



Editorial

Hyperemesis gravidarum, pregnancy and bone loss



It has been considerable controversy over the past decades as to whether high parity and/or prolonged lactation periods are detrimental to bone mineral density (BMD).¹ Concerns exist regarding a loss of BMD during pregnancy (at the lumbar spine of 7.6% relative to age-matched nonpostpartum controls),¹ although it may be transient, contributing to the consideration of the importance of adequate nutrition support for the pregnant women, including essential amino acids, trace mineral elements, and calcium or vitamin D supplementation.^{2–5}

A recent prospective randomized study was conducted to examine associations of several aspects of parity and history of lactation with incident hip fractures and clinical fractures and, in a subset of women with BMD, and the results showed no correlation between patterns of parity or history of lactation and fracture risk or BMD.⁶ Although it is negative,⁶ the risk of inadequate nutritional support is still high in pregnant women. Many pregnant women suffer from nausea and vomiting in their first trimester. Among these women, a small fraction may result in the most severe form, hyperemesis gravidarum, characterized by persistent vomiting, weight loss of more than 5%, ketouria, electrolyte abnormality and dehydration.⁷ In theory, it might further worsen the nutrition deficiency in these pregnant women. We are glad to learn that Dr. Uysal's study focused on this topic. The authors published an article in the current issue of the *Journal of the Chinese Medical Association* to investigate the relationship between bone loss and hyperemesis gravidarum.⁸

The authors compared BMD and some laboratory parameters of pregnant women with ($n = 40$) and without ($n = 39$) hyperemesis gravidarum in Kayseri Education and Research Hospital between June and December 2015.⁸ The authors found no significant statistical difference of dual energy x-ray absorptiometry (DEXA) and laboratory parameters between women with and without hyperemesis gravidarum.⁸ They concluded that pregnancy with hyperemesis gravidarum is not increasing risk of bone loss compared with that without is.⁸ The current study is interesting and worthy of a further discussion.

First, this study, by accident, found that vitamin supplementation seemed to be beneficial for early-pregnancy women. The authors found pregnant women without

hyperemesis gravidarum had a higher frequency to take vitamin than those with hyperemesis gravidarum did (92% vs. 65%, $p = 0.003$),⁸ suggesting that vitamin supplement may reduce the risk of hyperemesis gravidarum in the early pregnancy. A series of continuous physiological adjustments affect nutrient metabolism and energy requirements during pregnancy, the pre- and intra-pregnancy nutritional status constituting a critical factor for maternal health and fetal wellbeings.^{9,10} It has reported that 20–30% of pregnant women might have vitamin deficiency, and without prophylaxis, 75% may show a deficit of at least one vitamin.⁹ The deficiency of vitamins, minerals, and trace elements might be correlated with worse outcome of pregnancy.^{4,5,10} For example, vitamin B6 deficiency is associated with hyperemesis gravidarum and calcium deficiency might increase the risk of low birth weight and intrauterine growth restriction.⁹ Although deficiency is negatively correlated with maternal and fetal outcome, but overdosing should be avoided.⁹ Over vitamin E supplementation might be harmful to the pregnancy outcome by disrupting a physiologic oxidative gestational state.⁹ Therefore, supplementation might have a U-shaped phenomenon of benefits and risk, and the asserted benefits might only exist within a specific range, and the risks may present outside of this range.⁴

Second, Dr. Uysal's study confirmed the bone loss in the women after delivery.⁸ Is this bone loss correlated with postmenopausal osteoporosis.¹¹ Dr. Uysal and colleagues also found the lower serum levels of vitamin D in their study population.⁸ Therefore, Dr. Uysal's study re-emphasized beneficial for those pregnant women who are risky of multiple-micronutrient deficiencies, such as women living in low-to middle-income countries and/or vegetarian women. The role of vitamin D in human body is relatively complicated, although it is often discussed about calcium homeostasis, especially on issues of bone health. In fact, it might expand the conversation to cover cardiovascular, neurological, dermatologic, and immunologic systems, and possibly neoplasm therapy.^{12,13} One study showed that pregnant women with a higher serum level of 25-hydroxyvitamin D (≥ 37.5 nmol/L) in the first trimester had a significantly lower risk of small form gestational age (adjusted odds ratio 0.5, 95% confidence interval 0.3–0.9) than those with a lower serum level.¹⁴

Third, calcium and vitamin D demands are significantly increased in pregnant women in the third trimester and lactation period due to rapid fetal growth and lactation, which might contribute to bone loss.¹ Without prophylaxis, women would exacerbate bone loss. By contrast, hyperemesis gravidarum is present in the first trimester and disappears in the later pregnancy. This can explain the no correlation between hyperemesis gravidarum and bone loss in Dr. Uysal's study.⁸

Taken together, all hint the importance of special and intensive care for pregnant women. Among these, nutritional support and adequate vitamin and/or trace elements supplementation should be considered for those high-risk pregnant women. Our effort is attempted to minimize the pregnancy-related adverse events, such as hyperemesis gravidarum, pregnancy-induced hypertension, gestational diabetes mellitus, bone loss, and others. This not only provides an immediate better pregnancy outcome but also improve a long-term women's health.

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Conflicts of interest

The authors declare that they have no conflicts of interest related to the subject matter or materials discussed in this article.

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