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Deficiency and insufficiency of vitamin D in the Ukraine – update 2022

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Data from previous studies demonstrate the high frequency of deficiency and insufficiency of vitamin D in Ukraine, as in the world, which varies depending on the age and gender of the population, the season, the region of residence, and the type of concomitant pathology. The purpose of the study was to assess the vitamin D status in the Ukraine population during 2016-2022 years depending on age, sex, month, and year of observation. In a single-center cohort study, serum 25-hydroxyvitamin D (25(OH)D) level was analyzed in 7105 subjects aged 20-99 years. The analysis was performed depending on age, sex, month, and year of observation. The mean serum 25(OH)D level in the total group was 30.9 [22.1-41.0] ng/ml, the lowest level was in the age group 90-99 years old and the highest one was in the subjects aged 40-69 years old. 52.7% of the subjects had a sufficient vitamin D level, 27.4% had insufficiency, and 19.9% had a deficiency of vitamin D. No gender differences were found in the serum level of 25(OH)D, except the one for the women aged 60-69 years old, who had higher vitamin D levels compared to males parameters. Seasonal 25(OH)D levels variations indicated the highest values in September and October and the lowest ones in February and March. Additionally, we established the increase of serum 25(OH)D from 2016 to 2021 with the highest values in 2020 and 2021. Our data confirmed a decrease in vitamin D deficiency and insufficiency in 2021 and 2022 in the Ukrainian population compared to previous years (2016-2019) and previous studies in the Ukrainian population while maintaining their age-related and seasonal characteristics. It may be associated with an improvement in public awareness of global vitamin D deficiency and its positive skeletal and extraskeletal effects, as well as the COVID-19 pandemic in recent years.
Keywords: vitamin D deficiency; vitamin D insufficiency; 25(OH)D; age; sex; seasonality.

INTRODUCTION

Vitamin D is a group of biologically active fat-soluble secosteroids (more than 6 vitamins and 50 metabolites), that are synthesized in the lower layers of the epidermis of the skin under ultraviolet radiation of category "B" or come from food. In humans, vitamin D2 (ergocalciferol) and D3 (cholecalciferol) are the most important compounds from this group. Nowadays, numerous genomic and non-genomic mechanisms of the vitamin D action in the human body have been established which are responsible for its skeletal and numerous extraskeletal effects. Vitamin D receptors were found in the nuclei and cell membranes of almost all human organs and tissues [1].

Vitamin D is an important regulator of calcium-phosphorus metabolism in the human body, maintaining the integrity of the skeleton, and its deficiency increases the risk not only of osteoporosis and osteomalacia but also of a number of other serious conditions [2], including diseases of the immune, endocrine, nervous and cardiovascular systems and some common types of cancer [3-7].

In 2011, the Institute of Medicine (IOM) and the Endocrine Society's Clinical Guidelines Subcommittee re-assessed the reference ranges for vitamin D status and suggested it evaluating using measurement of the total serum level of 25-hydroxyvitamin D (25(OH)D). The next gradation was proposed: its deficiency (25(OH)D serum level <20 ng/ml or <50 nmol/l), insufficiency (20-29 ng/ml or 50-74 nmol/l) and normal level (≥30 ng/ml or ≥75 nmol/l) [8]. Nowadays, the data of numerous studies suggest a high frequency of vitamin D deficiency and insufficiency in the world [9-12], its frequency differs significantly on the country of residence, age, and gender of the examinees, the time of year at the time of examination, the presence and type of concomitant pathology, etc.

A recent study performed by Bouillon et al. [12] demonstrated that the mean value of vitamin D deficiency in the world (serum level of 25(OH)D <50 nmol/l) consisted of about 37%, and the lowest share of the deficiency is in the USA (18%) in contrast to countries of the European Union (40%) and Africa (34%). One of the highest shares of vitamin D deficiency is in Iran and Jordan (90%), and the smallest one is in Ghana and Seychelles (<7%). Another study, which was conducted in the USA, showed that 5% of the population aged from 1 year to older have severe vitamin D deficiency (25(OH)D < 12 ng/ml), and 18% had a moderate one [13]. An analysis of vitamin D status in different European countries showed that vitamin D deficiency occurs in approximately 20% of the population of Northern Europe, while in Western, Southern, and Eastern Europe it is 30-60% [14].

Previous studies conducted in Ukraine in 2011-2017, also revealed a large number of the population with low levels of serum 25(OH)D regardless of age, gender, and region of residence [15, 16]. The consequence of these studies was the widespread introduction of additional intake of vitamin D among the population in accordance with the recommendations for the countries of Central Europe [17]. Another factor that contributed to greater supplementation of vitamin D in the world generally and in Ukraine, in particular, was the COVID-19 pandemic due to the ability of vitamin D to reduce the risk of infectious diseases in general and pneumonia in particular. Today, in Ukraine, there is no data about the frequency of vitamin D deficiency and insufficiency over the past 5 years, which became the basis for this study.

The aim of the research was to assess the vitamin D status in the Ukrainian population during 2016-2022 years depending on the age, sex of the examinees, month, and year of observation.

METHOD

The single-center study was conducted in the State institution "D. F. Chebotarev Institute of Gerontology of the National Academy of Sciences of Ukraine". We retrospectively analyzed the serum 25(OH)D levels in 8,426 adults aged 20 to 99 years who, for various reasons, sought consultation at the Institute between January 2016 and July 2022.

According to the conclusion of the Ethics Committee of the institute (protocol No. 6 of July 26, 2022), the research fully met the ethical, moral, and legal requirements in accordance with the order of the Ministry of Health in Ukraine No. 281 of November 1, 2000, the Helsinki Declaration of the World Health Organization association on the ethical principles of conducting scientific medical research with human participants. All participants signed informed consent for the use of their data for scientific research.

Among 8426 persons whose data were available for analysis, 7105 were selected, among whom 88% (n = 6273) were women and 12% (n = 832) were men. Exclusion criteria were the presence of previous oncological diseases, somatic pathology in a state of sub- and decompensation, and the presence of diseases with a proven effect on vitamin D metabolism (kidney failure, liver failure, etc.), as well as taking dietary supplements or vitamin D in therapeutic doses (more than 4,000 IU per day at the time of the examination and 3 months before it).

For the analysis, the subjects were divided into groups depending on gender, and the level of 25(OH)D in blood serum (deficiency, insufficiency, and normal values). In addition, the analysis was carried out depending on the age of the examinees (the division into groups was carried out by decade), as well as on the year and month of observation.

Vitamin D status was assessed by the level of 25(OH)D in blood serum. Venous blood sampling was taken on an empty stomach from 8:30 a.m. to 10:00 a.m. Blood samples were collected in vacutainer tubes with EDTA and gel, centrifuged, and separated, then, following cold chain principles, sent to the laboratory for measurement of vitamin D levels.

The level of 25(OH)D in blood serum was determined using the electrochemiluminescence method on the Elecsys 2010 analyzer (Roche Diagnostics, Germany) using Cobas test systems. This method allows you to determine total 25(OH)D (25-hydroxyvitamin D2 and 25-hydroxyvitamin D3) in the range from 3.0 to 70.0 ng/ml, the sensitivity is 3.01 ng/ml, and the coefficient of variation is 7.5%. Samples with a concentration of vitamin 25(OH)D higher than the measurement range were manually diluted 1:2 and multiplied by the dilution factor.

The results were analyzed according to the following ranges of serum 25(OH)D level: 1) potentially toxic concentration: >100 ng/ml; 2) high concentration: > 50-100 ng/ml; 3) optimal concentration: > 30-50 ng/ml; 4) vitamin D insufficiency: 20-30 ng/ml; 5) vitamin D deficiency: <20 ng/ml; and severe vitamin D deficiency: <10 ng/ml [18].

For studying the seasonal effect on 25(OH)D levels, samples were grouped depending on the time of their collection into 4 seasons: spring (March-May), summer (June-August), autumn (September-November), and winter (December-February). Furthermore, vitamin D status was analyzed depending on the year of the study. For determining the average annual index of the 25(OH)D level, data for the years 2016-2021 were included in the analysis.

Statistical analysis was performed using STATISTICA 10 software (Serial Number: STA999K347150–W). Descriptive statistics methods were used with the definition of M (sample means), SD (sample standard deviation) in case of normal distribution, and Me (median and quartiles, [25Q-75Q]) in case of the non-normal distribution of studied variables. Mean values and their standard deviations were compared using the Student test or One-way analysis of variance ANOVA (when comparing 2 or more 2 independent groups), medians with the lower and upper quartiles – using the Mann–Whitney or Kruskal–Wallis (when comparing 2 or more 2 independent groups in the analysis, respectively). Differences in the distribution of the two samples were assessed using the $\chi 2$ test. The results are presented as the mean value and its standard deviation (M ± SD) or median and lower and upper quartiles (Me [25Q–75Q]), quantitative data – in the form of n (%). The calculation of M ± SD in the case of the non-normal distribution of the variables was used for comparing our results with the data of other researchers. Differences between indices were considered significant when $P < 0.05$.

RESULTS AND DISCUSSION

The mean age of the examinees included in the analysis was 60.4 ± 14.1 years (women were significantly older than men, respectively, 61.6 ± 13.0 and 52.5 ± 16.8 years, $t = 18.2$, $P < 0.0001$). The mean level of the serum 25(OH)D in the total group was 30.9 [22.1–41.0] ng/ml (M ± SD: 32.4 ±14.5 ng/ml), with minimum and maximum values of 3.0 and 132.9 ng/ml, respectively.

In the total group of the examinees, women had significantly higher 25(OH)D level in serum (Me [25Q–75Q]: 31.0 [22.3–41.2] ng/ml; M±SD: 32.6 ± 14.5 ng/ml) compared to men (Me [25Q–75Q]: 29.8 [20.9–39.9] ng/ml; M ± SD: 31.2 ± 14.3 ng/ml) ($Z = 2.59$; $P < 0.001$). However, the analysis in the age subgroups did not find any significant differences except for the group aged 60-69 years ($Z = 3.55$; $P < 0.001$), where the level in females was higher than in males [19].

The serum 25(OH)D level differed significantly between groups depending on age ($H = 81.9$; $P = 0.0001$). The lowest index was found in the oldest age group (90-99 years), and the highest one in the subjects aged 40-69 years old (Table 1). It was established significantly higher levels of serum 25(OH)D in persons aged 40-49 (P = 0.04), 50-59, and 60-69 years (P = 0.01) compared to the indices in the age group of 20-29 years, and the lowest level of serum 25(OH)D was in persons aged 90-99 years (P = 0.001). The level of 25(OH)D in this age group was significantly lower than the corresponding indices in all younger age groups.

The analysis in the total group showed that 2,942 subjects (41.4 %) had an optimal (30-50 ng/ml) concentration of 25(OH)D in the blood serum, 1,945 persons (27.4%) had vitamin D insufficiency, and 1,414 individuals had vitamin D deficiency (19,9%; Table 2). Severe vitamin D deficiency (25(OH)D level below 10 ng/ml) was registered in 232 subjects (3.3%).

A high serum concentration of 25(OH)D (>50-100 ng/ml) in the total group was found in 791 persons (11.1%), 13 subjects (0.2%, 11 women and 2 men) had potentially toxic concentrations of 25(OH)D (>100 ng/ml; Table 2). We did not find any significant differences in the frequency of various statuses between groups of men and women.

The analysis of the 25(OH)D level depending on the year of observation (2016-2021; Table 3) revealed a significant increase in indices during the studied period (H = 475.5; P < 0.0001), which may be due to the growing awareness of global vitamin D deficiency and its positive skeletal and extraskeletal effects in recent years among both health professionals and patients. However, the highest values of 25(OH)D were registered at the beginning of the COVID-19 pandemic in Ukraine (2020-2021), which is probably due to increased public attention to the positive effects of vitamin D [20], in particular, in the prevention respiratory tract infections [21]. Our results can possibly be explained by the increased consumption of vitamin D in prophylactic doses in order to protect against the COVID-19 infection and to prevent its severe course, especially in risk groups at the beginning of the pandemic.

The mean annual index of serum 25(OH)D levels for 2021 was significantly higher compared to 2016 (Z = 6.28; P < 0.0001); 2017 (Z = 11.71; P < 0.001), 2018 (Z = 8.07; P < 0.0001) and 2019 (Z = 5.48; P < 0.0001) and did not differ from the index of 2020.

Our data also demonstrated pronounced seasonal variations in serum 25(OH)D levels depending on the month of blood sampling. It is well-known that winter and spring are the seasons during which the level of vitamin D is significantly lower compared to the indices in summer and autumn [22]. In our research, the

Table 1. The level of 25(OH)D in the blood serum of the subjects depending on age, ng/ml

Age groups, years	n	Me [25Q–75Q]	M±SD	Differences (P) compared to the age group of 20–29 years
20–29	239	29.3 [20.2–39.4]	31.1±14.0	–
30–39	459	29.2 [21.5–39.2]	31.0±13.1	0.87
40–49	654	31.6 [22.4–42.0]	33.9±16.5	0.04
50–59	1489	31.5 [23.5–41.6]	33.4±14.1	0.01
60–69	2403	32.0 [23.0–41.8]	33.4±14.0	0.01
70–79	1419	29.7 [19.7–39.2]	30.6±14.6	0.60
80–89	423	29.2 [18.7–40.1]	30.4±15.4	0.53
90–99	19	17.0 [8.2–28.9]	17.5±12.0	0.001
Total	7105	30.9 [22.1–41.0]	32.4±14.5	0.87

Note: here and in Tables 3; 4. *n* - the number of examinees in the group. The difference between the indices was evaluated using the Mann–Whitney test.

Table 2. Distribution of subjects regarding the 25(OH)D serum level in the total group and by gender, n (%)

Serum level of 25(OH)D, ng/ml	All group	Men	Women
<10 (severe deficiency)	232 (3.3)	37 (4.4)	195 (3.1)
10–20 (deficiency)	1182 (16.6)	152 (18.3)	1030 (16.4)
20–30 (insufficiency)	1945 (27.4)	235 (28.2)	1710 (27.3)
>30–50 (optimal values)	2942 (41.4)	324 (38.9)	2618 (41.7)
>50–100 (high concentration)	791 (11.1)	82 (9.9)	709 (11.3)
>100 (toxic concentration)	13 (0.2)	2 (0.2)	11 (0.2)

Note: differences between male and female groups were assessed using the χ^2 test.

highest overall median serum 25(OH)D levels were found in autumn (32.9 ng/ml) and summer (31.2 ng/ml), and were lower in winter (30.5 ng/ml) and in the spring (28.5 ng/ml) (Figure). The average level of 25(OH)D in blood serum in the spring was significantly different from the values in the winter (Z = 5.35; P < 0.0001), summer (Z = 5.33; P < 0.0001) and autumn (Z = 8.59; P < 0.0001).

Analysis of the level of 25(OH)D in blood serum depending on the month of observation revealed its highest levels in September (33.7 [25.9–42.6] ng/ml) and October (33.1 [23.9–42.1] ng/ml), and the lowest – in February (29.4 [19.0–41.8] ng/ml) and March (27.7 [18.8–37.6] ng/ml; Table. 4).

As mentioned earlier, the study of the prevalence of vitamin D insufficiency and deficiency in Ukraine was conducted earlier. The first major epidemiological study in different regions of Ukraine regarding vitamin D status was conducted by Povoroznyuk et al. [15] in 2011. In this research, 1,575 subjects aged 20-89 years were examined, and the normal level of 25(OH)D in blood serum was found in only 4.6% of the subjects. Insufficiency was found in 13.6% of persons, and vitamin D deficiency in 81.8%. The average level of 25(OH)D was 34.49 ± 0.53 nmol/l (corresponding to 13.80 ng/ml), and the frequency of vitamin D deficiency and severe deficiency increased in older age groups.

Another large Ukrainian epidemiological research that studied vitamin D status in patients with musculoskeletal pathology involved 3,460 subjects aged from 1 to 92 years and was published in 2017 [16]. The mean level of serum 25(OH)D in the total group was 26.2 ± 11.9 ng/ml. The frequency of deficiency and insufficiency of vitamin D in patients with pathology of the musculoskeletal system was 37.3 and 30.6%, respectively.

Our study demonstrated higher serum levels of 25(OH)D in the Ukrainian population (32.4 ± 14.5 ng/ml in the total group) compared to the data of both Ukrainian studies [15, 16] (34.49 ± 0.53 nmol/l and 26.2 ± 11.9 ng/ml, respectively). Additionally, the shares of insufficiency (27.4%) and deficiency of vitamin D (19.9%, accordingly, in the first and second Ukrainian studies, it was 81.8 and 37.3%, respectively)

Table 3. The serum 25(OH)D level depending on the year of observation, ng/ml

Year	*n*	Me [25Q–75Q]	M ± SD	Differences (P) compared to 2021
2016	1028	25.1 [17.5–32.8]	25.9 ± 11.6	<0.0001
2017	1361	28.9 [19.8–37.3]	29.1 ± 12.3	<0.001
2018	1390	30.3 [21.7–40.6]	31.5 ± 13.0	<0.0001
2019	1433	31.8 [23.1–41.9]	33.3 ± 14.4	<0.0001
2020	786	36.8 [27.5–47.2]	38.1 ± 15.9	>0.05
2021	805	35.0 [26.8–45.8]	37.2 ± 15.8	-

Table 4. The serum level of 25(OH)D depending on the month of observation, ng/ml

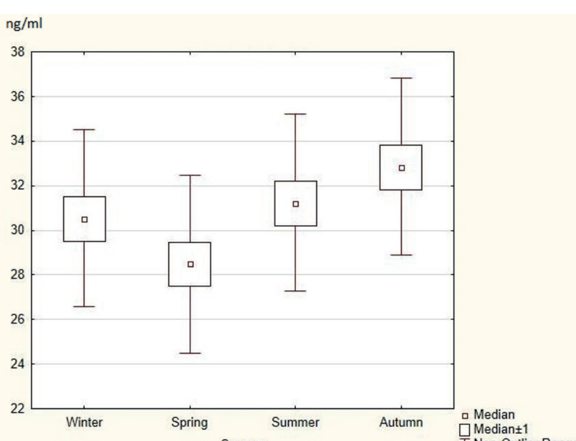
Month	*n*	Me [25Q–75Q]	M ± SD	Differences (P) compared to March
January	524	31.2 [23.9–42.1]	33.90 ± 14.71	0.000001
February	646	29.3 [19.0–41.8]	31.69 ± 16.26	0.01
March	633	27.7 [18.8–37.6]	29.26 ± 14.39	-
April	475	29.7 [19.9–39.1]	30.28 ± 13.89	0.07
May	578	29.4 [19.9–39.7]	30.83 ± 14.83	0.04
June	685	30.4 [21.4–39.6]	31.32 ± 13.53	0.005
July	558	31.0 [23.7–39.8]	32.32 ± 12.79	0.000001
August	499	32.4 [24.4–41.6]	33.57 ± 13.88	0.000001
September	654	33.7 [25.9–42.6]	34.75 ± 13.62	0.000001
October	648	33.1 [23.9–42.1]	34.44 ± 14.91	0.000001
November	660	30.8 [22.4–41.5]	32.73 ± 14.55	0.00001
December	544	31.0 [23.3–43.7]	33.92 ± 15.22	0.000001

were lower.

In our study, a significantly higher level of serum 25(OH)D was found in women (32.6 ± 14.5 ng/ml) compared to men (31.2 ± 14.3 ng/ml, P < 0.001), while as in the research of Povoroznyuk et al. [15] it was demonstrated a significantly higher level of 25(OH)D in males (38.9 ± 1.6 nmol/l compared to females (33.8 ± 0.6 nmol/l) in the total group), although it was not found significant differences in the age groups of 20-34, 35-44 and 75 years and older.

Also, it was found no significant differences in 25(OH)D levels among age subgroups, with the exception for higher levels in women aged between 60 and 69 years, which may be related to increased levels of supplemental vitamin D intake in this age subgroup. Additionally, in previous Ukrainian studies [15, 16] age-related features of vitamin D availability were established. Therefore, the serum level of 25(OH)D in young persons (20-34 years old) was significantly higher compared to subjects aged 75 years and older (respectively, 41.16 ± 2.53 and 32.65 ± 1.77 nmol/l) [15]. Another study [16] demonstrated that the mean level of 25(OH)D in the blood was the highest in the age group of 1-9 years (30.6 ± 15.1 ng/ml) and the lowest in those aged 80 years and older (20.4 ± 11.4 ng/ml). Unfortunately, a direct comparison of our results with previously conducted studies in Ukraine is not possible due to the different distribution into groups, however, we also established a significant influence of age on the serum level of 25(OH)D (H = 81.9; P = 0.0001), the lowest values of the index in the oldest age group (90-99 years), the highest one – in the age groups from 40 to 70 years.

A comparison of seasonal fluctuations of the serum level of 25(OH)D with the results of other studies revealed that, according to our



The serum level of 25(OH)D depending on the season, ng/ml. *P < 0.0001 compared to indices in other seasons research, the highest levels of 25(OH)D were recorded in September and October (34.75 ± 13.62 and 34.44 ± 14.91 ng/ml, respectively), while in the study of Povoroznyuk et al. [16] they were in August and September (28.6 ± 11.4 and 28.6 ± 11.6 ng/ml). The lowest 25(OH)D serum values were in February and March in both studies.

The comparison of our results with the data of neighboring countries [23] showed higher indices of the mean annual level of 25(OH)D (32.4 ± 14.5 ng/ml) compared to the data of the Polish population (18.0 ± 9.6 ng/ ml), which also included men and young women. The frequency of vitamin D deficiency and insufficiency also differed, so among the Polish population, 65.8% of the subjects had 25(OH)D serum levels below 20 ng/ml (defined as deficiency of vitamin D, compared to 19.9% in our study), 24.1% had 25(OH)D levels from 20 to 30 ng/ml (defined as insufficiency of vitamin D, compared to 27.4% in our study) and only 9.1% had optimal vitamin D levels (compared to 41.4% in our study). Significant differences compared to our results, in particular, may be associated with the use of another method of 25(OH)D measuring (the Liaison XL DiaSorin system: CLIA method; DiaSorin, Saluggia, Italy), as well as with the collection of blood samples in months with low solar activity (from February 14 to March 1 and from April 28 to May 15).

Today, this is the largest analyzed sample for studying vitamin D insufficiency and deficiency in Ukraine. As a result, we found that 19.9% of the subjects had a deficiency of vitamin D (25(OH)D level below 20 ng/ml (50 nmol/l), 27.4% had an insufficiency of vitamin D (indices below 30 ng/ml (75 nmol/l)) and 52.7% of the examined had a satisfactory level of vitamin D (>30 ng/ml). In addition, our study revealed significant seasonal variations in serum 25(OH)D. Thus, the lowest level was found in spring (March), and the highest level at the beginning of autumn (September). Similar data were obtained in countries located at the same latitude as Ukraine, where a typically temperate climate with four seasons is found. A large study of vitamin D status in the Romanian population (8,024 individuals with normal BMD) [24] showed similar seasonal variations with the lowest 25(OH)D serum concentration (13.5 [9.4–19.6] ng/ml) in March (compared to 29.26 ng/ml in our study) and the highest one (24.1 [18.3–30.3] ng/ml) in September (compared to 34.75 ng/ml in our study). Since both levels are higher than in the population of Romania, we can assume a more intensive intake of vitamin D in the Ukrainian population due to the COVID-19 pandemic. In the Romanian study, data from 2012 to 2016 were analyzed. If we take into account the data in Ukraine before the pandemic, the obtained results will be similar. Therefore, the highest levels in the Ukrainian population were found in August (28.6 ± 11.4 ng/ml) and September (28.6 ± 11.6 ng/ml), and the lowest one – in February (23.1 ± 11.6 ng/ml) and March (23.4 ± 11.3 ng/ml).

In a study of 206 Hungarian men [26], the highest serum 25(OH)D levels were found in late summer (33 ng/ml compared to 34.7 ng/ml in early autumn in our study), and lowest levels in late winter (23 ng/ml compared to 29.3 ng/ml in early spring in our study). However, the Hungarian study included only relatively healthy men over 50 years of age. Thus, it did not provide data on age-specific vitamin D status in the general population.

A limitation of this study is the fact that the studied samples are not a general sample of Ukraine, although our institute provides consultative assistance to patients from all regions of the country. The vast majority of examined subjects were from the central regions of Ukraine. Additionally, our research did not evaluate supplemental vitamin D intake in prophylactic doses in the studied population.

CONCLUSION

The mean 25(OH)D serum level of men and women aged from 20 to 99 years was 30.9 [22.1–41.0] ng/ml and was lowest in the age group from 90 to 99 and highest in the group of 40-69 years. We found normal vitamin D status in 41.4% of the subjects, insufficiency in 27.4% of persons, and vitamin D deficiency in 19.9% ones.

We found no gender differences in the serum 25(OH)D level except for the 60-69-year-old age group, whereas seasonal fluctuations of the 25(OH)D level were established with the highest values in September and October, and the lowest values in February and March. Additionally, an increase in 25(OH)D levels was found between 2016 and 2021, with the highest values in 2020 and 2021.

A comparison of our data with data from previous Ukrainian studies indicates a decrease in vitamin D insufficiency and deficiency in 2020 and 2021 while preserving their age and seasonal characteristics, which may be associated with increased awareness of the global vitamin D deficiency, its positive skeletal and extraskeletal impact in recent years, as well as the COVID-19 pandemic.

The authors of this study confirm that the research and publication of the results were not associated with any conflicts regarding commercial or financial relations, relations with organizations and/or individuals who may have been related to the study, and interrelations of co-authors of the article.

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ДЕФІЦИТ ТА НЕДОСТАТНІСТЬ ВІТАМІНУ D У НАСЕЛЕННЯ УКРАЇНИ – ОНОВЛЕННЯ 2022

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Дані численних досліджень свідчать про велику частку дефіциту та недостатності вітаміну D у світі загалом і в Україні зокрема, частота яких відрізняється залежно від віку та статі обстежених, пори року, регіону проживання, виду супутньої патології. Метою нашого дослідження було оцінити статус вітаміну D у населення України за 2016–2022 рр. залежно від віку, статі, місяця та року спостереження. В одноцентровому когортному дослідженні проаналізовані сироватковий рівень гідроксивітаміну D (25(OH)D) у 7105 осіб віком від 20 до 99 років. Середній сироватковий вміст 25(OH)D обстежених становив 30,9 [22,1–41,0] нг/мл, при цьому він був найнижчим у віковій групі 90–99 років і найвищим у осіб віком від 40 до 69 років. У 52,7% обстежених виявлено нормальні показники забезпеченості вітаміном D, у 27,4% – недостатність та 19,9% – дефіцит вітаміну D. Не отримано статевих відмінностей сироваткового вмісту 25(OH)D за виключенням групи віком від 60 до 69 років, де цей показник був вищим у жінок. При цьому встановлено сезонні коливання вмісту 25(OH)D з найбільшими значеннями у вересні та жовтні та найнижчими – у лютому та березні. Наші результати підтвердили зниження частки дефіциту та недостатності вітаміну D у 2020 та 2022 рр. у населення України порівняно з попередніми роками (2016–2019). Це може бути пов’язано зі збільшенням протягом останніх років обізнаності населення з приводу глобального дефіциту вітаміну D, його позитивного впливу, а також пандемією COVID-19.

Ключові слова: дефіцит і недостатність вітаміну D; 25(OH)D; вік; стать; сезонність.

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