



ORIGINAL ARTICLE

## Effect of maternal vitamin A supplementation on retinol concentration in colostrum<sup>☆,☆☆</sup>



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### KEYWORDS

Colostrum;  
Fasting;  
Postprandial period;  
Supplementary  
feeding;  
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### Abstract

**Objective:** To investigate the effect of vitamin A supplementation on the retinol concentration in colostrum under fasting and postprandial conditions.

**Methods:** This was a quasi-experimental study, with before and after assessments, conducted with 33 patients treated at a public maternity hospital. Blood and colostrum samples were collected under fasting conditions in the immediate postpartum period. A second colostrum collection occurred two hours after the first meal of the day, at which time a mega dose of 200,000 IU of retinyl palmitate was administered. On the following day, the colostrum was collected again under fasting and postprandial conditions. Serum and colostrum retinol concentrations were determined by high performance liquid chromatography.

**Results:** The serum retinol concentration was 37.3 (16.8-62.2)  $\mu\text{g}/\text{dL}$ , indicating adequate nutritional status. The colostrum retinol concentration before supplementation was 46.8 (29.7-158.9)  $\mu\text{g}/\text{dL}$  in fasting and 67.3 (31.1-148.7)  $\mu\text{g}/\text{dL}$  in postprandial condition ( $p < 0.05$ ), showing an increase of 43.8%. After supplementation, the values were 89.5 (32.9-264.2)  $\mu\text{g}/\text{dL}$  and 102.7 (37.3-378.3)  $\mu\text{g}/\text{dL}$  in fasting and postprandial conditions, respectively ( $p < 0.05$ ), representing an increase of 14.7%.

**Conclusions:** This study demonstrated that maternal supplementation with high doses of vitamin A in postpartum resulted in a significant increase of the retinol concentration in colostrum under fasting conditions, with an even greater increase after a meal.

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**PALAVRAS-CHAVE**

Colostro;  
Jejum;  
Período pós-prandial;  
Suplementação  
alimentar;  
Vitamina A

**Efeito da suplementação materna com vitamina A sobre a concentração de retinol no colostro****Resumo**

**Objetivo:** Investigar o efeito da suplementação com vitamina A sobre a concentração de retinol no leite colostro em condições de jejum e pós-prandial.

**Métodos:** Estudo quase-experimental, do tipo antes e depois, realizado com 33 parturientes atendidas em uma maternidade pública, das quais foram coletadas, em jejum, amostras de sangue e leite colostro, no pós-parto imediato. Uma segunda coleta de colostro ocorreu duas horas após a primeira refeição do dia, momento em que uma megadose de 200.000 UI de palmitato de retinila foi administrada. No dia seguinte, uma nova coleta de colostro foi realizada em condições de jejum e pós-prandial. As concentrações de retinol no soro e no colostro foram determinadas por cromatografia líquida de alta eficiência.

**Resultados:** A concentração de retinol sérico foi de 37,3 (16,8-62,2) µg/dL, evidenciando um estado nutricional adequado. No colostro, a concentração de retinol antes da suplementação foi de 46,8 (29,7-158,9) µg/dL em jejum e 67,3 (31,1-148,7) µg/dL em condições pós-prandiais ( $p < 0,05$ ), mostrando um aumento de 43,8%. Após a suplementação, os valores foram de 89,5 (32,9-264,2) µg/dL e 102,7 (37,3-378,3) µg/dL em jejum e pós-prandial, respectivamente ( $p < 0,05$ ), representando um aumento de 14,7%.

**Conclusões:** Este trabalho demonstrou que a suplementação materna com altas doses de vitamina A no pós-parto resultou em um aumento significativo da concentração de retinol no colostro em condições de jejum, sendo este valor ainda maior após a refeição.

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**Introduction**

Vitamin A is essential for human growth and development, preserves vision, and contributes to the proper functioning of the immune system, defending the body against infections.<sup>1</sup>

Vitamin A deficiency (VAD) can lead to disorders such as xerophthalmia and night blindness in childhood, as well as anemia and low resistance to infections, which can increase the severity of infectious diseases and the risk of death. Children of preschool age and pregnant women are considered the populations at greatest risk for VAD; it is estimated that approximately one-third of the world's population of preschoolers and 15% of pregnant women are biochemically deficient, mainly in Africa and Southeast Asia.<sup>2</sup>

Studies indicate that vitamin A deficiency constitutes a public health problem in the North and Northeast regions and some parts of Southeastern Brazil.<sup>3</sup> In 2006, the National Demographic and Health Survey (NDHS) indicated that the prevalence of VAD in Brazil is 17.4% in children younger than 5 years and 12.3% in non-pregnant women of reproductive age.<sup>4</sup>

Pregnant and lactating women have a higher requirement of vitamin A, and the risk of deficiency is aggravated by low nutrient intake and the emergence of infections in these groups.<sup>1,5</sup> The World Health Organization (WHO), the United Nations International Children's Emergency Fund (UNICEF), and the International Vitamin A Consultative Group (IVACG) recommend the provision of high doses of vitamin A (200,000 IU) until the 60th day after delivery to postpartum women from regions where the deficiency of this nutrient is endemic.<sup>6</sup>

Breast milk is a source of energy and nutrients at adequate amounts for the infant's nutrition, which includes proteins, lipids, carbohydrates, minerals, vitamins, lymphocytes, immunoglobulins, and growth factors.<sup>7</sup> Colostrum is the milk secretion of the first days postpartum, and several studies have demonstrated the protective effect against neonatal mortality of feeding the newborn with this milk, especially when offered in the first hour of life.<sup>8</sup>

According to Black et al.,<sup>9</sup> the risk of a newborn to have its reserves exhausted is greater when there is maternal micronutrient deficiency. Thus, the vitamin A content of breast milk is the main determinant of the nutritional status of vitamin A in the newborn.

Ross et al.<sup>10</sup> affirm that retinol is transferred to the milk in two ways: through the retinol binding protein (RBP) and through chylomicrons. However, the mechanism of vitamin A transfer to milk is yet to be fully understood in humans, and is being studied in animal models.<sup>11</sup>

Thus, the present study aimed to evaluate the effect of maternal vitamin A supplementation on retinol concentration in human colostrum under fasting and post-prandial conditions, aiming to contribute to the understanding of the mechanisms of retinol transfer to the mammary gland in humans, as most of the studies found in the literature were performed in animals.

**Methods**

This was a quasi-experimental intervention study, assessed before and after the intervention, carried out in a convenience sample. The study included 33 voluntary postpartum women aged 18 to 35 years treated at the obstetrics

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