain whether the aforementioned findings are a cause or only an end product. It is also unknown whether these women were diagnosed with allergic rhinitis before or during pregnancy. To clarify this, the data or measurements should also be performed in these subjects before their pregnancies. If the data were also similar or reproducible in these subjects before pregnancy, the relationship between vitamin E and allergic rhinitis may really exist.

In fact, the relationship between vitamin E and allergic rhinitis has been extensively reviewed recently.¹³ Patients with allergic rhinitis who were treated with vitamin E showed an inconstant finding about the allergic rhinitis-related symptoms or signs compared to those without vitamin E treatment.¹³ The laboratory data are also in agreement with the aforementioned inconstant clinical findings, which allergic rhinitis-related biomarkers may not be always different between patients with or without administration of vitamin E.¹³ In term of local effects or systemic effects, the data also failed to be consistent. For example, the inflammatory responses and the number of mucosal eosinophils were found to be reduced in rats treated with vitamin E compared to those without.¹³ By contrast, in term of the serum level of IgE, administration of vitamin E to patients did not show any change compared to those without a given vitamin E supplement.¹³ All addressing to claim that a low serum level of vitamin E may be associated with pathogenesis of allergic rhinitis are premature.

Much concern exists about the issue of malnutrition in pregnant women. Although many uncertainties are still present about the beneficials of supplementation of essential trace elements, minerals, or vitamins on pregnant women, a significant number of pregnant women are not meeting the National Academies of Science, Engineering, and Medicine Dietary Reference Intake recommendations for vitamins D, C, A, B6, K, and E, as well as folate, choline, iron, calcium, potassium, magnesium, and zinc even the use of dietary supplements in the United States,⁷ suggesting that the topics addressing how to provide an effective strategy to improve

adequate nutrition support for pregnant women are urgent in need.

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