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HYGIENIC ASSESSMENT OF THE DEPENDENCE OF VITAMIN D LEVELS AND BODY MASS INDEX IN RESIDENTS OF THE SOUTHERN REGION OF UKRAINE

ГІГІЄНІЧНА ОЦІНКА ЗАЛЕЖНОСТІ РІВНІВ ВІТАМІНУ D ТА ІНДЕКСУ МАСИ ТІЛА У МЕШКАНЦІВ ПІВДЕННОГО РЕГІОНУ УКРАЇНИ

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Topicality. In recent years, interest in the study of vitamin D levels has grown significantly due to new views on its role in the prevention of many diseases common in the modern population [1; 2; 4]. According to numerous studies, more than 50% of the population of our planet is insufficiently supplied with vitamin D, regardless of age and ethnicity [2]. Considering this, vitamin D deficiency and it's prevention are extremely relevant to residents of all regions of the globe [1; 3].

Vitamin D affects the regulation of fat and carbohydrate metabolism [4, 6]. Deficiency of 25-hydroxyvitamin D is associated with excessive accumulation of adipose tissue, impaired glucose tolerance, and insulin resistance, which in turn is the cause of the development of type 2 diabetes, obesity, cardiovascular disease, nephropathy, and osteoporosis [5; 6].

The key factor in the development of the negative impact of obesity on the level of vitamin D is the redistribution of 25(OH)D in a significant amount of adipose tissue and the liver (which naturally increases with obesity), which in turn affects the level of 25(OH)D concentration in blood serum [6] .

Goal. To evaluate the relationship between deficiency and insufficiency of vitamin D and indicators of the body mass index (BMI) of residents of the southern region of Ukraine.

Materials and methods. The study included an examination of 355 residents (men – 179; women – 176) of the Southern region of Ukraine,

aged 19 to 60 years (average age – 37.13±11.96 years). Exclusion criteria from the study were: the presence of diseases of the endocrine system, autoimmune pathology, oncopathology, chronic liver and kidney diseases, pregnancy and lactation, as well as taking, in the last three months, drugs containing vitamin D.

The patients participating in the study had their vitamin 25(OH)D total level determined (estimation of the total level of 25(OH)D2 and 25(OH)D3). The status of vitamin D was determined according to the recommendations of the Committee of Endocrinologists for the creation of clinical practice guidelines [7]:

- Vitamin D deficiency (DVD) – below 20 ng/ml or 50 nmol/l;
- Insufficiency of vitamin D (IVD) – from 21 to 29 ng/ml or from 50.1 to 74.9 nmol/l;
- Sufficient level of vitamin D – above 30 ng/ml or 75 nmol/l;
- Vitamin D intoxication over 150 ng/ml or 375 nmol/l

The interpretation of the body mass index indicators was carried out in accordance with the recommendations of the international group on obesity of the WHO (IOTF WHO, 1997), according to the formula based on the ratio of height and body weight (kg/m2).

Research results. It was found that the deficiency of 25(OH)D in blood serum was noted in 43.9% of patients, insufficiency in 38.6%, normal in 17.5%. The average level of 25(OH)D was 24.9±12.7 ng/ml.

During the study, all participants were divided into groups depending on their BMI: Group I (BMI < 18.5 kg/m2) – 10 patients, Group II (BMI 18.5-24.9 kg/m2) – 82 patients, III group (BMI 25.0-29.9 kg/m2) – 126 patients, IV group (BMI 30.0-34.9 kg/m2) – 81 patients, V group (BMI 35.0-39.9 kg /m2) – 51 patients, VI group (BMI > 40 kg/m2) – 5 patients.

Evaluating the dependence of the level of 25(OH)D in blood serum on BMI indicators, it was established that in group I, 60% of patients had DVD, 30% had IVD, and 10% were normal; II group – DVD – 19.5%, IVD – 35.4%, normal – 45.1%; III group – DVD – 42.9%, IVD – 44.4%, norm – 12.7%; IV group – DVD – 55.6%, IVD – 39.5%, norm – 4.9%; V group – DVD – 62.7%, IVD – 29.4%, norm – 7.8%; VI group DVD – 60%, IVD – 40%, norm – 0%;

The highest level of vitamin D was determined in the II group (29.45±10.14 ng/ml), and the lowest in the V group (19.9±7.4 ng/ml). In the 1st group, the average level of 25(OH)D was 23.2 ng/ml; III group – 26.44 ng/ml; IV group – 24.8±7.1 ng/ml; VI group – 24.1±4.1 ng/ml. The number of cases of DWD and IVD was higher in patients with body weight deficiency (23.1±6.7 ng/ml) and patients with BMI over 30 kg/m2

(26.1±2.1 ng/ml). An inverse correlation was established between the level of 25(OH)D and BMI (r=-0.19, p=0.005). At the same time, the level of 25-hydroxyvitamin D in blood serum did not differ in the study groups depending on age.

During the study, the dependence of vitamin D levels on the season was noted. Correlation analysis between the level of 25(OH)D and BMI was conducted separately by season ("Dark season" from October to February; "Light season" from April to September). A statistically significant correlation was noted between gender and the level of 25(OH)D in summer (Spearman coefficient -0.17). That is, in women, the level of 25(OH)D from April to September was statistically higher than in men in the study group.

Conclusions. In the course of the study, the dependence of BMI and levels of 25-hydroxyvitamin D was revealed in residents of the southern regions of Ukraine. It should be noted separately that the level of 25(OH)D in the summer was statistically higher in women than in men in the study group (Spearman coefficient -0, 17). This may possibly indicate differences in the diet and duration of exposure to the sun in men and women who were part of the study group.

According to the research data, risk groups for DVD and IVD are persons with body weight deficiency and BMI over 30 kg/m2. Vitamin D levels play a significant role in the development of impaired glucose tolerance and insulin resistance, which in turn is the cause of the development of type 2 diabetes, obesity, cardiovascular pathology, nephropathy and osteoporosis. Given that the majority of study participants had low levels of vitamin D in the blood, there is a need to implement a global system for the prevention of vitamin D deficiency and insufficiency.

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