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On the occasion of world kidney day 2018 with the theme of kidney disease in women; vitamin D deficiency and kidney diseases in women

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Vitamin D is known as a distinctive hormone made in the skin from exposure to sunshine. 1,25-dihydroxyvitamin D3 can stimulate the absorption of intestinal calcium by 30%–40% and phosphorus by 80%. Moreover, it increases the absorption of minerals from the skeletal system. Vitamin D deficiency decreases the absorption of dietary calcium and phosphorus from the intestine and subsequently, leads to an increase in the levels of PTH. Here are some studies on the prevalence of vitamin D deficiency in women.

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Introduction

Vitamin D is known as a distinctive hormone made in the skin from exposure to sunshine (1,2). Two significant types of vitamin D include vitamin D2 (ergocalciferol) and vitamin D3 (cholecalciferol). Vitamin D3 proven as an influential type of vitamin D is synthesized from 7-dehydrocholesterol exposed to sunshine in the skin (1). Vitamin D 25-hydroxylase invert vitamin D to 25(OH)D by hydroxylation in the liver (1,3). Subsequently, 25(OH) D-1 α -OHase invert 25(OH)D to the biologically active form of vitamin D, 1,25(OH)2D, by a further hydroxylation in the kidneys. Accordingly, 1,25(OH)2D acts by binding with its nuclear receptor in the different tissues including small intestine, kidneys and osteoblasts. Additionally, 1,25(OH)2D can stimulate the absorption of intestinal calcium by 30%–40% and phosphorus by 80% (4). It can also increase calcium reabsorption from the kidneys (1,5). Moreover, it increases the absorption of minerals from the skeletal system and modifies osteoblastogenesis and osteoclastogenesis. Since the main thing from which vitamin D can be obtained is exposure to sunshine, the main reason for vitamin D deficiency is insufficient exposure to sunlight (2,6). Wearing sunscreen, people with dark skin, obesity, fat malabsorption syndrome in which patients are

not able to absorb the fat-soluble vitamin D, and nephrotic syndrome are significant factors associated with vitamin D deficiency (1,7). Vitamin D deficiency decreases the absorption of dietary calcium and phosphorus from the intestine and subsequently, leads to an increase in the levels of parathormone (PTH). Secondary hyperparathyroidism leads to calcium modification through increased absorption of calcium from the skeleton and increased phosphorus excretion in the kidneys (1,4,8). Low levels of blood phosphorus induced by secondary hyperparathyroidism can cause mineralization defect in the skeleton known as rickets in children and osteomalacia in adults (9). Muscle weakness is another result of vitamin D deficiency that increases the risk of fractures (10). The levels of serum 25-hydroxyvitamin D determined for vitamin D deficiency and vitamin D insufficiency are respectively less than 20 ng/mL and 21-29 ng/mL (1,4). According to statistics, 48% of white preschool girls in Maine had less than 20 ng/mL 25(OH)D (11). Furthermore, 42% of African-American women at age of 15–49 in the United States had serum level of less than 15 ng/mL 25(OH)D at the beginning of the spring (12). In addition, taking vitamin and calcium supplement with vitamin D by women during pregnancy and lactation did not decrease the risk of vitamin D deficiency and

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higher-dose supplementation was needed (13). One study on the prevalence of vitamin D deficiency in pregnant women from different ethnic backgrounds living in the Netherlands demonstrated very high outbreak of vitamin D deficiency in pregnant non-Western women (14). Another study on the outbreak of hypovitaminosis D in women in pregnancy and their babies also showed a significant vitamin D deficiency among studied groups. Moreover, this study demonstrated a positive communication between maternal serum 25(OH)D and cord blood 25(OH)D and inverse communication between maternal serum 25(OH)D and PTH (15). Lips et al (8) investigated the prevalence of vitamin D inadequacy amongst 2606 women with a mean age of 67.1 ± 7.7 years suffering from osteoporosis. The results showed serum 25(OH)D levels less than 30 ng/mL in 63.9% of women. Therefore, 63.9% of women suffering from osteoporosis had vitamin D inadequacy. Vitamin D inadequacy was not related to older age and whether or not women were receiving osteoporosis treatment. In addition, taking vitamin D supplement ≥ 400 IU every day decreased the outbreak of vitamin D inadequacy in women. Generally, this study demonstrated that serum 25(OH)D levels are commonly low among women suffering from osteoporosis. According to a trial, the intake of vitamin D and calcium supplement by women without history of diabetes during 20 years decreased the risk of type 2 diabetes (16). Moreover Milaneschi and colleagues (17) suggested that vitamin D inadequacy is a risk factor for the advancement of depressive signs in old people. This association in women is stronger than men. These finding shed a light to vitamin D deficiency in women. Vitamin D deficiency may predispose women to renal diseases or aggravate renal insufficiency too.

Authors' contribution

MRT is the single author of the manuscript.

Conflicts of interest

The author declares no conflict of interest.

Ethical considerations

Ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the author.

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