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ORIGINAL ARTICLE

Prevalence of vitamin D deficiency and associated factors in women and newborns in the immediate postpartum period

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KEYWORDS
Vitamin D deficiency;
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Postpartum period

Abstract
Objective: To assess the prevalence of vitamin D deficiency and its associated factors in women and their newborns in the postpartum period.
Methods: This cross-sectional study evaluated vitamin D deficiency/insufficiency in 226 women and their newborns in Viçosa (Minas Gerais, BR) between December 2011 and November 2012. Cord blood and venous maternal blood were collected to evaluate the following biochemical parameters: vitamin D, alkaline phosphatase, calcium, phosphorus and parathyroid hormone. Poisson regression analysis, with a confidence interval of 95%, was applied to assess vitamin D deficiency and its associated factors. Multiple linear regression analysis was performed to identify factors associated with 25(OH)D deficiency in the newborns and women from the study. The criteria for variable inclusion in the multiple linear regression model was the association with the dependent variable in the simple linear regression analysis, considering $p<0.20$. Significance level was α <5%.
Results: From 226 women included, 200 (88.5%) were 20–44 years old; the median age was 28 years. Deficient/insufficient levels of vitamin D were found in 192 (85%) women and in 182 (80.5%) neonates. The maternal 25(OH)D and alkaline phosphatase levels were independently associated with vitamin D deficiency in infants.

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Conclusions: This study identified a high prevalence of vitamin D deficiency and insufficiency in women and newborns and the association between maternal nutritional status of vitamin D and their infants' vitamin D status.

PALAVRAS-CHAVE
Deficiência de vitamina D;
Recém-nascidos;
Mulheres;
Período pós-parto

Prevalência de deficiência de vitamina D e fatores associados em mulheres e seus recém-nascidos no período pós-parto

Resumo

Objetivo: Avaliar a prevalência de deficiência de vitamina D e os fatores associados em mulheres e recém-nascidos no período pós-parto.
Métodos: Estudo de delineamento transversal; avaliou-se a deficiência/insuficiência de vitamina D em 226 mulheres e seus recém-nascidos no município de Viçosa (MG), entre dezembro de 2011 e novembro de 2012. Coletaram-se 5mL de sangue do cordão umbilical e sangue venoso materno a fim de avaliar os parâmetros bioquímicos: vitamina D, fosfatase alcalina, cálcio, fósforo e paratormônio. Usou-se regressão de Poisson e adotou-se a Razão de Prevalência (95% IC), a fim de se avaliar a deficiência de vitamina D e fatores associados. Fez-se a análise de regressão linear múltipla para identificar os fatores associados à deficiência de 25(OH)D dos recém-nascidos e das mulheres do estudo. O critério para inclusão das variáveis na regressão linear múltipla foi a relação com a variável dependente na análise de regressão linear simples, considerando $p<0,20$. O nível de significância adotado foi $\alpha<5\%$.
Resultados: Das 226 mulheres, 200 (88,5%) tinham entre 20 e 44 anos; a mediana foi de 28. Encontrou-se prevalência de níveis deficientes/insuficientes de vitamina D em 192 (85%) mulheres e 182 (80,5%) recém-nascidos. A 25(OH)D materna e a fosfatase alcalina materna se comportaram como preditores independentes da deficiência de vitamina D dos recém-nascidos.
Conclusões: Foi possível identificar a alta prevalência de deficiência e insuficiência de vitamina D nas mulheres e recém-nascidos em nosso meio e a relação entre o estado nutricional materno de vitamina D e o do recém-nascido.

Introduction

Maternal–fetal vitamin D deficiency (VDD) is currently a frequent morbidity. Lifestyles, environmental factors (inadequate sunlight exposure), lack of vitamin D (VD) supplementation for children and pregnant women and insufficient intake of that vitamin and/or calcium are responsible for the high prevalence of VDD in developed and developing countries.[1–3]

VDD in a pregnant woman and her newborn (NB) is closely associated.[4] There is a greater transfer of 25(OH)D to the fetus via the placenta during the last months of pregnancy, which is the main source of this vitamin for infants during the first months of life.[5,6] Additionally, the placenta contains VD receptors and produces the enzyme that converts 25(OH)D into its active form, thereby increasing VD levels for the fetus.[5]

In the first six to eight weeks of postnatal life, the NB's VD status depends on the VD acquired by placental transfer in the uterus, as demonstrated by its direct association with the levels found in maternal blood.[6,7] In most NBs, VD stock acquired from the mother run out up to the eighth week of life.[7]

Studies carried in India, United States, Bangladesh, Korea and other parts of the world have shown that many children worldwide are born with low VD reserves as a result of high maternal VDD, with a high prevalence of deficiency/insufficiency of 25(OH)D, ranging from 22.3% to 73.6% and, therefore, at risk of rickets.[1,8–11] Normal plasma levels of VD promote the absorption of 30% of dietary calcium and more than 60–80% during periods of growth, due to the high calcium demand. Therefore, during childhood, VDD can cause growth retardation and bone abnormalities, increasing the risk of fractures later in life.[12] Additionally, low levels of 25(OH)D in cord blood were associated with increased risk of acute respiratory infections and wheezing in childhood.[13]

In most individuals, skin synthesis is the major source of VD and the remainder is obtained through diet and supplements.[1] Risk factors for nutritional rickets are: latitude, use of clothing covering most of the body, time of sunlight exposure, increased skin pigmentation, diets high in vegetables and low in calcium, exclusive breastfeeding, use of sunscreens and lifestyle.[14,15] VDD during pregnancy is a worldwide public health problem. Studies have reported VDD prevalence ranging from 18% to 84%, depending on