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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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VITAMIN D INSUFFICIENCY AS A RECENT PROBLEM FOR THE RESIDENTS OF TYUMEN CITY AND TYUMEN REGION

Boldyreva Yu.V, Lebedev I.A, Zaharchuk E.V, Lykasov A.G, Tersenov G.O.

Federal State Budgetary Educational Institution of Higher Education «Tyumen State Medical University» of the Ministry of Healthcare of the Russian Federation (FSBEI HE TyumSMU MOH Russia).

Abstract.

The present work is dedicated to the study of vitamin D content among residents of Tyumen city and Tyumen region. The study analyzed the correlation between the level of vitamin D in the blood and the gender, age, place of residence and season of seeking medical care. This study was carried out on the basis of multidisciplinary clinic of Tyumen State Medical University (MDC of Tyumen SMU). During the research, 231 medical records were analyzed. It was estimated that 51% of patients (118 people) had insufficient blood content of vitamin D. This condition requires early and adequate treatment, since otherwise the risk of clinical manifestations of hypovitaminosis D increases. Considering the important biochemical role of this vitamin in the body (it is proved that vitamin D is not only involved in the regulation of phosphorus-calcium metabolism; almost all cells have receptors for it) and the increased risk of the consequences in case of hypovitaminosis, the conducted study is a pressing issue of our time.

Key words. vitamin D, hypovitaminosis, Tyumen, Tyumen region.

Introduction.

The results of numerous studies [1] suggest that vitamin D deficiency is a universal risk factor providing the occurrence of various polyethiological diseases. According to the literature, there is a deficit of this micronutrient worldwide, including the Russian Federation. In this regard, a group of experts of different specialties, representing the leading clinical and scientific research centers, developed the National Program "Vitamin D deficiency among children and adolescents in the Russian Federation: modern approaches to the correction" (2017) based on several major nationwide studies. Creation of the mentioned "National Program" is the first step in solving the global problem of maintaining vitamin D availability in the child population [2-10].

Aim.

The aim of the study was to assess the vitamin D level in the blood of patients receiving medical care at the MDC of Tyumen State Medical University depending on their gender, age, place of residence, and season of seeking medical care.

Materials and methods.

The retrospective study was carried out on the basis of the MDC of Tyumen State Medical University. As there were no criteria of inclusion and exclusion, 231 medical records (in period from 2017 to 2020) of patients who sought medical care in this health facility to measure the level of vitamin D in the blood or with already measured vitamin D level were selected and analyzed using random sampling technique. The following parametres were analyzed: age, gender, place of residence, comorbidities, season of seeking medical care and D3 level. Statistical analysis of gender, age, place of residence, comorbidities and season of seeking medical care was performed with Microsoft Excel and the data of vitamin D content were processed using Statistica Version 10.0. The concentration of D3 in the blood was evaluated by a laboratory immunological method for in vitro quantification of D3 level. The enzyme-linked immunosorbent assay (ELISA) with the 25-OH Vitamin D ELISA microplate (Euroimmun, Germany; catalog number: EQ6411-9601) was used. The results were calculated on the basis of a standard calibration curve.

Results and Discussion.

The total number of examined patients was 231: 196 women (84,8%) and 35 men (15,2%) (Figure 1).

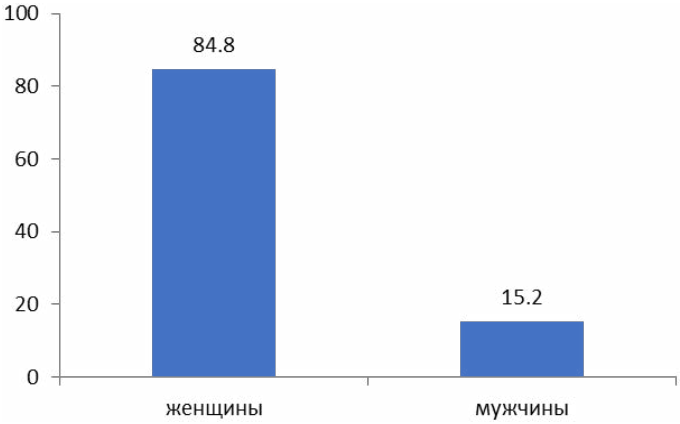

Figure 1. *Distribution of patients by sex, % (total number: 231 patients).*

As it can be seen from the presented data, females predominated in the study group. We believe that this can be explained by the fact that, firstly, the number of women in the population prevails over males. It has been established that the average life expectancy of women is higher than that of men [11]. Secondly, it has been proven that women take their health issues more seriously than men. According to the literature, men in the Russian Federation, on average, are 2.5 times less likely to seek medical help from specialists, despite the fact that mortality between the ages of 35 and 40 is almost 2 times higher in men than women of the same age group [1].

The whole group of patients, depending on age, was divided into 4 subgroups:

1) from 0 to 12 years (children).

2) from 13 to 20 years (adolescents).
3) from 21 to 55 years (adults).
4) from 56 years and older (elderly people).

It was found that adults prevailed in a trial group and accounted for 72.7% or 168 individuals of the total number included in the study; 14.3% (33 individuals) were included in the subgroup of elderly people, while children and adolescents' subgroups had an equal number of patients and accounted for 6.1% each (14 individuals). It should be noted that in 0.8% of cases (2 people), the age of patients was not stated in the medical record. The obtained data are shown in Figure 2.

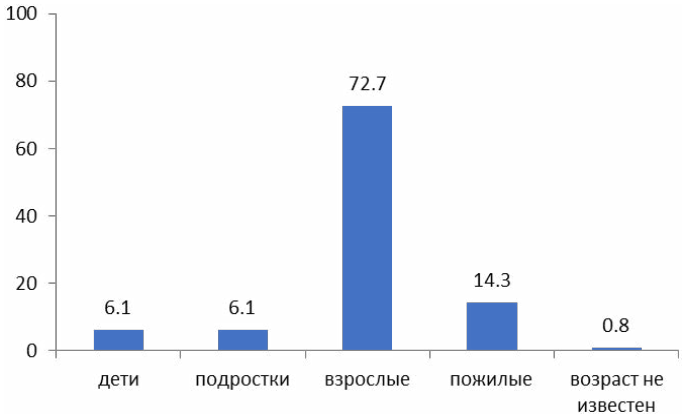

Figure 2. *Distribution of patients by age, % (total number: 231 patients).*

During further study the whole group of patients depending on the place of their residence was divided into 5 subgroups (Figure 3).

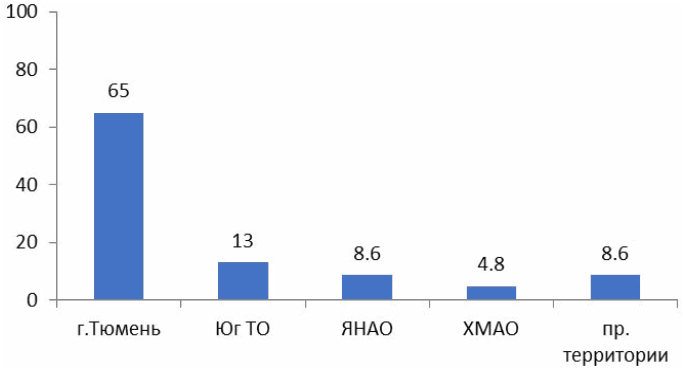

Figure 3. *Distribution of patients by place of residence, % (total number: 231 patients).*

1) residents of Tyumen city.
2) residents of the South of Tyumen region.
3) residents of Yamalo-Nenets Autonomous District.
4) residents of Khanty-Mansiysk Autonomous District.
5) residents of other territories.

It was established that the majority of patients do live in Tyumen city – 65% (150 people). Residents of the South of Tyumen region made up 13% (30 people); the share of population of Yamalo-Nenets Autonomous District and other territories accounted for an equal number of patients, 8.6% each (20 people), while the residents of Khanty-Mansiysk Autonomous District made up 4.8% (11 people).

It is known from the literature that one of the main characteristics of living in northern, or more precisely, high-latitude regions are a deficiency of vitamin D. In order to prove this, we present the results of a study [10], in which the authors established the correlation between the area of residence and frequency of vitamin D deficit. The trial group consisted of children under 18 years; vitamin D deficiency was defined as a level of 25 (OH)D below 20 nmol/L. Figure 4 shows a graph reflecting this relation.

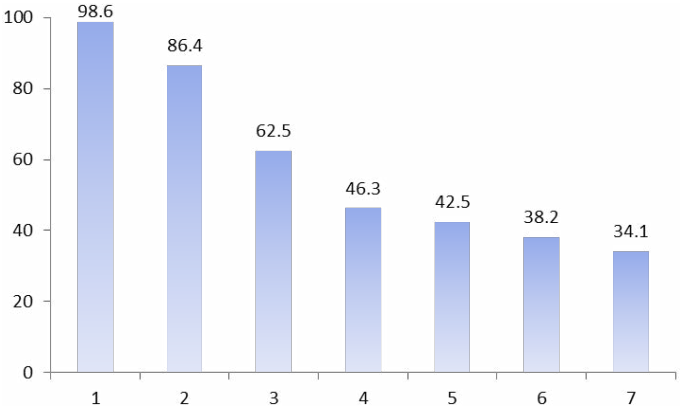

Figure 4. *Correlation between the area of residence and frequency of vitamin D deficit, % [2].*
**1 – s. Izhma (Komi Republic, Russia; LAT, 65^0 N); 2 – s. Kortkeros (Komi Republic, Russia; LAT, 62^0 N); 3 – Turku (Finland; LAT, 61^0 N); 4 – Bergen (Norway; LAT, 60^0 N); 5 – s. Orda (Perm Krai, Russia; LAT, 57^0 N); 6 – Moscow Oblast (Russia; LAT, 56^0 N); 7 – Edmonton (Canada; LAT, 52^0 N)*

The study emphasizes that the further north the region is, the more pronounced the vitamin D deficiency. This can be explained by the fact that vitamin D deficiency is widespread in areas located in northern latitudes (above 35 ° N), where, due to low average annual temperatures, a small number of sunny days as well as an acute incidence angle of sunlight rays and their scattering in the upper layers of the atmosphere in the autumn-winter and early spring period, contact with the skin is tangential, what significantly reduces the possibility of adequate vitamin D production [2].

It should be noted that Tyumen city corresponds to the Perm Krai (LAT, 57°15′ N). Thus, it can be assumed that the majority of inhabitants of this area have a deficit of vitamin D.

However, the results of another study showed that the rate of the vitamin D formation in skin is mainly affected not by the geographical latitude of the area, but the ecological and geographical factors caused by it: cloud cover, solar zenith angle, length of the daytime, time spent outdoors, features of wearing clothes, etc. [8]. Therefore, the correlation between vitamin D production and the geographic latitude of the region is only indirect. The foregoing confirms the fact that among residents, even in highly illuminated areas, vitamin D deficiency (due to habit of protection the body surface from solar radiation) is a common occurrence. Thus, in Saudi Arabia, Australia, India, the United Arab Emirates, and other warm countries, 30 to 50% of children and adults have level of 25(OH)D below 30 ng/mL [11]. In addition, it has been proven that the level of vitamin D is also affected by the mechanisms of adaptation

to the environment: the content of melanin in the skin, which provides different susceptibility to UV radiation (the darker the skin color, the lower the rate of vitamin D synthesis); availability of food sources of vitamin D; cultural and traditional features of the diet, etc.

Thus, it is not correct to associate vitamin D deficiency only with the geographical location of the area; this indicator can be considered as one of the factors affecting the level of vitamin D in the body [12].

Then, the correlation between the seasonality of seeking medical help and the level of vitamin D in the blood was analyzed. The whole group of patients was divided into 4 subgroups (Figure 5).

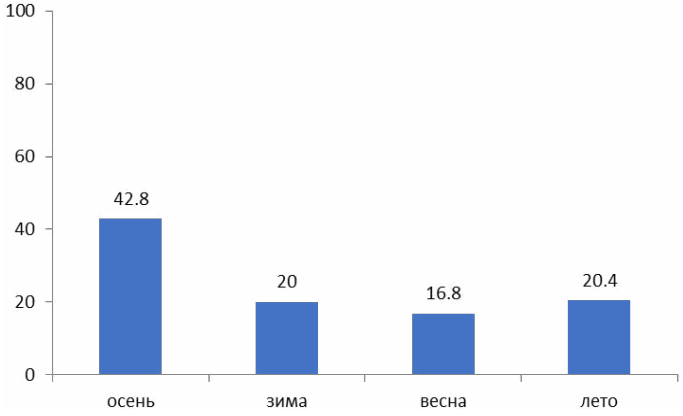

Figure 5. *Distribution of patients depending on season of seeking medical care, %.*

1) patients seeking medical care in winter.
2) patients seeking medical care in spring.
3) patients seeking medical care in summer.
4) patients seeking medical care in autumn.

After analyzing the data for gender, age, and place of residence of patients in the study group, as well as the seasonality of their seeking medical help, it was decided to measure the level of vitamin D in this group.

The entire group of patients, depending on the determined level of vitamin D in the blood, was divided into 4 subgroups:

1) patients with deficiency of vitamin D level in the blood (up to 20 ng/ml).
2) patients with vitamin D insufficiency (20-30 ng/ml).
3) patients with sufficient content of vitamin D in the blood (30-50 ng/ml).
4) patients with toxic levels of vitamin D in the blood (more than 100 ng/ml).

The analysis of the results showed that in the trial group there were more patients with insufficient content of vitamin D in the blood – 118 patients (51.1%). The second group, according to the frequency of occurrence consisted of 101 patients with sufficient level of vitamin D (43.7%); 9 patients (3.9%) had a vitamin D deficit while the toxic level of vitamin D was registered in 3 patients (1.4%).

The prevalence of patients with the deficient blood level of vitamin D was an expected result. Nevertheless, it is pleasant to note that the second most common group had sufficient levels of vitamin D in the blood. Probably, these were patients who underwent titration of vitamin D dose in order to eliminate its deficiency, or patients who underwent a differential diagnosis in order to exclude pathology accompanied by vitamin D deficiency.

The prevalence of patients with the deficient blood level of vitamin D was an expected result. Nevertheless, it is pleasant to note that the second most common group had sufficient levels of vitamin D in the blood. Probably, these were patients who underwent titration of vitamin D dose in order to eliminate its deficiency, or patients who underwent a differential diagnosis in order to exclude pathology accompanied by vitamin D deficiency. An analysis of seeking medical care seasonality in this group showed that more often patients sought for medical help in the winter – 47 patients (39.8%), less often in autumn – 35 patients (29.7%), even less often in spring – 24 patients (20.3%) and the rarest attendance was registered in summer - 12 patients (10.2%). It can be concluded that vitamin D deficiency is recorded more often in the autumn-winter period and less frequently in the spring-summer period. These results can be explained by the fact that UV rays activate endogenous synthesis of vitamin D in the spring-summer period.

Summarizing the above, we can get a "portrait" of the patient: a female aged 21-55, who lives in Tyumen city, seeks medical help in autumn and has an insufficient level of vitamin D in the blood.

Conclusion.

The presented work reflects the correlation between the level of vitamin D in the blood and several factors such as gender, age, place of residence and the seasonality of seeking medical care. The analysis of named factors showed that in order to relate patient to the risk group of hypovitaminosis D, it is worth approaching the solution in a complex manner. The assessment of each factor individually is random and can only serve as an "indicator", increasing the alertness during the vitamin D leveling. In addition, it was found that vitamin D deficiency can be observed at any time of the year, what emphasizes the importance of taking vitamin D supplements regardless of the season.

Conflict of interest statement.

The authors declare the absence of obvious or potential conflicts of interest related to the publication of this article.

Source of financing.

The authors state that they received no funding for the study.

Conformity with the principles of ethics.

All patients signed an informed consent to participate in the study. The study was approved by the local Ethics Committee at the Tyumen State Medical University.

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