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Vitamin A supplementation in Brazilian pregnant and postpartum women: a systematic review

Suplementação com vitamina A em gestantes e puérperas brasileiras: uma revisão sistemática

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ABSTRACT: ***Objective:*** To assess the impact of vitamin A supplementation on adult pregnant and puerperal women in Brazil regarding the content of vitamin A and secretory immunoglobulin A on colostrum and breast milk, in child's health conditions, and in mother–child binomial vitamin A status. ***Methods:*** A research was conducted in Medline, Scopus, Web of Science, and Lilacs electronic databases for the studies published between January 2000 and January 2014. The methodological quality of the studies was assessed according to Jadad scale. The study search was conducted in January 2014, independently by two authors. ***Results:*** Seven studies were found concerning the effects of vitamin A supplementation in the puerperal period on breast milk and infant morbidity. No study regarding pregnant women supplementation was found. The supplementation in the puerperal period raised the retinol content on breast milk, thus increasing the offer of vitamin A for the child and the concentration of secretory immunoglobulin A on colostrum. There was no description of effects on infant morbidity. ***Conclusion:*** It seems that the advantages of postpartum supplementation were not established in the Brazilian program, although the supplementation contributes to a better nutritional status of vitamin A for both the child and the puerperal woman and increases the offer of vitamin A for the newborn through the breast milk.

Keywords: Vitamin A. Dietary supplements. Postpartum period. Pregnancy. Milk, human. Review.

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RESUMO: ***Objetivo:*** Avaliar o impacto da suplementação com vitamina A (VA) em gestantes e puérperas adultas no Brasil sobre o teor de VA e imunoglobulina A secretora (IgAS) do colostro e leite materno, nas condições de saúde infantil e no *status* de VA do binômio mãe-filho. ***Métodos:*** Realizou-se uma busca eletrônica nas bases MEDLINE, *Scopus*, *Web of Science* e Lilacs por estudos publicados entre janeiro de 2000 e janeiro de 2014. A qualidade metodológica dos estudos foi avaliada conforme a escala de Jadad. A busca pelas publicações ocorreu em janeiro de 2014 de forma independente por dois autores. ***Resultados:*** Encontraram-se sete estudos sobre os efeitos da suplementação com VA no puerpério sobre leite materno e morbidade infantil. Nenhum estudo com suplementação em gestantes foi detectado. A suplementação no puerpério elevou o teor de retinol no leite materno, aumentando a oferta de VA para a criança, e também a concentração de IgAS no colostro. Efeitos sobre a redução na morbidade infantil não foram descritos. ***Conclusão:*** Constata-se que os benefícios descritos sobre a suplementação no pós-parto ainda não foram completamente evidenciados no programa brasileiro, embora a suplementação contribua para a melhora do estado nutricional de VA da criança e da puérpera e na oferta da vitamina, pelo leite materno, ao recém-nascido.

Palavras-chave: Vitamina A. Suplementos dietéticos. Período pós-parto. Gravidez. Leite humano. Revisão.

INTRODUCTION

Vitamin A deficiency (VAD) is one of the main nutritional problems in the world, thus affecting around 19 million pregnant women and 190 million children at preschool age[1-3]. This shortage corresponds to an important amount of child morbidity and mortality indices[4], considering the great importance of vitamin A in the first stages of life, since the child's conception until postnatal development[5].

During the child's first six months of life, it is known that vitamin A hepatic reserves are very limited. Thus, monitoring and improvement of vitamin A nutritional status of puerperal women may help increasing the hepatic stocks and provide an appropriate amount of this vitamin to children, through breast milk consumption[5]. Hence, the child's diet, since birth and in the first years of life, causes repercussions throughout the subject's entire life. In addition, because breast milk is the most consumed food in the first phase of life, it is also considered the most important source of vitamin A to enlarge the newborn hepatic reserves[6].

The World Health Organization (WHO) and the Pan American Health Organization (PAHO) have classified Brazil as an area with severe subclinical deficiency; thus, vitamin A supplementation has been implemented since 1983[7]. In 2005, the Ministry of Health (MH) increased the supplementation program for puerperal women who live in high-risk locations[3,7-10], through the administration of a single dose with 200,000 international units (IU) orally, in the immediate postpartum[8]. Therefore, exclusive maternal breastfeeding during the six-month period, which works as a strategy to decrease the morbidity load in childhood[11], consequently, becames an important strategy to improve the mother–child binomial vitamin A nutritional status[12].

In 2011, the WHO[1] revised vitamin A supplementation protocols for vulnerable groups. In conclusion, vitamin A in postpartum is effective for improving its status in mothers and children, but without evidence of morbimortality decrease. In the same year, the WHO started recommending vitamin A supplementation with daily or weekly doses for pregnant women, owing to the benefits achieved in this population group, which was affirmed again in 2013[13].

Given that the data of the Brazilian Child and Women Demography and Health Survey (Pesquisa Nacional de Demografia e Saúde -PNDS)[2] show the alarming prevalence of retinol serum inadequacy, not only in areas considered at-risk by the MH[8] but also in the entire Brazil — 17.4% of children younger than 5 years old and 12.3% of women in the reproductive age presented inappropriate vitamin A levels —, the objective of this article was to assess the impact of vitamin A supplementation during pregnancy or puerperium, in Brazilian adult women, on the outcomes: vitamin A content and immunoglobulins of colostrum and breast milk in child health conditions and mother–child binomial vitamin A status.

METHODS

This review was conducted following the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA Statement)[14]. Two authors independently carried out a survey in Medline, Scopus, Web of Science, and Lilacs electronic databases, during the month of January 2014, for studies published in Spanish, English, and Portuguese languages, during the period between January 2000 and January 2014. The keywords used for selection were in the databases of *Descritores em Ciências da Saúde* (DeCS) for Portuguese keywords and in the Medical Subject Headings (MeSH) for English ones. The search strategy used in Medline, Scopus, and Web of Science databases, and the English keywords applied were: "vitamin A" OR "dietary supplements" OR "postpartum period" OR "pregnancy" OR "milk, human" OR "colostrum" OR "prenatal care." The same search strategy was used in Lilacs database with the same terms; however, their corresponding words were in Portuguese. If possible, the filters were used comprising "humans, country, adults, language, year of publication, and type of study." This review does not have a registered protocol.

After database search, the following inclusion criteria were applied: original clinical trial articles carried out in Brazil; sample of adult healthy women; intervention with vitamin A supplementation, during pregnancy or puerperium, combined, or not, with vitamin E. Studies combining vitamins A and E supplementation were included because, in Brazil, vitamin A supplements distributed by the "Brazilian Program of Vitamin A Supplementation"[10] for puerperal women present an association with a small amount of vitamin E. In investigations with puerperal women, such population may not have received vitamin A supplementation during pregnancy. Exclusion criteria of the article included studies using supplementation associated with other micronutrients, with the exception of vitamin E, and gestation of more than one fetus.

The initial process of data collection was done through reading the titles and abstracts of available studies, followed by the selection of full articles available for a thorough analysis. As a search complement, bibliographic reference lists of each article included in the review were consulted to identify any possible important study that was not previously found. Only studies with approval of the Research Ethics Committee were included. Data were then extracted with regard to the year of publication, author, city where the study was carried out, sample size, administration and dose moment of supplement, and main results.

The methodological quality and bias risk of studies included in the systematic review were analyzed using Jadad scale[15], which assesses the quality of clinical trials based on information about randomization, study blinding, and sample losses. This scale varies from 0 to 5 points, considering studies of high quality and low bias of those with scores higher than 3. All disagreements regarding the inclusion or not of some articles were discussed between the two authors, which tried to get into an agreement; in the event of no agreement, a third author would be consulted. This review did not need the approval of the Research Ethics Committee to be conducted.

RESULTS

The electronic search initially found 35,494 studies. When tracking such researches, 35,435 titles were excluded, remaining only 59 publications, owing to the following main reasons: intervention in other population groups; supplementation of other micronutrients combined or not with vitamin A; other interventions together with, or not, the supplementation (probiotics, physical activity, and among others); studies with animals; and studies carried out in other countries. After this phase, articles underwent an abstract analysis, where 31 articles were excluded. The remaining 28 studies were considered appropriate to a full evaluation of its content to choose the eligible ones. At the end of this phase, seven articles were included in the literature review. The details of study search are described in Figure 1.

No studies using a large dose of vitamin A supplementation were found during gestations, which were carried out in Brazil. Six studies with puerperal women were conducted in northeast cities, two in Recife (which studied the same sample) and four in Natal. A trial was carried out at southeast that is a region that does not belong to the MH distribution program of vitamin A in large doses[10,21]. Studies are in Portuguese (n = 3) and English (n = 4) languages.

Table 1 summarizes the characteristics of the included articles, with regard to the place of performance, the moment when the intervention was conducted, the doses of administered supplements, the number of participants in each study, the main results, and the evaluation of manuscript quality (two studies[19,20] reached a score above 3). Five articles described a randomization performance in the distribution of participants to intervention groups in their methods[12,16-20]. The studies performed by Fernandes et al.[19], Santos et al.[20],

and Martins et al.[21] used the term "double-blind"; the studies of Bezerra et al.[16], Fernandes et al.[19], Santos et al.[20], and Martins et al.[21] presented information regarding losses and their causes. One of the articles mentions the occurrence of loss, but it does not show its causes[12].

CONTENT OF SERUM RETINOL, MATURE COLOSTRUM/MILK, AND VITAMIN A OFFER TO INFANTS

Bezerra et al.[12] assessed the effect of maternal supplementation with a single dose of retinol palmitate in order to provide the infant vitamin A. In the study, 85 women were randomly distributed into two groups: one received a single dose of 200,000 IU, and the other received 0 IU. On the basis of retinol content obtained in breast milk and through simulations, vitamin A consumption among children was calculated 24 hours and 30 days after delivery.

Women receiving supplement presented a significant increase of retinol content on colostrum at 24 hours and of mature milk 30 days after supplementation, compared with controls ($p < 0.05$). Daily retinol supply to newborns through the colostrum, 24 hours

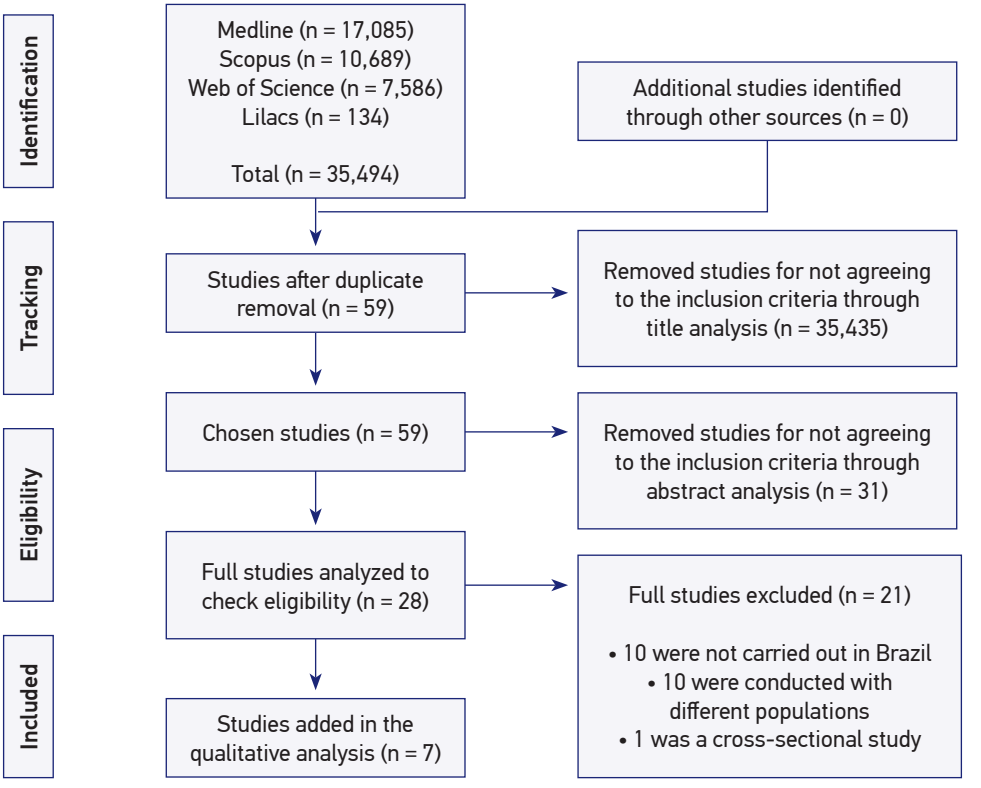

Figure 1. Diagram of the study selection and review process.

Table 1. Description and main results of the studies added in the systematic review.

Reference	City where the clinical trial was conducted	Time of supplement administration	Vitamin A dosage	Number of participants	Results	Score – Jadad scale
Puerperium						
Fernandes et al.[19] (2012)	Recife (PE)	Immediate postpartum (1st dose) and from 8 to 10 days after delivery (2nd dose for G1)	Retinol palmitate – 400,000 IU (G1) and 200,000 IU (G2)	276: 134 (G1) and 142 (G2)	There were no significant differences between treatment groups for assessed child's intercurrences.	5
Santos et al.[21] (2013)	Recife (PE)	Immediate postpartum (1st dose) and 10 days after delivery (2nd dose for G1)	Retinol palmitate – 400,000 IU (G1) and 200,000 IU (G2)	173: 81 (G1) and 92 (C)	There were no differences between groups regarding increase of child retinol contents in the assessed moments.	5
Bezerra et al.[16] (2010)	Natal (RN)	Immediate postpartum, with a 24-hour interval between one dose and another in S2	Retinol palmitate – 200,000 IU (S1); double dose 200,000 IU with a 24-hour interval (S2) and control (C)	143: 30 (C); 55 (S1) and 58 (S2)	There were no significant differences found in retinol contents on colostrum between groups ($p > 0.05$). In the mature milk, retinol content was significantly different between S1 and C ($p > 0.05$).	< 3
Martins et al.[20] (2010)	Ribeirão Preto (SP)	Supplementation between the 20th and 30th day after delivery	Retinol palmitate – 200,000 IU (G1) and soy oil (C)	61: 31 (G1) and 30 (C)	Increase of serum retinol contents in the supplemented groups compared with presupplementation and content of control subjects ($p = 0.032$); difference in the prevalence of vitamin A deficiency in breast milk between groups ($p = 0.002$).	< 3
Lima et al.[18] (2012)	Natal (RN)	Immediate postpartum	Retinol palmitate – 200,00 IU (S) and control (C)	96: 52 (S1) and 44 (C)	Increase of sIgA contents on colostrum between S participants compared with C ones ($p < 0.00001$).	< 3
Ribeiro et al.[17] (2009)	Natal (RN)	Until 16 hours after delivery	Retinol palmitate – 200,000 IU (S1) and without supplementation (C)	91: 47 (S1) and 44 (C)	Increases of retinol contents on colostrum in the S1 24 hours after supplementation ($p < 0.0001$). Women with lack of retinol on colostrum at 0 h time transferred more retinol to the colostrum in the 24 hours after supplementation.	< 3
Bezerra et al.[12] (2009)	Natal (RN)	Immediate postpartum	Retinol palmitate – 200,000 IU (S1) and 0 IU (C)	85: 55 (S1) and 30 (C)	Increase of retinol contents in breast milk 24 hours and 30 days after supplementation ($p < 0.05$).	< 3

IU: international units; p: significance level; sIgA: secretory immunoglobulin A.

after delivery, was of 1.63 μmol for controls and 2.9 μmol for the experimental group, considering an appropriate intake of 1.40 μmol/day and consumed milk volume of 500 mL/day. Thirty days after delivery, these values were of 0.64 μmol/day (control group – C) and 0.89 μmol/day (supplementation group – S), which corresponds to a 39% increase of retinol content in the supplemented group, compared with the control group. The value was 64% of the rate recommended for children aged 0–6 months (authors did not present statistical test values in this analysis). The study showed that the maternal supplementation with 200,000 IU of retinol palmitate in the immediate postpartum and the promotion of breastfeeding practices are efficient to improve vitamin A nutritional status for the mother–child binomial[12].

In another study, Bezerra et al.[16] evaluated the effect of two large different doses of retinol palmitate on retinol contents in the breast milk of healthy women. The sample comprised 199 puerperal women until 16 hours after delivery. Women were randomly divided into 3 groups and received supplements in the postpartum period, with a single dose of retinol palmitate of 200,000 IU (S1), a new dose of 200,000 IU, in a 24-hour interval (S2), or no supplementation (C). The mean retinol contents in the colostrum were of 94.8 ± 40 μg/dL (3.31 ± 1.40 μmol/L), 92.2 ± 52 μg/dL (3.22 ± 1.81 μmol/L), and 91.9 ± 53.5 μg/dL (3.21 ± 1.87 μmol/L), for groups C, S1, and S2, respectively ($p = 0.96$). Four weeks after delivery, the variance analysis of retinol values per milk volume presented a significant difference in the three means ($p = 0.013$), which were of 36.6 ± 17.4 μg/dL (1.28 ± 0.61 μmol/L) (C), 51.0 ± 28.6 μg/dL(1.78 ± 1.00 μmol/L) (S1), and 55.2 ± 31.5 μg/dL (1.93 ± 1.10 μmol/L) (S2). However, this difference was found only between group C and supplemented groups ($p < 0.05$). The lowest maternal deficiency percentage was seen in group S2 (20.7%), compared with groups S1 (34.5%) and C (46.7%); group S2 was considered moderately deficient, while groups S1 and C, very deficient. In this study, the analyzed variables – vitamin A consumption adaptation, food origin (animal or vegetal), maternal age, number of deliveries, anthropometric nutritional status, gestational hemoglobin, kind of delivery, and newborn gender—were not associated with retinol content in the milk[16].

The study of Ribeiro et al.[17], with 91 puerperal women, analyzed the effect of supplementation with 200,000 IU of VA in retinol contents on colostrum, from the collection of blood sample and two milk samples, before and 24 hours after supplementation. In the beginning of supplementation (0 h), control and supplemented groups presented serum contents of 1.3 ± 0.4 and 1.4 ± 0.4 μmol/L (7% deficiency) and 3.5 ± 1.7 and 3.3 ± 1.8 μmol/L ($p > 0.05$) on colostrum, respectively. After 24 hours of supplementation, milk retinol in the supplemented group increased from 3.6 ± 1.9 to 6.8 ± 2.6 μmol/L ($p < 0.0001$). The study showed that women with inappropriate retinol content on colostrum at 0-h time (< 2.04 μmol/L) transferred more retinol to the colostrum than those with appropriate contents in 24 hours (increase of 326.1 and 86.5%, respectively).

Santos et al.[20] analyzed the effect of maternal supplementation protocol with 400,000 (S = 81) and 200,000 IU (C = 92) on children's retinol contents after 2, 4, and 6 months of supplementation and the maternal dietetic consumption through a consumption frequency

questionnaire. The intervention happened around 8–10 days after delivery, time when a new supplementation was conducted with 200,000 IU for group C, while group S received a placebo. As a result, food standards between the two groups were similar. No significant differences were found between the groups with regard to retinol contents in the second ($p = 0.484$), fourth, and sixth months of life ($p = 0.421$). Comparison of the supplementation effect before and after such procedures showed a significant increase for both groups in the infant's contents ($p < 0.001$).

Martins et al.[21] carried out a randomized, double-blind, and placebo-controlled study in which 61 puerperal women participated, and 31 of them received the supplement with 200,000 IU (S), and 30 of them received a capsule including soy oil (C), who were followed up for a one-year period. The intervention happened between 20 and 30 days after delivery. Blood and breast milk samples were collected before supplementation and three months after delivery, and baby blood samples were also collected in the latter. The serum retinol mean between puerperal women was significantly increased in group S, compared with presupplementation contents, with 1.05 and 1.17 μmol/L rates, respectively ($p = 0.026$). There was also an increase when retinol contents were compared between groups S and C after supplementation, and the latter has a mean of 1.02 μmol/L ($p = 0.032$). A decrease of retinol contents in breast milk occurred in S, when compared with presupplementation contents, in which the mean values were 1.93 and 1.34 μmol/L ($p < 0.0001$), respectively, and between postsupplementation contents with a mean of 1.56 μmol/L ($p = 0.0003$). Another result was the significant difference in VAD prevalence in breast milk after the intervention of 16.1% in group S and 55.6% in group C ($p = 0.002$). Among children, VAD prevalence was 66%, and the mean of retinol content in the control group and the supplemented group ($p = 0.458$) was 0.64 ± 0.3 μmol/L and 0.69 ± 0.26 μmol/L, respectively[21].

CONTENTS OF SECRETORY IMMUNOGLOBULIN A ON COLOSTRUM

Lima et al.[18] assessed the supplementation effects on secretory immunoglobulin A (sIgA) contents of the colostrums of 96 mothers. Fifty-two participants in the supplementation group (S) received a large dose with 200,000 IU of retinol palmitate in the immediate postpartum. Colostrum samples were collected in the morning, and the supplement was administered right after in S participants. After 24 hours, a new collection was done. At 0-h time (before supplementation), the sIgA content mean was similar in both the groups, with 829.1 ± 337.6 mg/dL in the control and 827.3 ± 249.8 mg/dL in group S ($p = 0.52$). At 24 hours after supplementation, the mean contents of sIgA in group S were significantly higher than in group C, as follows: 501.2 ± 54.5 and 349.9 ± 177.2 mg/dL, respectively ($p < 0.00001$). During 24 hours after delivery, sIgA contents were lower than those found in the immediate postpartum (0 h), but the decrease was lower in group S (39.5%) than in group C (58.4%).

INFANT MORBIDITY

Maternal supplementation effect with high doses of 400,000 and 200,000 IU of retinol palmitate in the event of health problems in such children was assessed by Fernandes et al.[19] in a randomized, triple-blind study that followed up these children since birth until 6 months of life, with the same intervention that was used in the study by Santos et al.[20]. A total of 276 women took the supplementation, among whom 134 received 400,000 IU (G1) and 142 received 200,000 IU (G2). At the end of the study, 115 children from G1 and 109 from G2 were followed up during the first six months of life. Study results showed no significant differences between the groups with regard to intercurrences — diarrhea (relative risk [RR]: 0.96 [95%CI: 0.72–1.28]), fever (RR: 0.92 [95%CI: 0.75–1.14]), otitis (RR: 0.94 [95%CI: 0.48–1.85]), and acute respiratory failure (RR: 1.03 [95%CI: 0.88–1.21]). The need for venous rehydration (RR: 2.08 [95%CI 0.64–2.07]) and use of antibiotics (RR: 0.80 [95%CI 0.43–1.47]) were not different between groups either. The adjusted analysis for breastfeeding stated that duration time for this practice did not add benefits in the decrease of children problems. There were no reports regarding toxicity, and no children presented signals of xerophthalmia[19].

DISCUSSION

Only seven studies carried out in Brazil regarding supplementation were found with large vitamin A doses and their possible consequences for the mother–child binomial. The limited number of investigations and the methodological differences between them difficult the generalization of results.

Including only studies conducted in Brazil was chosen because of the current discussion about vitamin A supplementation effectiveness in pregnant and puerperal women, as pointed out by the WHO[1,13]. Searching for evidence on the impact of this supplementation in population with a known risk of VAD, such as Brazil, is important for the restructuration and/or elaboration of new public policies to end this deficiency. This discussion adds results of studies that indicate VAD as not being exclusive of areas considered endemic by the MH and that other parts of the country may be benefited with strategies for controlling and eradicating the issue[2,3].

Positive aspects of the studies added in this review are mainly the improvement of vitamin A nutritional status of the child and mother. Thus, the concepts are benefited with the increase of retinol and immunoglobulin contents in mother's milk.

Women with low serum contents before supplementation revealed more advantages with the intervention than those with appropriate contents, given the higher increase in vitamin A contents of the latter. This represents an advantage, mainly for infants, because the colostrum has a key role in VA inventory. Its relevance is also on the fact that immunoglobulins present a role to protect against infections that may assail the newborn, thus emphasizing the vitamin A role on the immunological system. The higher consumption of antibodies by

newborns may bring more protection against infectocontagious diseases and, consequently, decrease of morbidity in infants[22]. However, such statement could not be confirmed in this review, because the study that evaluated the supplementation of sIgA contents did not aim at determining the consumption of this immunoglobulin and its impact on child's health[18].

Some aspects might justify results on newborn's vitamin A nutritional status, such as: conceptuses are born with about less than 50% of the maternal hepatic reserves of retinol[21]; vitamin A absorption might be influenced on gastrointestinal physiological immaturity in children younger than 6 months[21]; and the cut point used for assessing the VAD in children younger than 6 months has been questioned[23].

Few studies, different purposes, and outlines may have influenced our results; therefore, caution is needed when transmitting such information for the entire Brazilian puerperal women. Maybe, these factors might influence on the comprehension about the real supplementation benefit of puerperal women in their children's health and vitamin A nutritional status, based on the results presented herein.

Although VA supplementation in the puerperium period can be considered a potentially efficient strategy to simultaneously improve VA nutritional status of women and infants, studies have pointed out that only one dose of 200,000 IU is not effective in the maintenance of vitamin A satisfactory contents[24,25]. Thus, the administration of a new large dose until 6 months after delivery is recommended[26]. Hence, the only three studies that approached the administration of a double dose of vitamin A in Brazilian investigations[16,19] demonstrated moderate benefits, when compared with the studies that assessed the single dose. In addition, a significant increase of retinol content in milk after four weeks postpartum[16], a decrease in child morbidity[19], and an increase of infant's retinol contents were not seen[21]. Future investigations are needed to determine the pertinence of administering a second dose of vitamin A, to ensure appropriate contents of this nutrient for a longer period and, thus, to contribute for fighting VAD marginal ways in children under exclusive breastfeeding. Furthermore, investigations in this direction could establish the best moment for its administration.

The outcomes presented herein demonstrate an improvement in vitamin A nutritional status of puerperal women and in the content of this vitamin in breast milk. The increase of vitamin A content in breast milk was also described in a study carried out in areas with higher VAD prevalence, such as Africa; however, it was limited, and no great difference was seen in the vitamin content between supplemented and control groups[27].

Lack of studies assessing the impact of the strategy under issue in Brazil, especially with regard to the decrease and prevention of maternal–infant morbimortality, shows that the real effects of vitamin A supplementation in postpartum needs more studying. In agreement with the findings presented herein about child's morbidity, a meta-analysis that assessed the impact of vitamin A supplementation in the puerperal period, including studies in Africa and Asia, did not describe any significant reduction on the main intercurrences for child's health (diarrhea and acute respiratory failure)[28]. This result is in agreement with the WHO outcomes, which led the organization to review the puerperium supplementation as a public health strategy[1].

The WHO[29] suggests vitamin A supplementation in pregnancy with doses considered safe for mother–child binomial. This recommendation was also done again in 2013[13], besides the observation that postpartum supplementation has not presented the expected results[1] with regard to the decrease of maternal–infant mortality. The lack of studies about vitamin A supplementation in Brazilian pregnant women leaves a gap on the possible benefits of this intervention in such biological moment. Some points might suggest the lack of these studies. One of these would be that the MH never considered pregnant women as the target public of its VAD eradication programs. Another issue is that, for a long time, it was believed that administering vitamin A supplementary doses, besides the recommendations preconized during pregnancy, would not be safe and would increase the risks of teratogenic problems in the conceptuses. Supplementation in pregnancy is considered a benefit to increase maternal–child retinol serum contents; to form retinol hepatic reserves of the conceptus; to decrease the prevalence of gestational night blindness and iron deficiency; and to decrease maternal morbidity in places where VAD is a public health issue[13]. However, more studies are needed to confirm the protection against maternal mortality[5,30-33].

It is worth mentioning other interventions to remove VAD, such as the increase of intake of food enriched with vitamin A and stimulus to consume foods that are vitamin sources, especially those of animal origin[1,13,34,35]. It is also worth highlighting the nutritional support during prenatal care, considering a study[36] showing this practice (including intervention measures to prevent and treat VAD) as a protecting factor against the occurrence of gestational night blindness.

FINAL CONSIDERATIONS

Given the lack of results, evidences available regarding vitamin A supplementation effects on postpartum need more investigations in order to evaluate the real benefits of the intervention in Brazilian puerperal women who live, or do not live, in areas of higher VAD risk. This is necessary even if there is a contribution for the VA nutritional status improvement of puerperal woman and infant and in the offer, through breast milk, of the vitamin to the newborn.

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