

Ministry of Health of the Republic of Kazakhstan  
NON-PROFIT JOINT STOCK COMPANY "WEST - KAZAKHSTAN MEDICAL  
UNIVERSITY NAMED AFTER MARAT OSPANOV"  
(JSC WKMU Marat Ospanov)

UDC 611.018.4: 612.392: 616-098: 618.175-053.6  
GRNTI 76.29.48, 76.03.02  
State registration No.0121RK00549



"APPROVED"

Management Board - Rector of the  
NISC West Kazakhstan Marat Ospanov  
Medical University", d.m.s.  
— E.K. Ismagulova  
October 2021

REPORT  
ABOUT RESEARCH WORK  
"FEATURES OF METABOLISM AND STATE OF MINERAL DENSITY OF BONE TISSUE  
IN ADOLESCENT GIRLS WITH PRIMARY DYSMENORHEA".  
(final)

Head of the research work  
PhD


Amanzholkyzy A.

Aktobe, 2021


List of performers

Responsible executor, Head of the School Amanzholkyzy A.  
research, Phd

Junior researcher

 Donaeva A.E.


Junior researcher

 Tubulbaeva C.A.

Junior researcher, master

 Kulzhanova D.S.

Junior researcher

 Akkozina A.M.

## ABSTRACT

Report 91 pages, 6 table, 9 figures, 38 sources, 12 app.

Key words: primary dysmenorrhea, adolescent girls, bone metabolism, genetic marker, bone mineral density, osteodensitometry.

The object of the study is adolescent girls with primary dysmenorrhea aged 13 to 18 years.

Aim of the project. Increasing the efficiency of research and early diagnosis of the role of geno-phenotypic features of bone metabolism and bone mineral density in adolescent girls with primary dysmenorrhea.

Methods: Instrumental, physiological, gynecological, clinical and laboratory.

The following data were determined: age, anthropometric data, data of gynecological status, content of macronutrients, results of genetic and biochemical blood markers.

Results of the work and their novelty: The obtained results of the research make it possible to expand diagnostic methods in practical health care from the standpoint of determining the mineral density of bone tissue by the method of ultrasonic osteodensitometry.

The implementation of the results of research work through an in-depth study of genetic markers and their identification have great prospects for assessing the risk group for the development of osteopenic syndrome and the development of an algorithm for early diagnosis (Appendix A), which was substantiated by the peculiarities of bone metabolism in adolescent girls with primary dysmenorrhea, taking into account the analysis of clinical laboratory results.

Within the framework of this project, 1 master's and 2 doctoral dissertations are launched, which will be carried out by the obtained results of this research (Appendix B, C, D).

The research results can be applied in different branches of medicine.

We have begun work on the implementation of the results of research work in the practical health care of the Region Perinatal Center for outpatient and polyclinic service, SOE "State Polyclinic No. 1" on REM SI "UZAO", secondary school No. 30 and secondary educational institutions of the Aktobe region (Appendix E).

The practical significance of the project lies in the fact that the study of the role of geno-phenotypic features of bone metabolism and bone mineral density will provide early diagnosis and increase the effectiveness of the study of adolescent girls with primary dysmenorrhea.

## CONTENT

INTRODUCTION.....	13
MAIN PART OF SRW REPORT.....	20
1 Object and methods of research.....	20
1.1 Object of research.....	20
1.2 Methods of research.....	22
1.2.1 Assessment of the gynecological status of primary dysmenorrhea.....	22
1.2.2 Ultrasound examination of bone mineral density.....	23
1.2.3 Study of genetic and biochemical markers of bone metabolism in adolescent girls.....	24
1.2.4 Algorithm development.....	26
1.2.5 Statistical analysis.....	27
2 Results and discussion.....	28
2.1 Assessment of gynecological status.....	28
2.2 Assessment of the state of BMD in adolescent girls with primary dysmenorrhea of the Aktobe region.....	31
2.3 Evaluation of biomarkers of bone metabolism in the examined adolescent girls .....	35
2.4 Evaluation of genetic markers of polymorphism associated with steoporosis.....	40
CONCLUSION.....	45
LIST OF USED SOURCES.....	47
APPENDIX A-Algorithm for early diagnosis of primary dysmenorrhea.....	51
APPENDIX B- Extract from the protocol of the Academic Council on the approval of the topic of the master's thesis and the scientific advisors of the master's student.....	52
APPENDIX C-Extract from the protocol of the Academic Council on the approval of the topic of the doctoral thesis of the doctoral student.....	53
APPENDIX D-Extract from the protocol of the Academic Council on the approval of the scientific advisors of the doctoral student .....	54
APPENDIX E-Acts of implementation of scientific research work.....	55
APPENDIX F-Visual analogue scale of pain intensity (VAS).....	60
APPENDIX G-Certificate of entering information into the state register of rights to the copyright object No. 16666 dated 04/14/2021.....	61
APPENDIX H-Certificate of acceptance of an article for publication in in the journal	

WoS SCIE Q2.....	62
APPENDIX J-Application for the grant of a patent of the Republic of Kazakhstan for a utility model.....	63
APPENDIX K-Program of International scientific and practical conference "Modern medicine: a new approach and relevant research" (in Russian and English languages).....	65
APPENDIX L-Abstracts with a report at the International Scientific and Practical conference "Modern medicine: a new approach and relevant research" .....	81
Appendix M-Abstract with a report at the LX International Scientific Conference students and young scientists "Science: Yesterday, Today, Tomorrow" in the framework of the 30th anniversary of Independence of the Republic of Kazakhstan .....	85

## TERMS AND DEFINITIONS

This SRW report uses the following terms with their respective definitions.

Alleles	alternative variants of the gene at each locus (one from the mother, the second from the father).
Anamnesis	set of information about the patient and the development of the disease obtained by interviewing the patient himself and those who know him.
Biomarker	characteristic (biological trait) that is used as an indicator of the state of the whole organism.
Bioelements	elements that are constantly part of the body, necessary for its vital activity and exhibit biological properties.
Bioelement composition	the content of bioelements in the body.
Body mass index	ratio of body weight in kilograms to the square of height expressed in meters (kg/m <sup>2</sup> ).
BQI	stiffness index - were determined from the QUS measurements.
Child's representative	a legal representative accompanying a patient under the age of 18, may be one of the parents, a close relative, or a guardian.
Densitometer	device that assesses the condition of bone tissue in a non-invasive way, which is used to detect diseases of osteoporosis.
Diagnosis	medical report on the pathological state of health of the subject.
Diagnostics	various methods of diagnosis.
Dysmenorrhea	cyclical pathological process manifested by pain in the lower abdomen during menstruation, accompanied by a complex of psychoemotional and metabolic-endocrine symptoms.
Early puberty	its first signs appear in girls at the age of 8-9 years, and the final ones at 10-12 years.
Gamma coefficient	indicator of the rate of delta change as a result of minor fluctuations in the price of the underlying shares.
Gene	section of DNA encoding a polypeptide chain.
Heterozygous alleles	different alleles.
Homozygous alleles	both alleles are identical.
Interquartile range (interval)	interval of attribute values containing the central 50% of the

	observations of the sample, that is, the interval between the 25th and 75th percentiles.
In vivo	inside a living organism or inside a cell.
In vitro	technology for performing experiments when experiments are carried out "in vitro" - outside a living organism
Kolmogorov-Smirnov criterion	nonparametric criterion of agreement, in the classical sense, designed to test simple hypotheses about the affiliation of the analyzed sample to some well-known distribution law.
Late sexual development	the appearance of its first signs at the age of 13 years and later, as well as the absence of menstruation at 15 years.
Level of statistical significance	value of the $\alpha$ -error allowed by the researcher, that is, the maximum probability of erroneous rejection of the null hypothesis of the statistical test allowed by the researcher. Usually, the values 0.05, 0.01 or 0.001 are taken as the magnitude of the significance level.
Mann-Whitney criterion	statistical criterion used to assess the differences between two independent samples by the level of a quantified trait.
Macronutrients	bioelements that are contained in the human body in significant quantities, from tens of grams to tens of kilograms.
Mutation	universal property of living organisms that underlies evolution and selection, and consists in a sudden change in genetic information.
Median	value of a trait that bisects the distribution of observations in the interval of trait values, that is, half of the values in the sample are less than the median, and the second half is greater than it.
Menarche	the first menstruation.
Micronutrients	interaction between vitamins and minerals in the process of their assimilation by the body.
Mean value	descriptive parameter that is a measure of the central trend for approximately normally distributed data.
Osteopenia	low mineral density of bone tissue.
Osteoporosis	less than -2.5 is osteoporosis with a high risk of fractures.
P value	probability of erroneous rejection of the null hypothesis

		calculated during the statistical test. To make a decision on whether it is necessary to reject the null hypothesis based on the results of a statistical test, the value of p is compared with the critical (threshold) significance level ( $\alpha$ -error) accepted by the researcher.
Pathogenesis		study of the mechanism of development, course and outcomes of diseases.
Pathology		disease; a condition that differs from the norm.
Primary (primary-functional)	dysmenorrhea	occurs from the moment of the formation of ovulatory cycles, in the absence of pathological changes in the pelvic organs.
Postmenopause		long period that occurs after premenopause and menopause, characterized by complete extinction of the reproductive system.
Prepubertal phase		characterized by a significant acceleration of the growth rate of the body in length, the appearance of the first external signs of puberty.
Puberty phase		characterized by the processes of puberty and the rapid formation of the adult level of development of the system of reproductive organs.
Post-pubertal phase		characterized by the completion of puberty, characteristic of a mature organism of signs, the cessation of body growth in length.
Puberty		morphofunctional restructuring of the body for individual development in connection with the acquisition of the ability to procreate. it is typical for the peripubertal period.
Reliability		degree to which the measurement reflects the true value of the measured attribute. Reliability of the study (the internal validity of the study) is determined by the extent to which the results obtained are valid for this sample.
SOS		reflection of the microarchitecture and elasticity of the bone.
Standard deviation		descriptive statistic that is a measure of scattering for approximately normally distributed data.
Spearman's rank coefficient	rank correlation	quantitative assessment of the statistical study of the relationship between phenomena used in nonparametric



	methods.
Symptom	sign of a disease that is not characteristic of a healthy body, used for the diagnosis and prognosis of the disease.
Syndrome	stable combination of a number of symptoms (symptom complex) with a single pathogenesis.
Tanner Scale	based on the physical observation of changes in external primary and secondary sexual characteristics, such as changes in breast size, male and female genitalia and pubic hair development.
VACUETTE tube	sterile, lidded tube with thin air containing reagents and other additives.
Z - criterion	important indicator of densitometry, the parameter shows how much the patient's bone density corresponds to normal indicators for his gender, age group, body weight.
Z-criteria - less than -2.0	SD decrease in bone mass compared to the age norm.
Z-criteria - more than 2.0	SD of normal bone mass compared to the age norm.
Z-score	result of comparing the patient's bone density with the average of his age group.

## LIST OF ABBREVIATIONS AND DESIGNATIONS

The following abbreviations and designations are used in this research report

AR	Aktobe region
Ax	the development of hair in the armpit.
Ax0	no hair
Ax1	there are single hairs
Ax2	there is a solid hair covering, occupying a relatively small area, but smaller than in adults
Ax3	there is a solid full hairline on the adult type
BMI	body mass index
BMD	bone mineral density
BQI	bone stiffness index
Ca	calcium
CALCR	Calcitonin receptor
CALCR C/C	a risk allele/mutation in this polymorphism has not been identified
CALCR T/C	polymorphism predisposing to osteoporosis was detected in a heterozygous form
CALCR T/T	polymorphism predisposing to osteoporosis was detected, not detected
CI	confidence interval
COL1A1	a polymorphism in the alpha-1 genes of the type 1 collagen protein chain
COL1A1 G/G	polymorphism predisposing to osteoporosis was not detected
COL1A1 T/T	polymorphism predisposing to osteoporosis was detected, not detected
COL1A1 T/C	polymorphism predisposing to osteoporosis was detected in a heterozygous form
ICD	International Classification of Diseases
IMM	immunofluorescence method
IHLA	immunochemiluminescence analysis
IFLA	immunochemistry fluorescence analysis
K	potassium
LE	level of evidence
Ma	development of mammary glands
Ma0	glands protrude above the surface of the chest

Ma1	glands are slightly protruding (the oblique circle together with the nipple forms a single cone)
Ma2	glands are significantly protruding together with the nipple and the periarticular circle, have the shape of a cone
Ma3	the body of the gland takes a rounded shape, the nipples rise above the periarticular circle
MC	menstrual cycle
Me	age of onset of the first menstruation (years, months)
Me0	absence of menstruation
Me-1	2 menstruation at the time of examination (menarche)
Me2	regular menstruation for 6 months
MES	Ministry of Education and Science
Mg	magnesium
MH RK	Ministry of Health of the Republic of Kazakhstan
Na	sodium
P	pubic hair development
P 0	no hair
P 1	single hair
P 2	hair on the central part of the pubis, thicker, longer
P 3	thick, long, curly hair, on the entire pubic area
PD	primary dysmenorrhea
PCR	polymerase chain reaction
PMS	premenstrual syndrome
PTH	parathyroid hormone
RK	Republic of Kazakhstan
SOS	a reflection of the microarchitecture and elasticity of the bone
SRW	scientific research work
UE	ultrasound examination
VAS	visual analog scale
VDR	intracellular vitamin D receptor
VDR T/T	a normal variant of the gene
VDR T/C	a heterozygous form of polymorphism
VDR C/C	a rare variant of polymorphism associated with an increased risk of osteoporosis, in a homozygous form

WKMU

West Kazakhstan Medical University

WHO

World Health Organization

## INTRODUCTION

Relevance, scientific novelty and significance of the project. The results of the dissertation work previously obtained by the applicant on the topic "The state of mineral density and features of bone metabolism in adolescents of Western Kazakhstan", among conditionally healthy adolescents, osteodensitometry revealed a decrease in bone mineral density (osteopenic syndrome) in 70% of the examined ( $Z$ -score  $-2.0 \pm 0.5$ ). Also, the average vitamin D deficiency among adolescent girls compared to the examined boys indicates an examination of the state of bone metabolism, including a decrease in bone mineral density, which was a prerequisite for the development of the idea of the planned project [1].

In the State Program for the Development of Healthcare of the Republic of Kazakhstan for 2020-2025, new principles of social policy and child protection are identified as one of the important priorities of the country's development in the coming years. Taking care of children is an integral part of the state policy of our country.

As one of the seven long-term priorities, healthcare is an important area that provides state social guarantees for the protection of public health and supports the personal responsibility of citizens for the protection and improvement of their health.

In order to improve the quality of life of the younger generation in the Republic of Kazakhstan, attention should be paid to the prevention and treatment of diseases at early stages, the conduct of major chronic and infectious diseases; modernization of medical and pharmaceutical education and science; improving the quality of medical training and improving drug policy [2].

Adolescence is a period of development when a positive energy balance is crucial for puberty, menarche and regulatory menstruation. Low estrogen levels negatively affect bone health, puberty, sexual function and fertility. During puberty, the highest level of bone formation in a woman's life is observed. Adequate nutrition, physical activity and estrogen are crucial for bone development and prevention of osteoporosis [3].

In the present conditions, it is extremely important to protect the health of adolescent girls, which subsequently determines the reproductive potential of the nation. Increasing environmental aggression, stress, social and economic instability create unfavorable conditions for the development of the younger generation. The study of the reproductive function of adolescents should be carried out taking into account the parameters of physical development, since the processes of sexual, physical development and bone remodeling are closely interrelated and interdependent. In this regard, the aim of the work was to increase the effectiveness of

research and early diagnosis of the role of geno-phenotypic features of bone metabolism and bone mineral density in adolescent girls with primary dysmenorrhea.

Osteoporosis is a common disease among both the female and male population. Previous studies have mostly focused on women, while more attention should be paid to men. Studies have shown that every fourth man over the age of 50 suffers from a fracture associated with osteoporosis during his life. Data from a systematic review and meta-analysis of 33 studies have shown that the prevalence of osteoporosis in Chinese elderly men is 23%. Peak bone mass is the main factor determining the risk of osteoporosis in older age. Adolescence is a critical period for the accumulation of minerals in the bones. Bone mass increases by about 45% during puberty and reaches about 90% of its peak value for adults by the end of puberty. Thus, getting enough bone mass in adolescence may be a key factor in preventing osteoporosis [4].

In adolescents, few studies have studied the effect of the distribution of adipose tissue on bone mass. Most studies of the correlation of adipose tissue with the bone mass of adolescents focus on the total body fat mass. Moreover, the results of these studies are contradictory. Some studies have reported a positive relationship between total body fat and BMD or bone mineral content, while others have reported a negative or zero relationship [5].

Now one of the urgent problems of pediatric and adolescent gynecology is dysmenorrhea [6].

Adolescent girls with dysmenorrhea represent an increased risk group for menstrual dysfunction and the formation of pathology of the reproductive system [7].

Dysmenorrhea is a difficult menstrual flow, and in clinical practice implies painful menstruation, which is accompanied by endometrial rejection during menstruation with a cyclically recurring pain syndrome [8].

Dysmenorrhea is the occurrence of severe pain in the lower abdomen of a cramping nature, which can be accompanied by vomiting, headache, back pain, diarrhea, fatigue during menstruation. Primary dysmenorrhea is characterized as pain resulting from excessive pathological contraction of the uterus, not palpable during clinical examinations, lesions in the pelvis. Primary dysmenorrhea usually occurs a year or two after menarche. Menstrual pain begins a few hours before or during menstrual bleeding and lasts 2-3 days. The most severe pain occurs in the first 24-36 hours of menstruation. Consistently, the inclusion and exclusion criteria among the surveyed adolescent girls were chosen from the above-mentioned features in their study, and this makes it possible to make an accurate representative sample [9].

Dysmenorrhea often significantly reduces the quality of life of the female population and is still an important public health problem. Despite numerous studies, the pathomechanism of dysmenorrhea has not been fully studied.

Based on the results of several studies conducted, it should be noted that severe menstrual pain associated with primary dysmenorrhea affects the quality of life depending on the general state of health.

According to WHO, up to 94% of girls aged 10-20 years and 8.8% of women aged 19-41 years suffer from menstrual pain. Dysmenorrhea often significantly reduces the quality of life and can even be the reason for absence from school or work.

According to a study conducted by the authors of the Maulana Azad Medical College (New Delhi, India), dysmenorrhea was detected in 67.2% of girls aged 13 to 19 years who had menarche for at least a year (198 teenage girls) [10].

The incidence of dysmenorrhea is diverse, high 35-92% and 8-80%, however, in Russian adolescents in a wide range ranges up to 45-93%, and in women of reproductive age in the USA 50% is observed [11].

Dysmenorrhea is a serious problem for the health of adolescents, as well as for practitioners who negatively affect the daily activities and quality of life of teenage girls. Adolescents have different courses of dysmenorrhea, which affects the lifestyle and does not respond to treatment, requires professional attention and proper in-depth diagnosis of this disease.

Related to this all practical healthcare professionals in the care of adolescents should be more knowledgeable and actively participate in the early diagnosis and treatment of dysmenorrhea.

This project presents new knowledge, in particular, about the relationship of primary dysmenorrhea with pain sensitivity, quality of life and mineral density and metabolism of certain bone tissue.

In infant girls, concentrations of both E1 and E2 were significantly higher at about 3 months of age (0.25 years) than in older prepubescent girls ( $P < 0.001$ ), and the average concentration of E2 was significantly higher than the median concentration of E1 in girls aged about 3 months ( $P < 0.001$ ) and 1 year ( $P = 0.001$ ). On the contrary, at the age of 1 to 7 years, the average concentration of E1 was significantly higher than the median of E2 ( $P < 0.001$ ). From about 10 years of age, the concentrations of E1 and E2, as well as the estimated free levels of E1 and E2, increase significantly with increasing age and reach a peak at the age of 15 to 16 years. The average concentration of E2 in adults was relatively constant up to +40 years, but with a large individual variation, presumably reflecting the differences associated with the period of puberty and the day of the menstrual cycle during blood sampling. The average concentration of E2 in women was significantly higher than their average concentration of E1 [12].

In a study conducted by Hanne Frederiksen and co-authors, serum concentrations of E1 and E2 were determined in 545 prepubescent and puberty-aged girls stratified by stage B1 - B5 of the Tanner breast. The highest measured concentration of E2 in prepubescent girls up to 7 years was 20 pmol /L. In older prepubescent girls (> 7 years), the concentration of E2 was slightly higher, which increased with age. Almost all E2 concentrations were above 10 pmol/L in girls with breast stage  $\geq$ B2 and above 100 pmol/L in girls with breast stage B4 – B5. In addition, the alleged postmenarchal women had higher serum concentrations of E2 than the premenarchal girls at stages B4 – B5. (Fig. 3 and 4).4). A similar pattern was observed for E1, in which the majority of prepubescent girls under 7 years of age had an E1 concentration of <10 pmol/L (the highest concentration was 30 pmol/L), and the majority of prepubescent girls over 7 years of age had a similar pattern. E1 concentrations in the range from 10 to 100 pmol / l [13].

According to a study by Kimberly Humann, it was noted that functional hypothalamic amenorrhea is common among athletes, which is explained by the synergistic relationship of exercise and low weight with puberty and the menstrual cycle. Low estrogen levels manifest themselves in different ways: amenorrhea, low bone mineral density, vaginal and breast atrophy, infertility and dyspareunia, as hormone replacement with physiological dosing of transdermal estrogen and cyclic progesterone to improve the bone health of a young woman [14].

It is possible that the variability of the functioning of the reward nervous system in adolescent studies may be related to individual differences in hormone levels. Researchers have suggested that high levels of estradiol and testosterone may enhance responses in neural affective and reward processing regions that are activated differently in adolescence compared to other developmental stages. Most studies of hormone production in adolescents (i.e. between the ages of 10 and 13 years), as a rule, focus on testosterone and estrogen or estradiol levels. Elevated levels of these hormones are a biomarker of puberty development and serve to more accurately measure the level of puberty of a teenager compared to age or subjective indicators, such as self-esteem of the puberty stage or, for women, the age of the onset of menarche. Our results show that in early adolescence, an early increase in testosterone and estradiol levels may lead to a (potentially temporary) decrease in the level of cognitive control over reward system activation, suggesting that interventions for early adolescents should target young people with low cognitive control during this sensitive period of development [15].

According to modern literature, large-scale work is being carried out with the problem of dysmenorrhea, using the example of treatment strategies and tactics [16].

The expected results of this project are aimed at a systematic review of the world literature on the advantages of early diagnosis methods used in physiology, gynecology and pediatrics.



Institute of Biomedicine, Physiology, Faculty of Medicine, University of Eastern Finland, Fat-free body weight (MT) was positively associated with bone mineral density (BMD) in children and adolescents, but the relationship between fat mass (LM) and BMD remains controversial. Some biomarkers secreted by adipose tissue, skeletal muscle, or bone may affect bone metabolism and BMD. We investigated the relationship of MT, LM and other biomarkers with BMD in children [17].

Lisa B. Rokoff 1, Cheryl L. Rivas-Schyman Department of Lifelong Chronic Disease Research, Department of Population Medicine, Harvard Medical School and Harvard Pilgrim Health Institute, Boston, Massachusetts, USA. Analyses by scientists from the United States show that central obesity is associated with a lower Z-index, and BMD only in children with the highest levels of abdominal fat. This discovery increases the likelihood of a threshold above which the central adipose tissue becomes more metabolically active and thereby negatively affects the bones [18].

There is evidence that the concentration of vitamin D is also considered an important predictor of this disease, which provides a prerequisite for clarifying the role of vitamin D in the pathogenesis of primary dysmenorrhea [19].

Many problems of menstrual dysfunction are associated with successive physiological events of puberty and can increase the effectiveness of its solution with the participation of practical healthcare.

According to the results of I.A. Deev and co-authors of the SSMU of the Russian Federation (2017), 8.1% of girls registered a delay in sexual development, and there was also an advance in growth, development of the uterus and ovaries among adolescent girls aged 13 to 16 years in comparison with rural peers [20].

The results of the study conducted by Saratov scientists confirmed that the high prevalence of hypovitaminosis D among adolescent girls (89.2%), which in more than half of cases was in the deficit range (63.8%), only 14.7% of patients with hypovitaminosis D had harmonious physical development. Based on these data, it is clear that the period of formation of the function of the reproductive system should be considered as a risk factor for the development of D-deficient conditions, increasing against the background of disorders of fat metabolism [21].

The value of vitamin D is known as a regulator of bone metabolism and calcium-phosphorus homeostasis and its role in the development of a number of pathological conditions. The accumulated data suggest a key role of the pleiotropic effects of vitamin in the genesis of reproductive physiology and the formation of certain gynecological diseases. The conducted systematic analysis by I.V. Kuznetsova (2018) provides a direction for further experimental and clinical evaluation of vitamin D deficiency in endometriosis and oncological diseases. The

results of the presented study showed that the prevalence of vitamin deficiency occurs in 32% of girls, deficiency - in 58% and an adequate level in 10% of the surveyed [22].

According to I.G. Zhukovskaya (2019), the average level of vitamin D deficiency and insufficiency did not differ by age, however, there was a significant increase in the frequency of vitamin D deficiency in postmenopausal compared with the reproductive and premenopausal periods [23].

In accordance with modern concepts, vitamin D is a steroid prohormone, which, along with parathyroid hormone (PTH) and calcitonin, plays an important role in the regulation of genes involved in calcium-phosphorus and bone metabolism. The effects of vitamin D are mediated by its binding to a specific steroid receptor (vitamin D receptor, VDR), which has transcription factor activity. The formation of a complex of steroid vitamin D receptors leads to the activation or suppression of many target genes that regulate bone remodeling, calcium homeostasis, and the immune response [24].

There is a strong correlation between vitamin D deficiency and the incidence of bone pain. However, the potential underlying mechanisms by which vitamin D may exert its pain relieving effect are poorly understood. In this review, we discuss pathways involved in pain perception and processing, primarily at the level of the dorsal root ganglion (DRG) neurons, and the potential interactions between vitamin D, its receptor (VDR), and known specific pain signaling pathways, including nerve growth factor (NGF), glial neurotrophic factor (GDNF), epidermal growth factor receptor (EGFR) and opioid receptors [24].

Various studies provide a list of genes that are effective in osteoporosis, such as VDR, Col1A1, alpha estrogen receptor, interleukin-6, and protein 5 associated with the LDL receptor. The relationship between Col1A1 Sp1 polymorphism and BMD has been investigated among different populations. Previous studies have shown an association between Col1A1 Sp1 polymorphism and low BMD, osteoporosis, and an increased risk of fractures, while some have not reached statistical significance. In healthy prepubertal children, only a small number of studies have been conducted to investigate the possible effect of the Col1A1 gene polymorphism on BMD [25].

A new era of genomic medicine has been ushered in by advances in genome sequencing technology and a dramatic increase in the efficiency of molecular gene editing tools. With increasing evidence that some genetic variants may have pleiotropic effects on two or more phenotypes, it is possible that therapeutic genetic interventions to treat one disease may have beneficial or adverse effects on other phenotypes throughout life [26].

Moreover, rs12704673 in CALCR, associated with birth weight and adult waist circumference, was not associated with waist circumference in previous GWAS, but showed

significant genome-wide associations with other obesity / anthropometric features such as BMI and hip circumference in adults 20, 35, 36. CALCR encodes a calcitonin receptor protein that is involved in maintaining calcium homeostasis. Our study also showed that CALCR, as well as two other genes previously known to be associated with BMI in adults (SCARB2 and KLF3-AS1) 35,37, had a combined effect on birth weight and adult BMI. These three loci are notable in that, to date, no locus has been reported associated with either birth weight or obesity traits of general genome significance. Functional studies of these loci can reveal biological pathways of obesity that begin at an early age [26].

The combination of hormonal, neurovegetative, metabolic, and psychoemotional disorders in dysmenorrhea requires a comprehensive differentiated approach to early diagnosis and treatment to significantly reduce the frequency of this disease.

A randomized controlled study of the Department of Obstetrics and Gynecology (Afyon Kocatepe University Hospital, Turkey) revealed significant and positive correlations between vitamin D levels and scores on a visual analog scale and a significant decrease in serum vitamin D levels in patients with dysmenorrhea indicate a possible role of vitamin D deficiency in primary dysmenorrhea of women aged 18-25 years [27].

According to the results of an observational study by Turkish authors, a significant and negative correlation was found between vitamin D and symptoms associated with dysmenorrhea. Vitamin D replacement therapy led to a significant reduction in symptoms in women in the 18-30 age group [28].

According to Iranian scientists, supplements in high doses of vitamin D have an effect on reducing the prevalence of premenstrual syndrome (PMS) and dysmenorrhea, and also have a positive effect on the physical and psychological symptoms of PMS [29, 30].

50 scientific articles have been analyzed on the problem of vitamin D deficiency, despite the fact that the effect of vitamin D deficiency on the health of children and adolescents has been studied for a long time, information about the role of vitamin D in the formation of menstrual function in puberty girls is scarce and ambiguous [31].

Vitamin D plays a crucial role in sexual development, possibly due to its effect on calcium homeostasis, cyclic fluctuations of sex steroid hormones or mineral density and bone metabolism [32], [33].

We will not only show the multifactorial effect of primary dysmenorrhea in adolescent girls, but also suggest future research areas and directions for future research by researchers regarding bone metabolism of the link between osteopenic syndrome [34].

Medical professionals working with young people should participate in a comprehensive review of the problems of the menstrual cycle within the framework of its adolescent and sexual

development. Thus, psychological growth is discussed, as well as important aspects of puberty. even in our rapidly developing era of medical technology, a thorough medical history and a pelvic floor examination remain the basis for any assessment of these teenage girls.

At the same time, under the influence of these changes, from the various facts listed above, the therapeutic and diagnostic effects of vitamin D, from the connection with the structure at the genetic level, a comprehensive assessment of these changes with a prognosis for the presence of bone mineral density can be justified.

And therefore, in order to increase the effectiveness of research and early diagnosis of the role of geno-phenotypic features of bone metabolism and bone mineral density in adolescent girls with primary dysmenorrhea in the data of the RK is relevant and extremely necessary.

The project has a scientific novelty, as for the first time in Kazakhstan, the multifactorial effect of primary dysmenorrhea in adolescent girls is determined, and the directions of future research of researchers are also proposed, which will allow the general public to improve their understanding of the state of bone metabolism in relation to the relationship between osteopenic syndrome.

**Practical significance** The practical significance of the project lies in the fact that the study of the role of the geno-phenotypic features of bone metabolism and bone mineral density will provide a choice for early diagnosis of the syndrome and preventive measures of primary dysmenorrhea in adolescent girls with respect to the structure at the genetic level, a comprehensive assessment of these changes with a prognosis for the presence of bone mineral density can be justified.

The purpose of the study in 2021: To increase the effectiveness of research and early diagnosis of the role of geno-phenotypic features of bone metabolism and bone mineral density in adolescent girls with primary dysmenorrhea (Appendix B).

Tasks of the reporting period for 2021:

1) To study the gynecological status and determine the relationship with the bone mineral density of the examined adolescent girls.

2) To study genetic markers (CALCR (rs1801197), COL1A1 (rs1800012), 7014A-VDR) polymorphisms associated with osteoporosis and biomarkers of bone metabolism in the examined adolescent girls.

3) Based on scientific data, to develop an algorithm for early diagnosis of the features of bone metabolism (osteopenic syndrome) in adolescent girls with dysmenorrhea.

## **THE MAIN PART**

### **1 Object and methods of research**

The study design is a one-story cross-sectional study. The work was approved by the local ethics Committee of the West Kazakhstan Marat Ospanov Medical University (meeting No. 8 of 14.10.2020). The research work was carried out in accordance with the principles of the Helsinki Declaration and subsequent amendments. The study was conducted in the Aktobe region.

#### **1.1 Object of the study**

The object of the study is adolescent girls with primary dysmenorrhea aged 13 to 18 years. Statistical data on the size of the child population in the coverage from 13 to 18 years were obtained from the official source of the Department of Statistics for the Aktobe region. This disease was divided into classes of MDK-10. In the calculation, Form No. 025U "Primary admission of teenage girls" was used. The respondents were selected by random sampling. The total number of teenage girls aged 13-18 years is 27,972 thousand. Among these girls, we selected a sample randomly. The sample size will not change much for groups of more than 20,000 people. The incidence of dysmenorrhea among the studied groups of adolescent girls is up to 8-83%. According to our data, the incidence of primary dysmenorrhea among adolescent girls was 26-30%.

Using a calculator, the sample size was calculated on the website Raosoft.com . the margin of error was - 5%; confidence level - 95% according to the calculation of the formula, the recommended sample size is 337 teenage girls (if the scientific and technical project is in full - 3 years), the larger the number, the more complete and accurate the value in the results of the study, nevertheless, in accordance with the 12-month periodicity and the amount of funds of the scientific and technical project, 105 respondents were calculated, since it would be possible to add another 20% of the total number of examined children.

All the examined teenage girls and their parents filled out a written informed consent to conduct additional research, only those respondents who had received consent conducted research.

Inclusion criteria: age - teenage girls from 13 to 18 years; regular menstrual cycle (for 27-32 days); first-time sign of primary dysmenorrhea; menarche for 1 year; girls who have not taken exogenous hormones and drugs affecting the central nervous system for 1 year; above 7 points on the VAS pain description scale for 1-3 days of the menstrual cycle; negative response to sexual contact; body mass index of at least 15% and not more than 25%.

Exclusion criteria: girls with diseases and abnormalities of the pelvic organs; after surgical treatment of the pelvic cavity; in the presence of a medical abortion in the anamnesis; with the detection of neurological and psychiatric abnormalities in the anamnesis; with a positive pregnancy test result; children under 13 and over 18 years old cannot participate in the study.

## **1.2 Research methods**

### **1.2.1 Assessment of the gynecological status of primary dysmenorrhea**

The assessment of the gynecological status of primary dysmenorrhea among the children's population was carried out in the consultative and diagnostic center, in the office of a pediatric and adolescent gynecologist and at the Department of Normal Physiology of the NJSC West Kazakhstan Marat Ospanov Medical University. In the last decade, there has been a noticeable change in gynecological morbidity, among which dysmenorrhea, amenorrhea and oligomenorrhea of adolescent girls predominate. This pathology was considered as a functional condition, and a number of authors regard it as a manifestation of the pathology of the reproductive system, often a hereditary disease. Timely detection PD will eliminate late visits to a doctor's appointment, as well as be informed and conditioned by the knowledge of adolescents and their parents on puberty issues. As noted, in the world data, the practice is widespread that the examination begins at the age of 12-13, if by this time there are no signs of puberty. From this point of view, we started a planned study that was conducted in the Western region, Aktobe region, the Republic of Kazakhstan. The total population among residents of teenage girls in the region was 27,972 thousand. According to the sequence of research works, first of all, the studied group of teenage girls were examined at the reception of a pediatric and adolescent gynecologist at the Regional Perinatal Center of the CDC according to the standard protocol.

As part of the implementation of the scientific and technical project in accordance with the calendar plan, work has begun since May 2021.

#### **Gynecological status of adolescent girls of Aktobe region**

The first stage of the examination of adolescent girls with PD was devoted to the anamnesis of life and disease. According to the results of the study on the study of gynecological status: complaints were clarified - collection of complaints, a complete history - the sequence of symptoms,

The second stage of the examination began with a general and gynecological examination. The assessment of physical development was carried out by measuring anthropometric indicators by absolute indicators of body length and weight (height, weight). Standard anthropometric instruments were used: a height meter, medical scales, a plastic

measuring tape. Sexual development was assessed taking into account the presence and severity of secondary sexual characteristics. The gynecological examination assessed the presence and nature of hair loss, the anatomical structure of the external genitals, as well as the definition of the VAS pain scale of primary dysmenorrhea (Appendix F, G).

The third stage of the study includes additional diagnostic methods for a wide range of studies of the desired pathology.

### 1.2.2 Ultrasound examination of bone mineral density

The main ultrasound examination for the determination of BMD, for the determination of bone mineral density in adolescent girls with primary dysmenorrhea was performed on the device osteodensitometer brand SONOST-3000, South Korea through the heel bone. This method will make it possible to diagnose osteopenic syndrome/osteoporosis among the studied adolescent girls, which indicates a decrease in BMD.

According to clinical guidelines (2009), the term "osteoporosis" should not appear in pediatric densitometric reports without a history of bone fractures. Again, the T-index should not be used to assess bone mineral density in children and adolescents. The conclusion about the "decrease in bone mass compared to the age norm" can be made only on the basis of the Z-criterion of less than -2.0 SD. With a Z-criterion of more than -2.0 SD of bone mineral density, the conclusion summarizes: "the indications are within the age norm." Nevertheless, a specific study takes into account the Z-Score indicator, since the main study group is teenage girls. Three parameters - broadband ultrasound attenuation (BUA, dB/MHz), sound velocity (SOS, m/s) and stiffness index (BQI) - were determined from the QUS measurements. BUA indicates the mineral content of bone tissue. SOS is a reflection of the microarchitecture and elasticity of the bone [ 27 ]. BQI is calculated from BUA and SOS values using the following formula:  $BQI = (0.67 \times BUA + 0.28 \times SOS) - 420$ . All measurements were performed by the same trained researchers.

The quality control of the sonometer was carried out before the measurements by directly superimposing the phantom signal on its converters. The in vivo variation coefficients for BUA and SOS were 2.3% and 0.2%, respectively. In the examined group of adolescents, depending on the percentage and quantitative values of this indicator, they are ranked into groups depending on the state of the BMD. The advantages of this method include the following indicators: safety, convenience and harmlessness (absence of excessive exposure).

### 1.2.3 Study of genetic and biochemical markers of bone metabolism in adolescent girls

In order to assess the state of genetic and biochemical markers of bone metabolism of adolescent girls, venous blood was analyzed using the Vacuette system Version No. 02-2019 by a random stratified sample of 105 adolescent girls in the Aktobe region. Blood was taken from a vein strictly in a specially equipped treatment room that meets the requirements of SanRaR No. 357 of May 31, 2017 "Sanitary and epidemiological requirements for health facilities" (Appendix No. 01. The maximum amount of blood that can be taken from a child; Appendix No. 2. Preanalytical requirements of INVITRO-Kazakhstan LLP). The analysis was carried out independently of the urban and rural children's population. The following documents were necessarily filled in for genetic research: a genetic research questionnaire, a referral form and informed consent.

To determine the genetic groups of markers – characterized.marker chain "complete osteoporosis panel" (CALCR, COL1A1, VDR).

In this regard, markers for the study of polymorphism c.1340C>T of the calcitonin gene (CALCR); c.104 - 441G>T of the collagen gene (COL1A1); 7014A-VDR of the vitamin D receptor has a prognostic value that allows determining the risk of osteoporosis. CALCR (7671), COL1A1 (7681), VDR (7014VDR)-the test material is whole blood (with EDTA). The method of determination is polymerase chain reaction with restriction analysis. 3 conclusions are issued by a geneticist according to the results: T / T is a normal variant of polymorphism in a homozygous form, T /S is a heterozygous form of polymorphism, C /S is a rare variant of polymorphism associated with an increase in the risk of osteoporosis, in a homozygous form. Genetic risk factors for osteoporosis. Analysis of the presence of polymorphisms in the alpha-1 genes of the type 1 collagen protein chain and the calcitonin receptor. The analysis of polymorphisms in the VDR gene of the vitamin D receptor does not require special preparation for the study. The subject fills out a genetic research questionnaire, a referral form and informed consent before submitting a genetic analysis. Calcitonin receptor gene (CALCR) - material for research: whole blood with EDTA. from venous blood in an amount of 3 ml to a lilac vacuum container with a black lid. Determined by the method of determination: polymerase chain reaction with restriction analysis. Issued 3 conclusion by a geneticist according to the CALCR result: C /C - risk allele / mutation in this polymorphism was not detected, T/C- polymorphism predisposing to osteoporosis was detected in a heterozygous form, T /T-polymorphism predisposing to osteoporosis was not detected. Special preparation for the study is not required. The subject fills out a genetic research questionnaire, a referral form and an informed consent before submitting a genetic analysis.



The alpha-1 gene of the type 1 collagen chain (COL1A1)- 441 G>T (COLLAGEN, TYPE I, ALPHA-1 gen) material for research: whole blood with EDTA. From venous blood in an amount of 3 ml to a lilac vacuum container with a black lid. Determined by the method of determination: polymerase chain reaction with restriction analysis. Issued 3 conclusion by a geneticist according to the CALCR result: C /C - risk allele / mutation in this polymorphism was not detected, T/C- polymorphism predisposing to osteoporosis was detected in a heterozygous form, T /T-polymorphism predisposing to osteoporosis was not detected. The COL1A1 gene encodes the amino acid sequence alpha-1 chain of the type 1 collagen protein. An increase in the risk of disease of carriers of T (T/T), compared with people homozygous for the G (G/G) allele. Special preparation for the study is not required. The subject fills out a genetic research questionnaire, a referral form and an informed consent before submitting a genetic analysis.

Biomaterial for the study: whole blood (2-3 ml) taken from EDTA. Method of determination: PCR and restriction analysis. It will be determined using the real-time PCR method using adjacent fluorescent-labeled samples (kissing probes) by measuring the melting temperature of samples after amplification (melting curve analysis), on a Vacuette Vacuum tube with K3EDTA, in a lilac-colored tube with a black ring for molecular diagnostics was carried out using a detecting amplifier "DT prime" in the Invitro laboratory, Moscow, Russia.

The content of the following macronutrients was evaluated: Ca, K, Mg, Na.

Biomaterial for research must be taken on an empty stomach. At least 8 hours should pass between the last meal and taking blood (preferably at least 12 hours). Juice, tea, coffee (especially with sugar) are not allowed. You can drink water before taking a blood test. The Vacuum tube is a sterile, lidded tube with thin air containing reagents and other additives. There are 2 types of red test tubes: 4ml (adults) and 2.5ml (children). The Vacuette system consists of three components: 1. Special needle; 2. Needle holder; 3. Vacuum Tube Vacuette with lid. When taking tests, all sanitary standards for blood sampling were maintained.

Magnesium is the test material serum from venous blood. Blood is collected in a red vacuum container with a red lid up to 3 ml. The method of determination is colorimetry with xylidyl blue with the principle of the enzymatic method on equipment - Architect c8000, c16000, Abbott reagent.

Potassium and Sodium - the test material-serum from venous blood is filled into a red container with a red lid to 3 ml of blood. The method of determination is an indirect ion-selective method, for equipment - Architect c8000 reagent - Abbott. This study can be performed in the "Priority" mode - results up to 14 hours.

Ionized calcium - venous blood is collected in a green vacutiner up to 3 ml of blood, with the principle of the indirect ion-selective determination method, on equipment - AVL 9180,

reagent - Roche Diagnostics GmbH, Germany Cobas TaqMan 48 - a system for automated amplification and detection of nucleic acids in samples in real-time PCR format (real-time PCR), which have undergone sample preparation on the Cobas AmpliPrep.

Estradiol - the test material is serum from venous blood, up to 3 ml of blood is collected from the red lid into the red container. Method of determination electrochemiluminescent immunotest ECLIA, equipment - Cobas E6000, reagent - Roche.

Vitamin 25 (OH) D - sampling is done from venous blood into a red vacuum container with a red lid up to 3 ml of blood. The test material-blood serum is determined by chemiluminescent immunoassay on microparticles, carried out on an ABBOTT Architect i2000 analyzer with chemiluminescent Chemiflex technology.

Parathyroid hormone - sampling is made from venous blood in a lilac vacuum container with a black lid up to 3 ml of blood. The content of many blood tests is subject to daily fluctuations, therefore, for a number of studies, blood should be given strictly at a certain time of day. Blood for parathyroid hormone is given only until 10 am. The test material is blood serum. The method of determination is electrochemiluminescent immunoassay, Cobas e601 (Roche). On the eve of the study, it is necessary to exclude increased psycho-emotional and physical activity (sports training). The patient should be at rest for 20-30 minutes before taking blood.

Progesterone - the test material is blood serum from venous blood in an amount of 3 ml in a red container with a red lid. The method of determination is solid-phase chemiluminescent immunoassay on microparticles on equipment - Architect i2000, reagent - Abbott.

The analyses were taken according to plan and were sent to the laboratory of Invitro Aktobe LLP (Moscow, Russia). Invitro Aktobe LLP is a certified laboratory according to ISO Europe standards.

#### 1.2.4 Algorithm development

To develop an algorithm for early diagnosis of identifying features of bone metabolism (osteopenic syndrome) in adolescent girls with dysmenorrhea.

Identification of the features of bone tissue metabolism was carried out by determining markers depending on the concentration of biochemical, genetic and chemical elements in the biological media. The design is schematically presented in the form of tables.

The algorithm was developed in the form of an application table format, using a modern design, where the structure of the pre-existing diagnostic plan will change depending on the health status of the subjects. There will also be an opportunity for additional in-depth analysis of the main indicators.

### 1.2.5 Statistical analysis

The Kolmogorov–Smirnov criterion will be used to determine the normality of the distribution of quantitative variables. Variables with normal distribution will be represented as mean (M) and standard deviation (SD), variables with non-Gaussian distribution will be represented as median (Me) and percentile (Me (Q25–Q75)).

Qualitative variables will be presented in the form of an absolute value and a percentage indicator.

To assess statistically significant differences between quantitative variables, the Student's criterion, the nonparametric Mann-Whitney U-test for 2 samples, and the Kraskel-Wallis H-test for three or more samples will be used.

The strength and direction of the relationship between the content of biomarkers and trace elements in the blood of the subjects will be evaluated using correlation analysis using the Pearson coefficient and nonparametric Spearman and Gamma coefficients.

The critical significance level ( $p$ ) when testing statistical hypotheses is assumed to be 0.05.

The STATISTICA 10 program (StatSoft-Russia) was used for statistical analysis.

## 2 Results and discussion

### 2.1 Assessment of gynecological status

It can be assumed that early diagnosis of primary dysmenorrhea in adolescent girls is associated with the state of bone metabolism and bone mineral density.

An assessment of the physical and sexual development of adolescent girls was carried out. The results of a cross-sectional examination of 105 adolescent girls aged from 12 years 6 months to 17 years 5 months 29 days are presented. Somatometry of adolescents (body length and weight) was performed; using body mass indices. The level of sexual development of adolescents was assessed by the sex formula, the age of menarche and Tanner.

During the survey, respondents had the following complaints: cramping pains in the lower abdomen, headaches, nausea, vomiting and swelling of the upper extremities.

From the anamnesis of the girls' life, a regular menstrual cycle was noted (for 27-32 days); a sign of primary dysmenorrhea was detected for the first time; menarche for 1 year; girls who did not take exogenous hormones and drugs affecting the central nervous system for 1 year; according to the VAS scale, pain for the first 1-3 days of the menstrual cycle; lack of sexual activity; body mass index of at least 15% and not more than 25%.

During gynecological examination among the examined adolescents with primary dysmenorrhea, secondary sexual characteristics were determined according to the Tanner criteria, which were assessed by the development of pubic hair, the development of hair in the armpit, the development of mammary glands and the age of menarche. These received data were recorded in the form of a table by criteria.

According to the results of complaints of cramping pains in the lower abdomen, the first days of the menstrual cycle (1-3 days) were noted in all girls, headaches amounted to 9.5%, nausea and vomiting occurred in 4% of the surveyed, and edema of the upper extremities was detected in only one respondent.

The average pain score on the VAS scale was 7.6 points.

One of the important indicators of puberty is the degree of development of secondary sexual characteristics. Knowledge of the patterns of development of a teenage girl makes it possible not only to correctly assess her development at the time of examination, but also, having identified deviations, to determine the likelihood of developing disorders of the reproductive system in adulthood. Early diagnosis and timely correction of these disorders increases the effectiveness of therapeutic and recreational measures that contribute to the restoration and preservation of reproductive health. There is a direct connection between sexual and physical development, therefore, the features of sexual development, the assessment of the severity of

secondary sexual characteristics and the state of the bone system are necessary for a comprehensive assessment of the physical development of a girl. The periods of puberty correspond to different degrees of development of secondary sexual characteristics [35]. The end of the first phase of puberty (puberty) coincides with the appearance of the first menstruation. At the end of the second phase of puberty, the completion of physical and sexual development, the appearance of ovulatory cycles, the final formation of an individual morphotype occurs. A certain sequence has been identified in the development of secondary sexual characteristics. The first sign of puberty is an increase in the mammary glands (Ma), the second is pubic hair (P) and in the armpits (Ax), and then the appearance of the first menstruation (Me). Violation of the sequence of secondary sexual characteristics reflects the neuroendocrine imbalance of the growing organism. From our data, it is obvious that by the age of 17, the formation of secondary sexual characteristics is not fully completed and corresponds to Ma1-3P2-3ax2-3. At the time of inclusion in the study, regular menstruation was observed in 85% of the examined adolescents. An advance in sexual development was revealed in 3.8% of adolescent girls, the remaining 96.2% of girls had the correct rate of sexual development. For girls aged 12 to 14 years, the accelerated pace of physical development is shown to be more characteristic of children. The advance of sexual development is inherent in children. At the age of 13, they also had a correlation between the rate of physical development and the formation of mammary glands (Ma), menstrual function, pubic hair (P) and armpits (Ah).

Normal individual development is a consistent development from stage I to stage IV without deviation of more than one level between all the signs. The development time from stages I to IV usually takes 3-4 years.

The state of sexual development is usually denoted by a general formula: A, P, Ma, Me, which respectively indicates the stages of maturation of each trait; for example A2, P3, Ma3, Me1. To assess menstrual function, there are three categories; Me1 - menarche, Me2 - an unsteady menstrual cycle (is a variant of the norm 1 year after the onset of menarche), Me3 - an established menstrual cycle. When assessing the degree of puberty according to the development of secondary sexual characteristics, a deviation from the average age norms is considered to be an advance or lag with shifts in the indicators of the sexual formula for a year or more.

Although the chronological time of the beginning, duration and end of puberty has individual characteristics, however, for girls, an increase in the mammary glands and the appearance of puberty before the age of eight or menarche before 9-10 years should be considered a pathologically early onset of puberty. Accordingly, the pathological sign is the absence of any signs of puberty in girls older than 13 - 13.5 years and the absence of menstruation in 15 - 15, 5 years and older.

The point significance of signs of puberty for girls:

Pubic hair - P:

P 0 - no hair;

P 1 — single hair;

P 2 - hair on the central part of the pubis, thicker, longer;

P 3 - thick, long, curly hair, all over the pubic area.

Axillary hair - Ax:

Ax 0 - no hair;

Ax 1 - Single hair;

Ax 2 - hair is sparse, on the central part of the depression;

Ax 3 - thick, curly, long hair on the entire armpit area.

Mammary gland development - Ma:

Ma 0 - the glands are not given out;

Ma 1 - the gland is somewhat protruding, the periarticular circle together with the nipple forms a cone;

Ma 2 - the gland is significantly protruding, together with the nipple and the periarticular circle forms a cone;

Ma 3 - the glands are significantly protruding, the nipple rises to about a nipple circle, the body of the gland is rounded.

Menstrual function - Me:

Me 0 - no menstruation;

Me 1 - menarche at the time of examination;

Me 2 - unstable menstrual cycle,

Me 3 - regular menstruation throughout the year

The degree of pubic hair (P) according to Tanner's criteria, P 3 was detected in 48.6%; P 2 - 42.8%; P 1 - 8.6%, respectively, no pathological signs were detected.

The degree of hair loss of the armpit (Ax) according to Tanner's criteria was Ax 2 - 38.1% and Ax 3 - 61.9% in adolescent girls.

Breast development (Ma) according to Tanner's criteria Ma 2 was in 6.6%, Ma 3 - 93.4% among the examined adolescents.

Menstrual function or menarche (Me) according to Tanner's criteria, Me 2 was detected in 14.3%, and Me 3 - 85.7% among respondents.

According to the results of the Spearman correlation between Tanner's criteria for the degree of pubic hair (P) and the degree of axillary hair (Ah), a direct strong relationship  $r= 0.7$  was noted; with the development of the mammary gland (Ma) and menstrual function or

menarche (Me) according to Tanner's criteria, there is also a direct moderate relationship, respectively,  $r = 0.24$ ;  $r = 0.34$ .

Further, an average direct relationship was revealed between the development of the mammary gland (Ma) according to Tanner's criteria with the degree of hairiness of the armpit (Ah)  $r = 0.3$ ; and with menarche (Me) there is an average direct correlation  $r = 0.6$ . These revealed connections once again confirm that sexual development is not only associated with a normal physiological state, but also with the borderline state of sexual development among our examined adolescent girls. According to the results of studies conducted in Europe and North America, there were differences in the age of the beginning of puberty among the population of one racial group, the beginning of menarche in Western Europe was 13.0 years, in Denmark - from 13.0 to 13.4 years; in Norway and Sweden - 13.2 years, in North America - from 12.6 to 12.9 years, in the European part of Russia – 13.3 years [35, 36].

In the early adolescent period, according to WHO, it was 66.3%, in the late adolescent period it was 33.7%. Pubic hair development in early adolescence was 54.08%, and in late adolescence was 45.9%. At the time of inclusion in the study, it was noted by a practitioner in late adolescence had a higher degree of development. Taking into account international regulatory documents that defined the criteria for the onset of puberty as the 2nd stage of the development of external genitalia in girls, the average age of the onset of menarche was 11 years.

## **2.2 Assessment of the state of BMD in adolescent girls with primary dysmenorrhea of the Aktobe region**

Considering the above, we considered it necessary to study the state of BMD and bone metabolism in primary dysmenorrhea in the Aktobe region of the Republic of Kazakhstan.

The study included data from 105 teenage girls. According to all certain parameters of physical development and the state of the BMD, the following was revealed. The average age was  $15.6 \pm 1.7$  years, the average height was  $160.2 \pm 7.2$  cm; the average body weight of adolescents included in the sample was  $53.5 \pm 9.9$  kg; the average value of the body mass index is  $20.7 \pm 2.8$  kg/m<sup>2</sup>, and the average value of the Z-score was  $-1.5 \pm 0.9$ . As can be seen in Table No. 1, in addition to all certain parameters of physical development and the state of BMD, groups for ranking osteodensitometric data among the examined adolescents are also presented: norm, osteopenia and osteoporosis.

Table 1 - Indicators of physical development and the state of the BMD of adolescent girls

	General n=105	Normal n=25	Osteopenia n=75	Osteoporosis n=5
	Me (q25;q75)			
Height	160 (156; 165)	161 (158; 168)	160 (155; 164)	158 (158; 164)
Weight	52 (48; 58)	52 (49;60)	52 (46; 58)	50 (50; 51)
BMI	20,3 (19,1; 22,2)	20 (18,8;22,2)	20,4 (19,1; 22,3)	20 (20; 20,9)
BQI	76,5 (71,4; 84,5)	91,5 (88,1;97,9)	75,6 (70,3; 79,2)	45,7 (38,2; 55,2)
Z-score	-1,6 (-1,9; -1,1)	-0,6 (-0,8; -0,2)	-1,7 (-2; -1,4)	-3,6 (-4,1; -3,3)
Z-score (%)	75,7 (70,5; 83,5)	96,6 (90,4; 87)	78,2 (74,7; 69,4)	49,8 (41; 62,5)
SOS (m/s)	1513,4 (1507,4; 1524,8)	1529,3 (1526,5; 1538,3)	1510,8 (1506,5; 1515,1)	1501,3 (1500,4; 1502,3)
BUA (dB/ MHz)	78,9 (72,6-85,8)	84,4 (78,5; 94,3)	77,7 (73; 84,5)	18 (7,2; 69)

According to descriptive statistics, among all surveyed adolescent girls, the values for height, body weight and body mass index were uniform, while the most important indicator for BMD Z-score was in the range of osteopenic syndrome. Also, this indicator was significantly distinguishable in all three groups. All parameters of the MPCT: BQI  $p= 0.000$ , Z-score  $p= 0.000$ , SOS (m/s)  $p= 0.000$ , BUA (dB/MHz)  $p= 0.001$ . A significant difference of  $p \leq 0.05$  was noted in all groups. The leading method for assessing bone strength remains the determination of bone mass, the equivalent of which is bone mineral density (BMD). Some authors note a positive relationship between body mass index (BMI) and BMD, but this relationship does not depend on age, gender or race [4].

The author O.A. Smirnova, based on the results of the study, concludes that a decrease in body weight may be accompanied by a decrease in BMD, in our results there was no decrease in body weight in the presented BMD groups.

The analysis of correlations between the level of sexual development, the degree of severity of secondary sexual characteristics and anthropometric indicators, as well as indices of physical development, was carried out. It is established that the degree of severity of secondary sexual characteristics and the main anthropometric indicators are interrelated: the correlation of these indicators is characteristic of girls. Anthropometric markers of the rate of sexual development, such as the components of height and BMI, have been identified.



Table 2 - Correlations between the state of BMD with physical and sexual development

	Ax	M	Pb	Me	Height	Weight	VAS
r (p ≤0.05) korel. Spearman/ Gamma							
Height	-	-	-	-	-	-	-
Weight	-	-	0,2	-	-	-	-
BMI	0,2	-	0,2	-	-	-	-
VAS	-	-	-0,2	-	-	-	-
BQI	-0,2	-0,5	-	-	0,3	-	0,3
Z-score	-0,3	-0,5	-	-	0,3	-	-
SOS (m/s)	-0,3	-0,5	-	-	0,3	-	0,3
BUA (dB/ MHz)	-	-	-	-	-	0,2	-

In our study, we found that gynecological status has an average and weak correlation with bone mineral density among the adolescent girls studied. The parameters of secondary sexual characteristics according to Tanner's criteria, breast development between BQI, SOS and Z-score have an inverse average relationship of  $r = 0.53$   $p \leq 0.05$ , and axillary hairiness between BMI positive and the constituent parameters of BMD revealed a negative weak relationship, whereas between pubic hair and the VAS pain scale, on the contrary, showed a negative weak correlation; there is a positive weak relationship between weight, BMI and pubic hair growth  $r = \pm 0.26$  ( $p \leq 0.05$ ) in adolescent girls with primary dysmenorrhea.

Correlation analysis shows that growth and pain scale according to VAS between the parameters of BMD: Z-score, BQI and SOS (m/s) positive weak connections were established, nevertheless significant  $r = 0.3$   $p \leq 0.05$ . Such connections once again confirm that the gynecological status has a relationship with the state of the BMD of these categories of respondents.

The following comparative analysis indicates a significant difference between the groups of breast development according to the parameters BQI, SOS and Z score  $p = 0.04$ , as well as between the hair of the armpit with the parameters BQI, SOS and Z score  $p = 0.02$ . Further, a significant difference between the groups of axillary hair and pubic hair is noted by weight and BMI  $p = 0.04$ , which is indicated in Table No. 3.

Table 3 - Comparative analysis of the parameters of physical development and BMD between groups of sexual development

		Height	Weight	BMI	BQI	Z-score	SOS (m/s)	BUA (dB/ MHz)	*p
		Me (q25;q75)							
Ax	n=3 9	163 (154;168)	52 (45;58)	20 (18,4; 21,5)*	83,3 (74; 89,8)	-1,2 (-1,8; -0,7)*	1517,2 (1510,8; 1528,5)*	81,4 (73,7; 89,5)	0,04
	n=6 6	160 (156;163)	52 (48;58)	20,7 (19,5; 22,7)*	76 (70,3; 82,3)	-1,6 (-2; -1,2)*	1512,1 (1506,4; 1521,8)*	77,8 (70,1; 84,6)	
M	n=7	160 (158;168)	52 (42;57)	20,2 (16; 20,8)	88,1 (85,8; 94,5)*	-0,8 (-1,0; -0,4)*	1528,5 (1520,9; 1534,8)*	82,1 (84,4; 62,8)	0,02
	n=9 8	160 (155,5; 164,5)	52 (48;58)	20,3 (19,1; 22,3)	76,3 (71,3; 83,8)*	-1,6 (-2,0; -1,1)*	1513 (1507,3; 1523)*	78,8 (72,6; 85,8)	
Pb	n=5 3	160 (158;164)	53 (48;60)	20,7 (19,5; 22,9)*	76 (71,3; 83,8)	-1,6 (-2,0; -1,1)	1512,8 (1505,9; 1523,9)	79,6 (70,6; 85,7)	0,04
	n=5 2	160 (154,5;165 )	52 (45;57)	20 (18,6; 21,4)*	78 (73,8; 85,8)	-1,5 (-1,8; -1,0)	1514,4 (1509,3; 1525,3)	78,6 (73,3; 87,4)	
Me	n=2 1	158 (156;161)	52 (46;57)	20,3 (19,1; 21,5)	77,4 (68,3; 82,5)	-1,5 (-2,1; -1,2)	1514,3 (1507,3; 1520,9)	76,8 (73,7; 82,1)	-
	n=8 4	160,5 (156;165)	52 (48; 58,5)	20,3 (18,9; 22,2)	77,4 (68,3; 82,5)	-1,6 (-1,9; -1,1)	1513,3 (1507,5; 1525,8)	79,6 (71,9; 85,9)	

Note: n – the number of adolescent girls with PD; Ax - axillary hair; Pb -pubic hair; M - breast development; Me - menstrual function.

In the presented groups, on the basis of menstrual function, the parameters of physical development and the components of BMD did not differ, since the main proportion (80%) of girls corresponded to regular menstruation during the year, and an unstable menstrual cycle was registered only in 20% of the surveyed adolescents. The nature of menstrual function determines the degree of development of secondary sexual characteristics during medical examinations of adolescent girls, the same revealed significant differences between groups of sexual development, especially according to BMD, helps to clarify for diagnostic purposes.

### 2.3 Evaluation of biomarkers of bone metabolism in the examined adolescent girls

The results obtained on the basis of solving the task, namely by determining biomarkers in the composition of macronutrients, hormones and vitamin D, are presented in Table 4. The contents of all biomarkers are taken by median and lower-upper quartiles by groups of the state of BMD.

Table 4 - Indicators of biomarkers of bone metabolism from the state of BMD in adolescent girls

	General n=105	Normal n=25	Osteopenia n=75	Osteoporosis n=5
	Me (q25-q75)			
Vitamin D	17,4 (14,3; 23,1)	16,3 (11,8; 21,4)	19,2 (14,5; 24,4)	15,7 (15; 16,1)
Ca	1,15 (1,13; 1,17)	1,15 (1,14; 1,17)	1,15 (1,13; 1,17)	1,15 (1,14; 1,15)
Mg	0,82 (0,79; 0,87)	0,83 (0,79; 0,88)	0,82 (0,79; 0,85)	0,87 (0,82; 0,9)
Na	138 (137; 139)	138 (138; 139)	138 (137; 139)	138 (138; 140)
K	4,2 (4,0; 4,4)	4,2 (4,1; 4,4)	4,2 (4,0; 4,4)	4,2 (4,0; 4,3)
Parathormone	3,15 (2,58; 3,98)	3,07 (2,76; 4,06)	3,17 (2,49; 3,97)	3,29 (2,84; 4,42)
Estradiol	186 (134; 368)	156 (134; 368)	186 (131; 284)	594 (196; 659)
Progesterone	0,8 (0,5; 3,0)	1,1 (0,7; 1,6)	0,8 (0,5; 5,4)	0,8 (0,4; 18,8)

As can be seen in Table 4, among all biomarkers, the content of Ca and progesterone were within the normal range. The calcium content in the general and ranked groups was within the reference values. Low calcium levels increase the spasticity and contractions of the uterus. Calcium homeostasis depends on the level of vitamin D, as in our study, inadequate vitamin D levels were 90% among the surveyed adolescents.

According to A.P. Gevorgyan et al. the study emphasizes that the lack of a cautious attitude to menstrual pain syndrome, which has an unfavorable reproductive prognosis and, when identifying the causes of PD, indicates hypomagnesemia [3]. Our data on Mg content showed normal limits among 92% of the examined adolescents, and 5.8% had an increased value in the range of 0.92-0.98 mmol/l and 2% of girls had a reduced value of 0.66-0.67 mmol/l. In our case, we did not identify a relationship between pain on the VAS scale and magnesium content, a fact that was mentioned in several results conducted.

According to the Na content in (n=5) 4.8% of girls, there is a moderate decrease from the reference values of 130-135 mmol/l.

The reverse pattern was established by the content of K, which showed above the norm of 4.9-5.3 mmol/l in 3.8% (n=4) of adolescent girls.

The level of parathyroid hormone in 2.8% of 7.02-10.7 mol/l girls was higher than the reference values, and 7.6% had an insufficient content of 0.33-1.56 pmol/l

Analysis of the results of numerous studies on the effect of vitamin D deficiency on pelvic floor dysfunction, conducted by N. Aydogmus and U.S. Demirdal (2018), that deficiency of this vitamin causes a significant decrease in the strength of the pelvic floor muscles, however, no reliable correlation between these conditions was found [37].

The value of vitamin D is known as a regulator of bone metabolism and calcium-phosphorus homeostasis and its role in the development of a number of pathological conditions. The accumulated data suggest a key role of the pleiotropic effects of vitamin in the genesis of reproductive physiology and the formation of certain gynecological diseases.

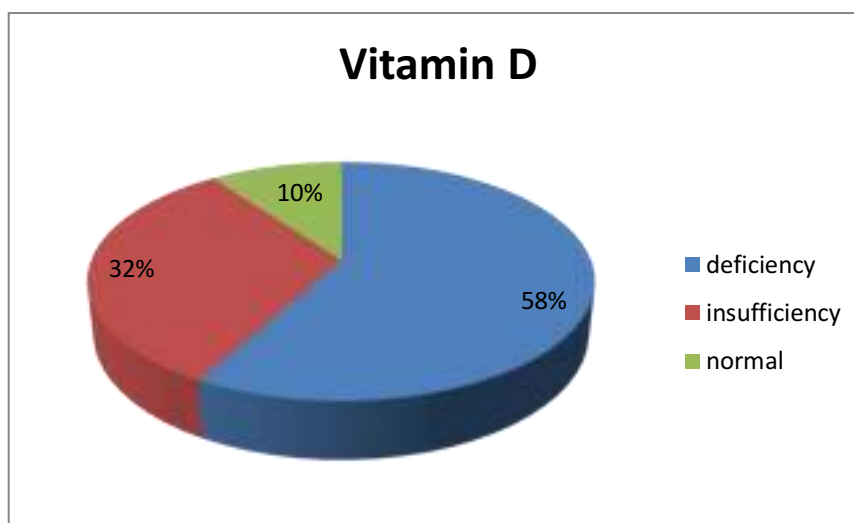


Figure 1 - Vitamin D content among the examined adolescent girls with primary dysmenorrhea

Where indicated in Figure 1, taking into account the provision of vitamin D, the following are highlighted: group 1 (n = 95) - inadequate level of 25 (OH)D and 2nd (n = 10) - adequate provision (30-100ng/ml).

Group 1 was divided into subgroup 1A (n = 34) - insufficiency 25(OH)D (20-30 ng/ml) and 1B (n = 61) – deficiency (<20 ng/ml). General descriptive statistics revealed that the average value of vitamin D was  $19.8 \pm 8.9$  ng/ml, which indicates the lower limits of the reference values.

Against the background of primary dysmenorrhea syndrome, 90% of the examined patients have an inadequate level of vitamin D, of which in subgroup 1A (36%) has an insufficient level in the range of  $23.76 \pm 4.9$ ; in subgroup 1B (64%) 25 (OH)D  $14.21 \pm 4.9$  in the specified contents.

Levels 25(OH)D in 105 adolescent girls with primary dysmenorrhea were inversely dependent on the score on a visually analog scale ( $r = -0.2$ ;  $p \leq 0.05$ ).

The results of the study confirmed the high prevalence of inadequate vitamin D provision among adolescent girls with primary dysmenorrhea (90%), which in 64% is in the deficit range.

On the basis of osteodensitometric data, groups of examined adolescent girls were formed into 3 groups: 1 - normal BMD; 2 - osteopenia and 3 - osteoporosis. As a percentage, there were the following indicators: 1 – 24%; 2 – 71%; 3 – 5%. Osteopenic syndrome prevails among all examined adolescents with primary dysmenorrhea. The results of biochemical analyses in the ranked groups were at reference values, except for vitamin D 25. This indicator significantly differed between the groups of examined adolescents.

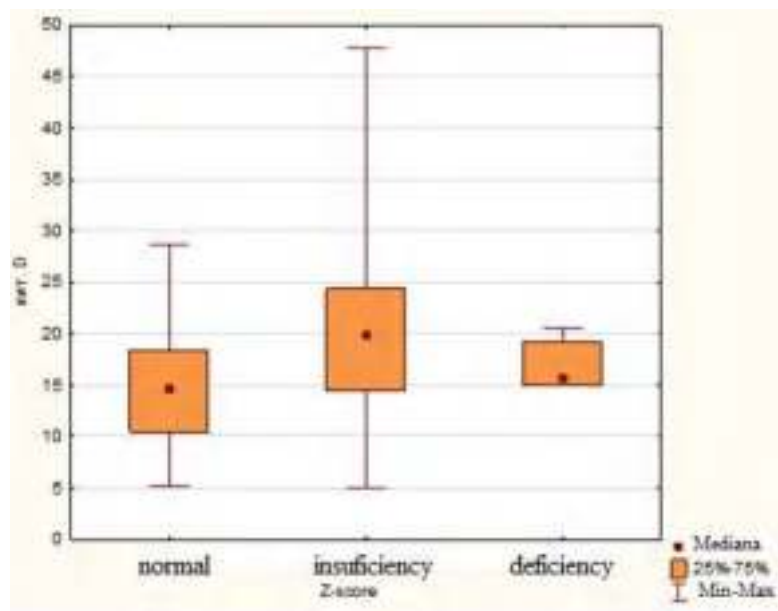


Figure 2 - Comparative analysis of vitamin D levels by BMD groups among the examined adolescents

The conducted systematic analysis by I.V. Kuznetsova (2018) provides a direction for further experimental and clinical evaluation of vitamin D deficiency in endometriosis and oncological diseases. The results of the presented study showed that the prevalence of vitamin deficiency occurs in 32% of girls, deficiency - in 58% and an adequate level in 10% of the examined [22].

According to I.G. Zhukovskaya (2019), the average level of vitamin D deficiency and insufficiency did not differ by age, however, a significant increase in the frequency of vitamin D deficiency in postmenopausal compared with the reproductive and premenopausal periods is recorded [23].

Of all the hormones, estradiol was different, since it has reference values for certain age groups. This hormone in each age group has its own identical range among adolescents with primary dysmenorrhea. According to the content of the hormone estradiol, an increased level was found in the range of 528-1279 pmol/l in 5.8% of the examined girls. As can be seen in Figure 3, the content of the hormone estradiol in the studied age groups.

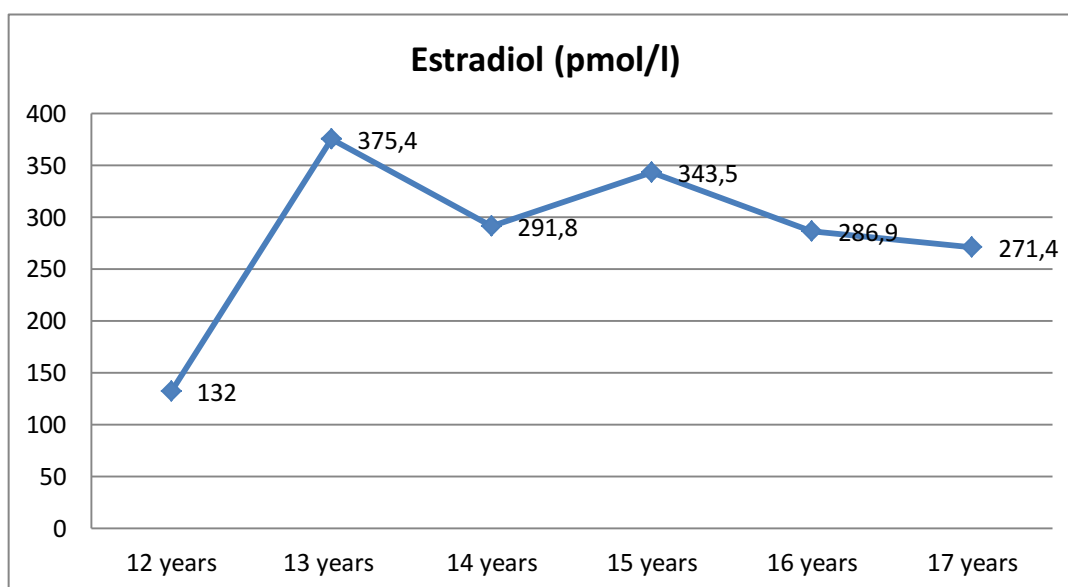


Figure 3 - Estradiol content depending on age among adolescent girls with primary dysmenorrhea

Analyzing the presented estradiol values by age, it was noted that at the ages of 14 to 17, the level was within the normal range. At the age of 12 and 13, the average estradiol values showed an increase in the level from the reference level, which was < 113 and <355, respectively. Such changes in the form of hyperestrogenism among girls aged 12-13 years are explained by the fact that there is a rapid jump in puberty.

According to the Huhmann K. study, it was noted that functional hypothalamic amenorrhea is common among athletes, which is explained by the synergistic relationship of exercise and low weight with puberty and the menstrual cycle. Low estrogen levels manifest themselves in different ways: amenorrhea, low bone mineral density, vaginal and breast atrophy, infertility and dyspareunia, as hormone replacement with physiological dosing of transdermal estrogen and cyclic progesterone to improve the bone health of a young woman. These results contradict our own data, in terms of the level of estrogen is high, but not significant. Everything is the same, and despite the increased value of estradiol, the BMD indicators are reduced [14].

It is possible that the variability of the functioning of the reward nervous system in adolescent studies may be related to individual differences in hormone levels. The researchers hypothesized that high levels of estradiol and testosterone may enhance the response in neural affective and reward processing areas, which are activated differently in adolescence compared to other developmental stages. Most studies of hormone production in adolescents (ages 10 to 13) tend to focus on testosterone and estrogen or estradiol levels. Elevated levels of these hormones are a biomarker of puberty development and serve to more accurately measure the level of puberty of a teenager compared to age or subjective indicators, such as self-esteem of the puberty stage or, for women, the age of the onset of menarche. The results show that in early adolescence, an increase in testosterone and estradiol levels can lead to a (potentially temporary) decrease in the level of cognitive control over the activation of the reward system, suggesting that interventions for early adolescents should be aimed at young people with low cognitive control during this sensitive period of development. All the above confirmation and conclusion coincide with our own results [38].

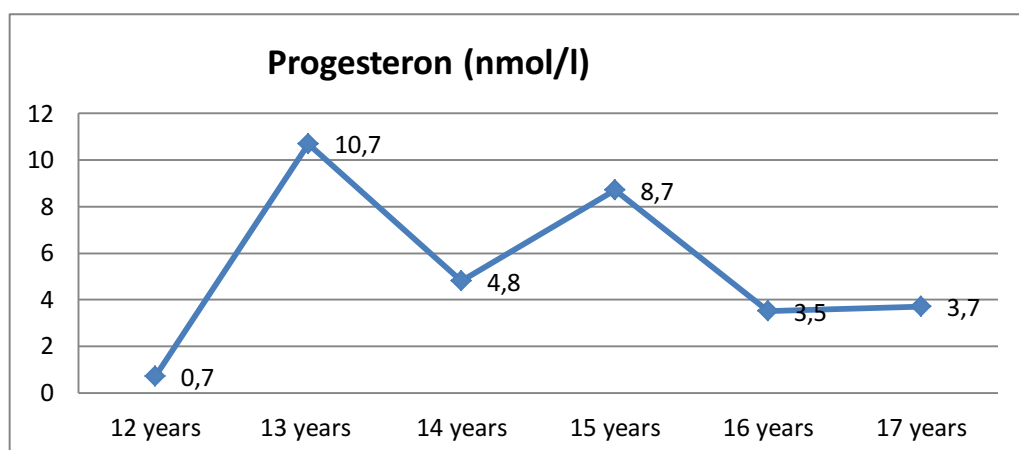


Figure 4 - Progesterone levels depending on age among adolescent girls with primary dysmenorrhea

According to the content of progesterone – one of the most important among sex hormones, it showed that, depending on age, the reference values remained unchanged at the stage of sexual development.

The next hormone is a parathyroid hormone, according to the content of this hormone among the examined adolescent girls, no violations were detected beyond the reference values at each specified age.

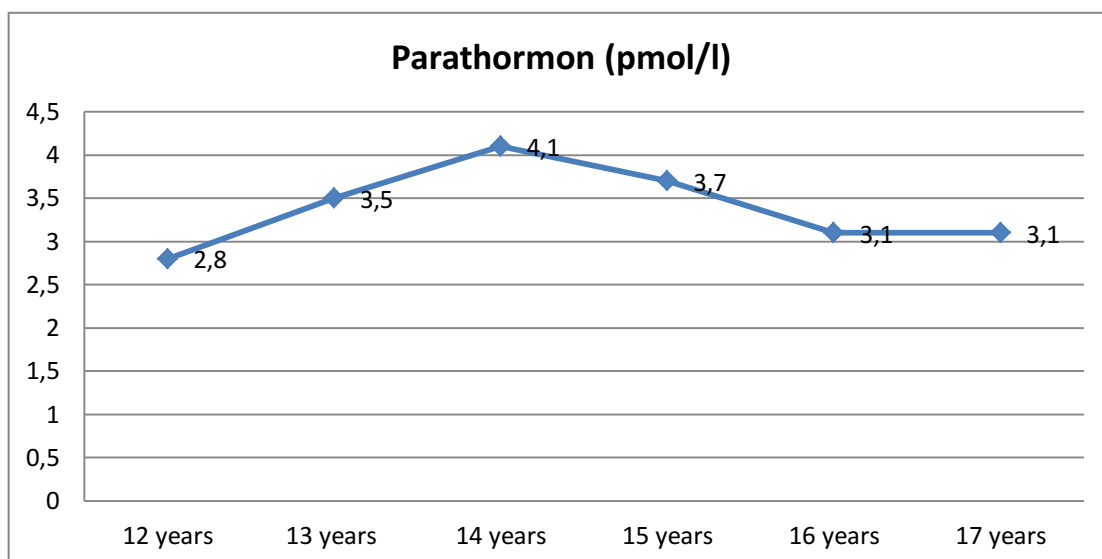


Figure 5 - Parathyroid hormone content depending on age among adolescent girls with primary dysmenorrhea

#### **2.4 Evaluation of genetic markers of polymorphism associated with osteoporosis**

The development of osteopenic syndrome and its complications is influenced by risk factors, which are divided into modifiable and unmodified (age, gender, heredity). We present here the literature evidence of how vitamin D/VDR signaling can interact with and regulate these genes, which are crucial for pain signaling. Further experimental studies in vitro and vivo are needed to study these potential interactions specifically on pain models. Such studies may reveal the potential usefulness of vitamin D both alone and in combination with existing analgesics for better treatment of chronic pain. In the same sequence, the following data were found in the categories of sexual development, which are indicated in Table 1



Table 5 - Occurrence of VDR genotype alleles depending on sexual development

VDR	Ax3	Ax2	total	Me2	Me3	total	PB3	PB2	total
t/t	33.4%	19.1%	52.4%	41.90 %	10.48 %	52.38%	24.76%	27.62%	52.38%
t/c	31.6%	11.4%	42.8%	40.0%	2.86%	42.86%	30.48%	12.3%	42.86%
c/c	3.8%	0.9%	4.8%	4.76%	0%	4.76%	1.90%	2.86%	4.76%
gen	n=72	n=33	n=105	n=91	n=14	n=105	n=60	n=45	n=105
total	68.8%	31.2%	100%	86.67 %	13.33 %	100%	57.14%	42.86%	100%

Table 6 - Occurrence of CALCR genotype alleles depending on sexual development

CALC R	Ax3	Ax2	total	Me2	Me3	total	PB3	PB2	total
t/t	14,29 %	7,62%	21,90 %	21,90%	1,90%	23,81%	15,24 %	8,57%	23,81%
t/c	37,14 %	17,14 %	54,29 %	43,81%	10,48 %	54,29%	27,62 %	26,67%	54,29%
c/c	17,14 %	6,67%	23,81 %	20,95%	0,95%	21,90%	14,29 %	7,62%	21,90%
gen	n=72	n=33	n=105	n=91	n=14	n=105	n=60	n=45	n=105
total	68,57 %	31,43 %	100,0 %	86,67%	13,33 %	100,00 %	57,14 %	42,86%	100,00 %

Vitamin D3 receptor VDR - 56% T/T risk allele was not detected; T/C polymorphism associated with the risk of osteoporosis in heterozygous form was detected in 39%; C/C polymorphism associated with the risk of osteoporosis in homozygous form - 5%. In a comparative analysis, a good result turned out to be in the homozygous form, which both genes in a pair are mutant and this is evidenced by a 4-5% ratio in both groups: the first and the second. T/C polymorphism associated with the risk of developing osteoporosis in a heterozygous form in the trend of increasing occurrence, and it can also be assumed by identifying a risk group among all examined adolescent girls.

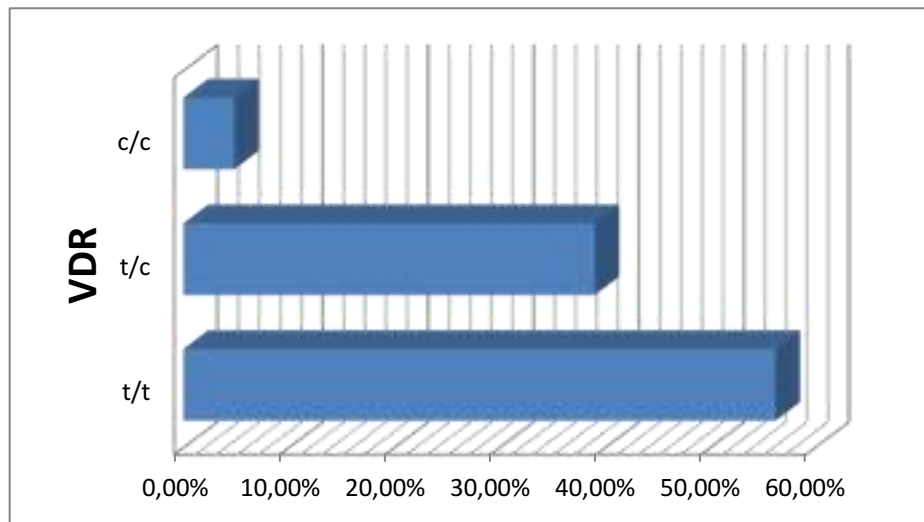


Figure 6 - Occurrence of alleles of the VDR genotype

According to the results of genetic markers of the calcitonin receptor CALCR, the occurrence of the risk allele in the heterozygous state of T/S is 51%; the T/T allele of risk in the homozygous state is 22%; in the remaining 27%, polymorphism predisposing to osteoporosis was not detected With/C. According to the state of MPCT, CALCR polymorphisms were not distinguishable, since in approximately the same percentage.

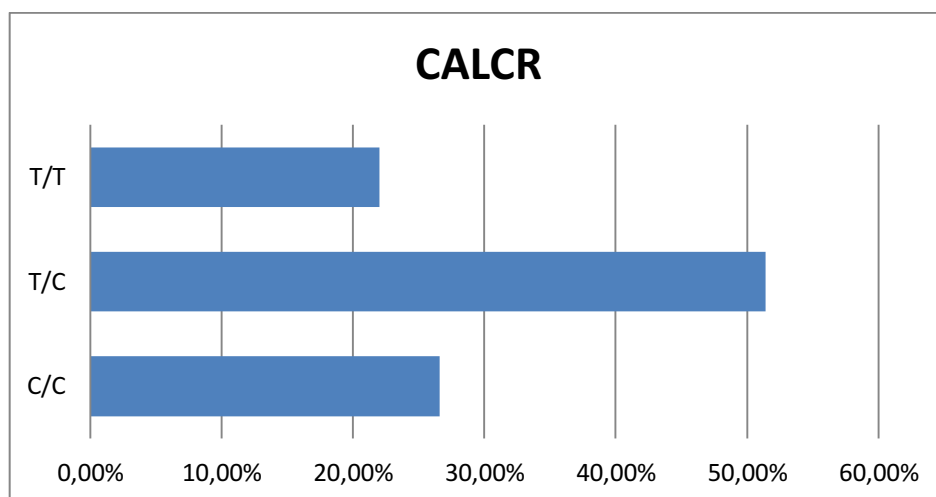


Figure 7 - Occurrence of CALCR genotype alleles

The next marker COL1A1 of the presence of polymorphisms in the genes of the alpha-1 chain of the collagen protein type 1 in T/T- the risk allele in the homozygous state and C/C - the risk allele in the heterozygous state were not detected; whereas 100% of the normal genotype type G/G polymorphism predisposing to osteoporosis was not detected.

According to the state of BMD, VDR polymorphisms in the group with normal BMD by genotypes t/t and t/c were found in the same percentage, and in the second group with osteopenia by genotypes t/t was 59%, c/c was in both groups of BMD in identical proportions. This genetic marker turned out to be informative, since VDR is also the most effective and informative among genetic markers for our adolescents.

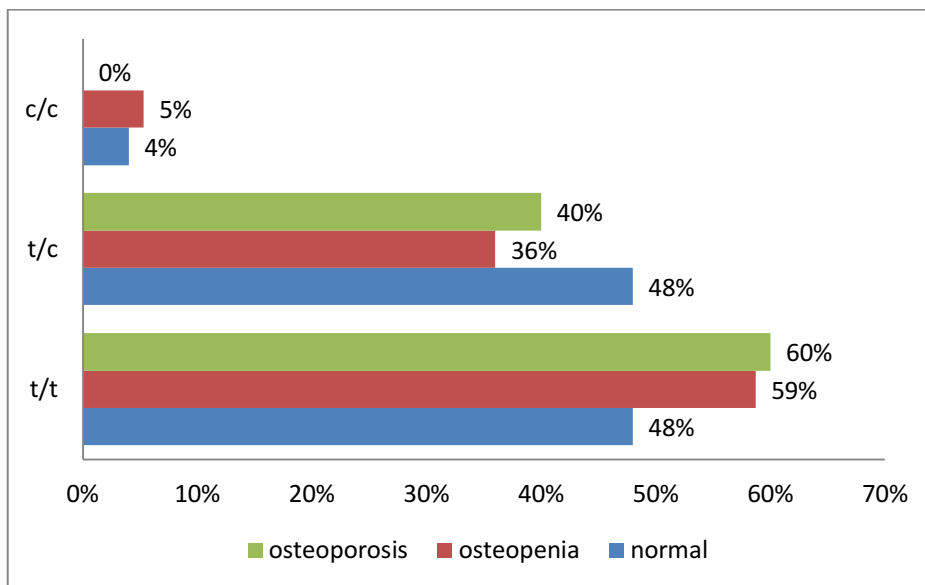


Figure 8 - Occurrence of alleles of the VDR genotype depending on the BMD

According to the state of BMD, CALCR polymorphisms in the group with normal BMD by T/T and S/S genotypes were found in the same percentage, and in the second group with osteopenia by T/S genotypes was 51%, S/S was in both groups of BMD (norm and osteopenia) in identical proportions. This genetic marker turned out to be informative, since VDR is also the most effective and informative among genetic markers for our adolescents.

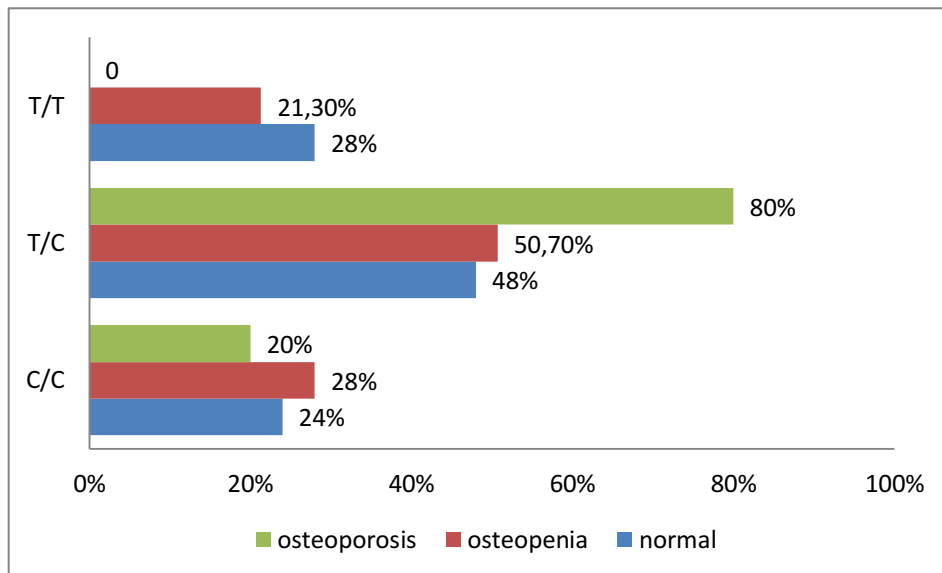


Figure 9 - Occurrence of CALCR genotype alleles depending on BMD

These studies revealed that the earliest signs of reproductive health disorders of adolescent girls are disorders of bone metabolism synthesis and hormone secretion, which should be actively detected among adolescent girls with reduced BMD for further observation, and if there are additional risk factors, consider the need for additional diagnosis and should be given great attention, since children are a demographic resource, it is the health of the younger generation that the health of the entire nation depends on.

## CONCLUSION

The data obtained clearly demonstrate that the period of formation of menstrual function in adolescence should be considered as a risk factor for the development of D-deficient conditions, increasing against the background of disorders of sexual development. This indicates that there was no delay in the appearance of secondary sexual characteristics in primary dysmenorrhea.

The level of sexual development of the severity of secondary sexual characteristics is interrelated with the pace of physical development. Adolescents with an accelerated rate of physical development are characterized by an advance in sexual development and more pronounced secondary sexual characteristics. The degree of severity of secondary sexual characteristics and the main anthropometric indicators are interrelated. Girls with high body mass index values are characterized by a higher score of sexual development and the severity of secondary sexual characteristics. *Acta Biologica Sibirica* ISSN 2412-1908 (Online). *Acta Biologica Sibirica*. 2015. №3-4 18

Interpretation of the results of all determined biochemical and genetic markers in the blood indicates how primary dysmenorrhea was associated with bone mineral density among the studied adolescent girls with dysmenorrhea. The issues in solving the actual problem raised in this application of the scientific and technical project are closely interrelated, since they are the optimal solution for conducting upcoming scientific research on the educational program of doctoral and master's degrees for doctoral and master's dissertations.

Lectures and master classes were held for adolescents and students of secondary schools and medical institutions, as well as for primary care practitioners explaining the state of bone metabolism and bone mineral density in adolescent girls with dysmenorrhea and based on reliable data on prevention, diagnosis and improvement of quality of life.

An algorithm of early diagnosis and methods of prevention of changes characteristic of osteopenic syndrome in primary dysmenorrhea in adolescent girls has been developed, based on the analysis of the obtained clinical and laboratory results. Further, the implementation of this developed algorithm for early diagnosis for the protection of menstrual health of adolescents and their relationship with bone mineral density will allow monitoring the state of bone metabolism of adolescent and sexual development of the growing organism as a whole.

In this project, and the results written 1 publication and an article submitted to the database Scopus in foreign peer-reviewed scientific journal with a percentile of not less than 58, observing the requirements of the tender documentation of the proposed grant funding (Appendix M).

The study of the above syndromes and features allowed us to determine the relationship between changes in bone metabolism and gynecological status in adolescent girls, which is presented in the form of a report with the results of a research project.

Obtained the title to copyright and the application for a utility model patent of the results obtained in the Kazakhstan patent office (Appendix N).

The spread of results among potential users was held international scientific-practical conference with the aim of raising awareness about the vitamin D deficiency, genetic predisposition and the characteristics of the metabolism and mineral density of bone tissue in primary dysmenorrhea among adolescent girls in Aktobe region (Appendix P, Q, R, S, T, U, V).

Implementation of the results of SRW It will significantly reduce and effectively solve problems with menstrual dysfunction in adolescents, due to in-depth diagnosis and preservation of the optimal quality of life of the children's population of Aktobe. This circumstance allows us to regard this problem not only as a medical one, but also as a social one.

Based on an integrated approach to early diagnosis and prevention, data have been obtained, in the further stage of research work for the commercialization of the program, it is planned to conduct master classes, seminars for employees of other medical organizations.

The implementation of the program of scientific search for gene markers and polymorphisms associated with osteopenic syndrome for adolescent girls with primary dysmenorrhea made it possible to understand and disseminate new knowledge in preclinical diagnostics among all residents, as well as to inform parents and children themselves.

Timely correction of vitamin D deficiency can make a significant contribution not only to general somatic health, but also to a favorable reproductive prognosis.

Thus, in the short-term period of the work done, it makes it possible for the structures of the health system to carry out measures for prevention, organization and planning of medical care, in order to preserve and strengthen the health of the child population.

The results of the study will help to understand the raised problem more objectively, further which will give new ideas for improving the situation and further scientific achievements in the field of the Ministry of Education and Science.

## LIST OF USED SOURCES

- 1 Amanzholkyzy A. Nurgaliyeva R. Kaldybayeva A. Biochemical variability of vitamin d receptor (Vdr) gene and its relationship with bone mineral density in children of the western region of the republic of kazakhstan // Research Journal of Pharmacy and Technology. -2019.- Vol.12, No. 2. -P. 735-740 - DOI: 10.5958 / 0974-360X.2019.00130.6
- 2 Concept of the State program for improving the health of the population for 2020-2025. -URL: [https://almaty-kvd.kz/index.php?option=com\\_content&view=article&id=49&Itemid=376&lang=ru](https://almaty-kvd.kz/index.php?option=com_content&view=article&id=49&Itemid=376&lang=ru) (date of access 17.08.2021)
- 3 Gevorgyan A.P., Sibirskaya E.V., Adamyan L.V., Arslanyan K.N. Primary dysmenorrhea of adolescent girls as a predictor of the development of undifferentiated connective tissue dysplasia // Problems of Reproduction. - 2017. - N.3. - S. 77-85.
- 4 Pashkova I. G. Osteodensitometric characteristics of bone tissue in women with normal body weight // Journal of Anatomy and Histopathology. - 2021. -- No. 3. - C.108-111.
- 5 Deng K.L, Li H, Yang W.Y, Hou J.L, Xu Y, Xiao S.M. Analysis of the Association between Fat Mass Distribution and Bone Mass in Chinese Male Adolescents at Different Stages of Puberty // Nutrients. -2021.- 13 (7). -P. 2163 - <https://doi.org/10.3390/nu13072163>.
- 6 Bulletin of the World Health Organization. -2009.- Iss. 87. No. 5.
- 7 De Sanctis V, Soliman A, Bernasconi S, Bianchin L, Bona G, Bozzola M, Buzi F, De Sanctis C, Tonini G, Rigon F, Perissinotto E. Primary Dysmenorrhea in Adolescents // Prevalence, Impact and Recent Knowledge. *Pediatr Endocrinol Rev.* 2015.- 13 (2). P. 512-20
- 8 Stella Iacovides, Ingrid Avidon, Fiona C Baker What we know about primary dysmenorrhea today // a critical review. -2015.- 21 (6). P.762-78 - PMID: 2 6346058DOI: 10.1093 / humupd / dmv039
- 9 Ashraf Moini, Tabandeh Ebrahimi, Nooshin Shirzad, Reihaneh Hosseini, Mania Radfar, Fatemeh Bandarian, show all The effect of vitamin D on primary dysmenorrhea with vitamin D deficiency: a randomized double-blind controlled clinical trial // *Journal Gynecological Endocrinology.* -2016. -Vol. 32. N. 6 -P. 502-505 -<https://doi.org/10.3109/09513590.2015.1136617>.
- 10 Szadek LL., Scharer K. Identification, prevention and treatment of children with reduced bone mineral density // *J Pediatr Nurs.* - 2014. - Vol. 29, N. 5 - P. 3-14
- 11 Hernández-Vega AM, Del Moral-Morales A, Zamora-Sánchez CJ, Piña-Medina AG, González-Arenas A, Camacho-Arroyo I. Estradiol Induces Epithelial to Mesenchymal Transition

of Human Glioblastoma Cells // Cells. -2020. -Vol. 21, N. 9. -P. 1930 - doi: 10.3390 / cells9091930. PMID: 32825553; PMCID: PMC7564468.

12 Frederiksen H, Johannsen TH, Andersen SE, Albrethsen J, Landersoe SK, Petersen JH, Andersen AN, Vestergaard ET, Schorring ME, Linneberg A, Main KM, Andersson AM, Juul A. Sex-specific Estrogen Levels and Reference Intervals from Infancy to Late Adulthood Determined by LC-MS / MS // J Clin Endocrinol Metab. - 2020.- Vol. 105, N. 3. - P. 754–68 - doi: 10.1210 / clinem / dgz196.

13 Huhmann K. Menses Requires Energy: A Review of How Disordered Eating, Excessive Exercise, and High Stress Lead to Menstrual Irregularities // Clinical Therapeutics. - 2020. - Vol. 42, No.3. -P.401-407.

14 Poon JA, Niehaus CE, Thompson JC, Chaplin TM. Adolescents' pubertal development: Links between testosterone, estradiol, and neural reward processing. Horm Behav. -2019.- Vol. 114, No. 104. -P. 504 - doi: 10.1016 / j.yhbeh.2019.02.015.

15 S.F. Nasyrova, F.F. Badretdinova, A.M. Ziganshin, E.V. Kulavsky Prevention of reproductive health disorders in adolescent girls with primary dysmenorrhea // Medical Bulletin of Bashkortostan. -2017.- T. 12. No. 5 (71). -WITH. 42-46.

16 Soininen S, Sidoroff V, Lindi V, Mahonen A, Kröger L, Kröger H, Jääskeläinen J, Atalay M, Laaksonen DE, Laitinen T, Lakka TA. Body fat mass, lean body mass and associated biomarkers as determinants of bone mineral density in children 6-8years of age // The Physical Activity and Nutrition in Children (PANIC) study. Bone. –2018. -Vol. 108. -P. 106-114. - doi: 10.1016 / j.bone.2018.01.003.

17 Rokoff LB, Rifas-Shiman SL, Switkowski KM, Young JG, Rosen CJ, Oken E, Fleisch AF. Body composition and bone mineral density in childhood // Bone. - 2019 Apr; 121: 9-15. - doi: 10.1016 / j.bone.2018.12.009. Epub 2018 Dec 15.

18 N. V. Bashmakova, T. V. Lisovskaya & V. Y. Vlasova Pathogenetic role of vitamin D deficiency in the development of menstrual dysfunction in pubertal girls: a literature review // Journal Gynecological Endocrinology. –2017. -Vol. 33. -P. 52-55 -https: //doi.org/10.1080/09513590.2017.1404235.

19 Deev I.A., Kolomeets I.L., Saprina T.V., Kobyakova O.S., Kamaltynova E.M., Kulikov E.S., Levko A.N., Kulikova K.V., Yurkova IN AND. Sexual development of adolescents in the Tomsk region // Pediatric Pharmacology. -2017. -T. 14. -N 5. -C. 366-372. - https: //doi.org/10.15690/pf.v14i5.1784.

20 Trushina O.V., Novichkov D.A., Khvorostukhina N.F., Romanovskaya A.V., Stepanova A.V., Pchelintseva L.I. Vitamin D status in adolescent girls with menstrual



dysfunction // Questions of gynecology, obstetrics and perinatology. - 2019. - N 18. -S.95-101. - DOI: 10.20953 / 1726-1678-2019-5-95101.

21 Kuznetsova I.V. Therapeutic and prophylactic effects of vitamin D in gynecological diseases associated with excessive proliferation // Obstetrics and Gynecology. - 2018. - N 4. - C.138-143.

22 Zhukovskaya I. G., Yakupova I. R. Influence of vitamin D on the state of somatic and reproductive health of women // Medical Council. - 2019. - N 21. - C.268-273.

23 Habib Abdella M., Nagi Karim, Thillaiappan Nagendra Babu, Sukumaran VijayaKumar, Akhtar Saghir. Vitamin D and Its Potential Interplay With Pain Signaling Pathways // Frontiers in Immunology. -2020. -Vol. 11. -P.820. -DOI = 10.3389 / fimmu.2020.00820.

24 Erdem, Melek et al. Investigation of the Relationship Between Fok1 and Col1A1 Gene Polymorphisms and Development of Treatment-Related Bone Complications in Children with Acute Lymphoblastic Leukemia // Turkish journal of haematology: official journal of Turkish Society of Haematology. -2019. -Vol. 36. -N 1. -P.12-18. -doi: 10.4274 / tjh.galenos.2018.2018.0221

25 Tekola-Ayele F, Lee A, Workalemahu T, et al. Genetic overlap between birthweight and adult cardiometabolic diseases has implications for genomic medicine // Sci Rep. -2019. N 9. -P.4076. -doi: 10.1038 / s41598-019-40834-w

26 Osman Karacin 1, Ilknur Mutlu 2, Mesut Kose 1, Fatih Celik 1, Mine Kanat-Pektas 3, Mehmet Yilmazer 1 Serum vitamin D concentrations in young Turkish women with primary dysmenorrhea: A randomized controlled study // Taiwan J Obstet Gynecol. -2018 N 57. -P.58-63. - doi: 10.1016 / j.tjog.2017.12.009.

27 Hatice Kucukceran, Ozhan Ozdemir, Serkan Kiral, Dilek Sensoz Berker, Rabia Kahveci, Adem Ozkara, show all The impact of circulating 25-hydroxyvitamin and oral cholecalciferol treatment on menstrual pain in dysmenorrheic patients // Journal Gynecological Endocrinology. -2019.-Vol. 35. N1. - P.53-57. -https://doi.org/10.1080/09513590.2018.1490407

28 Afsane Bahrami, Amir Avan, Hamid Reza Sadeghnia, Habibollah Esmaeili, Maryam Tayefi, Faezeh Ghasemi, show all High dose vitamin D supplementation can improve menstrual problems, dysmenorrhea, and premenstrual syndrome in adolescents // Journal Gynecological Endocrinology. -2018. - Vol.34. N8. -P.659-663 https://doi.org/10.1080/09513590.2017.1423466

29 Van Dyck FS. Genetics of osteoporosis in children // Endocr Dev. -2015. N28.-P. 196-209.

30 Szadek LL. Identification, prevention and treatment of children with reduced bone mineral density / Szadek LL., Scharer K. // J Pediatr Nurs. - 2014. -N29 -P.3-14.

31 Lasko, Catalano A, Benvenga C. Improvement of primary dysmenorrhea caused by a single oral dose of vitamin D: results of a randomized, double-blind, placebo-controlled study // Arch Intern Med. - 2012. N172. –P. 366 - 367.

32 Radzinsky V.E. , Khamoshina M.B. , Arkhipova M.P. , Lychak N.V. Reproductive health of adolescents in Russia: statistics, problems and prospects for improvement. // Gynecol Endocrinol. - 2014. N 30. –P. 64 -69.

33 Somayeh Z., Sakineh M.C., Mojgan M., Javadzadeh Y., PhD, Fatemeh E.D., // Pain Medicine. - 2017. - No.18. -P.3-13.

34 Acta Biologica Sibirica ISSN 2412-1908 (Online). // Acta Biologica Sibirica. - 2015. N3. -P.12.

35 Filatova, O. V., Kharchenko, E. V. Features of the relationship of parameters physical and sexual development of adolescents in Barnaul. // Acta Biologica Sibirica. - 2015.- N1. –S.7-23.

36 Gritsinskaya Vera Lyudvigovna, Mamedova Sabina Majidali Kyzy, and Nikitina Irina Leorovna. Indicators of physical and sexual development of adolescent girls in St. Petersburg // Reproductive health of children and adolescents. - 2017. N 6.-C. 22-29.- doi: 10.24411 / 1816-2134-2017-00002

37 I.A. Apolikhina, I.A. Kulikov Influence of hormone D on women's health // EFFECTIVE PHARMACOTHERAPY. Endocrinology. - 2018.- No.4 (30) .- P. 44-46

38 Poon JA, Niehaus CE, Thompson JC, Chaplin TM. Adolescents' pubertal development: Links between testosterone, estradiol, and neural reward processing. // Horm Behav. - 2019. N. 114. –P. 504. - doi: 10.1016 / j.yhbeh.2019.02.015

## APPENDIX A

### Algorithm for early diagnosis of primary dysmenorrhea



## APPENDIX B

### Extract from the protocol of the Academic Council on the approval of the topic of the master's thesis and the scientific advisors of the master's student

«МАРАТ ОСПАНОВ атындағы  
БАТЫС ҚАЗАҚСТАН  
МЕДИЦИНА УНИВЕРСИТЕТІ»  
КОММЕРЦІЯЛЫҚ ЕМЕС  
АКЦИОНЕРЛІК ҚОҒАМЫ



НЕКОММЕРЧЕСКОЕ  
АКЦИОНЕРНОЕ ОБЩЕСТВО  
«ЗАПАДНО-КАЗАХСТАНСКИЙ  
МЕДИЦИНСКИЙ УНИВЕРСИТЕТ  
имени МАРАТА ОСПАНОВА»

ХАТТАМА

ПРОТОКОЛ

Выписка из протокола № 2 (788)  
заседания Ученого совета Западно-Казхстанского  
медицинского университета им. Марата Оспанова  
от 21 октября 2021 года

#### СЛУШАЛИ:

Утверждение тем магистерских диссертации и научных руководителей магистрантов первого года обучения.

#### ПОСТАНОВИЛИ:

На основании заключения объединенной научной проблемной комиссии университета от 18.10.2021г., протокол №8 магистранту первого года обучения по образовательной программе М 144 «Медицина» Аккожиной А. утвердить тему исследования «Взаимосвязь минеральной плотности костной ткани с индексом массы тела у девочек-подростков с первичной дисменореей» и научных руководителей PhD Аминжолкызы А. и к.м.н. Калдыбаеву А.Т.

Выписка верна:

Секретарь Ученого совета,

Доктор PhD

Қоғам мадриясы  
ҚУБАЛДАРАМЫН А. АМИНЖОЛКЫЗЫ  
Қарастық ғалым хатшысы  
Үшінші секретарь совета

## APPENDIX C

### Extract from the protocol of the Academic Council on the approval of the topic of the doctoral thesis of the doctoral student

«МАРАТ ОСПАНОВ атындағы  
БАТЫС КАЗАҚСТАН  
МЕДИЦИНА УНИВЕРСИТЕТІ»  
КОММЕРЦИЯЛЫҚ ЕМЕС  
АКЦИОНЕРЛІК ҚОҒАМЫ



НЕКОММЕРЧЕСКОЕ  
АКЦИОНЕРНОЕ ОБЩЕСТВО  
«ЗАПАДНО-КАЗАХСТАНСКИЙ  
МЕДИЦИНСКИЙ УНИВЕРСИТЕТ  
ИМЕНИ МАРАТА ОСПАНОВА»

ХАТТАМА

ПРОТОКОЛ

Выписка из протокола № 4 (780)  
заседания Ученого совета Западно-Казахстанского медицинского  
университета им. Марата Оспанова  
от 24 декабря 2020г.

#### СЛУШАЛИ:

Утверждение темы докторской диссертацией докторанта 1-го года обучения по специальности D141 «Медицина»

#### ПОСТАНОВИЛИ:

На основании заключения объединенной научной проблемной комиссии университета от 10.12.2020 г., протокол №3 докторанту первого года обучения Донзевой А.Е. утвердить тему докторской диссертации «Жасөспірім қыздардың біріншілік дисменорея кезіндегі сүйек тінінің метаболизмі мен минералды тығыздығының жағдайын бағалау» по специальности D141 «Медицина».

Выписка верна:  
Секретарь Ученого совета,  
Доктор PhD

Қолы белгілес  
КУВААНДЫРАМШИ ҰДСТОБЕРЛІ  
Қосығың ықпалыңа қатысты  
Ученый секретарь совета  
А. АМИНЖОЛҚЫЗЫ

## APPENDIX D

### Extract from the protocol of the Academic Council on the approval of the scientific advisors of the doctoral student

«МАРАТ ОСПАНОВ атындағы  
БАТЫС КАЗАҚСТАН  
МЕДИЦИНА УНИВЕРСИТЕТІ»  
КОММЕРЦІЯЛЫҚ ЕМЕС  
АКЦИОНЕРЛІК ҚОҒАМЫ



НЕКОММЕРЧЕСКОЕ  
АКЦИОНЕРНОЕ ОБЩЕСТВО  
«ЗАПАДНО-КАЗАХСТАНСКИЙ  
МЕДИЦИНСКИЙ УНИВЕРСИТЕТ  
ИМЕНИ МАРАТА ОСПАНОВА»

ХАТТАМА

ПРОТОКОЛ

Выписка из протокола № 2 (788)  
заседания Ученого совета Западно-Казакстанского  
медицинского университета им. Марата Оспанова  
от 21 октября 2021 года

**СЛУШАЛИ:**

Утверждение научных руководителей докторантов первого года обучения.

**ПОСТАНОВИЛИ:**

На основании заключения объединенной научной проблемной комиссии университета от 20.10.2021г., протокол №10 докторанту первого года обучения по образовательной программе D141 «Медицина» Кульжановой Д. утвердить научных консультантов к.м.н., асс. профессора Сапарбаева С.С., PhD Аманжолқызы Айнур и MD, PhD, профессора Станкевичюс Эдгарас Института физиологии и фармакологии, Литовского университета наук о здоровье, г.Каунас, Литва.

Выписка верна:  
Секретарь Ученого  
Совета,  
Доктор PhD

Қолы қойды: \_\_\_\_\_  
Аманжолқызы Айнур  
ҚУДААМРАМЫН ДАСТОВЕРЯҒЫ  
Елдістің қызыл жұлдызы  
Ученый секретарь совета

## APPENDIX E

### Acts of implementation of scientific research work

СОГЛАСОВАНО

Руководитель ГКП "городская поликлиника №1" на ПХВ ГУ "Управление здравоохранения и медицинской помощи Республики Алтай"



СОГЛАСОВАНО

Проректор по стратегическому развитию, науке и международному сотрудничеству,

член Правления ЗКМУ имени Марата Оспанова  
С.С. Сапарбаев.



АКТ № 179

внедрения научно-исследовательской работы  
НАО ЗКМУ имени Марата Оспанова, кафедра нормальной физиологии

**Наименование предложения** Особенности состояния минеральной плотности костной ткани у девочек – подростков с первичной дисменореей.

**Работа включена** из научно-исследовательских работ, внедрена в инициативном порядке

**Форма внедрения** лекция-семинары для врачей всех специальностей и подростков.

**Ответственный за внедрение и исполнитель** А.Амвекжолкызы, Тубулбаева С.А.

**Эффективность внедрения** лечебно-диагностическая, профилактическая

**Предложения, замечания учреждения, осуществляющего внедрение:**






Применение ультразвукового остеоденситометрического метода пяточной кости, позволяет оценить состояние минеральной плотности костной ткани, а также определить связь с гинекологическим статусом среди девочек-подростков с первичной дисменореей.

**Срок внедрения**

**Председатель комиссии**

**Члены (ответственные за внедрение):**

**Исполнитель**

 Амвекжолкызы А.  
 Кульжанова Д.С.  
 Акжолдина А.М.  
 Тубулбаева С.А.  
 Донаева А.Е.

СОГЛАСОВАНО  
Директор СШ №30 г. Актобе

 ТЕРЕКОВА Ж.У.

25.09.2024 г.



СОГЛАСОВАНО

Проректор по стратегическому развитию,  
науке и международному сотрудничеству,  
член Правления ЗКМУ имени Марата Оспанова



Сапарбаев.  
2024 г.

### АКТ № 180

внедрения научно-исследовательской работы  
НАО ЗКМУ имени Марата Оспанова, кафедры нормальной физиологии

**Наименование предложения:** Особенности минеральной плотности костной ткани у девочек – подростков с первичной дисменореей.

**Работа включена из** научно-исследовательских работ, внедрена в инициативном порядке

**Форма внедрения** лекции-семинары для врачей всех специальностей

**Ответственный за внедрение и исполнитель** А.Аманжолкызы, Тубулбаева С.А.

**Эффективность внедрения** лечебно-диагностическая, профилактическая





**Предложения, замечания учреждения, осуществляющего внедрение:**

Применение ультразвукового остеоденситометрического метода пяточной кости, позволяет оценить состояние минеральной плотности костной ткани, а также определить связь с гинекологическим статусом среди девочек-подростков с первичной дисменореей.

#### Срок внедрения

**Председатель комиссии**

**Члены (ответственные за внедрение):**

 Аманжолкызы А.  
 Кульжанова Д.С.  
 Аккожина А.М.  
 Тубулбаева С.А.

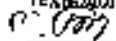
**Исполнитель**

 Донасва А.Е.



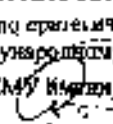
СОГЛАСОВАНО

Директор ЧУ «Актюбинский техникум  
технологического колледжа»

 Кари Л.М.

26 10 2021г.

СОГЛАСОВАНО

Проректор по организационному развитию,  
науке и международному сотрудничеству,  
член Правления ЗКМУ  Марата Османова

20 10 2021г.

**АКТ № 182**

внедрения научно-исследовательской работы  
НАО ЗКМУ имени Марата Османова, кафедры нормальной физиологии

Наименование предложения: Особенности минеральной плотности костной ткани у девочек – подростков с первичной дисменореей.

Работа исключена из научно-исследовательских работ, внедрена в клинический процесс

Форма внедрения лекции-семинары для врачей всех специальностей

Ответственный за внедрение и исполнитель А.Аманжолдызы, Тубулбаева С.А.

Эффективность внедрения лечебно-диагностическая, профилактическая

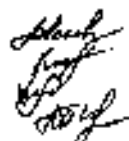
Предлагаемая, заимствованная учреждения, осуществляющего внедрение:

Применение ультразвукового остеоденситометрического метода плотности кости, позволяет оценить состояние минеральной плотности костной ткани, а также определить связь с психологическим статусом среди девочек-подростков с первичной дисменореей.

Срок внедрения 05.10.2021 г.

Председатель комиссии

Члены (ответственные за внедрение):



Аманжолдызы А.  
Кулажэинов Д.С.  
Анжукина А.М.  
Тубулбаева С.М.

Исполнитель




Донсова А.Б.

НАО ЗКМУ 605-01-2020. Едылган-эргетер жуманык снайру акти. Алтыншы басылды.  
Ф ЛРС ЗКМУ 605-01-2020. Акт внедрения научно-исследовательской работы. Издание шестое.

СОГЛАСОВАНО

Директор ЧУ «Актюбинский строитель-  
монтажный колледж»

 К.Т. Гынаторов

  
27 10 2021 г

СОГЛАСОВАНО

Проректор по стратегическому развитию,  
науке и международному сотрудничеству,  
член Правления ЗКМУ имени Марата Оспанова  
С.С. Сапарбаев.

  
  
27 10 2021 г

АКТ № 183

внедрения научно-исследовательской работы  
НАО ЗКМУ имени Марата Оспанова, кафедра нормальной физиологии

**Наименование предложения:** Особенности минеральной плотности костной ткани у девочек – подростков с первичной дисменореей.

**Работа включена из** научно-исследовательских работ, внедрена в инициативном порядке

**Форма внедрения** лекции-семинары для врачей всех специальностей

**Ответственный за внедрение и исполнитель** А. Аманжолкызы, Тубулбаева С.А.

**Эффективность внедрения** лечебно-диагностическая, профилактическая





**Предложения, замечания учреждения, осуществляющего внедрение:**

Применение ультразвукового остеоденситометрического метода пяточной кости, позволяет оценить состояние минеральной плотности костной ткани, а также определить связь с гинекологическим статусом среди девочек-подростков с первичной дисменореей.

**Срок внедрения** 27.10.2021 г.

**Председатель комиссии**

**Члены (ответственные за внедрение):**

 Аманжолкызы А.  
 Кульжанова Д.С.  
 Аккожина А.М.  
 Тубулбаева С.М.

**Исполнитель**

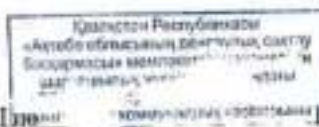


Донаева А.Е.

СОГЛАСОВАНО

Заместитель директора ОПЦ  
амбулаторно-поликлинической службы

Есенемалова С.М.  
10 2021 г.



СОГЛАСОВАНО

Проректор по стратегическому развитию,  
науке и международному сотрудничеству,  
член Правления ЗКМУ имени Марата Оспанова

Балиев С.С. Сапарбаев.  
10 2021 г.

**АКТ № 184**

внедрения научно-исследовательской работы  
НАО ЗКМУ имени Марата Оспанова, кафедра нормальной физиологии

**Наименование предложения:** Особенности минеральной плотности костной ткани у девочек – подростков с первичной дисменореей.

**Работа включена из научно-исследовательских работ, внедрена в инициативном порядке**

**Форма внедрения** лекция-семинары для врачей всех специальностей

**Ответственный за внедрение и исполнитель** А. Аманжолкызы, Тубулбаева С.А.

**Эффективность внедрения** лечебно-диагностическая, профилактическая

**Предложения, замечания учреждения, осуществляющего внедрение:**

Применение ультразвукового остеоденситометрического метода пяточной кости, позволяет оценить состояние минеральной плотности костной ткани, а также определить связь с гинекологическим статусом среди девочек-подростков с первичной дисменореей.

**Срок внедрения** 05.10.2021 г.

**Председатель комиссии**

**Члены (ответственные за внедрение):**

*[Signature]* Аманжолкызы А.  
*[Signature]* Кульжанова Д.С.  
*[Signature]* Аккожина А.М.  
*[Signature]* Тубулбаева С.М.  
*[Signature]* Долаева А.Е.

**Исполнитель**

## APPENDIX F

### Visual analogue scale of pain intensity (VAS)





## APPENDIX H

### Certificate of acceptance of an article for publication in in the journal WoS SCIE Q2



**CERTIFICATE OF ACCEPTANCE**

This certificate confirms the fact that the article **\*Clinical case and review of batriodic mesenchymal sarcoma of the uterus in primary dysmenorrhea followed by juvenile uterine bleeding\***, authored by Airur Donayeva, Airur Amanzholkyzy, Samat Saparbaev, Zhanat Komekbay, Gulnara Gubashcheva, is preparing for accepting for publication in the journal Web of Science SCIE Q2.

The issue is at the stage of technological preparation for printing and the complete data on it, as well as the link of the actual placement, will be available within a few months. The layout of the article and data on the issue will be provided after the fact of publication.

Date: 29/10/2021

Head of Scientific Projects  
Implementation Department,  
  
Viacheslav Kerner

«SCIENTIFIC PUBLICATIONS»  
✉ info@pubscience  
🌐 www.pubscience

+38 (044) 39 24 552  
+7 (497) 244 05 08  
+7 (727) 312 28 01

APPENDIX J

Application for the grant of a patent of the Republic of Kazakhstan for a utility model

Дата поступления 01.09.2021	(15) Дата вступления между изобретателем и патентообладателем в силу патента	(21) Регистрационный №	(22) Дата подачи
<input type="checkbox"/> (60) заявка на патент на изобретение или на полезную модель, поданная заявителем в другом государстве <input type="checkbox"/> (67) заявка на патент на изобретение или на полезную модель, поданная заявителем в другом государстве <input type="checkbox"/> (70) заявка на патент на изобретение или на полезную модель, поданная заявителем в другом государстве <input type="checkbox"/> (77) заявка на патент на изобретение или на полезную модель, поданная заявителем в другом государстве <p style="text-align: center;"><b>ЗАЯВЛЕНИЕ О ВЫДАЧЕ ПАТЕНТА Республики Казахстан на полезную модель</b></p>			
Предоставляю настоящим своим документом, прилагаю (присылаю) выдать патент Республики Казахстан на полезную модель: (71) Заявитель(и):		Код страны по стандарту ISO 3166 (если он утвержден)	
1. Независимое изобретение (объект) "Заводка-Кухонный медведь" с укомплектованной крышкой "Мирная Сказочка" (улица Мирная 63, Алматы-100000 (Самара, город Алматы, район Алатау, 030019) Описание изобретения дано в прилагаемом к заявке документе.		КЗ	
Выдвигаю настоятельную просьбу выдать патент на полезную модель. Заявитель заявляет, что изобретение является новым, оригинальным, промышленно применимым и соответствует критериям патентности. Проведу (присылаю) уведомить. Авторитетный орган по патентам: <input type="checkbox"/> органы интеллектуальной собственности в государственном учреждении Национального центра интеллектуальной собственности + РПТ (национальный институт интеллектуальной собственности) <input type="checkbox"/> органы интеллектуальной собственности в РПТ, государственной институт интеллектуальной собственности в соответствии с пунктом 4 статьи 20 Закона <input type="checkbox"/> органы интеллектуальной собственности в РПТ (национальный институт интеллектуальной собственности) в соответствии с пунктом 3 статьи 20 Закона Авторитетный орган по патентам (пунктом 5 статьи 20 Закона) (номер заявки _____, дата подачи _____) <input type="checkbox"/> государственная интеллектуальная собственность в государственном учреждении (пунктом 3 статьи 20 Закона)			
(31) № заявки, в отношении которой подана заявка	(32) Дата первоначальной заявки	(33) Код страны изобретения по ВТБ (если первоначальная заявка подана в другом государстве)	
(34) Название изобретения Способ изготовления крышки медведя П при изготовлении изделия у домашнего животного Место/фирма изобретателя/изобретатель/изобретатель Е. Дурдыевич, статус изобретателя/изобретателя			
Адрес для корреспонденции (почтовый/почтовый адрес и/или адрес электронной почты) АЦЕНТРАЛА ЖАНАТ БИВАПТЕРКОРПЛА, ШИБЕЛА Б. И. П. Алматы 2, АРТКОБДИКАЛАТ АҚТӨБЕ, Республика Казахстан, 080019 Телефон: _____ Мобильный тел: _____ Факс: _____ Адрес электронной почты: jana@jancorp.kz			
(74) Патентный поверенный (полное имя, регистрационный номер) или представитель (полное имя) (полное имя и фамилия/имена)			

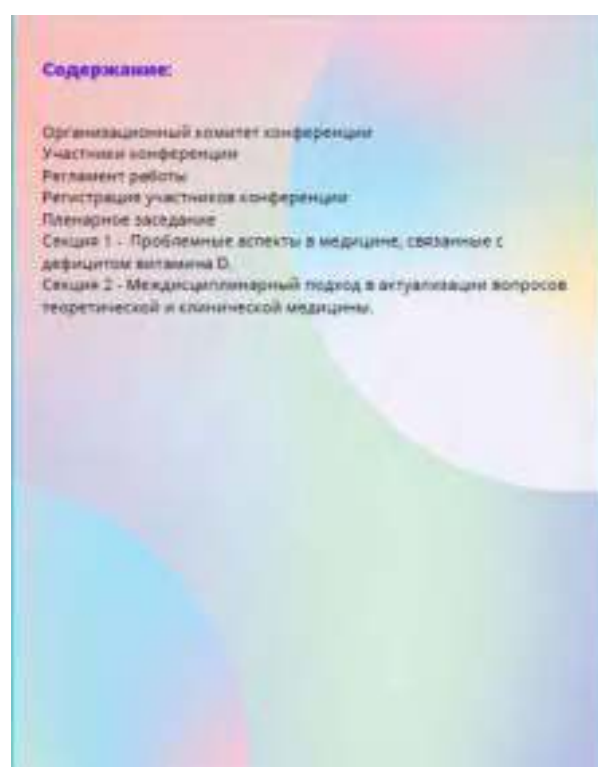
Перечень прилагаемых документов	Количество листов в 1 экземпляре	Количество экземпляров	(место для отчета РТИ об интеллектуальной собственности)
<input type="checkbox"/> приложения к заявлению			
<input checked="" type="checkbox"/> описание технической модели	5	1	
<input checked="" type="checkbox"/> формулы технической модели	1	1	
<input type="checkbox"/> чертеж(и) и иные материалы			
<input checked="" type="checkbox"/> реферат	1	1	
<input checked="" type="checkbox"/> документ об оплате государственной пошлины		1	
<input type="checkbox"/> документ, подтверждающий: наличие оснований для увеличения размера оплаты			
<input type="checkbox"/> патент(ы) перевод(ов) заявки(ов) (при направлении международной приоритетности)			
<input type="checkbox"/> документы заявки на иностранных языках			
<input type="checkbox"/> доверенность, удостоверяющая полномочия заявителя патентного поверенного или представителя			
<input checked="" type="checkbox"/> другой документ (указать) доверенность	1		
Или фактуры чертежей, прилагаемой для публикации с формулой(рефератом)			
(72) Автор(ы) (указывается полное имя)	Полный почтовый адрес местонахождения, включая наименование страны и ее код (по стандарту ISO 3163, если он установлен)		
1. Аманжолды Айнур	Абулхайыр кыш 22/9, Актобе, KZ, 030000		
2. Акжолена Аамырал Манасовна	Нур Актобе 1шар 36к31, Актобе, KZ, 030000		
3. Купжанова Давира Саиджановна	Алипа Молдагулова 56Д/1 кв 101, Актобе, KZ, 030000		
4. Диева Айнур Ергалиевна	Мират Сейтасова 38/1 кв 41, Актобе, KZ, 030000		
5. Тубулганов Салтанат Асметжановна	Мират Сейтасова 38В кв8, Актобе, KZ, 030000		
<input type="checkbox"/> (из) патент( патенты) на изобретение заявки (заявки) как автор(ов) при публикации сведений о выданных патентах на изобретение модели			
Подпись(и) автор(ов):			
Согласен на использование сведений, составляющих охраняемую законом тайну, содержащихся в информационных системах			
Подпись		Подписано с помощью ЭЦП АППИМОВА ЖАНАТ	
01.09.2021		Роль (Фамилия)	
Подпись(и) заявителя(ов) (при подписании от имени юридического лица подпись руководителя скрепляется печатью)			





## APPENDIX K

### Program of International scientific and practical conference "Modern medicine: a new approach and relevant research" (in Russian and English languages)



## Организационный комитет конференции

**Исмагулова Эльнара Кереевна** – и.о. председатель Правления – Ректор Западно-Казахстанского медицинского университета имени Марата Оспанова, доктор медицинских наук

**Сапарбаев Самат Сагатович** – Проректор по стратегическому развитию, науке и международному сотрудничеству, член Правления, кандидат медицинских наук, ассоциированный профессор

**Мусин Надияр Маратович** – Проректор по клинической работе, член Правления Западно-Казахстанского медицинского университета имени Марата Оспанова, кандидат медицинских наук, PhD

**Станкевичис Эдгарис** – доктор медицинских наук, профессор Литовский университет наук о здоровье

**Баспакова Акмарал Мухамеджановна** – руководитель департамента по научной работе, к.м.н., ассоциированный профессор

**Климов Леонид Яковлевич** – заведующий кафедрой факультетской педиатрии, декан педиатрического факультета Ставропольского государственного медицинского университета, доктор медицинских наук, доцент

**Досимов Жумабек Баймешович** – доктор медицинских наук, профессор кафедры детских болезней №2

**Нургалиева Роза Ергалиевна** – доктор медицинских наук, профессор кафедры нормальной физиологии

**Калдыбаева Айман Турганбаевна** – кандидат медицинских наук, доцент, руководитель кафедры нормальной физиологии

**Аманжолқызы Айну́р** – доктор PhD, доцент кафедры нормальной физиологии

**Кульжанова Динара Сандибаевна** – магистр медицинских наук, старший преподаватель кафедры нормальной физиологии, докторант 1 года обучения

**Асхожина Акмарал Манасовна** – преподаватель кафедры нормальной физиологии, магистрант 1 года обучения

**Доняев Айну́р Ергалиевна** – докторант 2 года обучения кафедры нормальной физиологии

**Альмаханова Майганым Жакаевна** – преподаватель кафедры нормальной физиологии

**Батырова Тамара Жаксығалиевна** – магистр медицинских наук, старший преподаватель кафедры нормальной физиологии

**Балмаганбетова Фарида Кикбаевна** – магистр медицинских наук, старший преподаватель кафедры нормальной физиологии

**Исаев Галымжан Исаевич** – кандидат медицинских наук, доцент кафедры нормальной физиологии

**Омарова Айну́р Бахитовна** – магистр биологических наук, преподаватель кафедры нормальной физиологии

**Айбасова Жулдыз Абдрашитовна** – кандидат медицинских наук, доцент кафедры нормальной физиологии

### Принимают участие:

1. НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова», г. Актюбе, РК.
2. Государственное бюджетное учреждение здравоохранения Самарской области "Самарская городская больница" №4, г. Самара, РФ.
3. Азербайджанский Медицинский Университет, г. Баку, Азербайджан
4. Кыргызская государственная медицинская академия им. И.К. Аалунбаева, г. Бишкек, Кыргызстан.
5. ФГАОУ ВО "Крымский федеральный университет им. В.И. Вернадского", институт "Медицинская академия имени С.И. Георгиевского", г. Симферополь, РФ.
6. ФГБОУ ВО Уфимский государственный авиационный технический университет, г. Уфа, РФ.
7. «Самарский государственный медицинский университет» МЗ РФ.
8. ГБОУ ВО "Ставропольский государственный медицинский университет" МЗ РФ, г. Ставрополь.
9. «Башкирский государственный медицинский университет» Минздрава России, г. Уфа, РФ.
10. Научно-производственный центр трансфузиологии Министерства здравоохранения Республики Казахстан
11. НАО "Медицинский Университет Семей", г. Семей, РК.
12. Казахский Национальный медицинский университет имени С. Д. Асфендиярова, г. Алматы, РК.
13. ТОО «МЦ Тау Сункар», г. Алматы, Республика Казахстан
14. НАО "Медицинский Университет Караганды", г. Караганда, РК.

### Регламент работы

#### Время Актюбе

Регистрация участников - 10.45 -11.00

Пленарное заседание - 11.00-11.50

Секционное заседание – 11.50 – 16.00

Мастер классы 09.00-18.00

Место проведения: зал ректората ЗКМУ им.Марата Оспанова, город Актюбе

Ссылка <https://wkmu.webex.com/jmeet/webex2>

### Пленарное заседание

#### Церемония открытия конференции:

1. **Аухенов Нурлан Ерденьевич** – кандидат медицинских наук, руководитель управления медицинской науки и инновационных технологий Департамента науки и человеческих ресурсов, МЗ РК.
2. **Исмагулова Эльнара Кереевна** – и.о. председатель Правления - Ректор Западно-Казахстанского медицинского университета имени Марата Оспанова, доктор медицинских наук.
3. **Мусин Надияр Маратович** - Проректор по клинической работе, член Правления Западно-Казахстанского медицинского университета имени Марата Оспанова, кандидат медицинских наук, PhD

### Приветственное слово:

1. **Эдгарас Станкевичюс** - доктор медицинских наук, профессор Литовский университет наук о здоровье

2. **Климов Леонид Яковлевич** - заведующий кафедрой факультетской педиатрии, декан педиатрического факультета Ставропольского государственного медицинского университета, доктор медицинских наук, доцент. "Витамин D - вчера, сегодня, завтра"

3. **Досимов Жумабек Баймешович** - доктор медицинских наук, профессор кафедры детских болезней ИАЭ

4. **Омаров Курмангазы Куралович** - кандидат технических наук, директор проектной дирекции АО «Фонд науки» Комитета науки Министерства образования и науки Республики Казахстан «Роль АО «Фонд науки» в коммерциализации РННД

### Секция 1: «Проблемные аспекты в медицине, связанные с дефицитом витамина D»

<https://wkm.u.webex.com/jmeet/webex2>

#### Модераторы:

**Сапарбаев Самат Сагатович** - Проректор по стратегическому развитию, науке и международному сотрудничеству, член Правления, кандидат медицинских наук, ассоциированный профессор

**Климов Леонид Яковлевич** - заведующий кафедрой факультетской педиатрии, декан педиатрического факультета Ставропольского государственного медицинского университета, доктор медицинских наук, доцент

#### Время Агстобе

11.50-12.05

**Верисокина Наталья Евгеньевна**, ГБОУ ВО «Ставропольский государственный медицинский университет» МЗ РФ - "Обеспеченность витамином D и гипокальциемия у новорожденных и недоношенных детей"

12.05-12.20

**Бейшебай кызы Гулнур**, Кыргызская государственная медицинская академия им. И.К. Аунбаева, г. Бишкек, Кыргызстан - "Морфологические особенности тимуса у новорожденных крыс в условиях горной фитоцены Кыргызстана"

12.20-12.35

**Дёмин Евгений Павлович**, ТОО «МЦ Тау Сункар», г. Алматы, Республика Казахстан - "Перспективы применения Тридалий спрей у пациентов с остеопорозом и саркопенией"

12.35-12.50

**Хафизов Мунаввис Мунависович**, «Башкирский государственный медицинский университет» Минздрава России, г. Уфа, РФ - "Изменение минерализации костной ткани у пациентов перенесших пневмонию, вызванную вирусом SARS-CoV-2"

12.50-13.05

**Ягупова Анастасия Валерьевна**, ГБОУ ВО "Ставропольский государственный медицинский университет" МЗ РФ - "Внедрение национальной программы по профилактике и коррекции гиповитаминоза D у детей: результаты на Юге России".

13.05-13.20

**Ягупова Самира Мамедгасан**, Азербайджанский Медицинский университет, г. Баку, Азербайджан - "Патогенетические аспекты изменений эндотелиолиза при сочетании воздействия инфекции и гипоксии".

13.20-13.30

**Шевандова Алина Алексеевна**, Медицинская академия имени С.П. Георгиевского г. Ставрополь, РФ - "Изучение нейропластичности и когнитивных функций при длительной оптогенетической стимуляции".

Перерыв 15 минут

13.45-14.00

**Курмаев Дмитрий Петрович**, ФГБОУ ВО «Самарский государственный медицинский университет» МЗ РФ - "Саркопения у мужчин пожилого и старческого возраста с полиморбидной патологией".

14.00-14.15

**Исмаилова Светлана Куралбаевна**, Казахский Национальный медицинский университет имени С. Д. Асфендиярова г. Алматы, РК - "Роль витамина D в развитии возрастной макулярной дегенерации сетчатки".

14.15-14.30

**Осмонов Айтбек**, Кыргызская государственная медицинская академия им. И.К. Акуновска г. Бишкек, Кыргызстан - "Внутриклеточные лимфатические бассейны эпн, мио-и эндоркарда".

14.30-14.45

**Колманбай Жанат Ескариевна**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова» г. Актобе, РК - "Thoracoscopic changes in the lungs with Covid 19".

14.45-15.00

**Тубулбаева Салтанат Азметжановна**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова» г. Актобе, РК - "Особенности полового развития у девочек-подростков с первичной дисменореей".

15.00-15.15

**Амангелди Жансая Куанышқызыл**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова» г. Актобе, РК - "Астана целасындағы 10-14 жастағы балалардың тамашауына тілмемалық бала беру".

15.15-15.30

**Тубай Назгул Асанқызыл**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова» г. Актобе, РК - "Функциональная недостаточность и полиморфизм гена рецептора витамина D у детей, больных бронхиальной астмой".

15.30-15.45

**Ким Ирина Сергеевна**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова» г. Актобе, РК - "Полиморфизм генов ассоциированный с риском развития гиповитаминоза D у детей раннего возраста казахской популяции".

15.45-16.00

**Донаева Айнул Ергалиевна**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова» г. Актобе, РК - "Полиморфизм гена рецептора витамина D VDR и минеральной плотности костной ткани у азиатских девочек-подростков с первичной дисменореей".

16.00-16.15

**Кульжанова Динара Сандыбаевна**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова» г. Актобе, РК - "Статус витамина D у девочек-подростков с первичной дисменореей".

**Секция 2: «Междисциплинарный подход в  
актуализации вопросов теоретической и  
клинической медицины»**

<https://wikmi.webex.com/jmeet/webex1>

**Модераторы:**

**Досимов Жумабек Баймешович** – доктор медицинских наук, профессор кафедры детских болезней №2.

**Нургалиева Роза Ергалиевна** – доктор медицинских наук, профессора кафедры нормальной физиологии.

**Время Аクトбе**

**11.50 - 12.05**

**Башинская Софья Андреевна**, Государственное бюджетное учреждение здравоохранения Самарской области "Самарская городская больница" №4, г. Самара, РФ. - "Подход к терапии сахарного диабета 2 типа у пожилых"

**12.05 - 12.20**

**Кизатова Сауле Танзилевна**, НАО "Медицинский Университет Караганда", г. Караганда, РК. - "К вопросу об эффективности пренатального и неонатального скринингов врожденных пороков сердца".

**12.20 - 12.35**

**Рахымжанова Сауле Орынгалиевна**, НАО "Медицинский Университет Семей", г. Семей, РК. - "Соотношение отклонений массы тела и различных типов телосложения у студентов 1-3 курса НАО "СМБ".

**12.35 - 12.50**

**Имжаров Талгат Айатович**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова», г. Актюбе, РК. - Возможности интраоперационной уретеропиелоскопической ассистенции при лапароскопическом удалении камней верхних мочевых путей.

**12.50 - 13.05**

**Ахметова Сауле Жумабаевна**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова», г. Актюбе, РК. - Патоморфологический анализ хронического гастрита среди жителей города Актюбе.

**13.05 - 13.20**

**Аренова Шолпан Бисенгалиевна**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова», г. Актюбе, РК. - "Плацентарный аку факторы-1 превалируют в ранней диагностике үшін биомаркер ретінде".

**13.20 - 13.30**

**Таушанова Майя Карибаевна**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова», г. Актюбе, РК. - "Глюкозамен ауыратын науқастардың өмір сапасы. Введение шоу".

**Перерыв 15 минут**

**13.45 - 14.00**

**Бекболатов Нурлан Аманатулы**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова», г. Актюбе, РК. - Влияние приуса на развитие дисфункции височно-нижнечелюстного сустава.

**14.00 - 14.15**

**Дильмагамбетов Данияр Саруарович**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова», г. Актюбе, РК. - "Clinical manifestations and causes contributing to the development of relapses of respiratory tuberculosis".

**14.15 - 14.30**

**Сырлыбаева Лаззат Махсатовна**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова», г. Актюбе, РК. - "Determination of reference values of amino acids and carbamides concentrations for the diagnosis of inherited metabolic disorders".

14.30 - 14.45

**Жолдасова Нургуль Жанабаевна**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова», г. Актобе, РК. –  
"Efficacy of minimally invasive therapy and laser therapy in the complex treatment of endoparodontal lesions".

14.45 - 15.00

**Доскабулова Дария Топеуқызы**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова», г. Актобе, РК. –  
"Introduction of a model for improving the health literacy of children and adolescents".

15.00 - 15.15

**Тасқожина Гулайм Есенбаевна**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова», г. Актобе, РК. –  
"Assessment of cellular immunity in women with breast cancer".

15.15 - 15.30

**Балмаганбетова Фарида Кикбаевна**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова», г. Актобе, РК. –  
"The relationship between the immune status and the biocenosis of the vagina in women with breast cancer".

15.30 - 15.45

**Астраханов Акежан Рустемович**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова», г. Актобе, РК. –  
"Assessment of the effectiveness of antiviral therapy for hepatitis c virus during the period of sustained virologic response".

15.45 - 16.00

**Жанаманова Раушан Нурболатовна**, НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова», г. Актобе, РК. –  
"Lactobacteria and colonization resistance of the intestine in children".

16.00 - 16.15

**Аккожина Акмарал Манасовна**,  
**Калдыбаева Айман Турганбаева** НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова», г. Актобе, РК. –  
"Особенности минеральной плотности костной ткани у девочек-подростков с первичной дисменореей".

16.15 - 16.30

**Егизбаева Дина Кожабаевна**,  
**Жексенова Ажар Николаевна** НАО «Западно-Казахстанский медицинский университет имени Марата Оспанова», г. Актобе, РК. –  
"Age-related characteristics of the antitumor immune response in women with breast cancer"

**Мастер классы в онлайн формате**  
**Время Актюбе**

**09.00 - 09.50**

**Жамалиева Д.М.** – мастер-класс «Как написать аннотацию к диссертации? Описание актуальности, формулирование гипотезы, цели и задач исследования».

<https://us04web.zoom.us/j/773162829508?pwd=ZTFjOFRhZVhASzZWZkZWlPWkppUkUwZWZ0>

**10.00 - 11.00**

**Тюржанова Г.А., Апакаева Р.А., Темирова М.С.** - мастер-класс в офлайн режиме, практические занятия "Электронные ресурсы в помощи медицинскому образованию и науке"

Место проведения: Научно-медицинская библиотека ВКМУ ул. Марата  
Оспанова Конференц-холл.

**16.00.-17.00**

**Хожамкул Рабига Алтай кызы**, консультант компании Elsevier по Центральной Азии и Азербайджану

«Авторский вебинар КазМУ: Как использовать Scopus для успешной публикации научной статьи»

[https://elsevier.zoom.us/webinar/register/WN\\_5LRMNEsaTruh5cJW3F-s4A](https://elsevier.zoom.us/webinar/register/WN_5LRMNEsaTruh5cJW3F-s4A)

**17.00 - 18.00**

**Татьяна Сафонова**, директор медицинского направления, Россия, Казахстан, Узбекистан Elsevier.

Вебинар «Обучающий ресурс Elsevier ClinicalKey Student» - электронная платформа для эффективного обучения студентов медицинских ВУЗов»

<https://elsevier.zoom.us/joining/register/tjcrsqqr0gsl9sd1pF9W79KLy11a-11Aa2T>

Meeting ID 996 6572 3690

Passcode 747228

**Мастер классы в онлайн формате**  
**Время Актюбе**

**17.30 - 18.30**

**Гульмира Кудайбердиева**, доктор медицинских наук, профессор кафедры кардиологии и сердечно-сосудистой хирургии, старший научный сотрудник НИИ сердечно-сосудистой хирургии, Бишкек, Кыргызстан, директор Центра научных исследований и развития образования, главный редактор журнала «Сердце, сосуды и трансплантация» «Бишкек».

Мастер-класс по теме: "The design of articles in peer-reviewed journals".

<https://us04web.zoom.us/j/8497364629?pwd=bVlVWlYkdFpteG5UWHQyMkthbGZoQT09>

<https://us04web.zoom.us/j/8497364629?pwd=bVlVWlYkdFpteG5UWHQyMkthbGZoQT09>

Meeting ID 849 736 4629

Passcode 092NAv





NISU "WEST KAZAKHSTAN  
STATE OPENED MEDICAL  
UNIVERSITY"



## Programm

International Scientific and Practical Conference  
"MODERN MEDICINE: a NEW APPROACH and RELEVANT RESEARCH"  
among the medical educational organizations of Kazakhstan, FSU  
and beyond, confined to the World Osteoporosis Day (WOD)  
conducted within the framework of NTP AP09562004 "Features of  
metabolism and the state of bone mineral density in adolescent  
girls with primary dysmenorrhea"



29 October 2021  
Aktobe

### Content:

Organizing committee of the conference

Conference participants

Regulations of work Registration of conference participants

Plenary session

Section 1: «Problematic aspects in medicine associated with vitamin D  
deficiency»

Section 2: «Interdisciplinary approach in the actualization of theoretical  
and clinical medicine issues»

### **Organizing committee of the conference**

**Ismagulova Elnara Kereevna** - acting Chairman of the Board - Rector of the Marat Ospanov West Kazakhstan Medical University, Doctor of Medical Sciences

**Saparbaev Samat Sagatovich** - Vice-Rector for Strategic Development and International Cooperation, Member of the Management Board, Candidate of Medical Sciences, Associate Professor

**Muslin Nadjar Maratovich** - Vice-rector for clinical work, member of the Board of the Marat Ospanov West Kazakhstan Medical University, candidate of medical sciences, PhD

**Edgaras Stankevicius** - Doctor of Medical Sciences, Professor, Lithuanian University of Health Sciences

**Baspakova Akmaral Mukhamedzhanovna** - Head of the Department for Scientific Work, Candidate of Medical Sciences, Associate Professor

**Klimov Leonid Yakovlevich** - Head of the Department of Faculty Pediatrics, Dean of the Pediatric Faculty of Stavropol State Medical University, Doctor of Medical Sciences, docent

**Dosimov Zhumabek Baymeshovich** - Doctor of Medical Sciences, Professor of the Department of Children's Diseases №2

**Nurgalleva Roza Ergaleevna** - Doctor of Medical Sciences, Professor of the Department of Normal Physiology

**Kaldybaeva Ayman Turganbaevna** - Candidate of Medical Sciences, docent, Head of the Department of Normal Physiology

**Amanzholkzy Ainar** - PhD, docent of the Department of Normal Physiology

**Dinara Sandibaevna Kulzhanova** - Master of medical science, senior lecturer of the Department of Normal Physiology, 1st year doctoral student

**Akkozhdina Akmaral Manasovna** - Lecturer of the Department of Normal Physiology, 1st year master's student

**Donaev Ainar Ergalievna** - 2nd year doctoral student of the Department of Normal Physiology

**Almekhanova Maiganym Zhakaevna** - Lecturer of the Department of Normal Physiology

**Batyrova Tamara Zhaksygalievna** - Master of medical science, Senior Lecturer of the Department of Normal Physiology

**Balmaganbetova Farida Kikbaevna** - Master of medical science, Senior Lecturer of the Department of Normal Physiology

**Isaev Galymzhan Isaevich** - Candidate of Medical Sciences, docent of the Department of Normal Physiology

**Omarova Ainar Bakhitovna** - Mester of Biological Sciences, Lecturer at the Department of Normal Physiology

**Albasova Zhuldyz Abdrashitovna** - Candidate of Medical Sciences, docent of the Department of Normal Physiology

### Participants:

1. NISC "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK.
2. State budgetary institution of health care of the Samara region "Samara city hospital" No. 4, Samara, RF.
3. Azerbaijan Medical University, Baku, Azerbaijan
4. Kyrgyz State Medical Academy named after I.Kakhubayev International Higher School of Medicine, Bishkek, Kyrgyzstan.
5. "V.I. Vernadsky Crimean Federal University", Institute, "Medical Academy named after S.I. Georgievsky", Simferopol, RF.
6. Samara State Medical University of the Ministry of Health of Russia, Samara, RF.
7. Federal state-owned publicly-funded institution of higher education "Stavropol State Medical University of the Ministry of Health of the Russian Federation, Stavropol.
8. Ufa state aviation technical university, Ufa, the Russian Federation
9. Bashkortostan state medical university, Ufa, the Russian Federation
10. Scientific and Production Center for Transfusiology of the Ministry of Health, Nur-Sultan, the Republic of Kazakhstan.
11. NISC "Semey Medical University", Semey, RK.
12. Asfendiyarov Kazakh National Medical University, Almaty, Kazakhstan.
13. LLP "Medical Center Tau Suncar", Almaty city, The Republic of Kazakhstan.
14. NISC "Medical University of Karaganda", Karaganda, RK.

### Work regulations

#### Aktobe time

- Registration of participants - 10.45 - 11.00  
Plenary session - 11.00-11.50  
Sectional meeting - 11.50 - 16.00  
Master classes 09.00-18.00  
Venue: hall of the administration of WKMU, Aktobe  
Link <https://wkmu.webex.com/meet/webex2>

### Conference opening ceremony:

1. **Aukenov Nurtan Erdenovkch** - Candidate of Medical Sciences, Head of the Department of Medical Science and Innovative Technologies of the Department of Science and Human Resources, Ministry of Health of the Republic of Kazakhstan.
2. **Ismagulova Elnara Kereevna** - e.o. of the Board - Rector of the West Kazakhstan Medical University named after Marat Ospanov, Doctor of Medical Sciences.
3. **Musln Nadiar Maratovich** - Vice-rector for clinical work, member of the Board of the Marat Ospanov West Kazakhstan Medical University, candidate of medical sciences, PhD.

### Welcoming speech:

1. **Edgaras Stankevicius** - Doctor of Medical Sciences, Professor Lithuanian University of Health Sciences.

2. **Leonid Klimov Yakovlevich** - Head of the Department of Faculty Pediatrics, Dean of the Pediatric Faculty of Stavropol State Medical University, Doctor of Medical Sciences, Associate Professor "Vitamin D: yesterday, today, tomorrow".

3. **Dosimov Zhumabek Baymeshovich** - Doctor of Medical Sciences, Professor of the Department of Children's Diseases №2.

4. **Omarov Kurmangazy Karalovich** - Candidate of Technical Sciences, Director of the Project Directorate of JSC "Science Foundation" of the Science Committee of the Ministry of Education and Science of the Republic of Kazakhstan "The role of JSC "Science Foundation" in the commercialization of RNTD.

### Section 1: «Problematic aspects in medicine associated with vitamin D deficiency»

<https://wkms.webex.com/meet/webex2>

#### Moderators:

**Samat Sagatovich Saparbayev** - Vice-Rector for Strategic Development, Science and International Cooperation, Member of the Board, Candidate of Medical Sciences, Associate Professor.

**Leonid Yakovlevich Klimov** - Head of the Department of Faculty Pediatrics, Dean of the Pediatric Faculty of Stavropol State Medical University, Doctor of Medical Sciences, Associate Professor.

#### Aktobe time:

11.50-12.05

**Verisokina Natalia Evgenievna**, Federal state-owned publicly-funded institution of higher education "Stavropol State Medical University of the Ministry of Health of the Russian Federation, Stavropol - "Vitamin D supplementation and hypocalcemia in newborns and premature infants".

12.05-12.20

**Beishebal kyzy Gulnur**, Kyrgyz State Medical Academy named after I.Kaikhunbayev International Higher School of Medicine, Bishkek, Kyrgyzstan - "Thyroid indices in newborn rats in conditions of mountain hypoxia of Kyrgyzstan".

12.20-12.35

**Dyomin Evgeniy Pavlovich**, LLP "Medical Center Tau Sunca", Almaty city, The Republic of Kazakhstan - "Prospects for the use of TriDall® spray in patients with osteoporosis and sarcopenia".

12.35-12.50

**Khafizov Munavis Munavilovich**, Clinic of the Federal State Budgetary Educational Institution of Higher Education Bashkir State Medical University of the Ministry of Health of the Russian Federation, Ufa, Republic of Bashkortostan - "Changes in bone mineralization in patients who have suffered pneumonia caused by the SARS-CoV-2 virus".

12.50-13.05

**Yagupova Anastasia Valerievna**, Federal state-owned publicly-funded institution of higher education "Stavropol State Medical University of the Ministry of Health of the Russian Federation, Stavropol, Russia"

- "Implementation of the national program "vitamin D deficiency in children and adolescents of the Russian federation: modern approaches to correction": results in the south of Russia".

13.05-13.20

**Yagubova Samira Mammadgasan**, Azerbaijan Medical University, Department of Pathological Anatomy, Baku - "Pathogenetic aspects of changes in the adenohypophysis under the combined effect of infection and hypovita".

13.20-13.30

**Shevandova Alina Alekseevna**, Medical Academy named after S.I. Georgievsky, Simferopol, Russia - "Study of neuroplasticity and cognitive functions with long-term optogenetic stimulation".

**Break 15 minutes**

13.45-14.00

**Kurmaev Dmitriy Petrovich**, Samara State Medical University of the Ministry of Health of Russia, Samara, Russia - "Seroopenia in elderly and senile men with polymorbid pathology".

14.00-14.15

**Ismailova Svetlana Kuraltbaevna**, Adendiyarov Kazakh National Medical University, Almaty, Kazakhstan - "Influence of vitamin D on the course of age macular degeneration".

14.15-14.30

**Osmanov Aitbek**, Kyrgyz State Medical Academy named after I.Kakhumbajev International Higher School of Medicine, Bishkek, Kyrgyzstan - "Intramural lymphatic pools of the epi- myo- and endocardium".

14.30-14.45

**Komekbal Zhanat Eskerakyzdy**, NQSC "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Histopathological changes in the lungs with Covid 19".

14.45-15.00

**Tubulbaeva Saltanat Akhmetzhanovna**, NQSC "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - Features of sexual development in adolescent girls with primary dysmenorrhea.

15.00-15.15

**Dosimov Arystan Zhumabekovich**, NQSC "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Peculiarities of of the vitamin D receptor gene polymorphism in Kazakh children with bronchial asthma".

15.15-15.30

**Gulbay Nazgul Asankyzy**, NQSC "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "The peculiarity of the D-vitamin status in children with bronchial asthma".

15.30-15.45

**Klin Irina Sergeevna**, NQSC "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Polymorphism of hypovitaminosis D genes in young children of the Kazakh population".

15.45-16.00

**Donaeva Ainur Yergalievna**, NQSC "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Polymorphism of vitamin D VDR receptor gene and mineral density of bone tissue in asian adolescent girls with primary dysmenorrhea".

16.00-16.15

**Kutchanova Dinara Sandilbaevna**, NQSC "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Vitamin D status in adolescent girls with primary dysmenorrhea".

## Section 2: «Interdisciplinary approach in the actualization of theoretical and clinical medicine issues»

<https://wkms.webex.com/join/webex1>

### Moderators:

**Dosimov Zhumabek Baymashovich** - Doctor of Medical Sciences, Professor of the Department of Children's Diseases №2.

**Nurgaliev Rosa Yergalievna** - Doctor of Medical Sciences, Professor of the Department of Normal Physiology.

### Aktobe time

11.50 - 12.05

**Bashinskaya Sofia Andreevna**, Federal State Budgetary Educational Institution of Higher Education "Samara State Medical University" of the Ministry of Health of the Russian Federation, Samara, RF - "An approach to the treatment of type 2 diabetes mellitus in the elderly".

12.05 - 12.20

**Kizatova Saule Tanzilovna**, NISC "Medical University of Karaganda", Kazakhstan - "To the question of the effectiveness of prenatal and neonatal screening for congenital heart defects".

12.20 - 12.35

**Rakhymzhanova Saule Oryngazievna**, NISC "Semey Medical University", Semey, Republic of Kazakhstan - "The ratio of deviations of body weight and various types of constitution in students of the 1-3 course of the NISC "SMU".

12.35 - 12.50

**Imzharov Talgat Abatovich**, NISC "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Combination of laparo - endoscopic techniques in urology for urolithiasis of the upper urinary tract".

12.50 - 13.05

**Akhmetova Saule Zhumabaevna**, NISC "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Pathomorphological analysis of chronic gastritis among residents of Aktobe".

13.05 - 13.20

**Arenova Sholpan Bisengalievna**, NISC "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Placental growth factor - 1 as a biomarker for early diagnostics of preeclampsia".

13.20 - 13.30

**Taushanova Maya Karibaevna**, NISC "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Quality of life of patients with glaucoma. Literature review".

### Break 15 minutes

13.45 - 14.00

**Bekbolatov Nurlan Amanatuly**, NISC "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "The effect of bite on the development of temporomandibular joint dysfunction".

14.00 - 14.15

**Dilmagambetov Daniyar Saruarovich**, NISC "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Clinical manifestations and causes contributing to the development of relapses of respiratory tuberculosis".

14.15 - 14.30

**Syrlybayeva Lyazzat Makhmatovna**, NISC "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Determination of reference values of amino acids and carnitines concentrations for the diagnosis of inherited metabolic disorders".

14.30 - 14.45

**Zholdasova Nurgul Zhanabayeva**, NISC "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Efficacy of minimally invasive therapy and laser therapy in the complex treatment of endoperiodontal lesions".

14.45 - 15.00

**Doskalbulova Dariya Tolesukyzy** - NISC "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Introduction of a model for improving the health literacy of children and adolescents".

15.00 - 15.15

**Taskozhina Gulaim Esenbayevna**, NJS "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Assessment of cellular immunity in women with breast cancer"

15.15 - 15.30

**Balmaganbetova Farida Kikbayevna**, NJS "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "The relationship between the immune status and the biocenosis of the vagina in women with breast cancer"

15.30 - 15.45

**Astrakhanov Akezhan Rustemovich**, NJS "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Assessment of the effectiveness of antiviral therapy for hepatitis c virus during the period of sustained virologic response"

15.45 - 16.00

**Zhanamanova Raushan Nurbolatovna**, NJS "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Lactobacteria and colonization resistance of the intestine in children"

16.00 - 16.15

**Akkochina Akmaral Manasovna**,  
**Kaldybaeva Alman Turganbayevna**, NJS "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Features of bone mineral density in adolescent girls with primary dysmenorrhea"

16.15 - 16.30

**Yegizbayeva Dina Kozhabayevna**,  
**Zhekenova Azhar Nikolayevna**, NJS "West Kazakhstan Marat Ospanov Medical University", Aktobe, RK - "Age-related characteristics of the antitumor immune response in women with breast cancer"

### Master classes in online format

#### Aktobe Time

09.00 - 09.50

1. **Zhamalleva L.M.** - "How to write an abstract for a dissertation? Description of relevance, formulation of a hypothesis, goals and objectives of the study"

<https://us04web.zoom.us/j/73162629500?pwd=ZTFjOFAzZWZkbWl1PWkppUFAwda0p>

10.00 - 11.00

Master class mode offline

**Turezhanova G.A., Apakayeva R.A., Temirova M.S.** - "Practical classes "Electronic resources to help medical education and science"

Venue: Scientific and medical library of WZMU named after Marat Ospanov, Conference Hall.

16.00 - 17.00

**Khodzhamkul Rabiga Altay Kyzy**, Consultant of Elsevier for Central Asia and Azerbaijan "Author's webinar of KazNU. How to use Scopus to successfully publish a scientific article"

[https://elsevier.zoom.us/webinar/register/WN\\_5LlRMNEsaTruhGcJWGF-s4A](https://elsevier.zoom.us/webinar/register/WN_5LlRMNEsaTruhGcJWGF-s4A)

17.00 - 18.00

**Tatyana Salomova** - Director of Medical Direction, Russia, Kazakhstan, Uzbekistan Elsevier "Elsevier ClinicalKey Student training resource - an electronic platform for effective teaching of medical students"

[https://elsevier.zoom.us/meeting/register/tJcrceqvDgsE9Sd1pF9W79k-Ly11a\\_1TAz2T](https://elsevier.zoom.us/meeting/register/tJcrceqvDgsE9Sd1pF9W79k-Ly11a_1TAz2T)

Meeting ID 936 6572 3690

Passcode 747228

## Master classes in online format

Aktobe Time

17.30 - 18.30

**Gulmira Kudalberdieva** - MD, DSc, FESC, Professor in Cardiology and Cardiovascular Surgery Senior Research associate CV surgery SRHSOT, Bishkek Kyrgyzstan Director of the Center for Scientific Research and Development of Education, Bishkek Editor-in-Chief Heart, Vessels and Transplantation Journal  
Master class on the topic: The design of articles in peer-reviewed journals

[https://us04web.zoom.us/j/8497364629?](https://us04web.zoom.us/j/8497364629?pwd=bVYwYXQxdlFpdzZGUWVHd0YkRkZjB6GtoQT09)

[pwd=bVYwYXQxdlFpdzZGUWVHd0YkRkZjB6GtoQT09](https://us04web.zoom.us/j/8497364629?pwd=bVYwYXQxdlFpdzZGUWVHd0YkRkZjB6GtoQT09)

Meeting ID 845 736 4629

Passcode 092NA



## APPENDIX L

### Abstracts with a report at the International Scientific and Practical conference "Modern medicine: a new approach and relevant research"

#### POLYMORPHISM OF VITAMIN D VDR RECEPTOR GENE AND MINERAL DENSITY OF BONE TISSUE IN ASIAN ADOLESCENT GIRLS WITH PRIMARY DYSMENORRHEA

Donayeva A.E.<sup>1</sup>, Amanzholkyzy A.<sup>1</sup>, Gubasheva G.K.<sup>1</sup>, Muhambetalyeva G.K.<sup>1</sup>, Yarniyazova Zh.K.<sup>1</sup>, Kimakov N.N.<sup>1</sup>

<sup>1</sup>West Kazakhstan Narat Ospanov Medical University, Aktobe, Kazakhstan

**Background.** Dysmenorrhea is the occurrence of severe pain in the lower abdomen during menstruation. The pain is often cramping and may radiate to the hips or lower spine. Lower abdominal pain may be accompanied by vomiting, headache, back pain, diarrhea, and fatigue.

The vitamin D / vitamin D receptor (VDR) has been shown to suppress the inflammatory effects mediated by NF- $\kappa$ B.

The exchange of calcium and phosphates in bone tissue is regulated with the participation of vitamin D by the interaction of its hormone-active form, calcitriol 1,25 (OH) 2 D3, with the receptor cells. The receptor for calcitriol (vitamin D, VDR) (or NR1H1) belongs to the family of nuclear transcriptional proteins and is involved not only in transcription, controlled by microRNA.

Among the hypotheses of menstrual dysfunction with vitamin D deficiency, neurohumoral regulation of the hypothalamic – pituitary – ovarian system is considered essential due to the localization of vitamin D receptors (VDR), in contrast to other vitamins, in the nuclei of various tissues and organs. However, over the past 10 years, data have been accumulated on the role of genetic polymorphism of the VDR gene in the pathogenesis of various manifestations of menstrual dysfunction. Some studies have shown a beneficial effect of cholecalciferol on menstrual irregularities such as oligomenorrhea and dysmenorrhea. With regard to the abundant data on the role of vitamin D, both traditional and recently published, there is a strong correlation between vitamin D deficiency and various other factors that determine a wide range of polymorphic clinical manifestations, where menstrual dysfunction is significant in girls at puberty.

In this review, we discuss pathways involved in pain perception and processing, primarily at the level of dorsal root ganglion (DRG) neurons, and the potential interactions between vitamin D, its receptor (VDR), and known specific pain signaling pathways, including nerve growth factor (NGF), glial neurotrophic factor (GDNF), epidermal growth factor receptor (EGFR) and opioid receptors.

**Aim.** to study the diagnostic significance of the VDR genetic marker (rs731236) and the state of bone mineral density in adolescent girls with primary dysmenorrhea.

**Methods.** Research design - cross-sectional study.

The study involved 105 girls (12 to 18 years old) adolescents with primary dysmenorrhea. After obtaining informed consent from adolescents and their parents, a blood test was taken from a vein for the genetic marker 7014a-VDR (rs731236) in adolescent girls with primary dysmenorrhea. BMD was assessed using ultrasound densitometry.

**Results.** According to genetic testing, the subjects were divided into the following groups according to the distribution of alleles of the polymorphic marker vitamin D receptor VDR: T / C, C / C, T / T. The first group consisted of 58 girls (56%) with the T / T gene, in the second group C / C in 5 girls (8%), in the third group T / C 41 (36%). The distribution of alleles of the intracellular vitamin D receptor VDR gene in adolescent girls with primary dysmenorrhea with normal BMD was as follows: carriers of T / T genotype-12 (48%), carriers of C / C 1 (4%), carriers of T / C genotype-12 ( 48%). In the second group with reduced and / or osteopenia, carriers of T / C genotype-26 (35%), carriers of C / C 4 (5%), carriers of T / T genotype-45 (60%). The C / C genotype did not depend on BMD.

**Conclusions.** 1. It was determined that in 36% of adolescents with primary dysmenorrhea, the heterozygous T / C genotype is determined in both groups of BMD.

2. On the study of genetic markers of bone remodeling in the future, which indicates the need for an in-depth study of the state of BMD and further determination of the relationship between the presence of genotype variants in adolescent girls with primary dysmenorrhea.

**Acknowledgements.** Authors declare the absence of conflict of interest. The study is funded by the Ministry of Education and Science of the Republic of Kazakhstan IRN AP09563004.

## Features of bone mineral density in adolescent girls with primary dysmenorrhea

Alkuzhina A.M.<sup>1</sup>, Amanzholova A.<sup>1</sup>, Kaldybaeva A.T.<sup>1</sup>, Kamkova M.E.<sup>1</sup>, Aikova Zh.A.<sup>1</sup>, Isayev G.I.<sup>1</sup>

<sup>1</sup>West Kazakhstan Mansur Ospanov Medical University, Aktobe, Kazakhstan

**Background.** Dysmenorrhea is a serious health problem for adolescents, as well as for medical practitioners, which negatively affects the daily activities and quality of life of adolescent girls. Today, one of the urgent problems of pediatric and adolescent gynecology is dysmenorrhea. Teenage girls with dysmenorrhea represent a high risk group for menstrual dysfunction and the formation of reproductive system pathology. Today, one of the urgent problems of pediatric and adolescent gynecology is dysmenorrhea. Adolescents with dysmenorrhea represent a high risk group for menstrual dysfunction and the formation of reproductive system pathology. Based on the results of several studies conducted, it should be noted that severe menstrual pain associated with primary dysmenorrhea affects the quality of life depending on the overall health. Bone mineral density is a measure of bone density. Features regarding bone remodeling, deficiencies in diagnostic knowledge related to bone health associated with primary dysmenorrhea in adolescent girls.

**Aims.** To assess bone mineral density (BMD) in adolescent girls with primary dysmenorrhea.

**Methods.** We examined 106 adolescent girls with primary dysmenorrhea at the age of 12-18 years. The state of BMD was assessed using ultrasound osteodensitometry, which was carried out through the calcaneus using a SCROST-3000 South Korea osteodensitometer device. According to the state of BMD, adolescent girls are divided into three groups: group 1 (n = 21) - Z-score norm ( $\geq -1$ ) and group 2 (n = 79) - Z-score osteopenia ( $-1 - (-2.9)$ ), 3rd (n = 5) - osteoporosis Z-score ( $\leq -3$ );

**Results.** The average age of the surveyed adolescent girls was  $15.6 \pm 1.7$  years; height  $160.2 \pm 7.2$  cm; weight  $53.5 \pm 9.9$  kg; BQI  $78.2 \pm 13.7$ ; SOS  $1516.2 \pm 13.7$  (m / s); BUA  $77.8 \pm 19.0$  (dB / MHz); BMI  $20.7 \pm 2.7$ ; In group 1, normal BMD, the mean value was  $163.6 \pm 6.7$  cm; weight  $54.4 \pm 9.5$  kg; BQI  $95.1 \pm 11.8$ ; SOS  $1534.096 \pm 12.3$  (m / s); BUA  $86.7 \pm 16.3$  (dB / MHz); BMI  $20.4 \pm 2.7$ ; in group 2 with osteopenia, the height is  $159.4 \pm 7.2$  cm; weight  $53.2 \pm 10.0$  kg; BQI  $73.0 \pm 9.3$ ; SOS (m / s)  $1510.6 \pm 8.4$ ; BUA (dB / MHz)  $74.0 \pm 18.8$ ; BMI  $20.8 \pm 2.7$ ;

Anthropometric indicators such as height, weight, BMI had a weak positive correlation with the indicators of osteodensitometry  $r = 0.3$

**Conclusions.** Thus, the obtained data prove the importance of further in-depth study of the relationship between body mass index and bone mineral density, since the main factors of peak bone density in adolescent girls are age and the onset of sexual age.

**Acknowledgements.** Authors declare the absence of conflict of interest. The study is funded by the Ministry of Education and Science of the Republic of Kazakhstan ERN AP09563404.

### References.

1. Guzenyuk O., Chernenkov Y. Dysmenorrhea in girls in puberty: prevalence, causes and principles of therapy // Doctor. - 2015. No. 3. S. 63-66.
2. Association between dietary calcium intake and BMD in children and adolescents. Kaiyu Pan, Chengyue Zhang, Xiaocang Yao, Zhongxin Zhu
3. Bone mineral density in women of reproductive age with rheumatic diseases. O. V. Dobrovolskaya, N. V. Dymov, A. V. Smirnov, I. A. Shumilova, N. V. Turoptsova V. A. Nasonova Research Institute of Rheumatology, Moscow, Russia. DOI: 10.33667/2078-5631-2019-2-37(112)-7-11

## VITAMIN D STATUS IN ADOLESCENT GIRLS WITH PRIMARY DYSMENORRHEA

Kulzhanova D.S.<sup>1</sup>, Amansholkyzy A.<sup>1</sup>, Saparbaev S.S.<sup>1</sup>, Nurgaliyeva R.E.<sup>1</sup>, Aibasova Zh.A.<sup>1</sup>,  
Isaev G.I.<sup>1</sup>

<sup>1</sup>West Kazakhstan Marat Ospanov Medical University, Aktobe, Kazakhstan

**Background.** The National Guide to Gynecology (2009) defines dysmenorrhea as a violation of the menstrual cycle, manifested by painful menstruation and includes a wide range of neurovegetative, metabolic, endocrine, mental and emotional abnormalities, the main manifestation of which is pain syndrome. The frequency of pain during menstruation, according to various researchers, ranges from 8 to 90% [1].

Many scientific articles have been analyzed on the problem of vitamin D deficiency, despite the fact that the effect of vitamin D deficiency on the health of children and adolescents has been studied for a long time, information about the role of vitamin D in the formation of menstrual function in puberty girls is scant and ambiguous. Vitamin D plays a critical role in sexual development, possibly due to its effects on calcium homeostasis, cyclical fluctuations in sex steroid hormones, or bone mineral density and metabolism [2, 3].

**Aim.** A study of vitamin D levels in adolescent girls with primary dysmenorrhea.

**Methods.** 105 adolescent girls with primary dysmenorrhea at the age of 12-18 years were examined. Determination of 25 (OH) D in blood serum was performed by chemiluminescence immunoassay. Taking into account the supply of vitamin D, the following are distinguished: 1st group (n = 95) - inadequate level of 25 (OH) D and 2nd (n = 10) - adequate supply (30-100ng / ml). Group 1 was divided into subgroup 1A (n = 34) - deficiency of 25 (OH) D (20-30 ng / ml) and 1B (n = 61) - deficit (<20 ng / ml).

**Results.** General descriptive statistics revealed that the average vitamin D value was  $19.8 \pm 8.9$  ng / ml, which indicates the lower limits of the reference values.

Against the background of primary dysmenorrhea syndrome, 90% of the examined have an inadequate level of vitamin D, of which in subgroup 1A (36%) it has an insufficient level within  $23.76 \pm 4.9$ ; in subgroup 1B (64%) 25 (OH) D  $[4.21 \pm 4.9]$  in the indicated contents.

Levels of 25 (OH) D in 105 adolescent girls with primary dysmenorrhea were inversely related to the score on a visual analogue scale ( $r = -0.137$ ;  $p = 0.05$ ).

**Conclusions.** The results of the study confirmed a high prevalence of inadequate vitamin D supply among adolescent girls with primary dysmenorrhea (90%), which is 64% in the deficit range. The data obtained clearly demonstrate that the period of the formation of menstrual function in adolescence should be considered as a risk factor for the development of D-deficiency states, which increases against the background of violations of sexual development.

**Acknowledgements.** Authors declare the absence of conflict of interest. The study is funded by the Ministry of Education and Science of the Republic of Kazakhstan project IRN AP09563004.

### References:

1. Gumenyuk O., Chernenkov Y. Dysmenorrhea in girls in puberty: prevalence, causes and principles of therapy // Doctor. - 2015. No. 3. S. 63-66.
2. Afiane Bahrami, Amir Avan, Hamid Reza Sadeghnia, Habibollah Esmaeili, Maryam Tayebi, Faezeh Ghaseini show all High dose vitamin D supplementation can improve menstrual problems, dysmenorrhea, and premenstrual syndrome in adolescents Journal Gynecological Endocrinology Volume 34, 2018 - Issue 8 Pages 659-663 <https://doi.org/10.1080/09513590.2017.14234662>
3. Trushina O.V., Novichkov D.A., Khvorostukhina N.F., Romanovskaya A.V., Stepanova N.N., Pchelintseva L.I. Vitamin D status in adolescent girls with menstrual dysfunction. *Vopr. ginekolog. i perinatol. (Gynecology, Obstetrics and Perinatology)*, 2019, 18(5): 95-101. DOI: 10.20953/1726-1678-2019-5-95-101

## FEATURES OF SEXUAL DEVELOPMENT IN ADOLESCENT GIRLS WITH PRIMARY DYSMENORRHEA

Donayeva A.E.<sup>1</sup>, Amanzholkzy A.<sup>1</sup>, Tubalbaeva S.A.<sup>1</sup>, Gubasheva G.K.<sup>1</sup>, Mihanbetalyeva G.K.<sup>1</sup>, Yermiyazova Zh.K.<sup>1</sup>, Kunakov N.N.<sup>1</sup>

<sup>1</sup>West Kazakhstan Murat Ospanov Medical University, Aktobe, Kazakhstan

**Background.** The period of puberty is a very responsible and kind of "critical" period of the child's postnatal development, which often determines his future life. Often, depending on how healthy the child enters this period, how correct it is, depends not only on his future, but also on the future of the next generations.

The sexual development of adolescents is one of the important indicators of the well-being of the population, the study of which in the context of the global trend towards a change in the timing of the onset of adolescence can help identify problems of public health care. Dysmenorrhea occurs in most adolescent girls and is the main cause of occasional short absences from school in this group. A presumptive diagnosis of primary dysmenorrhea can be made based on a typical history of pelvic pain that coincides with the onset of menstruation and lasts 1–3 days. This stage ends with the appearance of menarche in girls. At this time, the level of growth hormone decreases, the level of gonadotropins and estrogens rises, the function of the thyroid gland is activated.

**Aim.** To study the characteristics of sexual development according to Tanner and the definition of the Kazakh population among adolescents with primary dysmenorrhea.

**Methods.** Secondary sex characteristics were assessed by a specialist physician according to Tanner criteria, which assessed the development of pubic hair, axillary hair development, mammary gland development, and age at menarche.

**Results.** 105 adolescent girls were examined aged 12 to 18 years. The average age was  $15.6 \pm 1.7$  years. At the time of enrollment in the study, 89% of adolescents had regular periods. Our study revealed that 3.8% of adolescent girls had premature sexual development, and the remaining 96.2% of girls had no pathology in sexual development. The degree of hairiness in the armpit according to Tanner's criteria in the early adolescence according to WHO was 66.3%, in the late adolescence it was 33.7%. Pubic hair development in early adolescence was 54.1% and in late adolescence was 45.9%. At the time of inclusion in the study, it was noted by a practitioner in late adolescence to have a higher degree of development. Taking into account the international regulatory documents that determined the criteria for the onset of puberty, the 2nd stage of development of the external genital organs in girls, the average age of the onset of menarche was 11–12 years.

**Conclusions.** The data obtained indicate that, with primary dysmenorrhea, there was no delay in the appearance of secondary sexual characteristics. This research will be continued, as well as the relationship with growth and sexual development among this category of surveyed will be revealed.

**Acknowledgements.** Authors declare the absence of conflict of interest. The study is funded by the Ministry of Education and Science of the Republic of Kazakhstan project IRN AP09563004.

## APPENDIX M

Abstract with a report at the LX International Scientific Conference students and young scientists "Science: Yesterday, Today, Tomorrow" in the framework of the 30th anniversary of Independence of the Republic of Kazakhstan

Донцова А.Е.

### БІРІНШІЛІК ДИСМЕНОРЕЯ АНЫҚТАДҒАН ЖАСӨСПІРІМ ҚЫЗБАЛАДАҒЫ МИНЕРАЛЬДЫ ТЫҒЫЗДЫҒЫ МЕН СҮЙЕК ТІНІ МЕТАБОЛИЗМІ ЖАҒДАНЫН СИПАТТАҒАН КЛИНИКАЛЫҚ ЖАҒДАН

Қаыпты физиология кафедрасы

Ғылыми жетекшісі- PhD, доцент Аманжолқызы А.

Марат Оспанов атындағы Батыс Қазақстан Медициналық Университеті  
Ақтөбе қаласы, Қазақстан Республикасы

Өзектілігі. Дисменорея - бұл ауыршық болған күннен бастап егезар күндерінің алғашқы 48 сағат ішінде ішкі төмен бөлігіне толық төрілі ауырсынумен кәрінетін және ішкі жәмбақ күшесінің гипоплазиялық өзгерістеріне бөлігінен процесс[1]. Қыздардың жанытық жетілу кезіндегі D витаминінің рөлі туралы кәрітеген және мағметтерге сүйене отырып D дәруменінің жетілушілігін анықтайтын факторлар және полиморфы клиникалық кәрістердің бір бөлігі екені мағметте егезар ішкінің бұзылуы арасындағы байланыстың болуын әлемдік деңгейде кәрітеген пәкіталық туындыныңна дәлелденіп отыр [2].

Бұл жәкілде негізі назар остеоденситометрия және биохимиялық маркерлерді анықтудың биохимиялық әдісі кәрітемен анықталатын остеопениялық синдромға (сүйек тінін беркілінің немесе сызылышының төмендеуі) тудыратыны метаболизміне әсері[3]. Мағметте Біріншілік дисменорея анықталған жасөспірім қызбалардағы минеральды тығыздығы мен сүйек тіні метаболизм жағдайын бағалау.

Метермарлар мен әдістері. ОПО Кеңес-диагностикалық функцияна балалар және жасөспірімдер гинекологияның қабылалуына жасөспірім қызбаларда біріншілік дисменорея диагнозы қойылыпты. Ауырсыну шкаласы VAS бойынша анықталыпты, бидің клиникалық жағдайдағы науқастың шкаласы 7 балл. Науқасқа ультрадыбыстық остеоденситометрия әдісі мен қанның биохимиялық анализіне сүйектің метаболизмі жағдайының биомаркерлері анықталыпты қан сарысуындағы мағметте (Mg): кальций, натрий, ионизирленген кальций (Ca<sup>2+</sup>), 25-OH D дәрумені, эстрадиол (E2), прогестерон, паратгормон анықталды. Нәтижелер мен талшылу. Остеоденситометрияның қорытындысы бойынша остеопения анықталды. 25-OH D дәрумені-6,8нг/мл яғни талшылық анықталды. Ал мағметте-0,80ммоль/л, кальций-2,36ммоль/л, эстрадиол-1 нмоль/л, прогестерон-1,8нмоль/л, паратгормон-0,19нмоль/л, яғни қалыпты мөлшерде болды. Жоғарыда аталған синдромлар мен ерекшеліктерді егезар-тегікейлі жәкіттеу практикалық денкәметте сақтау дәрігерлеріне жасөспірім қыздардың сүйек метаболизмі мен гинекологиялық кәрітебесіндегі өзгерістер арасындағы байланысты байқалауға мүмкіндік береді.

Қорытындысы. Алынған денкәметрияның қорытындысымен және жәкітәлілік негізде талшылуға сүйене отырып, біріншілік дисменореясы кәрітепегі остеопениялық синдромына тен және арасында тікелей байланыс бар екені анықталды. Қолданылған әдебиеттер:

С.Ф. Насырова, Ф.Ф. Бадретдинова, А.М. Зиганшина, Е.В. Кулаковский Профилактика нарушений репродуктивного здоровья у девушек-подростков с первичной дисменореей. Мед. вестник Башкортостана. Том 12, №5(71), 2017. С. 42-46.

N. V. Bashmakova, I. V. Lisovskaya & V. Y. Vlasova Pathogenetic role of vitamin D deficiency in the development of menstrual dysfunction in pubertal girls: a literature review Journal Gynecological Endocrinology Volume 33, 2017 -Issue suppl: Factors of Endocrine and Reproductive Health Pages 52-55 <https://doi.org/10.1080/09513590.2017.1404235>

З.Аманжолқызы А. Нұрғалиева Р. Кәкітәйева А. Биохимикалық вариациялы витамин d рецептор (Vdr) гені және онының сүйек минералды тығыздығы мен онының батыс өңіріндегі балалардың

**РЕЗЮМЕ**

**Дурыева А.Е.**

**СОСТОЯНИЕ МИНЕРАЛЬНОЙ ПЛОТНОСТИ И МЕТАБОЛИЗМА КОСТНОЙ ТКАНИ У  
ДЕВОЧКИ ПОДРОСТКА С ПЕРВИЧНОЙ ДИСМЕНОРЕЕЙ: ОПИСАНИЕ КЛИНИЧЕСКОГО  
СЛУЧАЯ**

**Западно-Казахстанский Медицинский Университет имени Мирета Оспанова**

По результатам полученной денситометрии и анализа результатов лабораторных исследований установлено, что существует прямая связь между остеопеническим синдромом и первичной дисменореей.

**SUMMARY**

**Duryeva A.E.**

**STATES OF MINERAL DENSITY AND METABOLISM OF BONE TISSUE IN A TEENAGE  
GIRL WITH PRIMARY DYSMENORRHEA: DESCRIPTION OF A CLINICAL CASE**

**West Kazakhstan Medical University named after Mirra Ospanov**

According to the results of the obtained densitometry and analysis of the results of laboratory studies, it was established that there is a direct link between osteopenic syndrome and primary dysmenorrhea.



# LX МЕЖДУНАРОДНАЯ НАУЧНАЯ КОНФЕРЕНЦИЯ СТУДЕНТОВ И МОЛОДЫХ УЧЕНЫХ

-НАУКА: ВЧЕРА, СЕГОДНЯ, ЗАВТРА-  
В РАМКАХ 30-ЛЕТИЯ НЕЗАВИСИМОСТИ  
РЕСПУБЛИКИ КАЗАХСТАН

28 апреля 2021

## МАЗМУНЫ – СОДЕРЖАНИЕ

**СЕКЦИЯ 5** ІШІО АУРУУЛАР ЖӘНЕ ІРГЕЛЕС ПӘНДЕР -  
ВНУТРЕННИЕ БОЛЕЗНИ И СМЕЖНЫЕ ДИСЦИПЛИНЫ

**СЕКЦИЯ 6** ХИРУРГИЯЛЫҚ ПӘНДЕР ЖӘНЕ  
АКУШЕРСТВО-ГИНЕКОЛОГИЯ – ХИРУРГИЧЕСКИЕ БОЛЕЗНИ И  
АКУШЕРСТВО-ГИНЕКОЛОГИЯ

**СЕКЦИЯ 7** СТОМАТОЛОГИЯ – СТОМАТОЛОГИЯ

**СЕКЦИЯ 8** ӘЛЕУМЕТТІК-ГУМАНИТАР ҒЫЛЫМДАР –  
СОЦИАЛЬНО-ГУМАНИТАРНЫЕ НАУКИ- ФИЛОЛОГИЯ  
ҒЫЛЫМДАРЫ – ФИЛОЛОГИЧЕСКИЕ НАУКИ

**СЕКЦИЯ 9** «ACTUAL PROBLEMS OF MEDICINE AND EDUCATION»  
(АҒЫЛШЫН ТІЛІНДЕ) – «ACTUAL PROBLEMS OF MEDICINE AND  
EDUCATION» (НА АНГЛИЙСКОМ ЯЗЫКЕ)

II ПЕНАРЛЫҚ МӨЖІЛІС – II ПЛЕНАРНОЕ ЗАСЕДАНИЕ

# LX МЕЖДУНАРОДНАЯ НАУЧНАЯ КОНФЕРЕНЦИЯ СТУДЕНТОВ И МОЛОДЫХ УЧЕНЫХ

-НАУКА: ВЧЕРА, СЕГОДНЯ, ЗАВТРА-  
В РАМКАХ 30-ЛЕТИЯ НЕЗАВИСИМОСТИ  
РЕСПУБЛИКИ КАЗАХСТАН

28 апреля 2021

## ОРГАНИЗАЦИОННЫЙ КОМИТЕТ КОНФЕРЕНЦИИ

Телпуев Мурат Койшибаевич – ректор ЗКМУ имени  
Марата Оспанова;

Сапарбаев Самат Сағатович – проректор по  
стратегическому развитию, науке и международному  
сотрудничеству ЗКМУ имени Марата Оспанова;

Исмагулова Эльнара Кереевна – проректор по учебной и  
воспитательной работе ЗКМУ имени Марата Оспанова;

Баспақова Ақмарал Мұхамеджановна – руководитель  
департамента по научной работе;

Балиғамбетова Ару Досеновна – руководитель СНО  
ЗКМУ имени Марата Оспанова;

Битегенова Аружан – председатель СНО ЗКМУ имени  
Марата Оспанова;

Сағымбай Ерпан – зам.председателя СНО ЗКМУ им.  
М.Оспанова;

Астраханов Акежан – советник по науке СНО ЗКМУ имени  
Марата Оспанова.

Отесин Махмутсултангали – советник по науке СНО ЗКМУ  
им. М.Оспанова.

Ержігіт Найзабек – советник по науке СНО ЗКМУ имени  
Марата Оспанова.



# LX

МЕЖДУНАРОДНАЯ  
НАУЧНАЯ  
КОНФЕРЕНЦИЯ  
СТУДЕНТОВ И  
МОЛОДЫХ УЧЕНЫХ

-НАУКА: ИЧЕРА, СҮҮРДІКІ, ЗАБІРА-  
Б РАМКАХ 30- ЛЕТИЯ НЕЗАВИСИМОСТИ  
РЕСПУБЛИКИ КАЗАХСТАН

29 маусым, 2021

## ПРИНИМАЮТ УЧАСТИЕ

1. Западно-Казахстанский медицинский университет имени Марата Оспанова, г.Актобе, Республика Казахстан;
2. ФГБОУ ВО «Башкирский государственный медицинский университет» МЗ РФ, г. Уфа, Россия;
3. НАО «Медицинский университет Семей»;
4. Южно-Казахстанская медицинская академия Шымкент, Республика Казахстан;
5. Вп-Фараби атындағы Қазақ ұлттық университеті
6. АрГУ им К.Жубанова;
7. ФГБОУ ВО Саратовский НИГУ им. Н.Г. Чернышевского Минобрнауки России, Саратов, Россия;
8. Белорусский государственный медицинский университет, Минск, Беларусь;
9. НАО «Медицинский университет Астана»;
10. Запорожский государственный медицинский университет;
11. ФГБОУ ВО «Оренбургский государственный медицинский университет» Минздрава России г.Оренбург, Российская Федерация;
12. Общеобразовательная средняя школа № 25;

# LX

МЕЖДУНАРОДНАЯ  
НАУЧНАЯ  
КОНФЕРЕНЦИЯ  
СТУДЕНТОВ И  
МОЛОДЫХ УЧЕНЫХ

-НАУКА: ИЧЕРА, СҮҮРДІКІ, ЗАБІРА-  
Б РАМКАХ 30- ЛЕТИЯ НЕЗАВИСИМОСТИ  
РЕСПУБЛИКИ КАЗАХСТАН

29 маусым, 2021

## ЖҰМЫС ТӘРТІБІ

I Пленарлық мәжіліс	09.00-9.15
Секция мәжілістері	9.30
II Пленарлық мәжіліс	14.00-15.00

## РЕГЛАМЕНТ РАБОТЫ

I Пленарное заседание	09.00-9.15
Секционные заседания	9.30
II Пленарное заседание	14.00-15.00

**LX** МЕЖДУНАРОДНАЯ  
НАУЧНАЯ  
КОНФЕРЕНЦИЯ  
СТУДЕНТОВ И  
МОЛОДЫХ УЧЕНЫХ

-НАУКА. ВЧЕРА, СЕГОДНЯ, ЗАВТРА-  
В РАМКАХ 30-ЛЕТИЯ НЕЗАВИСИМОСТИ  
РЕСПУБЛИКИ КАЗАХСТАН

28 июля, 2021



9.00-9.15

**I ПЛЕНАРЛЫҚ МӘЖІЛІС  
I ПЛЕНАРНОЕ ЗАСЕДАНИЕ**

**Өткізілетін орны ~ Место проведения:  
Webex**

**Төрағасы/Председатель – Төлеуов Мұрат  
Қойшибаевич - Марат Оспанов атындағы БҚМУ  
ректоры/ ректор ЗЖМУ имени Марата Оспанова**

**Төраға орынбасары / Заместитель председателя  
–Сапарбаев Самат Сағатович - Марат Оспанов  
атындағы БҚМУ стратегиялық даму, ғылым және  
халықаралық серіктестік жөніндегі проректоры/  
проректор по стратегическому развитию, науке и  
международному сотрудничеству ЗЖМУ имени  
Марата Оспанова**

**Хатшы/Секретарь: Битегенова Аружан Армановна  
–Марат Оспанов атындағы БҚМУ Жастар ғылыми  
қоғамының төрағасы/ председатель Молодежного  
научного общества ЗЖМУ имени Марата Оспанова**

**LX** МЕЖДУНАРОДНАЯ  
НАУЧНАЯ  
КОНФЕРЕНЦИЯ  
СТУДЕНТОВ И  
МОЛОДЫХ УЧЕНЫХ

-НАУКА. ВЧЕРА, СЕГОДНЯ, ЗАВТРА-  
В РАМКАХ 30-ЛЕТИЯ НЕЗАВИСИМОСТИ  
РЕСПУБЛИКИ КАЗАХСТАН

28 июля, 2021



9.30

**1 СЕКЦИЯ**

**ЖАС ҒАЛЫМДАР ІРГЕЛІ ЖӘНЕ КЛИНИКАЛЫҚ ҒЫЛЫМДА –  
МОЛОДЫЕ УЧЁНЫЕ В ФУНДАМЕНТАЛЬНОЙ И  
КЛИНИЧЕСКОЙ НАУКЕ**

**Өткізілетін орны - Место проведения: Zoom - конференция  
платформа Zoom**

**Ғылыми кеңесші/ Научный консультант: д.м.н. профессор  
Жумалина А.К.**

**Төраға/ Председатель: Астраханов А.  
Хатшы/ Секретарь: Усмановы Н.Т.**

**КУЛЖАКНОВА Д.С. – ВЗАИМОСВЯЗИ МЕЖДУ АНТРОПОМЕТРИЧЕСКИМИ И  
МОРФОМЕТРИЧЕСКИМИ ПАРАМЕТРАМИ СЕРДЦА У СТУДЕНТОВ  
МЕДИЦИНСКОГО УНИВЕРСИТЕТА.**

**ТАЖИГУЛОВА А.Т. – ТЕМЕУ ШЕГУ ЖӘНЕ ИМ ТАМЫРЛАРЫНЫҢ  
РЕЗИСТИВТІЛІГІ**

**БОЛАТ М. - ЭПИДЕМИЯ COVID-19 НА МЕСТОРОЖДЕНИИ ТЕНГІЗШЕВРОЙЛ**

**САГАТХАЛИ А.С. - ЭПИДЕМИОЛОГИЧЕСКАЯ СИТУАЦИЯ ПО COVID-19 В  
МАНГИСТАУСКОЙ ОБЛАСТИ**

**LX** **МЕЖДУНАРОДНАЯ  
НАУЧНАЯ  
КОНФЕРЕНЦИЯ  
СТУДЕНТОВ И  
МОЛОДЫХ УЧЕНЫХ**

**-НАУКА: ВЧЕРА, СЕГОДНЯ, ЗАВТРА-  
В РАМКАХ 30-ЛЕТИЯ НЕЗАВИСИМОСТИ  
РЕСПУБЛИКИ КАЗАХСТАН**

**29 сәуірі, 2021**



**ДОНАЕВА А.Е. - БІРІНШІЛІК ДИСМЕНОРЕЯ АНЫҚТАЛҒАН ЖАСӨСПІРІМ  
ҚЫЗБАЛАДАҒЫ МИНЕРАЛДЫ ТЫҒЫЗДЫҒЫ МЕН СҮЙЕК ТІНІ МЕТАБОЛИЗМ  
ЖАҒЛАЙЫН СИПАТТАҒАН КЛИНИКАЛЫҚ ЖАҒДАЙ.**

**КОЖАГЕЛЬДИЕВА Л.Х. - ВНЕДРЕНИЕ УПРАВЛЕНИЯ ХРОНИЧЕСКИМИ  
НЕИНФЕКЦИОННЫМИ ЗАБОЛЕВАНИЯМИ. ОПЫТ Г.НУР-СУЛТАН**

**НАУРЗАЛИНОВА Ш.Б. - ҚАНТ ДИАБЕТІМЕН АУЫРАТЫН БАЛАЛАРДА  
КӨКТАМЫРЛЫҚ ПЕРИФЕРИЯЛЫҚ КАТЕТЕРМЕН АССОЦИРЛЕНГЕН  
ИНФЕКЦИЯНЫҢ ҚОЗДЫРҒЫШТАРЫНА МИКРОБИОЛОГИЯЛЫҚ  
МОНИТОРИНГ ЖҮРГІЗУ**

**Колхозбай А. - ҚАНТ ДИАБЕТІМЕН АУРАТЫН БАЛАЛАРДЫҢ ӨМІР  
САҒАСЫ**

**НАГИНА А.М. - БАЛАЛАРДАҒЫ СОЗЫПМАЛЫ АДЕНОИДИТТІҢ  
КОНСЕРВАТИВТІ ЕМДЕУДІҢ НӘТИЖЕЛІГІ**

**ПЛОХУШКО Р. - ОЦЕНКА КАЧЕСТВА ЖИЗНИ ДЕТЕЙ С  
БРОНХИАЛЬНОЙ АСТМОЙ**

**АМИРАДИНОВА А. К. - ЗАМАҢҒИ КЕЗЕҢДЕГІ БАЛАЛАРДА ЖЕДЕЛ  
ВИРУСТЫҚ ИНФЕКЦИЯЛАРДЫ ЕМДЕУДІҢ ТИІМДІЛІГІН БАҒАЛАУ**

**РАХМЕТУЛЛИНА А. - БАСТАУЫШ СЫНЫП ОҚУШЫЛАРЫ АРАСЫНДА СКОЛИОЗ  
ДАМУЫНЫҢ ҚАУІП ФАКТОРЛАРЫ**