

Figure 1. The change in 25(OH)D in the blood plasma of the examined contingent, depending on the age

Obtained in the course of the study, the results indicate a decline in vitamin D since 2 years, all age groups of the population. (Fig.1). The lowest levels of 25(OH)D in the organism identified in children 3 years of life with the average value was  $19.31 \pm 1,0$  ng/ml and in children 3 - 6 years -  $21,77 \pm 0,96$  ng/ml. the largest risk group for the development of deficiency (hypovitaminosis) were children 1 month.- 3 years - 36,4%, ie every 3rd child.

Conclusion: the Obtained during research results indicate a high frequency of failure and vitamin D deficiency in a group 3 years of life (92,43%), children aged 15-17 years (88,4 %) and 2 years of life (for 84.7%). The highest calzidiola found in the group of healthy children 3-6 years (56.6 per cent), slightly less in children from birth to 6 months (45,8%). The increase in the degree of accuracy with age in the development of vitamin D deficiency and to predict FR in the group have young children, allowing you to include this criterion as predicting factors for having children in the first 3 years (Fig.1).

### Literature

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### VITAMIN D INSUFFICIENCY IN CADETS OF THE AMUR REGION

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**Abstract** Nowadays, the lack of sunshine vitamin D is associated with rickets in children and osteoporosis in adults. Recently, however, new data on the physiological role of cholecalciferol and the relationship of its deficit with numerous diseases (immune system, cardiovascular, oncological, neurological, etc.) were received. This paper presents the analysis of the results of the study of vitamin D metabolites in serum of healthy adolescents, training on the basis of the Amur Cadet Corps, residing in the territory of the Amur region. Risk factors for development of vitamin D deficiency were identified and the adequacy of preventive measures was assessed. A study to identify D-deficient states of conditionally healthy adolescents in the Amur region began with the December 2014 and March, 2015. The article presents the first results of studies indicating a high frequency of deficits of varying severity of vitamin D in healthy adolescent boys in the Amur region. Currently the principles of prevention and optimal methods of correction of low vitamin D status in adolescents are not developed. These results allow to speak about necessity of revision of existing methodological recommendations taking into account modern approaches to the prevention and treatment of deficiency with different degrees of severity of vitamin D in children and adolescents.

**Key words.** Vitamin D, cholecalciferol, hypovitaminosis, deficiency, vitamin D insufficiency, adolescent boys, cadets, risk factors.

**Introduction.** In the scientific literature has dramatically increased the interest in solar vitamin D. Over the past half century was published more than 60 thousand articles on the subject. Not more than 30% of physiological needs vitamin D enters the human body. To prevent the effects of D-deficiency condition is a necessary and timely prevention and treatment of vitamin D deficiency, so additional applications of farmpreparatov vitamin D throughout life is necessary. Up to the present time vitamin D was associated within the meaning of the doctor effect on bone-joint system and for the prevention/treatment of rickets in children the first year

of life[3]. In the present study, D - deficient States in children has become the most urgent problem. In recent years, were discovered and collected convincing data on the role of vitamin D in many other biological processes. Hormonally active form of vitamin D, namely calcitriol receptors, detected in at least 36 different tissues of the body, where they carry out the regulation of processes of growth and differentiation of cells and prevents their excessive proliferation and controls the synthesis of hormones.[5] So, for example, it is proved that the deficiency of this vitamin increases the risk of autoimmune and inflammatory disorders, cancer (mammary, pancreatic, prostate gland, intestine and colon), heart failure, hypertension, myocardial infarction, diabetes, obesity. It is proved that the contents 25(OH)D above 30 ng/ml is sufficient to ensure normal uncostly effects of this vitamin on the human body.

We know that about 30-50% of the population of Europe and the United States revealed low levels of vitamin D. According to Beghin et al, 2012 study of 1,006 Teens 12 to 17 years showed that 81% had insufficient levels of vitamin D in adolescents living in the EU.

In the course of research in the Department of Pediatrics GBOU SPE Russian medical Academy of health Ministry under the leadership of Professor Zakharova I. N. in 2013-14 the examined children aged 10 to 17 years in Moscow. Results seasonal changes of vitamin D in the blood serum demonstrates the relationship of this vitamin from the month of the year. The lowest concentration of vitamin D was observed in may, and a more favorable pattern in summer and autumn than in winter-spring.

The result of another study in girls aged 10-17 in different months of the year showed that the average content of vitamin D in October and November was significantly higher than in February and March, tells about the depletion of the body 25(OH)D in winter in conditions of low insolation.

A recent study of adolescents living in the Amur region revealed that 26.2 percent of the surveyed low in vitamin D, higher levels were noted in adolescents living in rural areas (Evseeva et al., 2014).

According to the findings of many scientific studies it was found that average content of 25(OH)D in blood serum, according to most experts, agree on the following criteria[7]:

- normal 25(OH)D >30 ng/ml.
- insufficiency of 25(OH)D 21-29 ng/ml;
- deficiency of 25(OH)D <20-11 ng/ml;
- severe deficiency of 25(OH)D <10 ng/ml.

It is recognized that the content of 25(OH)D level above 50 ng/ml is necessary to ensure all uncosted effects of this vitamin on the human body [8,9]. On the basis of numerous studies it was found that excess vitamin D in blood serum is considered to be above 100-120 ng/ml vitamin D Intoxication is manifested by development of hypercalcemia, hypercalciuria and hyperphosphatemia [10,11].

The Department of Pediatrics sbei HPE Amur state medical Academy MZ of the Russian Federation in 2014 was organized a study on assessment of security cadets boys of adolescent age with vitamin D in the Amur Region.

The aim of this work was to study the availability of vitamin D in adolescents Amur region, the Amur pupils in the Cadet Corps to optimize diagnosis, effective prevention and correction of irregularities in the status of vitamin D.

Objectives of the study were:

1. To study the prevalence and degree of severity of the changes of vitamin D in adolescent boys Amur region.
2. To evaluate the risk factors for the formation of the low status of vitamin D in adolescent boys, the Amur, the student Cadet Corps.
3. To analyze the relationship between low vitamin D status and incidence of boys cadets.

Materials and methods. Data fgbu "far East management on Hydrometeorology and environment monitoring", analysis of laboratory parameters, including the level of total calcium, phosphorus and alkaline phosphatase; the content of the metabolite of vitamin 25(OH)D in serum was determined by high performance liquid chromatography in 60 apparently healthy adolescent boys cadets, clinical and anamnestic data. A study to identify D-deficient States boys cadets began in December 2014 and March 2015.

Criteria for inclusion of patients in the study: healthy male cadets, 15-17 years old, pupils of the cadet corps of the Amur from Blagoveshchensk living in the Amur region.

Exclusion criteria children: children with disorders of hepatic function (jaundice, diarrhoea); disorders of renal function; the presence of mental disorders.

Clinical and anamnestic data was evaluated after a careful study of the patient card (form 112) and a specially designed questionnaire, including information about the prenatal development of the child, the nature of power, the features of the somatic status, of heredity. Also in the card were entered data of objective examination of the child, the presence of somatic diseases, the administration of multivitamins, rest in the summer,

the results of additional methods of research (clinical blood analysis, urine analysis according to standard techniques, biochemical analysis of blood), expert advice.

The package of applied programs Statistica 6.0 [4].

The results of the study. According to the "far East management on Hydrometeorology and environment monitoring", it is possible to speak about tendencies to deterioration of the ecological situation in the region; for the period 2009-2014 the average annual concentration of suspended particles increased and exceeds several times the level of maximum permissible concentration; air pollution (including particulate concentration) is found to be very high (air pollution index 14). A large number of Sunny days in the district. Blagoveshchensk is fairly large, but only the average temperature in the summer months - June-July-August (20,1-22,7-20,3 respectively) allows to the child the sun.

In the course of the study in the group of conditionally healthy adolescents-60 children, students of the Amur corps of cadets, 15-17 years, it was revealed that 7 of Teens (11,6%) level of 25(OH)D within normal limits, and in 53(88,3%) mentioned lack of vitamin D. The Average of all examined 25(OH)D=23,89±0,66 ng/ml, Sa=2,31±0,03 mmol/l, P=1,45±0,03 mmol/l, Alkaline phosphatase=300,8±8,28 U/L. depending on the levels of vitamin D groups were formed: group I with low content of vitamin 25(OH)D was 53(88,3%) of a teenager, whose average age of 16.2±0,09, weighing 66,46±0,66, height=169,87±0,67. The average in this group is 25(OH)D=22,17±0,5 ng/ml, Sa=2,29±0,03 mmol/l, P=1,43±0,03 mmol/l, alkaline phosphatase=304,56±8,67 U/L. the group with insufficient vitamin D included 39 (65%) adolescents, in the subgroup with deficiency of 25(OH)D included 14 cadets (23.3 percent).

In the second group with an index of vitamin D in the normal range included 7(11.6 percent.) the cadets, whose average age was 16.5±0,22, body mass 69,0±0,37, height=168,0±0,97. Averages were 25(OH)D=33,10±0,81 ng/ml, Sa=2,47±0,1 mmol/l, P=1,56±0,07 mmol/l, alkaline phosphatase=266,6±25,78 U/L. the Performance of CA, P, alkaline phosphatase all surveyed boys cadets were in the normal range, significant differences between the groups were observed.

After studying of the anamnesis and an objective examination the next stage in the work was the identification of risk factors (RF), contributing to the development of vitamin D deficiency in adolescents. Analysis of acute and chronic morbidity in the surveyed adolescent boys revealed: a disease of the gastrointestinal tract (chronic gastroduodenitis without exacerbation (CGD), GIT, pancreatopathy)-50,94% (p=0.023). Virus - bacterial infection of the SOT (frequent respiratory infections more than 4 times during the school year, bronchitis, sinusitis, laryngotracheitis, pneumonia ill - 64,1% (p<0.001). Vegetative - vascular (VVD) was observed in 35(66%), which was manifested by complaints of headache y17(32%) boys cadets, arterial hypertension 1 degree in 2(3,7%) adolescents, sleepiness during the day and hypotension in 6 (11,3%), dizziness in 4 (7,54%), irritability in 7(13.2%), and red dermographism was observed in 33(62.2 percent).

During the inspection of the boys complained of difficulty falling asleep and sleep surface 29(54,7%), anxiety and anxiety in 31(58.4 percent), hyperhidrosis in 27(50.9 percent). Violation of posture in the form of asymmetry of the shoulder girdle, the angles of the scapula, angles of waist was noted in 36(67.9 percent). During examination of the oral cavity revealed that dental caries was observed in 12(22,64%), the absence of teeth in 7(13.2%), and defect of enamel was observed in 9 (16.9 percent).

A study for teenage boys to identify risk factors for developing low vitamin D level also included a study of the influence of the location of teenagers in the summer. We noted that the boys of the cadets who were in the summer in areas of high solar insolation (North-Caucasian Federal district, Krasnodar Krai, Thailand, Egypt, Turkey), vitamin D levels in the blood during winter was significantly higher than in adolescents, the vacation of which took place in the zone of low insolation (far Eastern district) (p<0.001). Analysis of individual data showed that in the group with 25(OH)D in the normal range revealed that the boys take a multivitamin which includes prophylactic dose of cholecalciferol (400-500ME) Alphabet, and Vitrum Duovit in contrast to the group of adolescents with a low content of 25(OH)D<29 ng/ml, who had not taken vitamins.

Discussion of the data obtained. Analyzing the data of environmental factors in the Amur region, it is possible to speak of a continuing trend of air pollution for the period 2009-2014. Identified a very high level of IZA with a high content of benzopyrene, formaldehyde, and an increase in the average annual concentrations of suspended substances, sulfur dioxide, nitrogen, phenol. This along with the low insolation and a low number of Sunny days per year makes it difficult the synthesis of vitamin D under the influence of the UFO, creating the preconditions for low vitamin D. So, the optimum temperature for the thermal baths 20-22°C in the city of Blagoveshchensk is available from mid-May to mid-September, that is 4 months out of the year.

As a result of the work of vitamin D in boys cadets 15-17 years, the average vitamin D level made up 23.89±0,66 ng/ml. the amount detected in only 7 (11,6%) average cholecalciferol 32,94±0.7 ng/ml, thus being at the lower limit of normal; a lack of vitamin D concentration - 39 (65%; adolescents, in the subgroup with deficiency of 25(OH)D - 14 (23,3%). Low levels of vitamin D were observed in 53(86,6%), with an average level of 22.87±0,57 ng/ml.

We have identified DF, which may affect the decrease in the level calcidiol in the blood. Thus, the pres-

ence of chronic diseases in the cadets overall effect on the level of vitamin D ( $p=0.025$ ), but this is not due to nosological forms ( $p=0.189>0.05$ ). From the bone-joint system, there are differences in the levels of vitamin D at 5 % level of significance, with low levels of vitamin D observed in the cadets with the chest deformity and flat feet. Thus, there is a contribution to an insufficient level of vitamin D are contributing factors such as the combination of in the body available virus - bacterial infection on the background of chronic pathology of gastrointestinal tract and disorders KSS-71,4%. It has the value of summer holiday of teenagers in areas of high solar insolation resulting in increased and even in winter was significantly higher than in adolescents, the vacation of which took place in the zone of low insolation( $p<0.001$ ). Influenced by and taking multivitamins which include prophylactic dose of cholecalciferol (400-500ME) Alphabet, and Vitrum Duovit in contrast to the group with low vitamin D and adolescents did not take multivitamins( $p<0.001$ ).

The analysed results indicate a high frequency of failure and deficiency of cholecalciferol in the Amur region in children 15-17 years of 86.6% with a mean level of vitamin 25(OH)D=26,74±0,81 ng/ml.

Conclusion. To prevent low vitamin D level of adolescents is necessary to study 25(OH)D, its correction and control, taking into account risk factors for developing deficiency of vitamin D. Prophylactic administration of vitamin D should continue, and adolescent children year-round, given the low solar insolation, with the use of vitamin d compounds.

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**SOY – FROM ANCIENT BEANS TO MODERN SOY FOODS**

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For Asia people Soy is a traditional food. Considering its role the leading specialist in the study of healthy effects of soy foods M. Messina wrote: "In China the word for soybean is ta-tou, which means "greater bean. It is not surprising to give the importance to soybeans because in Asian culture, they were both as a food and a medicine" (Messina, 1995). There are a lot of oriental soy-foods, such as soy milk – Doujiang (China), Tonyu (Japan), bean curd – Tofu (Japan), Dòufu (China), fermented beans – Natto (Japan), fermented bean paste – Miso (Japan), Doubanjiang or Douchi (China), Doenjang (Korea), soy sauce - Chiyou/siyau (China), Shōyu (Japan) and many others. In the West, soybeans for many years were best known for their high protein content. The healthy effects of Soy foods are being increasingly recognized in the USA, Europe and Russia only within the last decades mainly because of the results of epidemiological studies revealing the low incidence of pros-