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Review Article

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Vitamin D in pregnancy- A Review

Maryam Nakhaee Moghadam[1]

[1]Department Obstetrics and Gynecology, Maternal and Fetal Health Research Center, Zabol University of Medical Sciences, Zabol, Iran

Abstract

Vitamin D is one of the varieties of fat-soluble vitamins converted to non-enzymes in the skin during exposure to ultraviolet rays of the sun; some of 7-dehydrocholesterol is converted into vitamin D3 precursor and, then, converted into vitamin D3 by self-modification. Results of the Literature review were exported to Endnote. Prior to the formal screening process, a calibration exercise was undertaken to pilot and refine the screening. Formal screening process of titles and abstracts were conducted by two researchers according to the eligibility criteria, and consensus method was used for solving controversies among the two researchers. The full text was obtained for all titles that met the inclusion criteria. Additional information was retrieved from the study authors in order to resolve queries regarding the eligibility criteria.Prolonged and efficient exposure to sunlight in form of putting face and hands in the sun for 2 hours a week is likely to be enough to provide normal levels of vitamin D; additionally, dietary supplements during pregnancy and breastfeeding are essential for babies and children, especially children with dark skin that live in higher latitudes, because skin pigments reduce the effectiveness of ultraviolet radiation and reduce the production of vitamin D. Vitamin D can be provided from special herbal and animal sources; the best nutritional sources include fish, fatty or liver oil, butter, cream and egg yolk. Additionally, human and cow milk are poor sources of vitamin D are.

Keywords: Vitamin D , pregnancy

Introduction

Vitamin D is one of the varieties of fat-soluble vitamins converted to non-enzymes in the skin during exposure to ultraviolet rays of the sun; some of 7-dehydrocholesterol is converted into vitamin D3 precursor and, then, converted into vitamin D3 by self-modification (1) .

The ultraviolet rays of the sun deactivates part of the produced vitamin D; as a result of this production and deactivation, vitamin D reaches its peak in contact with sunlight (2).

Methods

Search strategy

Searches were conducted by two independent researchers in international (PubMed, Web of science, Scopus and Google scholar) and national (SID, Magiran) databases for related studies from the inception of the databases to September 2017 (without time limitation) in English and Persian languages. To ensure literature saturation, the reference lists of included studies or relevant reviews identified through the search were scanned. The specific search strategies were created by a Health Sciences Librarian with expertise in systematic review search using the MESH terms and free terms according to the PRESS standard . After the MEDLINE strategy was finalized, it was adapted to search in other databases. Accordingly, PROSPERO was searched for ongoing or recently related completed systematic reviews. The key words used in the search strategy were “Vitamin D , pregnancy” and Iran which were combined with Boolean operators including AND, OR, and NOT.

Study selection

Results of the Literature review were exported to Endnote. Prior to the formal screening process, a calibration exercise was undertaken to pilot and refine the screening. Formal screening process of titles and abstracts were conducted by two researchers according to the eligibility criteria, and consensus method was used for solving controversies among the two researchers. The full text was obtained for all titles that met the inclusion criteria. Additional information was retrieved from the study authors in order to resolve queries regarding the eligibility criteria. The reasons for the exclusion criteria were recorded. Neither of the review authors was blinded to the journal titles, the study authors or institutions.

Discussion

Vitamin D3 does not have biological effect by itself and it requires two successive hydroxylation, which is first done in the liver and then in the kidney, to form its active hormone metabolite 25 and 1 dihydroxyvitamin D3 (3). At the same time, locating the receptor for the active form of vitamin D in tissues that do not directly play a role in bone and calcium metabolism, such as pancreatic beta cells and immune cells, emphasizes physiological role of this molecule (4); this molecule plays its role through activating the nuclear receptor of vitamin D. The role of vitamin D on pancreatic beta cell function may be interrupted by binding 25 and 1 dihydroxyvitamin D3 to the vitamin D receptor in beta cells (5). Vitamin D may directly increase insulin sensitivity by stimulating the expression of the peroxide receptor expression (an agent regulating fatty acid metabolism in skeletal muscle and adipose tissue), which, in turn, might increase secreted vitamin and insulin sensitivity by regulating the concentration of extracellular calcium and its flow through the membrane of the beta-cell pancreas and insulin-sensitive enzymes (6-9).

It has recently been reported that the presence of pancreatic antibodies in the neonate might havean inverse relationship with maternal vitamin D in pregnancy (10) and a low serum concentration of 25 hydroxyvitamin D, which are usually observed in type 1 and type 2 diabetes (11). Vitamin D is known to be an anti-inflammatory and immune-modifying agent, which can potentiate the autoimmune pathology of type 1 diabetes and improve chronic inflammation that plays a role in insulin resistance of type 2 diabetes (12).

It has been shown that an increase of 25 and 1 dihydroxyvitamin D3 in the first trimester of pregnancy is related to calcium hemostasis; this vitamin, in addition to being calcium transfer regulator, has, also, immune activity in placenta. Heterogeneous cells have immunogenic targets for vitamin D, and since maternal and fetal cells can mediate inherent, adaptive and immune actions, vitamin D may affect many of the actions, including implantation and response to infection and inflammation, during pregnancy (13).

Additionally, clinical problems associated with insufficient vitamin D levels in pregnancy affect the mother and the fetus; some of the main maternal complications include preeclampsia, vaginitisbacteria, gestational diabetes; the most common embryonic/neonatal problems complications includeaffecting bone mass, asthma, type 1 diabetes, multiple sclerosis, autism, and HIV transmission from mother to fetus (14).

Therefore, the role of vitamin D in pregnancy is related to the following activities; 1. Effect on fetal skeletal complexity. 2. Functional adjustment of placenta. 3. Contribution to childhood diseases and fetal planning (15).

According to the World Health Organization (WHO), levels> 10 ng / ml are regarded as deficiency and 20 ng / ml are considered as inadequate vitamin D (16). The prevalence of vitamin D deficiency is reported to be 18 to 48%in pregnant women (17).

Prolonged and efficient exposure to sunlight in form of putting face and hands in the sun for 2 hours a week is likely to be enough to provide normal levels of vitamin D; additionally, dietary supplements during pregnancy and breastfeeding are essential for babies and children, especially children with dark skin that live in higher latitudes, because skin pigments reduce the effectiveness of ultraviolet radiation and reduce the production of vitamin D. Vitamin D can be provided from special herbal and animal sources; the best nutritional sources include fish, fatty or liver oil, butter, cream and egg yolk. Additionally, human and cow milk are poor sources of vitamin D are (18).

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