

Influence of vitamin D binding protein polymorphism, demographics and lifestyle factors on vitamin D status of healthy Malaysian pregnant women

ABSTRACT

Background: Vitamin D deficiency (VDD) has been related to vitamin D binding protein (GC) gene polymorphism, demographics and lifestyle factors in different populations. However, previous studies only focused on demographic and lifestyle factors or genetic factors alone. Therefore, this cross-sectional study aimed to assess the association between GC gene polymorphism, demographics and lifestyle factors with VDD among Malaysian pregnant women. **Method:** Information on demographic characteristics, dietary vitamin D intake from supplement and food, time spent outdoors, skin type and clothing were collected using a questionnaire. Plasma total 25-hydroxyvitamin D (25OHD) levels were measured using an Ultra-High-Performance Liquid Chromatography (UHPLC). Maternal GC single nucleotide polymorphisms (SNPs) (rs4588 and rs7041) were determined using restriction fragment length polymorphism (RFLP) technique. **Results:** Results showed that 50.2% of pregnant women were vitamin D deficient (25OHD < 30 nmol/L). VDD (25OHD < 30 nmol/L) was significantly associated with age, veiled clothing, maternal vitamin D intakes from both food and supplements, and GC rs7041 (and GC diplotypes). In contrast to previous studies that reported for non-pregnant population, a significant positive association was found between CC genotype for SNP GC rs7041, GC 1s-1s and GC If-2 with risk of VDD (25OHD < 30 nmol/L). **Conclusions:** The high prevalence of maternal VDD found in this study suggests the need for urgent development and implementation of vitamin D supplementation or fortification strategies to reduce VDD among pregnant women. The discrepancy in the association between GC rs7041 gene polymorphism and VDD reflects the variation in the factors associated with VDD in pregnancy compared to non-pregnant state.

Keyword: Pregnant women; Single nucleotide polymorphism; Vitamin D binding protein; Vitamin D deficiency