



ORIGINAL ARTICLE

Vitamin A nutritional status in high- and low-income postpartum women and its effect on colostrum and the requirements of the term newborn^{☆,☆☆}

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KEYWORDS

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Postpartum women;
High-income;
Low-income;
Newborn

Abstract

Objective: To evaluate the vitamin A status in serum and colostrum of postpartum women with different socioeconomic status, comparing the colostrum retinol supply with the vitamin A requirement of the newborn.

Methods: Cross-sectional study conducted with 424 postpartum women. Vitamin A maternal dietary intake was estimated using a food frequency questionnaire. Colostrum and serum retinol levels were measured by high performance liquid chromatography (HPLC). Serum retinol concentrations <20 µg/dL were indicative of vitamin A deficiency (VAD). Vitamin A levels provided by colostrum <400 µgRAE/day were considered as insufficient for term newborns.

Results: The mean maternal vitamin A intake during pregnancy was 872.2 ± 639.2 µgRAE/day in low-income women and 1169.2 ± 695.2 µgRAE/day for high-income women ($p < 0.005$). The prevalence of VAD was 6.9% ($n = 18$) in the low-income group and 3.7% ($n = 6$) in the high-income group. The estimated mean retinol intake by infants of the high- and low-income mothers were 343.3 µgRAE/day (85.8% AI) and 427.2 µgRAE/day (106.8% AI), respectively.

Conclusions: Serum VAD was considered a mild public health problem in both populations; however, newborns of low-income women were more likely to receive lower retinol levels through colostrum when compared with newborns of high-income mothers.

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PALAVRAS-CHAVE

Vitamina A;
Colostro;
DVA;
Pós-parto;
Alta renda;
Baixa renda;
Recém-nascido

O estado nutricional de vitamina A em mulheres de alta e baixa renda após o parto e seu efeito sobre o colostro e a necessidade do recém-nascido a termo

Resumo

Objetivo: Avaliar o estado nutricional de vitamina A no soro e colostro de puérperas com diferentes condições de renda, comparando os níveis de retinol fornecido através do colostro com a necessidade de vitamina A do recém-nascido.

Métodos: Estudo transversal com 424 mulheres pós-parto. A ingestão de vitamina A dietética pelas mães foi estimada através de um questionário de frequência do consumo alimentar. Os níveis de retinol no soro e colostro foram quantificados por cromatografia líquida de alta eficiência (CLAE). Concentrações de retinol $<20 \mu\text{g/dL}$ no soro foram indicativas de DVA. Os níveis de vitamina A fornecidas pelo colostro $<400 \mu\text{g/RAE/dia}$ foram considerados insuficientes para os recém-nascidos a termo.

Resultados: A ingestão média de vitamina A das mães durante a gravidez foi de $872,2 \pm 639,2 \mu\text{gRAE/dia}$ em mulheres de baixa renda e $1169,2 \pm 695,2 \mu\text{gRAE/dia}$ em mulheres de alta renda ($p < 0,005$). A prevalência de DVA foi de 6,9% ($n = 18$) no grupo de baixa renda e de 3,7% ($n = 6$) no grupo de alta renda. A estimativa dos valores médios de ingestão de retinol por lactentes de mães de baixa e alta renda foi de $343,3 \mu\text{g/RAE/dia}$ (85,8% AI) e $427,2 \mu\text{g/RAE/dia}$ (106,8% AI), respectivamente.

Conclusões: A DVA no soro foi prevalente em ambas as populações, entretanto, recém-nascidos de mães de baixa renda foram mais propensos a receberem níveis inferiores de retinol no colostro em comparação com recém-nascidos de mães de alta renda.

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Introduction

The World Health Organization (WHO) defines vitamin A deficiency (VAD) as tissue concentrations of vitamin A low enough to have adverse health consequences. Serum retinol concentrations below $0.70 \mu\text{mol L}^{-1}$ indicate deficiency, especially when clinical signs are present, ranging from nyctalopia to blindness.^{1,2} Worldwide, 19 million pregnant women have low serum retinol, mainly in regions at risk such as Brazil, where 15.3% of the population has been diagnosed as vitamin A deficient.³ The main risk factors attributed to this nutritional deficiency are low income and lack of access to dietary sources of vitamin A.⁴⁻⁶ VAD affects the anatomical and functional integrity of the gastrointestinal and respiratory mucous membranes, significantly increasing maternal morbidity and mortality from infectious diseases.⁷ Due to the diminished vitamin A body reserves at birth, human milk is responsible for providing adequate amounts of retinoids to ensure normal growth and development.⁸ Human milk is the ideal source of vitamin A, favoring rapid growth and acting as an antioxidant and immune barrier; however, many factors modulate the composition of this nutrient in breast milk, such as diet, economic status, and maternal nutritional status.^{9,10}

For decades, studies have indicated the public health importance of VAD in pregnant and postpartum women from developing countries,^{3,11,12} where the extent of the problem in low-income women is evident. However, limited

research has been conducted on this deficiency in high-income women.

In Brazil, low-income women frequently attend public hospitals, which routinely distribute supplements of iron salts and folic acid to pregnant women during prenatal care, as required by Ordinance No. 730 issued on May 13, 2005.¹³ Regarding vitamin A, women receive a single 200,000 IU dose of retinyl palmitate in the hospital right after delivery. This strategy applies to all municipalities of the Northeast and North regions of Brazil, as well as to the Legal Amazon, Special Indigenous Sanitary Districts, and municipalities covered by the 'Brazil without Misery' plan in the Central-West, South, and Southeast regions.¹⁴ In contrast, high-income women attending private hospitals do not receive the supplements provided by the Brazilian Ministry of Health, so obstetricians routinely prescribe daily supplements of vitamin A during pregnancy.

Thus, strategies for preventing VAD in the Brazilian population are different, and the determining factors for VAD in this population need further clarification. The hypothesis established for this study was that high-income mothers who received supplementation during pregnancy would present an adequate vitamin A status, and would therefore offer sufficient amounts of this vitamin through colostrum to meet the nutritional needs of the newborn, when compared with economically deprived woman in Brazil. Thus, the present study is a novel investigation that aimed to assess the vitamin A nutritional status in high- and low-income

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