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# Participation of Vitamin D in Menopause Management Strategies

Manoni Panchulidze, Rusudan Kvantchakhadze

*School of Health Sciences, University of Georgia, Tbilisi, Georgia*

## Abstract

The health of the population is one of the key factors in economic development and, at the same time, an objective indicator of the quality of life. Public health policy in the world follows the path of large-scale financing of healthy lifestyle projects. The health of women was very relevant, because in a viewpoint of material and technical progress, an equal role has been assigned to men and women. Menopause and the climacteric state of women is a special issue in the health care of any prosperous European country. It is very important to approach the issue on a large scale, but this requires regional studies. Our interest fell on women with menopause living in Kvemo Kartli. In order to review and further transform the data for the Kvemo Kartli region of Georgia, we analyzed the literature on the advisability of using vitamin D as a factor that improves the quality of life of women in the menopausal period. We searched for peer-reviewed new and recent publications in order to write this review. A wide range of biological properties of vitamin D, which is involved in the regulation of many important physiological functions, is described here. The negative impact of vitamin D deficiency not only on the development of cancer, cardiovascular diseases, but also on the increase in the severity of climacteric syndrome is represented. The multiple beneficial effects of vitamin D have led to a detailed planning of the studies that the research team will carry out the next 12 months.

KEYWORDS: menopause; vitamin D medicine; Kvemo Kartli; Georgia



## Introduction

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One of the major challenges in the modern world is to improve and develop the healthcare system. The health of the population is the most important factor that can assess the economic and social situation of the country. The importance of the healthcare system was once again highlighted during a pandemic period caused by the new coronavirus.

All aspects of the healthcare system are very important. In all developed countries, women's health and protection is a very important area, which provides additional costs in terms of research, methodology, prevention.

The number of pre and menopausal women is increasing every year against the background that their social inclusion, activities and purposefulness are equal to those of other age groups. Bearing this in mind, it is very important to separate the target group of menopausal women and pay close attention to scientific results and conclusions in order to improve the management of the menopausal period and to develop preventive measures. Osteoporosis, oncological and cardiovascular diseases – this is an incomplete list of pathologies that are actively developing and are factors that hinder well-being and longevity [1-5].

Observational and epidemiological studies in recent years have shown that mortality from cancer, cardiovascular diseases and diabetes increase with the remoteness of the region of residence of patients from the equator. The best results of treatment for various types of cancer are higher in summer than in winter. This was the basis for the assumption that there is a relationship between these diseases and the level of insolation, as well as the level of supply of vitamin D [6-9]. It is known that 25 (OH) D hydroxylases in many cells and active form of 1,25 (OH) 2D, which acts locally, inducing cell differentiation and angiogenesis, suppressing invasive cell growth.

The concentration of 25 (OH) D in blood serum is the best indicator to determine vitamin D in circulation. It is the main form of vitamin D, it describes the concentration of vitamin D in food, vitamin D obtained from natural preparations, and the synthesis produced by ultraviolet radiation in the skin.

WHO has published a review of the correlation between vitamin D and cancer. This has led to the initiation of several major clinical trials. The current findings suggest that vitamin D deficiency is a risk factor for breast cancer, endometrial ovaries cancer, esophagus cancer, stomach cancer, urinary tract and bladder cancer, kidney cancer, and Hodgkin's and non-Hodgkin's lymphomas.

## Our goal

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Our goal was to analyze the literature on the advisability of using vitamin D as a factor that improves the quality of life of women in the menopausal period for further data transformation in the Kvemo Kartli region of Georgia.

## Materials and methods

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We searched for peer-reviewed new and recent publications, in order to write this review.

## Results and discussion

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There are many studies where it is reported that the vitamin has positive effects in the prevention of diabetes mellitus and have some positive results in the treatment of this type of diabetes as well. The beneficial properties of vitamin D have been stated in insulin resistance and glucose tolerance, and the effect of vitamin D in type 2 diabetes mellitus has been assessed as positive [9,10].

Numerous scientific papers report that vitamin D deficiency affects the establishment and development of hypertension, sclerosis, rheumatoid arthritis, acute respiratory diseases. There is a strong consensus among studies that there is a link between vitamin D and multiple sclerosis, as well as between respiratory and infectious diseases and vitamin D. Some authors point to the attitude and connection between vitamin D and tuberculosis. Intestinal problems and vitamin D deficiency are fully described. Vitamin D has a positive effect and reduces the number and manifestation of respiratory disease in the total cohort [11-14].

Rare sun exposure, reduced ability of synthesizing vitamin D in the skin under the influence of ultraviolet rays, the use of sunscreens, age-related lactase deficiency, gastrointestinal diseases accompanied by a decrease in vitamin D absorp-



tion, increase the risk of vitamin D deficiency in women [15,16].

Taking into account the high frequency of D-hypovitaminosis in women during postmenopausal period and its adverse effect on the quality of life in general, active examination and detection of vitamin D deficiency are required in case of: overweight or obesity, depressive conditions, bad mood, carbohydrate metabolism disorders, psycho-emotional and neuro-vegetative manifestations of climacteric syndrome.

The postmenopausal period often occurs against the background of neuro-vegetative and psycho-emotional disorders. To streamline the emotional component and to increase the social activity of women, it is necessary to replenish the vitamin D deficiency. Therapy for climacteric syndrome mainly includes drugs for menopausal hormone therapy. However, it is necessary to include drugs with vitamin D in the therapy of climacteric syndrome. The purpose of this combination therapy is effective in the manifestations of increased fatigue, decreased vital activity, as well as against the background of depression and anxiety.

Vitamin D belongs to the group of fat-soluble vitamins. It is naturally presented only in a very limited amount of food, and synthesis in the human body is possible only under certain conditions, when the ultraviolet rays of sunlight hit the skin. Vitamin D, obtained from food and in the form of dietary supplements, as well as formed by exposure to the sun, is biologically inert. Adequate levels of vitamin D are especially important for the proper functioning of the endocrine system in the bone tissue.

Vitamin D binds to a specific vitamin D receptor (VDR), which regulates the expression of many genes, including the TRPV6 ion channel genes (mediates intestinal absorption of calcium). In addition, interaction of vitamin D with CALB1 (calbindin), provides the transportation of calcium into the bloodstream; interaction of vitamin D with BGLAP (osteocalcin), provides mineralization of bone tissue, homeostasis of calcium; interaction of vitamin D with SPP1 (osteopontin), regulates the migration of osteoclasts; interaction of vitamin D with REN (renin), ensures the regulation of blood pressure, being a key element of renin-angiotensin-aldosterone; interaction of vitamin D with IGFBP (insulin-like growth factor binding protein), enhances the effect of insulin-like growth factor; interaction of vitamin D with FGF-23 and FGFR-23 (factor of growth of fibroblasts 23), regulates the levels of calcium, phosphate anion, processes of cell division of fibroblasts; interaction of vitamin D with TGF-beta1 (transforming growth factor beta1), regulates the processes of cell division and differentiation of osteoblasts and keratinocytes; interaction of vitamin D with LRP2 (LDL receptor-associated protein 2), mediates endocytosis of low-density lipoproteins; interaction of vitamin D with INSR (receptor-insulin), mediates the effects of insulin on any cell type [17].

In addition, vitamin D participates in the functioning of the immune system by modulating cytokine levels and regulates T-helper lymphocyte division and B-lymphocyte differentiation. A number of studies have noted a decrease in the incidence

of respiratory tract infections while taking vitamin D. In addition, it also has anti-proliferative and differentiating effects that determine the oncological protective effect of vitamin D [8].

International clinical recommendations for the prevention of vitamin D deficiency conditions, as well as the results of a number of studies, indicate that in order to maintain optimal levels of vitamin D in blood, i.e. more than 30 ng/ml, a daily absorption requires more than 1500-2000 IU a day, and during obesity and disorders of metabolism of vitamin D – more than 6000-8000 IU a day.

A large number of drugs that may be purchased in pharmacies in Georgia are vitamin D in the form of water and oil solutions. For the physiological absorption of vitamin D<sub>3</sub> in the small intestine, the participation of bile acids is necessary, most fully it comes from solutions of the so-called micelles. Micelles are nanoparticles with a fatty core containing vitamin D and a hydrophilic shell, which allows nanoparticles to be evenly distributed throughout the entire volume of an aqueous solution, increasing absorption and increasing the bioavailability of fat-soluble vitamins A, D, E, C.

Relevance and plans of the issue. There are a large number of studies of vitamin D preparations. However, the authors, while regularly working on the review, were interested in what kind of effect one or another drug has on the residents of Kvemo Kartli, Georgia. There is no conclusive evidence. Kvemo Kartli is a region located in the Southeastern part of Georgia. The region is one of the most significant developed in Georgia. The area of the region is of 6528 km squares, which accounts for 10% of the Georgian territory. The region is the third most populated region in Georgia with a population of 497.000. Given the large number of women living in rural areas, and the relatively small number of first aid and gynecological offices, in the light of different climates and nutritional characteristics, our interest as of healthcare professionals in this region is very important. There are studies that have shown what kind of improvement is expected during combination therapy in menopause period. It is very important to conduct such surveys in Kvemo Kartli and compare the data with other regions. Whereas the review clearly shows that the positive effects of D hormone, which is more often referred to as vitamin D, have been well studied in relation to individual pathologies, although the effectiveness of determining its share in combination therapy remains unexplored. D hormone has a wide range of biological properties and is involved in the regulation of many important physiological functions. Recently, a number of publications have emphasized the important role of vitamin D in numerous physiological functions [18-24].

As it is known, total number of women living in Kvemo Kartli is equally represented by the Georgian ethnic group and Azerbaijan ethnic group. These women live in cities and villages. The main Azerbaijan villages are located in Kaspi, Mtskheta and Kareli districts.



The socio-economic level of women living in Kvemo Kartli is almost the same and does not depend on their ethnic origin. In recent decades their clothing, food traditions have undergone a transformation and are now approaching urban standards. Their food ration is approaching a balanced diet.

However, the farther the residential area is from the city, the more visible is the national individualism.

Cereal, green plant foods predominate in the ration of Azerbaijani women living in rural areas, but there is a sufficient amount of meat as well. In their traditional clothing, headgear does not absorb direct sunlight. They are mostly brown-haired.

Georgian women's ration is more cows' milk, eggs, meat, less loose clothing, tighter, their skin color is paler.

Despite the differences, it can be said that their nutritional ration is visible and it is not a particular health problem.

However, it should be noted that there may be different levels of vitamin D among women living in Kvemo Kartli. This assumption generated our interest. In order to develop a personalized approach to menopause management, we will study in detail the mechanisms of menopause management and prevention of different ethnic groups in urban and rural areas in the future.

## Conclusion

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Vitamin D has a special role in the management of menopause, but it is very important to determine its role specifically for the study of women living in Kvemo Kartli. In this regard, our research group has planned specific measures that reflect the impact of vitamin D supplements on improving the somatic and psychogenic health of menopausal women.

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