Biological sciences

Chemical sciences

Culture and Arts

Ecological technologies

Medical sciences

CONTENTS

EVALUATION OF BIO MORPHOLOGICAL FEATURES OF BREAD WHEAT GENOTYPES AND VARIETIES BY STATISTICAL ANALYSIS

Gurbanov F., Hasanova A., Ibrahimova Sh.

Azerbaijan State Agrarian University, e-mail: haci-firudin@rambler.ru, hasanovaaynur77@mail.ru, senay.quliyeva.84@mail.ru

The research was conducted on 49 bread wheat samples. Fifteen morphological features were studied and statistical analysis (Cluster, Correlation) have been carried out. According to the results, in order to carry out of incoming genetic analyses the first breeding material and samples have been selected. Acquisition of structural elements of the plant was carried out based on appropriate methods. Statistical analyzes were calculated by means of the SPSS computer program, and the cluster, corona and similarity diagram were given. Based on the results, samples were selected for the initial selection material and future genetic analyzes. It is known that there are complicated dependencies among the signs of productivity, but also there are a multitude of factors affecting these addictions. In the selection process, each of these conditions requires a thorough study, as it is of particular importance. Correlation relationships amongst many important signs in the study have been determined statistically accurate. The main purpose of the research is to compare the varieties of bread wheat kept in the National Gene Bank and to increase the yield of these sustainable varieties.

Keywords: Triticum aestivum L., genoytpe, cluster, correlation, variety

The growing population of the world and suffering from food lack are among the main problems of today. In the world market, the price of a seed is directly proportional to the amount of protein. Due to this demand, agricultural workers, including agrarian and scientific scientists, and professionals are responsible for increasing the productivity of grain crops, increasing their stress resistance and creating more quality varieties. This is due to select the more productive and stress-resistant bread wheat varieties is the main task of the breeders.

In order to meet the growing demand of the people for bakery and bakery products, development of agriculture is one of the most important issues. Wheat is the main human food crop and is rich in nutrients.

In order to detect the existing genetic diversity of the wheat plant over the centuries and to ensure its efficient use in the future, wheat collections should be studied from a variety of aspects, including the quality of samples [5].

As in many countries, in our republic bread is the main source of food for the population and plays a key role of the people's demand for herbal protein. it is considered that wheat consists of 35% of the main food source of people and provides almost 20% of the world's nutritional demand. In our republic, cereals are grown in all regions – irrigated, arid, at the foot of the mountain and mountainous zones. From this point of view, one of the main tasks of the breeders is to create appropriate varieties for each soil-climate condition. As the quality of soft wheat is determined by genotype, so technology of sowing depends on in climatic conditions [6].

In order to search for valuable sources for selection, it is essential to conduct a theoretical research. In this regard, laboratory methods allow the evaluation of the raw material in the application of breeding processes and evaluation of the best material at all stages of the breeding [7].

Continuously obtaining high yield varieties from cultivated crops is one of the key factors [2]. According to A. Juchenkova (2005), variety plays the key role in 22% of the various agro-technical measures, used to raise productivity.[3] In recent years, in order to strengthen the food supply and livestock fodder supplies, in our country have been adopted a number of state programs, laws and decisions. Therefore, in our modern times, which are characterized by acute and anomalous climatic variability, the creation and application of cereals varieties with stable yield and grain quality is urgent and important [2, 1]. In order to achieve the goal, in the first year of the research, in order to determine the biological, morphological features, systematic and economic signs of bread wheat varieties, to determine the ecological and agrotechnical conditions needed to obtain high yield grains, phenological observations, plant and spike analysis were carried out. Since ancient times the genetic diversity of the signs has been studied by investigating the morphological features of the plants in the field conditions. It should be noted that the selection of better genotypes can be achieved by using genetic diversity [3].

In accordance with the theme, held in the Scientific Research *Institute* of Crop*Husbandry* of the Republic of Azerbaijan it was conducted one of the major researches "On creation, introduction and distribution of new, quality and ecologically adaptable varieties of wheat by enriching and hybridization of germplasm of wheat on the basis of local and introduced samples", also in Ganja, it has been conducted the researches on selection of bread wheat under irrigation conditions. Despite the high productivity of some introduced varieties, the reasons for late adaptation of these genotypes to local conditions are different (lack of soil moisture during vegetation, hot, dry summer, mineral elements and humus-free, saline soils, etc.).

The sharp change of climate indicators than the average perennial norm – excessively soft winter, intense rainfall and low temperatures during the summer and early summer, high temperature during ripening period, the shortening of waxing ripening period in the wheat during the ripening season affect the quantity and quality of the yield. As a result of cooperation with international organizations, most samples with high productivity are selected and introduced from obtained breeding materials of ICARDA, CIMMIT, and etc.

In order to increase productivity and quality it is important to apply new innovative technologies, mineral and organic fertilizers, agrotechnical methods against pests and diseases etc. Establishing high genetic potential, biotic and abiotic stress factors resistant, favorable to the conditions varieties, under the circumstances we mentioned, is one of the major challenges of the breeders [5].

According to the conditions of each region, our country has different zones for its natural climatic conditions. To ensure high yields in those regions it is advisable to cultivate varieties favorable to each region climate.

According to A.A. Juchenkova (2005), in various agro-technical measures used to increase productivity variety has the role of range from 20 to 22%. The variety plays the main role in extreme conditions (drought, frostbite, epiphytosis of diseases, etc.) [8].

The main purpose of the research is to comparatively evaluation of 49 varieties of bread wheat varieties available in the National Gene Bank and increase the planting of these productive and resistant varieties.

Materials and methods of research

The study was conducted on 49 bread wheat varieties planted at the scientific research base of the Genetic Resources Institute of ANAS. Gene bank samples were collected from different regions of Azerbaijan. The examples used in the experiment were sown in two repeats in each sample with the "Randomization" design. The intergrain distance was 4 cm and the distance between the two rows were 20 cm. 15 morphological parameters (height of plant, number of all stems, and number of productive stems ...) were recorded.

Obtaining of structural elements of the plant was carried out on the basis of appropriate methods. Statistical analyzes were calculated by the SPSS computer program, and the cluster, correlation and similarity diagram were given.

Results of research and their discussion

In the research, structural elements of productivity of 46 bread wheat genotypes, taken from the gene bank of Genetic Resources Institute of ANAS and planted in the Scientific Research Base have been studied and correlation analyzes on 15 features have been performed.

It was found the correlation relations between number of productive stems and the total number of stems (0.969**), the weight of spikes and number of productive stems (0.831**), height of plant and number of internodes (0.410**), length of peduncle and plant height (0.778**). There is enough information about it in the literatures.

Significant correlation has been determined between length and weight of main spike (0,379**), seed length (0,386**), number of grains in the main spike (0,628**), 1000 seeds weight (0.455**), number of spikelets in the spike (0.535**). Additionally, a significant correlation was found between number of spikelets in the spike and length of main spike (0,652**), number of spikelets in the spike and the number of kernels in the main spike (0.523**), the number of kernels in the spikelet and number of kernels in the main spike (0.440**), kernel length and 1000 seeds weight (0.458**), the spike weight and number of total stems (0,773**), spike weight and number of grains in the main spike (0,353**).

There is also a significant negative correlation among the signs, including the length of the peduncle and the number of seeds in the main spike (-0,269*). There is also a negative correlation between the 1000 seed weight and the number of productive stems (-0,245*).

It should be noted that the number of grains is of great importance for breeding [6]. In *V. aestivum* genotypes number 37 and 39 varieties and *V. durum* genotype number 38, one of the structure elements of productivity, 1000 seeds weight the number of kernels in the main spike have been of interest. Thus, in the genotypes 37, 39, the 1000 seeds weight was 38.8 grams and 39.6 grams (correspondingly), the number of kernels in the main spike was 35.2 and 36.2 (respectively), this addiction was normally. However, there was a difference between these figures in genotype 39, so, 1,000 seeds weight was 51.2 grams and number of grains in main spike was 35.4. Based on annual indicators, research is still underway because it is hard to come to a complete conclusion.

In recent year's research, the indicators on 49 samples, average values of this dependence were 39.7 and 39.4. In the varieties of V. erythrospermum and V. aestivum, the difference between these figures was found that the number of seeds were few, but 1000 seeds weight was more.

Between genotype 87, belonging to V. erytrospermum (52 pc. and 31.6 g) and genotype 74 (50,2 pc. and 37,2 g), it was found a difference. the number of seeds in the main spike was more than the 1000 seeds weight (V. erythrospermum – 52 pcs, 31.6 g and V. graecum – 50.2 pcs, 37.2 g).

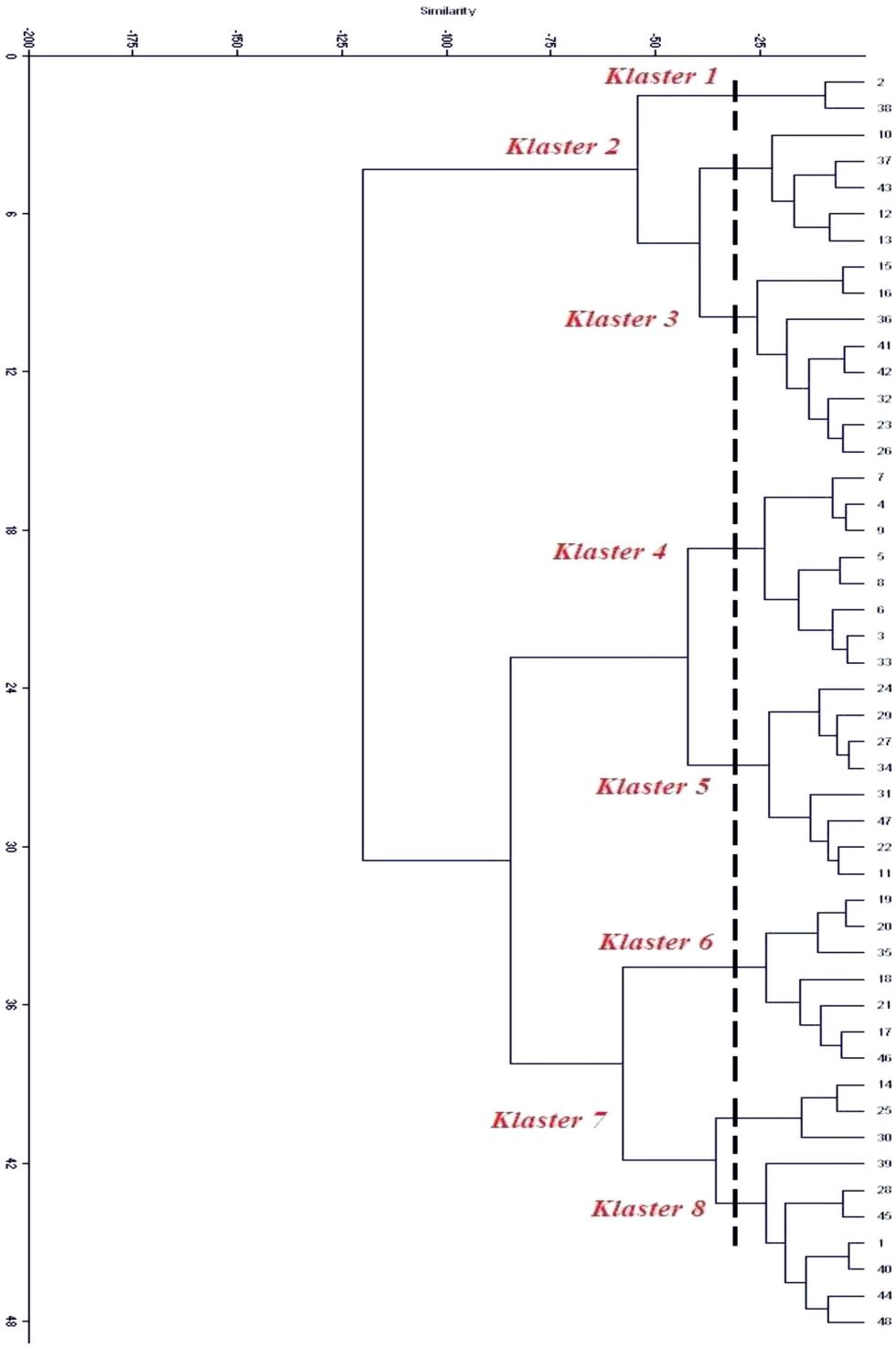
Mdk (52.4g) was determined as the most severe species of V. erythrospermum. In V. erythrospermum və V. lutescens samples te-0,4, tu-0,8, sss-22, sds-4,4 were determined. Due to the above-mentioned symptoms, they differed from other varieties with high values. Therefore, these two species varieties were included in the neighboring (6.7.8) clusters. In some of the V. aestivum varieties, low values were observed. So, esk (1.8 g) and mdk (31.2 g) were deteemined respectively.

In cluster analysis the genotype No. 87 and No. 96 took place in near clusters, No. 96 genotype took its separate place in cluster 8. Genotype No. 79 took place near the two new variety located cluster, to the 4th cluster. When we focus on the location of the new varieties in the cluster analysis, we observe that they belong to different clusters.

Thus, due to several factors, the genotypes no. 95 and 94 were closer in clusters (4th). The indicators of these varieties on the structural elements of productivity was closer to one another, where the sharp difference was only given to the length of the awn. If we take into consideration that 1000 seeds weight is one of the main indicators of productivity, then the genotype 96 can be considered relatively more efficient than the other two varieties. The genotype number 96 is farther away from them, i.e in the 8th cluster.

Correlations between morphological parameters of seed

	BB	UGS	MGS	BS	SAU	QU	ASU	ASK	ASDS	MDK	BSK	SSS	SDS	TE	TU
BB	1	0.199	.271*	.410**	.778**	0.023	.292*	0.064	-0.125	0.098	.324*	0.185	-0.016	-0.04	.277*
UGS		1	.969**	0.101	0.036	-0.081	0.099	-0.105	0.231	-0.214	.773**	0.08	-0.008	0.072	-0.109
MGS			1	0.124	0.087	-0.041	0.101	-0.09	0.24	-.245*	.831**	0.079	-0.063	0.017	-0.151
BS				1	0.121	0.231	.277*	0.137	0.205	0.144	0.176	0.123	0.234	-0.058	0.216
SAU					1	-0.2	0.152	0.035	-.269*	0.198	0.131	0.028	0.077	0.078	0.241
QU						1	0.203	0.026	0.1	-0.237	-0.016	-0.021	0.017	-0.143	-0.02
ASU							1	.379**	.294*	-0.003	.276*	.652**	0.214	.259*	0.148
ASK								1	.628**	.455**	.243*	.535**	.319*	0.137	.386**
ASDS									1	0.026	.353**	.523**	.440**	-0.066	-0.021
MDK										1	-0.025	0.069	0.197	0.136	.458**
BSK											1	.307*	0.027	0.132	-0.011
SSS												1	.313*	0.209	0.236
SDS													1	.242*	.277*
TE														1	0.206
*. Correlation is significant at the 0.05 level (1-tailed).															
**. Correlation is significant at the 0.01 level (1-tailed).															



Relations between morphological parameters of seed

It is known that there are complicated dependencies among the signs of productivity, but there are also many factors affecting to these sdependences. In the breeding process, each of these conditions requires a thorough study, as it is of particular importance. Amongst many important signs in the study, correlation relationships have been determined statistically accurate.

References

1. Ahmadov M.G., Hasanova G.M., Rustamov Kh.N., İbadov V.F., Ibrahimov E.R., Musayev A.J. Productivity and quality indicators of wheat learned in the competitive variety testing, proceedings of. XXIV (2013) v, Baku: Muallim, 2013.

2. Aliyev J.A., Talai J.M., Musayev A.J., Ahmadov M.G. The contribution of the Agricultural Institute to the country food security // Scientific proceedings of SRI of Crop Husbandry. Bakı: Muallim, 2012; 6-12.

3. Khan A.J., Azam F., Ali A. Relationship of morphological traits and grain yield in recombinant inbred wheat lines grown under drought conditions // Pak. J., Bat.., 2010, V. 42(1), P. 259-267.

4. Kovtun V.I., Kovtun L.N. Earing, kernel grain mass and 1000 seeds mass in increasing of productivity of winter bread wheat // Proceedings of the Orenburg State Agrarian University. Agriculture and forestry 2015. p. 27-29.

5. Belan I.A. Rosseeva LP, Lozhnikova LF, Blokhina NP, Valueva LG Breeding value of samples of the wheat of the VNIIR collection in the conditions of the southern forest-steppe of Western Siberia // Vestnik of the Altai State Agrarian University, №10 (72), 2010, p. 8-12.

6. Kochetov V.K.Sort of winter wheat, the main factor of increasing productivity and obtaining flour of specified quality. // Scientific journal. CubGAU, No. 75 (01), 2012.

7. Aliev R.T., Hajıyeva S.İ., Javadova L.I., Mikailova R.T. sustainability of bread wheat varieties (T.aestivum L.) to abiotic stress factors. Proceedings of Botanical Istitute of ANAS, 2010 XXXI volume. p. 397-402.

8. Zhuchenko A.A. Adaptive farming. / Fundamentals of agricultural systems in Stavropol. Under the general editorship of VM. Penchukova and G.R. Drozhko. Stavropol, 2005, p. 73-113.

VEGETATION AND DISTRIBUTION OF MEDICINAL PLANTS IN THE HIGHLANDS OF THE NARYN REGION (INNER TIEN SHAN)

Omurova K.O.

Kyrgyz Republic, Ministry of Education and Science, Naryn State University named after S. Naamatov, Naryn, e-mail: k.omurova76@mail.ru

In this work the general vegetation of the Inner Tien Shan is considered. The Tien Shan is a large system of mountain ranges stretching for 2450 km east-north-easterly direction. 198.5 thousand km2 of the Tien Shan territory is located in Kyrgyzstan occupying the Central and Inner Tien Shan, partially-Western and Northern. In the highlands of the Tien Shan, due to special physical and geographical conditions, a complex history of origin and development, a peculiar, distinctive flora and vegetation was formed. Therefore, almost 95% of the territory of Kyrgyzstan is covered by mountains covered with natural vegetation, which is suitable for the use of medicinal plants of pasture and haymaking use. This favors the agricultural production of the republic. The area of the Inner Tien Shan is 80 thousand km2. Of these, more than half are raised over 3000 m. urn.m. With the purpose of preserving unique natural complexes, protection of rare and endangered species of animals and plants of the Inner Tien Shan, by the Resolution of the Kyrgyz Republic Government dated 1 March 1994, the Karatal-Japyryk State Reserve was organized on the territory of the reserve about 400 plant species were noted, 50 species of medicinal plants.

Keywords: mountain structure, grass-motley, kobresia, accumulation

In the Central-Eastern part of Inner Tien Shan there is Karatal-Japyryk State Nature Reserve situated. It was established by resolution of the Kyrgyz Republic Government on the 1st of March 1994 with purpose of conservation of unique nature complexes, protection of rare and threatened species of flora and fauna of Central Tien-Shan, and maintaining regional environmental balance. The reserve currently occupies 21,264 hectares at an altitude of 2150-3980 m. above sea level being set with Son-Kul-Too and Acha-Tash ranges in the north and the range of Boor-Albas in the south. In general, the territory is a powerful mountain structure, considerably elevated (at least 2500 m, max – 4000 m above sea level) with a complex combination of ridges that occupy most of the reserve territory [1].

Objectives:

– processing of literature data on Inner Tien Shan vegetation description;

– scheduling of climatic conditions on the reserve's territory;

– tabling of medicinal plants' growing on the territory of the reserve expansion;

– studying the degree of distribution of medicinal plants in various high-landscape belts of the reserve.

Results of research and their discussion

The climate of the reserve is severe, harsh continental, with great fluctuations, both in seasons and during the day. Highland belt is cool in summer and cold (in places) and snowy in winter. July temperature here is +11, +16 °C. Winter is long (November-March) with January average temperatures –17, –20 °C. Nival belt (from 3500 m and above) is characterized by a harsh climate. This is the belt of snowfields, rocks, glaciers, moisture accumulation. Even in the lower part of this belt the average July temperatures do not exceed –4, –7 °C, average January ones fall to –22 °C. The average amount of precipitation is from 400 to 500 mm per year.

The relatively high air temperature in the summer period, followed by increased insolation, and constantly blowing winds contribute to the rapid evaporation of water from the soil and its desiccation. That's why the development of plants in the highlands is strongly influenced by climatic factors, especially atmospheric precipitation [2].

In general, the Inner Tien Shan highland vegetation's features are: narrow floristic spectrum; domination of grassy-motley and kobresia communities, different medicinal plants and low prevalence of shrubby and total absence of woody plants; predominance of steppes over other types of vegetation; low-level monodominant communities; high edifying role of dominants [3].

Woody vegetation is represented mainly by forests from spruce trees (Tien Shan) – picea schrenkiana and archaean Turkestan – juniperus turkestanica. They are typical for the forest meadow-steppe belt. Common bush – the alberta briar (rosa aiberti) is common of the bushes. Common cereals: oatgrass furrowed-festuca suicata, pinnate feather-brachypodium pinnatum, timothy grass-phleum pratense, oat-helictotrichon. Common herbs – geranium rocky-geranium saxatile, the vysilistnik simple and smelly-thalictrum simplex, foetidum [4]. Names of medicinal plants are shown in the table.

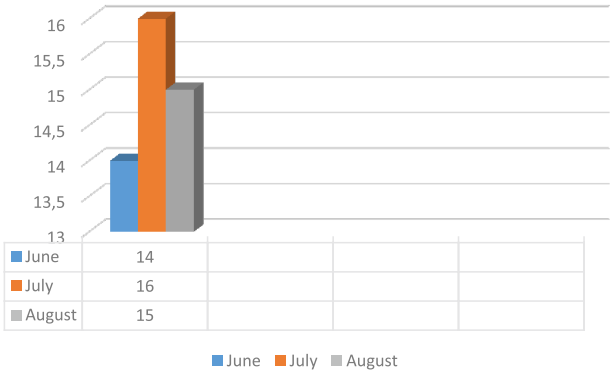


Fig. 1. High mountain belt (2200–3500 m) in summer

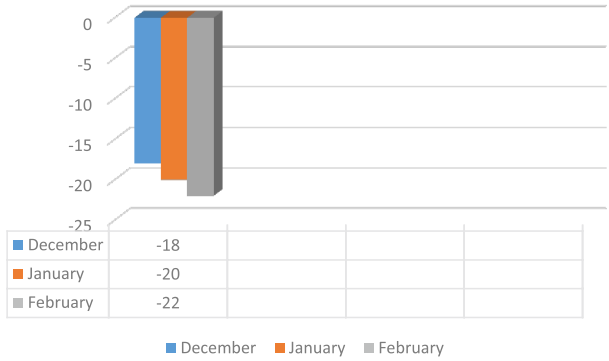


Fig. 2. High mountain belt (2200–3500 m) in winter

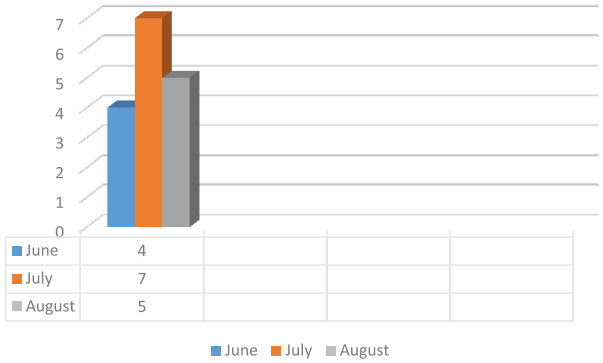


Fig. 3. Nival belt (3500 m and above) in winter

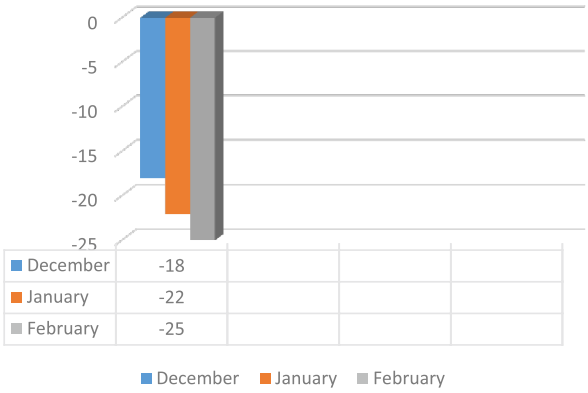


Fig. 4. Nival belt (3500 m and above) in summer

Names of medicinal plants

	Common medicinal plants in nature reserve	Reserve areas.		
		Karatal-Achatash	Song-Kul	Chatyr-Kul
1	Tien Shan Wormwood – Artemisia tianschanica Composite Family -Asteraceae	Mai-Küngöy, Karatal-Achatash, Kol-Tor, Korzhoy.	Teipshi, Song Kol southern part	
2	Green Wormwood –Artemisia viridis Composite Family -Asteraceae	Korzhoy, Achatash, Kol-Tor		
3	Turkestan Allheal -Valeriana turkestanica (V tianschanica. V officinalis auct). Valeriana Family – Valeriana	Zhele-Karagai, Zhazy-Karagai, Mai-Küngöy		
4	Common dandelion Composite Family – Taraxacum officinale – Asteraceae	Considered to be a popular herb	Batail-Aral, Teipshi, Kumduu-Suu	South-eastern part
5	Foalfoot. Tusilag-Ofarfara Composite Family – Asteraceae	Kol-Tor, Achatash, Karatal		
6	Yarrow -A.millefoliumL Composite Family – Asteraceae	Sai-Achyk, Zhele-Karagai, Zhazy-Karagai, Mai-Küngöy		
7	Marshalov thyme – Thymus. marschallianusL. Mint Family – Lfmiaceae	Karatal-Achatash		
8	Meadow pine – Equisetum arvense Horsetail Family– Equisetaceae	Karatal-Achatash, Kol-Tor	Kumduu-Suu, Teipshi, Kaz-Uya.	South-eastern part
9	Marjoram – Origanum vulgare Mint Family – Lamiaceae	Zhazy-Karagai, Archaluu Tor, Zhondomo		
10	Hoary plantain – Plantago media Plantain Family– Plantaginaceae	Zhazy-Karagai, Archaluu Tor, Zhondomo		
11	Common tansy -Tanacetum vulgare. Composite Family -Asteraceae		Batail-Aral, Teipshi	South-eastern part
12	Common edelweiss – Leontopodium ochroleucum Composite Family – Asteraceae	Karatal, Kol-Tor, Achatash, Sai-Achyk nival areas		Kara-Suu, Karasai-Bulak
13	Bur beggar-ticks -Bidens tripartite Composite Family -Asteraceae	Kok-Bel, Achatash		
14	Horseheal -Inula helenium.L Composite Family – Asteraceae	Kok-Bel, Karatal Kol-Tor.		
15	Knot grass-Polygonum aviculare.Buckwheat Family- Polygonaceae	Korzhoy, Kok-Bel, Mai-Küngöy		
16	Grey wallflower-Erysimum canescens Cabbage Family – Brassicaceae	Zhele-Karagai,Mai-Küngöy		
17	Small-flowered Adonis -Adonis Buttercup Family. – Ranunculaseae	Kol-Tor		
18	Rotundifolious monkshood -Aconitum rotundifplium Buttercup Family – Ranunculaseae	Kok-Bel, Сай -Ачык, Kol-Tor, Zhele-Karagai, Mai-Küngöy		
19	Blindweed – Capsella bursa-pastoris Cabbage Family – Brassicaceae	Mai-Küngöy, Kok-Bel, Zhondomo		
20	Turkestan Motherwort – Leonurus turkestanicus.Mint Family- Lamiaceae	Kara-Jylga, Zhele-Karagai, Kok-Bel, Kol-Tor, Karatal		
21	Desert sage -Salbial dererta Mint Family – Labiatae(Lamiaceae)	Bel-Teipshi, Sai-Achyk, Kyzyl-Belec, Kara-Jylga		

Note: [5, 6].

Conclusion

The study of wild medicinal plants in various phytocenoses of high-mountainous areas has great theoretical and practical significance.

The main wild-growing species are valuable medicinal plants of the steppes, meadow-steppes, subalpine meadows of the Tien Shan. Therefore, the proper planning of further research works will yield good results in the study of plants and plant communities, the sustainable use and conservation of vegetation in the Inner Tien Shan.

References

1. 20th anniversary of The Karatal-Japyryk State Nature Reserve Bishkek: 2014. – 460 p.

2. Chupakhin V.M. Inner Tian Shan – Frunze: Kyrgyz Ministry of Agriculture USSR. – 1979. 128 p.

3. Golovkova A.G. Vegetation of Kyrgyzstan – Frunze: Ilim, 1990. – 452 p.

4. Tsekanov A.S., Sodombekov I.S. Use and protection optimization of Song Kol basin vegetation (Recommendations). – Frunze, 1988. – 115p.

5. Alimbaeva P.K., Goncharova A.V. Wild herbs of Kyrgyzstan. Frunze, 1981. – 270 p.

6. Russian-Kyrgyz Dictionary of Plant Names and Botanical Terms Bishkek: Turar, 2013. – 338 p.

MONITORING OF GREENHOUSE PESTS IN BOTANICAL GARDENS OF KAZAKHSTAN AND CONTROL

[1]Valiyeva B.G., [1]Murzova T.V., [2]Likhacheva T.V.

[1]Institute of Botany and Phytointroduction SC MES RK, Almaty, e-mail: valiyeva_b@bk.ru;

[2]Zhezkazgan Botanical Garden, Zhezkazgan

This article reflects the monitoring results of tropical and subtropical plant collection of on coccid damage (Coccoidae), Tetranychus urticae and Trialeurodes vaporariorum. Species constitution of pests and their feeding plants are revealed. Coccids, Tetranychus urticae and Trialeurodes vaporariorum have been considered to be permanent pests of greenhouse plants for ages (1970-2017).They are related to harmful species causing huge damage to lots of plant types in greenhouse. The consumption of insecticides temporarily stops their development, reduces the degree of damage and spread. Mechanical cleaning, usage of soap, strict culling, pruning of severely damaged plant parts (leaves, stems) and other hand tools are announced to be additional measures to combat them. The list of the most affected and more resistant plant species is given.

Keywords: greenhouse, tropical and subtropical plants, pests – Coccoidae, Tetranychus urticae and Trialeurodes vaporariorum. Stable and susceptible plant species, control

Concentration in a greenhouse on a limited area of large species diversity and a high number of plants creates certain prerequisites for emerging and spreading of various diseases and the propagation of harmful and dangerous pests [1]. The greenhouse complex of the Institute of Botany and Phytointroduction was established in 1969 and is introduced to be the only place in the Republic where a collection of unique tropical and subtropical plants is represented. The collection area consists of 940 sq.m. The Main Botanical Garden (Moscow), the Botanical Institute of Moscow V.L. Komarova (St. Petersburg), botanical institutions of the Caucasus and Crimea rendered an enormous contribution in the enrichment of the greenhouse collection [2]. For many years the department has been working to enrich the collection material with new species including forms of interest in botanical and decorative terms [5, 6]. For this purpose, on the subject-matter exchange, the Botanical Garden annually issues seeds from domestic and foreign botanical gardens. According to individual literary data [8], the most common dangerous species are known on the plants of the greenhouse in Moscow. In Lithuania, 30 species of coccid pests of decorative plants have been registered [11]. The first publications on pests and diseases of greenhouse plants in Main Botanical Garden (Almaty) have been known since 1970. According to greenhouse coccids, there is some information in the published article of 1978 [3]. The results of long period researches (1970-1984) were published in the reference book [4]. During this period, the most common species were established causing great damage to decorative introduced plants in all botanical gardens of Kazakhstan including greenhouse plants. On the greenhouse plants, such pests as Tetranychus urticae, Trialeurodes vaporariorum, Coccus hesperidum, and Pseudococcus maritimus were found. Despite the small number of pest species, they are reported to be harmful species causing huge damage to plenty of plant types in the greenhouse. However, after the publication of the "Reference book" more than 30 years have passed. In this connection, it is time to carry out a complete inventory of the closed ground plants, analyze the pest species composition, the severity of the damage, the composition of the feeding plants that are prone to damage, assess the plant species resistance to pests, and apply protective control measures to reduce their severity and extension.

Materials and methods of research

The aim of the work was to identify the species composition of pests of tropical and subtropical greenhouse of the Main Botanical Garden (MBG) (Almaty city) and the Zhezkazgan Botanical Garden (ZBG) (Zhezkazgan city). Stationary observations were conducted in the MBG, as well as planned visits to the ZBG according to a pre-compiled schedule. To diagnose and determine the severity of the most dangerous pests, insect pests were collected, as well as herbarium materials, and the greenhouse plants damaged by them were noted. Determinants and monographic works were used to determine and refine the types of dangerous insect pests [8, 11]. Determination and refinement of plants are conducted according to generally accepted sources [7, 10]. Approved recommendations on plant protection have been used for the implementation of protective measures against pests [9].

When planning treatments against pests, the accounting for the severity threshold is found to be the main indicator. For comparative entomological assessment all the plants, depending on the extent of damage will be divided into 4 groups:

1) no damaged by the pests;

2) development of the damaged no more than 25 % (the degree of damage is very weak);

3) development of the damaged within 26-50 % (the degree of damage is average affected);

4) damaged up to 50 % leaves (the degree of damage is very strong).

Results of research and their discussion

In the greenhouse approximately 450 species and forms of tropical and subtropical plants of the world have been growing. During the survey, pests, which annually cause damage in plants, have been identified. In the greenhouse and warm-houses, development of coccid occurs annually. When examining closed ground plants, 13 species of especially dangerous pests of plants were identified (the names are given in alphabetic order):

1. Aspidiotus nerii Bouche. It occurs on greenhouse and indoor plants. It is marked on next species: *Nerium oleander* L. (Apocinaceae), *Hedera helix* L. (Araliaceae), *Asparagus asparagoides* (L.) Wight. (Liliaceae), *Ficus retusa* L. (Moraceae), *Thrachycarpus fortunii* (Hook.) H. Wendl (Palmae). The damage was – 3 points.

2. Ceroplastes sinensis Guer. Its damage was found on 3 plant families. *Laurus nobilis* (Lauraceae), *Myrtus communis* (Myrtaceae), *Cytrus meyeri* (Rutaceae). Its damage – 1 point.

3. Coccus hesperidum L. Larvae and females settle on shoots, petioles, leaves and trunks. It damages annually such plants as *Abutilon striatum thompsonii, Hibiscus cyriacus* L. (Malvaceae), *Adiantum formosum* R. Br (Adiantaceae), *Aphelandra atrovirens N*.E.Br. (Acanthaceae), *Amaryllis belladonna* L., *Clivia gardenia* Hook. (Amaryllidaceae), *Asparagus asparagoides* (L.) Wight., *Chlorophytum comosum* (Thunb.) Baker (Liliaceae), *Aucuba japonica* Thunb. (Cornaceae), *Citrus reticulata* Mare *hort.'Clementin'* (Rutaceae), *Laurus nobilis* L. (Lauraceae), *Monstera deliciosa* Liebm. (Araceae), *Nerium oleander* L. (Apocinaceae), *Philodendron scandens* C. Koch et Sello, *Scindapsus pictus* Hassk. (Araceae). Females and larvae damage sprouts, petioles, leaves, mainly from the upper side, causing discoloration, deformation of leaves and shoots. With a strong infection, plants are covered with a sooty fungus (niello), which retards the normal development of plants. Strongly damaged shoots wither and leaves fall off. Coccus hesperidum refers to viviparous forms. The first age larvae of the stroller settle creeping on the plants. The damage sometimes forms 4 points.

4. Diaspis boisduvalii Sign. This species damages the leaves, petioles, unblown leaves. It covers completely the leaf blade more often on the underside of the sheet. Damaged leaves become brown, dry up. The female shield is white or grayish white, flat, round, translucent with light brown larval skin, 2 mm in diameter. Polyphage. The pest is able to cause serious damage to lots of plants: *Dracena fragrans* (Dracaeneae), *Eugenia brasilliensis* Lam. (Myrtaceae), *Ficus retusa* L (Moraceae), *Livistonia australis* (Palmae), *Nerium oleander* L. (Apocinaceae), *Thrachycarpus fortune* (Hook.) H. Wendl. (Polypodiophyta) . Its damage is 3-4 points.

5. Diaspis bromeliae Kern. The pest was first recorded at *Cussonia spicata* in 2010. The pest damages leaves, stems and internodes. Nearby plants were also damaged by the pest *Abutilon* hybridum (Malvaceae), *Agave americana* L., *Agave sisalana* Perrine. (Agavaceae), *Cereus monstrosus* (DC.), *Citrus reticulate* Blanco var. *unchii* (Rutaceae). The damage was counted to be 2 points. Mechanical cleaning of plants, washing with a solution of soap, as well as additional treatment with pesticide led to the partial or complete disappearance of this pest. Currently it is marked on the *Abutilon* hybridum (Malvaceae).

6. Myzodes persicae Sulz. It is harmful to young shoots, leaves, flowers. The leaves turn yellow, the flowers fall and the buds do not open. *Myzodes persicae* are small insects, pale green, and 1.4-2.5 mm long. The pest damaged many plants: *Coleus* hibridus (Labiatae), *Chrysanthemum corea* Nakai (Compositae). The damage – 4 points.

7. Pinnaspis aspidistrae Sygn. Normal view of the leaves. The female's shield is brown, elongated, pear-shaped, 2-2.5 mm long. Polyphage. It forms dense colonies. The pest damages *Adiantum formosum* R. Br. (Adiantaceae), *Aspidistra elatior* Blume (Liliaceae.), *Dracaena draco, D. reflexa* Zacc. (Dracaeneae). The pest is introduced with planting material. The damage concludes 2 points.

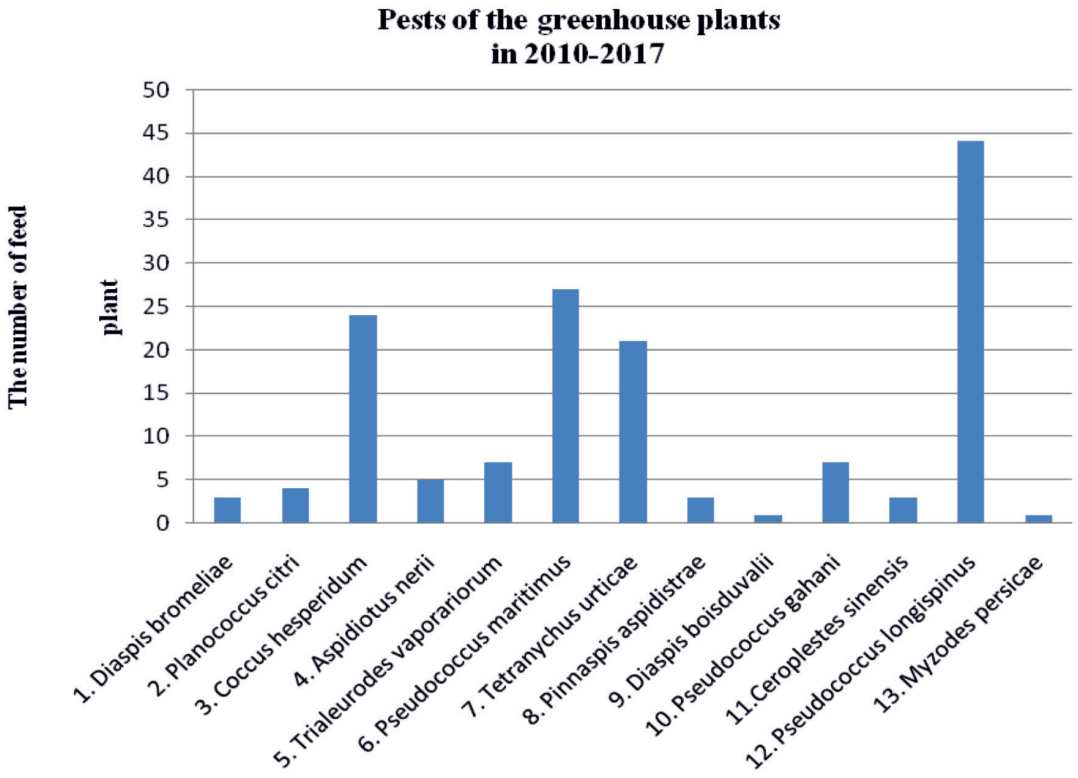
8. Planococcus citri Risso.It damages the above-ground part of the plant: stem leaves. With severe damage the plant dries. The pest is noted on four plant families: *Calanchoe blossfeldiana* Poln. (Grossulaceae), *Coleus pumilus* Blanco (Labiatae), *Euphorbia pulcherrina* (Willd) (Euphorbiaceae), *Nerium oleander* L. (Apocinaceae). The damage compiled 2 points.

9. Pseudococcus gahani Green. It affects plants of the many family: *Citrus reticulata Mare hort.'Clementin', Citrus limon* L. (Rutaceae), , *Fatsia japonica* Decne.et Planch. (Araliaceae), *Laurus nobilis L.* (Lauraceae), *Monstera deliciosa* Liebm. (Araceae). The damage is 3-4 points.

10. Pseudococcus longispinus Targ. An adult female and larvae damage leaves and stems. The adult female is elongated oval, 17 pairs of thin white wax threads are located at the edge of the body, of which the back pair is the longest and often exceeds the body length of the female. The length of female body without wax threads is up to 3.5 mm. Its females are vivacious; they elaboratea very thin white waxy thread, forming a cotton-like net, where the larvae are kept until the beginning of feeding. The damage from it is noted in the following types of closed ground plants: *Abutilon megapotamicum* St.Hil.et Nand. (Malvaceae), *Agave americana* L. (Agavaceae), *Achimenes candida* Lindl.(Gesneriaceae), *Adiantum formosum* R. Br. (Adiantaceae), *Anthurium andreanum* Lind. *Monstera deliciosa* Liebm., *Philodendron selloum* C.Koch., *Spathiphyllum wallisii* Regel (Araceae), *Aphelandra aurantiaca* var. *roezlii* Regel, *Sanchezia nobilis* Hook., *Jacobinia carnea* Nichols. (Acanthaceae), *Araucaria bidwillii* Hook. (Araucariaceae), *Aucuba japonica* Thunb. (Cornaceae), *Begonia rex* Putzeys (Begoniaceae), *Bougainvillea glabra* Choisy, *Bougainvillea sellowiana* (Berg) Burret. (Nyctaginaceae), *Boehmeria macrophylla* D.Don (Urticaceae), *Calathea lietzei* E.Morr. (Marantaceae), *Citrus reticulata Mare hort.'Clementin* (Rutaceae), *Cissus juttae* Dinter. (Vitaceae), *Clivia gardenia* Hook. (Amaryllidaceae), *Codiaeum variegatum* L. (Euphorbiaceae), *Cyperus alternifolius* L. (Cyperraceae), *Dracaena draco* L. (Dracaeneae), *Feijoa sellowiana* (Myrtaceae), *Ficus auricularia* Lour., *Ficus carica* L., *Ficus bengalensis* (Moraceae), *Gardenia jasminoides* Ellis. (Rubiaceae), *Hibiscus cyriacus* L., *H. rosa-sinensis* (Malvaceae), *Kalanchoe pinnatum* S. Kurz. (Crassulaceae), *Maranta arundinacea* L. (Marantaceae), *Musa basjoo* Siebold et Zucc.(Musaceae) , *Nerium oleander* L. (Apocinaceae), *Opuntia stricta* (Cactaceae), *Passiflora edulis* (Passifloraceae), *Peperonia caperata* (Piperaceae), *Plumbago capensis* Thunb. (Plumbaginaceae), *Portulaca grandiflora* Jacq. (Portulacaceae), *Rhoe sparhaceae* (Swartz) Stearn (Commelinaceae). Its harm is 2-3 points. Examination of greenhouse plants in the Zhezkazgan Botanical Garden displayed that the most common species are: *Trialeurodes vaporariorum*, *Tetranychus urticae*, *Pseudococcus longispinus.*

11. Pseudococcus maritimus Ehrh. It deteriorates leaves, stalks, internodes of plants from the following families: *Abutilon* hybridum (Malvaceae), *Adiantum formosum* R. Br. (Adiantaceae), *Amaryllis belladonna* L., *Clivia gardenia* Hook. (Amaryllidaceae), *Begonia sepmerflores* (Begoniaceae), *Camellia japonica* L. (Teaceae), *Cissus antarctica* Vent. (Vitaceae), *Dieffenbachia maculate* G.Don (Araceae), *Euphorbia pulcherrina* (Willd) (Euphorbiaceae), *Rhododendron indicum*(L.)Sweet (Ericaceae), *Fatsia japonica* Decne. et Planch., *F.japonica* var.moseri (Thunb.) Decene. et Planch. (Araliaceae), *Hibiscus cyriacus* L. (Malvaceae). In recent years (2012-2015) *Pseudococcus maritimus* widened the range of feeding plants and is currently marked on such plants as *Ctenanthe oppenheimiana*, *Marantha leuconeura* E.Morren (Marantaceae), The damage sometimes compiles 3-4 points. The following species have been included to the most severely – and medium – damaged species with *Pseudococcus maritimus* for last years: *Bougainvillea glabra* (Choisy); *Bougainvillea spectabilis* Willd. (*Nyctaginaceae), Calathea crocata* (Marantaceae), *Callisia fragrans* (Lindl) Woods., *Commelina benghalensis* L. (Commelinaceae), *Coniogramme japonica* (Thunb.) Diels.(Helonitidaceae), *Eucharis grandiflora* Planch. (Amaryllidaceae), *Erythrina corallodendron* L. (Fabaceae), *Eugenia brasiliensis* Lam. (Myrtaceae), *Passiflora quadrangularis* L. (Passifloraceae*), Petrea volubilis* L. (Verbenaceae), *Piper nigrum* L. (Piperaceae),. Treatment with chemical means of protection practically does not lead to the complete eradication of this pest. Only additional pruning and mechanical cleaning make it possible to reduce temporarily the number and severity of the pest.

12. Trialeurodes vaporariorum Westw. It harms in the closed and opens (summer) ground, causing discoloration of the leaves and covers them with a sugary coating. The adult insect is 1.3-1.5 mm long, yellowish, with two pairs of wings pollinated by a waxy coating. The larvae are flat, oval, with spinules. Its eggs are greenish-yellow, deposited on the underside of the leaves. One generation is 30-40 days. Polyphage. Everywhere locally. The pest is marked on 7 families. Species that are severely damaged are: *Begonia rex* Putzeys (Begoniaceae), *Beloperone guttata* Brandebgee (Acanthaceae), *Bignonia ungiuscati* (L.) (Bignoniaceae), *Coleus blumei* Benth hybridus (Labiatae), *Fuchsia* hybrida (Onagracae), *Gloxinia hybrida* (Gesneriaceae), *Lantana camara* L. (Verbenaceae). The occupancy of the *T. vaporariorum* was 3-4 points.



Pests of tropical and subtropical plants in greenhouse

13. Tetranychus urticae Koch. It is found on the following plant families of tropical and subtropical plants: *Ageratum mexicanum* Sims. (Asteraceae), *Amarillis belladonna* (Amaryllidaceae), *Asplenium* sp. (Polypodiophyta), *Calla aethiopica* (Araceae), *Ciclamen europaeum* C. Caswell (Primulaceae), *Cissus antarctica* Vent. (Vitaceae), *Citrus limon* (L.) Burm. (Rutaceae), *Feijoa sellowiana* (Myrtaceae), *Fuchsia gracilis* (Onagracae), *Freesia* hybrida (Liliaceae), *Hedera helix* (Araliaceae), *Hibiscus rosa-sinensis* (Malvaceae), *Hydrangea paniculata* Sieb. (Hydrangeaceae), *Jacobinia cornea* Nichols., *J. pohliana* (Nees) Lindau (Acantaceae), *Nerium oleander* L. (Apocynaceae), *Punica granatum nana* L. (Pnicaceae), *Trachycarpus fortunei* (Hook.) H.Wendl. (Palmae). The plant leaves, which were damaged by mites, decolor, often dry out and fall off. This leads to a decrease in decorativeness, and sometimes to the death of plants. It harms also the families of *Moraceae* (*Ficus bengamina* L.), *Rutaceae* (*Citrus limon* (L.) Burm.), *Cactaceae* (Cactus spp.) and other greenhouse and flowering plants. The optimum temperature for a mite is 29-31 °C, the optimum humidity is 35-55 %. The increase in humidity adversely affects the development of the mite. A variety of pesticides and acaricides are used in order to suppress the pest development. However, because of the widespread usage of pesticides, the difficulties of fighting *Tetranychus urticae* are increasing, as a result, in recent years it has acquired considerable resistance to acaricides. The occupancy is 3-4 points per year.

As a result of the last year research (2010-2017), resistant plant species that were not damaged by the aforementioned pests were identified. These include the following plants from the family: *Acorus gramineus*'Variegtus, *Alocasia odora* C., *Anthurium andreanum* Lind. (*Araceae*). Thus, the results of multi-year (2010-2017) surveys of tropical and subtropical plants, a quantitative analysis of pests found on closed ground plants are shown in Figure.

According to the quantitative ratio *Pseudococcus longispinus* and *Pseudococcus maritimus* are the most abundant species in a closed ground. The range of damaged plants is extensive and they were identified respectively on 44 and 27 types of feeding plants. *Coccus hesperidum* is a polyphage and has been identified

in 20 families and 24 plant species. *Tetranychus urticae* is identified in 21 families and 22 plant species. *Trialeurodes vaporariorum* is also one of the harmful pests of the enclosed ground. It damages many types of potted plants that grow in a closed ground. It should also be noted that the small number of pests and plant species, which were damaged by them,is not the criterion of their low degree harmfulness. All identified pests are classified as harmful and dangerous plant species of enclosed soil. Control measures include the following activities: Agrotechnical measures that ensure the normal development of plants, in autumn the removal and burning of affected leaves and shoots, on which the pest is overwintered; consumption of chemical control tools to reduce their numbers, severity and spread to other nearby plants. All of the drugs listed below are permitted for usage against plant pests.

1. BI-58, 40% c.e (dimethoate) BASF, Germany. Spraying during the vegetative season (summer) (aphis, thrips, ticks, coccids and others); Carate, 5% c.e. (lambda – cyhalothrin). Zeneca, England. Spraying during the vegetative season (aphis, thrips, ticks, coccids, fall webworm and others); Kel'tan, purified, 18 c.e. (dicofol), Rhom and Haas, USA. Spraying in the vegetation period (ticks, whitefle); Omait, 30% s.p.; 57% c.t. Junirojal, USA. Spraying (ticks, arachnoidal ticks).

2. A necessary condition for effective action of drugs is their alternation and their usage in combination with other drugs. Such mixtures reduce the number of treatments, and the effectiveness of the drugs increases. Particular attention should be paid to combating sucking pests (aphids and spider mites), which sucking out the juices, greatly weaken the plants.

3. Almost all chemical means of controlling pests and plant diseases are poisonous to humans and warm-blooded animals. Work related to the chemical consumption should be carried out under the direct supervision of agronomists and other professionals who are well versed in the pesticide handling and who are responsible for the implementation of necessary measures to prevent accidents.

Conclusions

In the greenhouse the development of pests is observed annually. During the survey, 13 pest species were found out and identified, damaging 51 genes from 43 families consisting of tropical, subtropical and potted plants. Relatively stable (18 species) and highly damaged plant species (20 species) are defined. Control measures are reduced in the timely usage of chemical agents (systemic or contact action), as well as improving the agrotechnical conditions of cultivation. During this period, plant pests such as bromeliad shield, citrus wax shield, black convex scutellum were brought. Identification of these pests has made it possible to reduce their numbers, spread to other plants and practically destroy some species (black convex scutellum). It should be noted that the same plant species of the same family can be damaged by several pest types.

References

1. Danilova N.S., Odegova M.A. Vrediteli i bolezni rasteni mestnoi flory v Jakutskom botanicheskom sadu // Byulleten' Gl. Bot. Sada. Moskva: Nauka, 2000. – Vyp. 180. P. 121-123. (in Russ.).

2. Glavny Botanicheskiy Sad Istoriya obrazovaniya, structura, itogi nauchnoy deyatel'nosti. Alma-Ata: Nauka, 1982. – 96p. (in Russ.).

3. Idrisova Zh.I., Vassman N.A. Vrediteli expozicionnoy oranzherei Glavnogo Botanicheskogo Sada AN Kaz.SSR // Vrediteli i bolezni introduzirovannykh decorativnykh rasteny // Tez. dokl. VI rab. sovesh. rukov. sluzhb. zashity rasteny region. bot. sadov SSSR. 11- 15 sentyabrya, 1978. – P. 42-43. (in Russ.).

4. Lukpanov Zh.L., Vassman N.A., Kalymbetova N.K. Vreditely i bolezni introduzirovannykh rasteny Kazakhstana. Spravochnik. Alma-Ata: Nauka, 1984. – 54 p. (in Russ.).

5. Murzova T., Raushanova A., Orazalina G. Collections Foundation of protected ground plants. Conservation and sustainable use of genefund of plant world in Eurasia at the present stage, 3 September 2016, EXPO-2016. Antalya, Turkey. 2016. – P. 137-139. (in Eng.).

6. Murzova T.V., Raspaeva A.K., Orazalina G.K. Collecziya sredouluchshayushkh tropicheskikh i subtropicheskikh rasteny Instituta botaniki i phytointrodukcii dlya sozdaniya phytomoduley//Sbornik. Izuchenie i sokhranenie i razional'noe ispol'zovanie rastitel'nogo mira Evrazii. Almaty, 2017. – P.466. (in Russ.).

7. Saakov S.G. Oranzhereinye i komnatnye rasteniya i ukhod za nimi. M.: Nauka, 1985. – 323 p. ((in Russ.).

8. Synadsky Yu.V., Korneeva I.B., Dobrochinskaya I.B. Vreditely i bolezni zvetochno-decorativnykh rasteny. Spravochnik. M.: Nauka, 1985 – 592 p. (in Russ.).

9. Valiyeva B.G., Nashenova G.Z., Tanabaeva S.A., Zhumagaliyeva A.Zh. Prakticheskie recomendazii po bor'be s vreditelyami i boleznyami v botanicheskikh sadakh Kazakhstana. Almaty, 2017. – 32 p. (in Russ.).

10. Vassil'eva I.M., Udalova R.A. Sukkulenty i drugie kserofity v oranzhereyakh Botanycheskogo Instituta im. V.L. Komarova. – St.-Petersburg, 2007. – 415 p. (in Russ.).

11. Vengelyauskaite A. Kokzidy decorativnykh rasteniy v Litovskoy SSR, ich vidovoy sostav, rasprostranenie, biologiya naibolee vrednykh vidov i mery bor'by s nimi. – Avtoref. … dis. kand.biolog.nauk. Kaunas, 1966. – 24 p. (in Russ.).

INVESTIGATION OF SYNTHESIS AND THERMODYNAMIC PROPERTIES OF SILVER THIOSTANNATES IN WATER AND ETHYLEN GLYCOL CONDITION

Huseynov G.M., Imanov H.A., Cafali M.M., Ibrahimova L.N.

Nakhchivan Branch of National Academy of Sciences of Azerbaijan Institute of Natural Resources, Azerbaijan, e-mail: qorxmazhuseynli@rambler.ru

Obtaining condition of silver thiostannates were investigated in water and ethylene glycol conditions based on $AgNO_3$ and SnS_2 compounds by the differential-thermal (DTA), X-ray, scanned electron microscopy (SEM) analysis methods. It has been established that, nano and micro-sized Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 and $Ag_4Sn_3S_8$ compounds are obtaining when the thermally processing mixture within the mole ratios of $AgNO_3/SnS_2$ = 4:3; 4:5; 2:1; 8:3 and 1:1 at a temperature of (pH = 6÷8) 353-453 K within 48 hours in the water and ethylen glycol conditions. The values of the integral thermodynamic functions of the corresponding compounds of electrical motion force were determined and the standard atomization thermodynamic functions were calculated based on these values. The thermodynamic parameters of the decomposition reactions of $Ag_2Sn_2S_5$, Ag_4SnS_4 and $Ag_4Sn_3S_8$ compounds that were melting incongruently in the temperatures at 955 K, 1043 K and 1147 K were calculated and the equilibrium constants of the corresponding reactions were determined according to the Gibbs free energy value.

Keywords: silver thiostannate, water, ethylene glycol, temperature, electrical motion force, thermodynamic function, micro photo, equilibrium constant, yield

There are Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 and $Ag_4Sn_3S_8$ compounds in Ag-Sn-S system. These compounds are part of perspectively functional materials and they have semiconductor, photoelectric and thermoelectric properties [1-16]. Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_8SnS_6 və $Ag_4Sn_3S_8$ compounds are used in the electronics industry because they have high semiconductor properties [20].

In recent times, interest has increased about the acquisition of these compounds in the nanoparticles or micro-particles forms. In contrast to monocrystals, better properties are observed in nanoparticles and micro-particles. In this regard, the acquisition of nano and micro particles in the aqueous and organic solvent conditions of Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 və $Ag_4Sn_3S_8$ containing compounds is one of the actual issues [12-20].

There is a few information about the acquiring of silver thiostannates in nanoparticles in aqueous and organic solvent conditions. In this regard, one of the most topical issues is the study of the condition of these compounds as nanoparticles in various organic matter (ethylene glycol, dimethylformamide and ethylenediamine) conditions.

Experimental part and discussion of the results

Silver(I)nitrate and tin(IV)sulfide were used as the starting material for the synthesis of Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 and $Ag_4Sn_3S_8$ in water and ethylene glycol conditions. Tin(IV)sulfide was obtained by the method known in the aqueous in the impact regularly of tin(II)chloride with H_2O_2 and $CH_3CS(NH_2)$ [12-19].

$AgNO_3/SnS_2$ = 4:3; 4:5; 2:1; 8:3 and 1:1 mixed in mol ratio and the solvent was added according to the stoichiometric structure of Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 və $Ag_4Sn_3S_8$ compounds. The conditions for the reaction have been investigated in aqueous and ethylene glycol environments. The synthesis condition was researched within the range of 353-453 K temperature. Very small amounts of components were used considering the formation of nanoparticles and the presence of tin(IV)sulfide adhesion properties. The required amount of components was mixed and 20 ml of solvent (aqueous and ethylene glycol) was added, three samples were prepared from each compound. The samples were completely mixed then placed in a microwave oven and heated at a temperature of 353-423 K for 48 hours. The precipitated sediments were filtered, initially washing with 0,1 M CH_3COOH solution then washed with ethyl alcohol after all dried in vacuum at 353 K.

The individuality of the obtained compounds and physical-chemical properties were investigated by DTA (Pyrometer HTP-70, Thermoscan-2), X-ray (2D PHASER "Bruker", CuK_α, 2θ, 20-80 deg.) (fig. 1), microstructure analysis methods and EMF measurements.

According to the X-ray results, it was found that the crystallization rate was 57-72% of compounds obtained in aqueous and ethyleneglycol conditions. The Ag_2SnS_3 compound obtained at 453 K is crystallized in the orthorombic syngony: *S.g.: $Pna2_1$; lattice. par.:*

a = 0,6272 nm, b = 0,5795 nm, c = 1,3181 nm; $\beta = 93{,}31^0$ *(Fig. 1).* $Ag_2Sn_2S_5$ compound also is crystallized in the orthorombic syngony: S.g.: $Pna2_1$; lattice. par.: *a = 0,78165 nm, b = 0,7719 nm, c = 1,1121 nm.* Ag_4SnS_4 compound is crystallized in the monocline syngony: S.g.: $Pna2_1$; lattice. par.: *a = 0,69161 nm, b = 0,7112 nm, c = 1,3021 nm;* $\beta = 92{,}5^0$. Ag_8SnS_6 is crystallized in the orthorombic (S.g.: $Pna2_1$; lattice. par.: *a = 1,5334 nm, b = 0,5620 nm, c = 1,07244 nm*), but $Ag_4Sn_3S_8$ compound is cubic syngony (S.g.: $P4_132$; *a = 1,0799 nm; Z = 4*).

An endothermic effect observed at 935 K temperature in the DTA curve of the Ag_2SnS_3 compound, which corresponds to its melting temperature. The compounds $Ag_2Sn_2S_5$, Ag_4SnS_4 and $Ag_4Sn_3S_8$ are respectively incongruent melting at 955 K, 1043 K and 1137 K. It has been determined that these compounds are disintegrate by the following reactions:

$$Ag_2Sn_2S_5 \rightarrow Ag_2SnS_3 + SnS_2 \text{ (955 K)};$$

$$Ag_4SnS_4 \rightarrow Ag_2SnS_3 + Ag_2S \text{ (1043 K)};$$

$$Ag_4Sn_3S_8 \rightarrow 2Ag_2SnS_3 + SnS_2 \text{ (1137 K)}.$$

Polymorphic conversion temperature of Ag_8SnS_6 is 445 K, melting point is 1120 K.

Micromorphology of the samples was studied by HITACHI TM3000 microscope. The analysis of the microscopic images on the bottom of the glass revealed that compounds obtained in aqueous and ethylene glycol conditions are nanoparticles. The particle size is 60-120 nm in the thin layer of the Ag_2SnS_3 compound in the aqueous condition, but in the ethylene glycol condition is 40-100 nm (fig. 2).

The nanoparticles size of the $Ag_2Sn_2S_5$ compound formed at 453K in the ethylene glycol environment are smaller. The nanoparticles size obtain at 423 K are large and the adhesion is more observed among the particles (fig. 4). It was determined that the particles size obtained at 373 K in the aqueous condition is 150-348 nm, and the size of the nanoparticles size taken in the ethylene glycol varies among 318-572 nm. It is known that, the merger with each other of SnS2 molecules and polymerization are occurs when the tin (IV) sulphide is keeped for a certain period of time or processed thermally. This event is observed in many thiostannates of tin, including $Ag_2Sn_2S_5$ compounds.

High adhesive nanorods are obtaining of Ag_8SnS_6 compound at 458 K. The length of the nanorods ranges from 4-10 nm and a diameter of from 82-187 nm. The formation of nanorods in the aquatic environment does not occur. Full formulation is observed in the ethylene glycol condition (fig. 2). The formation of nanorods in the Ag_8SnS_6 compound can be explained by the large amount of silver.

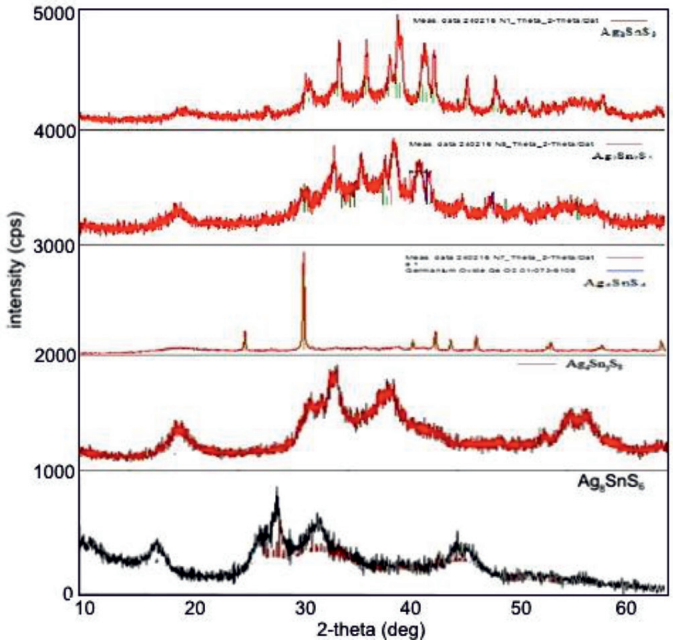


Fig. 1. Diffractograms of the Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 and $Ag_4Sn_3S_8$ compounds obtained in the ethylene glycol condition

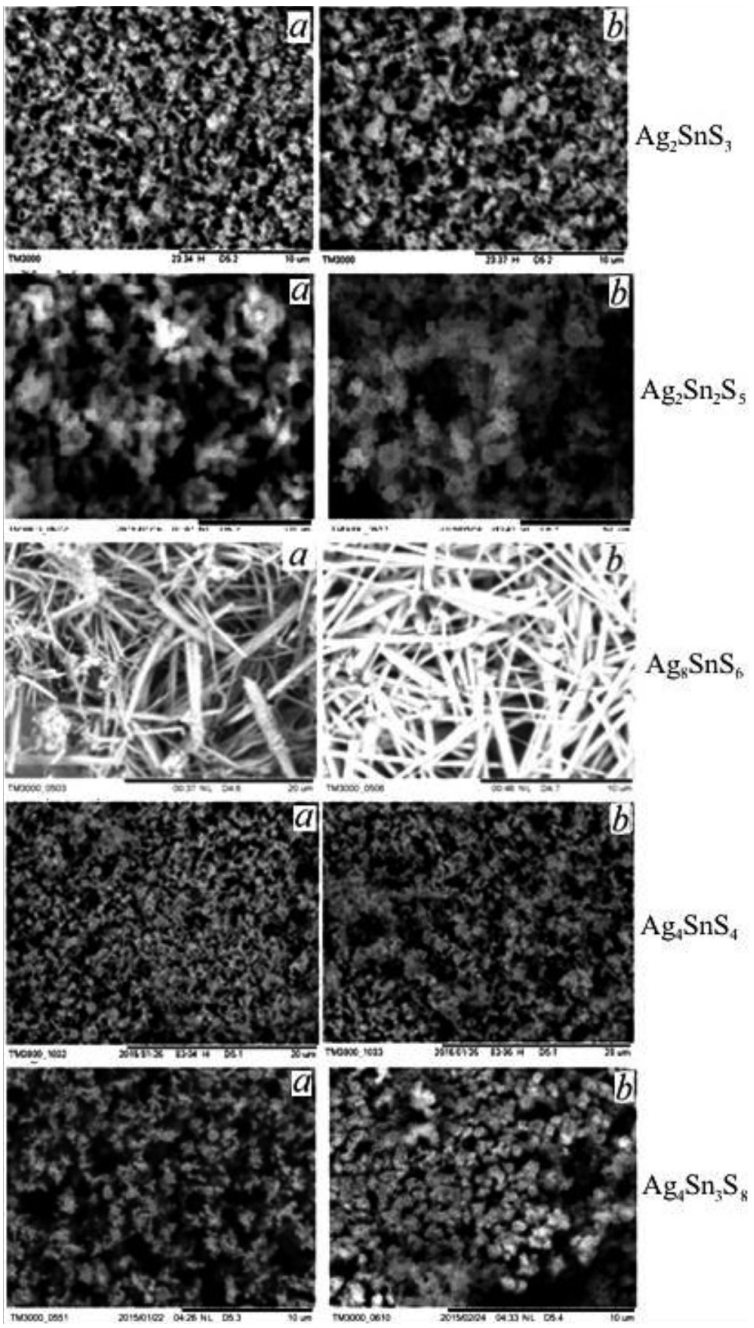


Fig. 2. SEM images of Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, $Ag_4Sn_3S_8$ and Ag_8SnS_6 compounds obtained in water (a-373 K) and ethylene glycol (b-453 K)

The particles of the Ag_4SnS_4 compound in the aqueous condition are 190-230 nm, and the particles obtained in the ethylene glycol condition are 80-140 nm. The particles are zigzagically structured and interconnected (fig. 2). It can be said that the composition of the phase is identical because it does not have a different structure.

Large aggregates are observed in SEM images of $Ag_4Sn_3S_8$ compound. These aggregates size are larger in ethylenglycol (fig. 2). Aggregates are consist of high adhesive particles with a structure size of 98-137 nm. The formation of aggregates in this combination can be explained to the large amount of tin in compound. As can be seen in the SEM images,

no other phase particles in the obtained compound structure of water and ethylene glycol conditions are observed. This also confirms the X-ray results of the $Ag_4Sn_3S_8$ compound. An elemental analysis (Launch Trion XL dilution refrigerator – OXFORD device) of sediment content was made to specify the stoichiometric structure of Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 and $Ag_4Sn_3S_8$ compounds. According to the results, the mass and atomic proportions of silver, tin and sulphur contained in the compounds were determined (table 1).

According to the results of the table, it has been determined that the stoichiometric structure of the sediments corresponds to Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 and $Ag_4Sn_3S_8$ compounds. It has been revealed that the composition of sulphur in the simple formulas of compounds is slightly out of (0,07-0,09 at.%) stoichiometry. It can be explained by the fact that, when adding the thioacetamide solution to the initial mixture, some free sulfur is separated because of the condition is acid (pH = 2-2,5). This also shows itself in the composition of synthesized compounds.

Here is also investigated the effects of pH (pH METER-pH410 "AKVILON") and temperature on the yielding of Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 and $Ag_4Sn_3S_8$ compounds. 0,1 M H_2SO_4 and 0,1 M NH_3H_2O solutions were used to study the impact of pH on condition on the yield of compounds. It has been determined that the compounds have the maximum yield (96,21-97,63%) at the pH range of 6-8 (453 K). The yield is reduced because of the compounds disintegrate at pH < 2 and pH > 9.

The effect of the temperature was studied on the yileding of Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 and $Ag_4Sn_3S_8$ compounds in pH = 6-8. It was determined that the yileding of Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 and $Ag_4Sn_3S_8$ compounds increased when temperature increased. Maximum yielding of compounds is observed in temperature range T = 393-453 K. X-ray results show that the crystallization rate of compounds is 57.2 and 65.7%, when the aqueous solution of Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 and $Ag_4Sn_3S_8$ compounds is thermally processed in autoclave at 453 K for 24 hours.

(-) Ag | Ag_4RbI_5 | Ag_2SnS_3 ($Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 və $Ag_4Sn_3S_8$) (+)

type consentration element has been constructed to make EMF measurements. The results of [1-4, 21-24] studies have been used to prepare the concentration element. EMF measurements were made with a V7-34A brand digital voltmeter and compensation method at a temperature range of 300-430 K. Measurements were accomplished both at the heat and cooling time. At this time, the difference in the measurement results was less than 0.5 mV. EMF–T dependency charts have been established based on the EMF values. Thermodynamic parameters were calculated based on EMF–T dependency. For this purpose, the linear equation was used which is the used in scientific literature [1-3]:

$$E = a + bT \pm t\left[(S_E^2 / n) + S_b^2 \cdot (T - \overline{T})^2\right]^{1/2}$$

Here, the number n – the number of pairs of E and T values; respectively S_E və S_b – dispersion of separated EMF measurements and b coefficients, $\overline{T}$ – average temperature, K; t – the student criterion. The corresponding linear equations have been obtained by the smallest squares method through a special computer program (POWDER-2). The silver parsial thermodynamic functions of Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 and $Ag_4Sn_3S_8$ compounds were calculated based on the following expressions using the linear equations.

$$\Delta\overline{G}_{Ag} = -zFE\ ;\ \Delta\overline{H}_{Ag} = -zFa\ ;\ \Delta\overline{S}_{Ag} = zFb\ .$$

Integral thermodynamic functions of compounds based on potential generating reactions were calculated using the standard thermodynamic functions values of silver, copper parsial molar functions and corresponding sulfides in literature (table. 2).

The reason for the relatively high rate of error in the prices of integrated integrated temodynamic functions is that Gibbs free energy by EMF is calculated directly and the enthalpy and entropy is calculated from the angular coefficient of temperature dependence of EMF.

Standard atomization thermodynamic functions of corresponding compounds were calculated based on the prices of integral thermodynamic functions of Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 and $Ag_4Sn_3S_8$ compounds. According to Hess's law, the atomic energy of any complex matter is equal to the subtraction of the formation enthalpy of that compound with the total atomization energies of the appropriate simple substances (Ag, Sn, S) [3]:

$$\Delta H^{at.}_{com.} = \sum \Delta H^{at.}_{elem.} - \Delta H_{com.}$$

The standard atomization thermodynamic functions of Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 and $Ag_4Sn_3S_8$ compounds were calculated using this expression (table. 3).

Table 1

Results of the elements analysis of compounds

Compounds	Amount of elements, %					
	Ag		Sn		S	
	weight	at.	weight	at.	weight	at.
Ag_2SnS_3	50,11	33,32	27,61	16,66	22,28	50,02
$Ag_2Sn_2S_5$	35,17	22,21	38,76	22,22	26,07	55,57
Ag_4SnS_4	63,62	44,43	17,52	11,11	18,86	44,46
Ag_8SnS_6	73,527	53,32	10,127	6,66	16,346	40,02
$Ag_4Sn_3S_8$	41,13	26,66	34,16	19,98	24,71	71,36

Table 2

Integral thermodynamic functions of Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 and $Ag_4Sn_3S_8$ compounds

Compounds	$-\Delta_f G^0$	$-\Delta_f H^0$	S^0
	kC/mol		*C/mol·K*
Ag_2SnS_3	213,91 ± 2,3	183,77 ± 7,1	218,03 ± 10,4
$Ag_2Sn_2S_5$	407,45 ± 5,1	351,4 ± 9,3	321,65 ± 9,2
Ag_4SnS_4	234,25 ± 2,5	199,07 ± 4,3	454,8 ± 6,7
Ag_8SnS_6	274,95 ± 1,2	232,67 ± 2,3	609,92 ± 6,8
$Ag_4Sn_3S_8$	724,65 ± 1,3	535,01 ± 2,2	841,3 ± 8,7

Table 3

Standard atomization thermodynamic functions of Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 and $Ag_4Sn_3S_8$ compounds

Compounds	$-\Delta G^0_{at.}$	$-\Delta H^0_{at.}$	$\Delta S^0_{at.}$
	kC/mol		*C/mol·K*
Ag_2SnS_3	1641,6	1552,8	1354,6
$Ag_2Sn_2S_5$	2840,95	3159,64	1384,75
Ag_4SnS_4	2882,45	3249,02	1413,3
Ag_8SnS_6	4831,7	5477,07	2622,19
$Ag_4Sn_3S_8$	4852,05	5296,21	2034,4

The equilibrium constants of the decomposition reactions of the incongruent melting $Ag_2Sn_2S_5$, Ag_4SnS_4 and $Ag_4Sn_3S_8$ compounds have been determined using the values of the determined thermodynamic parameters. It is known that the products of the decomposition reaction of these compounds are respectively melting at 955 K, 1043 K and 1147 K. When it's cool, the process is returning because the initial substances are obtain. Initially, the conversion of the thermodynamic parameters of decomposition reactions was calculated at the same temperatures:

$Ag_2Sn_2S_5 \rightarrow Ag_2SnS_3 + SnS_2$, $\Delta H = -16,6$ kC; $\Delta G = -20,35$ kC; $\Delta S = 13,22$ C;

$Ag_4SnS_4 \rightarrow Ag_2SnS_3 + Ag_2S$, $\Delta H = -84,74$ kC; $\Delta G = -87,98$ kC; $\Delta S = 92,77$ C;

$Ag_4Sn_3S_8 \rightarrow 2Ag_2SnS_3 + SnS_2$, $\Delta H = -32,6$ kC; $\Delta G = -35,22$ kC; $\Delta S = 33,84$ C.

It is known that when the temperature rises, the value of free energy greatly varies unlike from the enthalpy and entropy. Therefore, equilibrium constants of reactions occurring at melting temperatures were calculated using the following equation [20]:

$$\lg K = -\frac{\Delta G}{19,47 \cdot T}.$$

Table 4

Equilibrium constants of decomposition reactions

Reactions	Temperature, K	lgK	K
$Ag_2Sn_2S_5 \leftrightarrow Ag_2SnS_3 + SnS_2$	955	1,57	37,15
$Ag_4SnS_4 \leftrightarrow Ag_2SnS_3 + Ag_2S$	1043	8,94	$8,7 \cdot 10^8$
$Ag_4Sn_3S_8 \leftrightarrow 2Ag_2SnS_3 + SnS_2$	1147	0,28	1,91

The results obtained are given in the table below (table 4).

As the values of the equilibrium constants shows, the equilibrium reaches right in all three reactions at melting temperatures. Liquid phase is two-component.

Conclusion

Ag_2SnS_3, $Ag_2Sn_2S_5$, Ag_4SnS_4, Ag_8SnS_6 and $Ag_4Sn_3S_8$ compounds were obtained by hydrothermal method and their individuality was confirmed by X-ray, DTA methods in the aqueous and ethylene glycol condition. The micromorphology of the obtained compounds was studied and it was determined that the compounds at 453 K temperature were formed from nanoparticles. The boundaries of obtain of the compounds were determined in hydrothermal conditions. According to EMF measurements, the prices of integral thermodynamic functions of compounds are determined, and the values of the standard atomic thermodynamic functions of compounds based on these values are calculated. The equilibrium constants of the decomposition reactions occurring at melting temperatures of the incongruent melting $Ag_2Sn_2S_5$, Ag_4SnS_4 and $Ag_4Sn_3S_8$ compounds have been determined using Gibbs's free energy value.

References

1. Babanly M.B, Yusibov Y.A. Electrochemical methods in the thermodynamics of inorganic systems. Baku. Elm. – 2011. – 306 p.

2. Babanly M.B, Yusibov Y.A., Abishev V.T Three-component chalcogenides based on copper and silver. Baku: BSU. – 1993. – 342 p.

3. Babanly M.B., Yusibov Y.A., Babanly N.B. The EMF Method with Solid-state Electrolyte in the Thermodynamyc Investigation of Ternary Copper and Silver Chalcogenides // Electromotive Force and Measurement in Several System. Ed. S. Kara. Intechweb. Org. – 2011. – P. 57-78.

4. Baqheri S.M., Alverdiyev I.C., Yusibov Y.A, Babanly M.B. Thermodynamic investigation of Ag_8SnSe_6 compound by solid electrolyte EHQ method // BSU news. – 2014. – P. 5-12.

5. Belandria E., Fernandez B.J. Temperature Dependence of the Optical Absorption of the Ternary Compound Ag_2SnS_3 // Jpn. App. Phys. – 2000. V.39. – P. 293-295.

6. Brauer G. Guide to Inorganic Synthesis. Moscow "The World". – 1985. – v. 3. – 1056 p.

7. Emeli J. Elements of Per. with English. – Moscow: The World. – 1993. – 256 p.

8. Fujikane M., Kurosaki K., Muta H., Yamanaka S. Thermoelectric Properties of Ag_8GeTe_6 // J. Alloys. Compd. 396 – 2005. – P. 280-282.

9. Gorochov O. Les composes Ag_8MX_6 (M = Si, Ge, Sn, et X = S, Se, Te) // Bull. Soc. Chem. Fr. – 1968. – P. 2263-2275.

10. Hofmann-Amtenbrink M. Silver-Selenium-Tin. / Ternary Alloys. A Comprehensive Compendium of Evualuated Constitutional Data and Phase Diagrams. V.1, Max Plank Int, Stuttgart. – 1992. – P. 562-565.

11. Hull S., Berastegui P., Grippa A. Ag^+ Diffusion within the Rock-Salt Structured Superionic Conductor $Ag_4Sn_3S_8$. // J. Phys.: Condens.Matter. – 2005. – v.17. – P.1067-1084.

12. Huseynov G.M. Obtaining of Ag_2SnS_3 nanoparticles in ethylene glycol medium / XII All-Russian Conf. with Int. participation "Problems of solvation and complex formation in solutions. From effects in solutions to new materials ". in Ivanovo. – P. 249.

13. Huseynov G.M. Preparation of $Ag_2Sn_2S_5$ nanoparticles in the $AgNO_3$-SnS_2-$(CH_3)_2NHCO$ system / Mater. Int. scientific and practical work. Conf. "Chemistry and Ecology-2015". UGNTU, Salavat. – 2015. – P.143.

14. Huseynov G.M. Preparation of Ag_2SnS_3 compound in an ethylene glycol medium // "International Journal of Applied and Fundamental Research". – 2016. – № 8. – P. 516-519.

15. Huseynov G.M. Preparation of Ag_8SnS_6 compound in dimethylformamide medium. // Bulletin of Tomsk State University. – 2016. – P. 29-33.

16. Huseynov G.M. Preparation of Ag_8SnS_6 in a dimethylformamide medium. / Mater. Int. scientific. Conf. "Polyfunctional chemical materials and technologies", Tomsk. – 2015. – P. 74-76.

17. Huseynov G.M. Preparation of the compound in the $AgNO_3$-SnS_2-C_2H_4 $(OH)_2$ system. // "Science and world" International scientific journal. – № 4 (32). – 2016. – Vol.1. – P. 87-89.

18. Huseynov G.M. Investigation of the condition of copper (I) thiostranates in ethanol-water mixture. // ANAS Nakhchivan Branch "News". – № 4. – P. 29-37.

19. Huseynov G.M. Obtaining $Ag_2Sn_2S_5$ compound based on silver (I) nitrate and tin (IV) sulphide // ANAS Nakhchivan Branch "News". – 2015. – № 2. – P. 29-35.

20. Huseynov G.M. Silver and its combinations. Nakhchivan University "Nuh" publishing house. – 2016. – 240 p.

21. Ivanov-Shchits AK, Murin IV Ionika of the solid body.t.1, ed. S.-Petersburg. University: 2000. – 616 p.

22. Melekh B.T., Stepanov N.B., Fomina T.A., Semenovich S.A. Thermodynamic properties of compounds in the tin-selenium system // J. Phys. Chemistry. – 1971. – Vol. 45. – No. 8. – P. 2018-2020.

23. Morachevsky AG, Voronin GF, Heiderich VA, Kutsenok IB Electrochemical methods of investigation in the thermodynamics of metallic systems. "Academic Book". – 2003. – 334 p.

24. Ollitrault-Fitchet R., Rivet J., Flahaut J. et.al. Description du systeme ternaire Ag-Sn-Se // J. Less-Common. Met. – 1988. – V.138. – P. 241-261.

MYSTERY OF "STENDAL SYNDROME"

Zahovaeva A.G.
Ivanovo State Medical Academy, Ivanovo, e-mail: ana-zah@mail.ru

What is the great force of art? The art is harmony or disharmony? The purpose of scientific research: the study of "Stendal Syndrome" as a paradox of art. Methods: logical analysis, discourse analysis, elements of psychoanalysis, hermeneutic analysis, deduction and induction. In offered research the problem of perception of art is considered. Art is dialogue of Persons. Art is special sensual the world of the person. Art is an activity of the person. The art main task is to reflect and express the sensual world, to raise sincere emotion. In art the truth is a truth of feelings. Art is a dialogue of emotions; therefore to understand art it is correct to read the transferred emotions. Reflecting and expressing the world, art is a struggle against chaos in the human psyche. Art can heal the wounds of the soul! This is the basis of art therapy. Conclusion: "Stendal Syndrome" is a disruption in the transmission of feelings. Art can be an indicator of mental disorders, but the main mission of art is to humanization of personality.

Keywords: art, psyche, art-therapy "thought-sense", sense, experience, dialogue, personality, syndrome

What is the secret of art? In the proposed study, the problem of perception of art is considered. Art is a dialogue of people. Art is a special sensual world. The main task of art is to reflect and express the sensual world, to show the sincerity of emotions. In art, truth is the truth of the senses. Art is a dialogue.

The purpose of scientific research: the study of "Stendal Syndrome" as a paradox of art. Methods: logical analysis, discourse analysis, elements of psychoanalysis, hermeneutic analysis, deduction and induction.

What is the great force of art? The art is harmony or disharmony?

"Art is a sphere of feelings of a person in the form of their direct experience. The carriers of emotions in art are images and symbols, which are organized and visualized in material of certain forms. Art approaches the phenomena and objects, not merely for the purpose of representing them, but for raising emotions to stir up feelings a person's soul" [1].

The great ancient philosopher Aristotle called art "probable existence, an illusion of reality that can evoke the emotional reaction of the viewer" [2, 1451b]. The representative of German classical philosophy G.Gegel pointed out that the aim of art is "to fill the hearts and give a person, developed and undeveloped, to feel all that the human can experience and create in the depths of its Spirit, what secretly excites the Spirit" [3, p. 52]. About the sensitive nature of art, wrote L. Tolstoy, N. Chernyshevsky [4, 5]. J. Delez – French representative of postmodern argues that "a work of art ... is the science of the sensuous" [6, p. 79].

The artist V. Kandinsky wrote: "Art is the mother of our feelings" [7, p.10]. K. Stanislavsky: "There is no genuine art without emotions" [8, p. 451].

Art affects the human feelings and emotions. But is disharmony possible in the transmission of emotions? In psychiatry there is the concept of "Stendal Syndrome" – this is a mental disorder caused by the impact of a work of art on a person. As a result, there may be symptoms of dizziness, rapid heartbeats, tears, auditory and visual hallucinations.

"Stendal Syndrome" is associated with the name of the great French writer Stendal (1783-1842). Stendal first described this specific symptomatology by visiting the Church of the Holy Cross (the Basilica of Santa Croce) in Florence in 1817 (Stendal "Naples et Florence: un voyage de Milan à Reggio"). Stendal wrote: "When I was leaving the Church of the Holy Cross, my heart began to beat; it seemed to me that I was dying. I thought I had lost consciousness. I saw masterpieces of art born of energy passions. After which everything became meaningless, small, limited. My excitement was great ..."

In 1979, the Italian psychiatrist Gabriella Magerini first described "Stendal Syndrome". Other scientific researchers are not present.

What is "Stendal Syndrome"? "Stendal Syndrome" is a mental disorder, emotional instability characterized by frequent palpitations, dizziness, sometimes and hallucinations. This symptomatology is manifested when a person is under the influence of works of art; the "syndrome" arises in museums, at concerts of classical music.

"Stendal Syndrome" should be studied in two aspects:

1. "Stendal Syndrome" as a paradox of the psyche.
2. "Stendal Syndrome" as a paradox of art.

"Stendal Syndrome" as a paradox of the psyche: aggression, vandalism, phobias, hallucinations. "Stendal Syndrome" is a form of psychogenic (reactive) psychosis, an acute reaction to stress. Symptoms of the so-called "Stendal Syndrome" may be a sign of a more

serious, deep mental disorder. There are several striking manifestations of the "Stendal Syndrome". This: the aggression to the painting "Ivan Grozny and his son Ivan" (I. Repin), In 1913 A. Balashov made three knife blows on the picture, he shouted: "Enough of blood"! In 2018, this picture was again damaged by a man with a weak psyche. In 1985, there was an attack on the painting by Rembrandt "Danae". The man caused great damage to the great masterpiece; he cut it with a knife and poured sulfuric acid. The picture was badly damaged. "Danae" was restored for 12 years. There are many such examples.

Interest in the concept of "Stendal Syndrome" increased with the release of the eponymous feature film ("Stendal Syndrome", directed by Dario Argento). However, the authors' understanding of the concept is even more confusing.

"Stendal Syndrome" is a hypersensitivity to the art, the disharmony of the senses and the intellect.

Why is this happening? What is the secret of "Stendal Syndrome"? *"Stendal Syndrome" as a paradox of art.* The aim of art is harmony within man and the harmony of man and the world of man. The concept of "catharsis", which belongs to Aristotle, expresses the essence of the humanism of art.

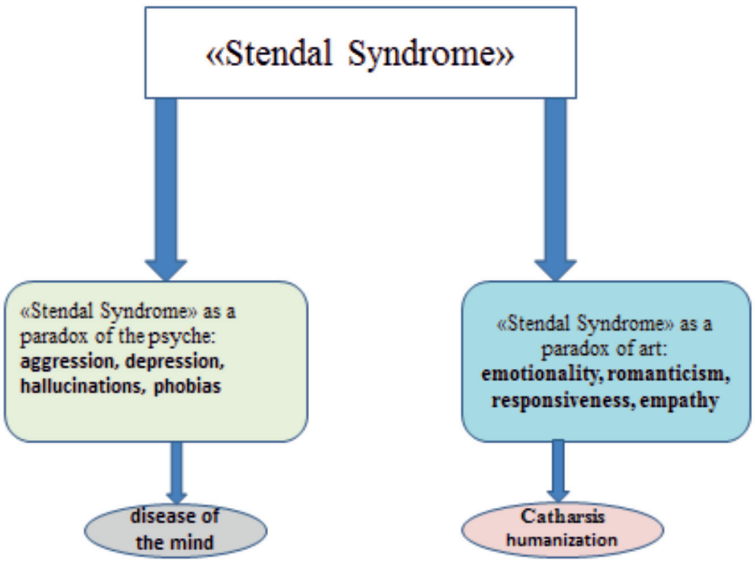
Emotions of art are special. A mentally healthy person distinguishes reality from the illusion of art.

The emotions of art are social! They are universal! The artist, the writer conveys not just a sensual image, but a social, typical feeling, something that can lead to a dialogue.

The emotion of art is always intellectual. Artistic emotion activates thought, it is rational, meaningful. Artistic emotion is a synthesis of feelings and thoughts, emotional thinking, "thought-feeling".

Artistic emotion is filled with meaning. The meaning gives rise to questions: "What"? (What is the object of the image?), "Why"? The relation of the artist to the object; "How"? – manner, style of the artist. And the question: "Who"? – the viewer [9, pp. 437-439]. The Great Russian psychologist and philosopher L.Vygotsky wrote that "art is the central emotion or emotion resolved directly in the cerebral cortex. Senses of art are smart emotions [10, p. 201].

The great secret of art in the unconscious. Here is the sacral meaning of the so-called "Stendal Syndrome". With a healthy psyche, the unconscious is not isolated from consciousness. There is a stable, active dynamic attitude, cooperation between the conscious and the unconscious. Art is understood and perceived as a fantasy (an unreal world), and not of reality. The unconscious is the "door" to the universe of art. At the same time, the "reasonable emotions" of art should be controlled.



L.S. Vygotsky is a "theory of the funnel" for explaining the psychological value of art. "The world seems to be pouring into the wide opening of the funnel with thousands of irritations, instincts, and inside the funnel there is an eternal struggle, but at the same time… Art harmonizes our feelings and Souls" [11, p. 314, 316].

An important aspect of understanding the "Stendal Syndrome" is synesthesia. Art through the unconscious activates all the senses. When dealing with art, a person feels a multi-sensory experience. This theory is well studied by the scientist B.M. Galeev: "art is the main sphere of social practice, where synesthesia dominates [12].

Synesthesia is able to push the boundaries of art and to expand the possibilities of feelings in art. It is known that many Great people in art had the ability to synesthesia-this is Sh. Baudelaire, A. Rimbaud, K. Balmont, A. Scriabin, V. Kandinsky.

When we look at the picture of I. Ivazovsky "Ninth wave", we can "hear" "the breath of the sea"; feel the cold wind and the horror of the last moments of life before the shipwreck. To understand the role of synesthesia in art is to unravel the code of the unconscious.

Reflecting and expressing the world, art struggles with chaos in the human psyche. Moreover, art is able to cure!

The first scientific experience of the use of artistic creativity in treatment was described by the doctor A. Hill in the book "Fine art against disease" (1945). He introduced the term "art therapy".

The object of art-therapy is human mind, that is, the emotional world of a human being, a human soul. Here one can clearly see the sensual and image-bearing nature of art. Art can purify the sensual world (catharsis), and correct its orientation. Through art-therapy, psychical and psychological disorders can be diagnosed and cured [1] Types of art therapy: music therapy, chromo therapy, dance therapy, Libro-psychotherapy, theater therapy, fairytale therapy.

Art in psychotherapy (art-therapy) a means of therapeutic effect on the person, it is a way of expressing ("withdrawing") mental and psychological disorders, experiences. A special place in art-therapy is given to music. It is common-place that music appeals to the human feelings directly.

A music appeals directly to human feelings.The influence of music on human consciousness is well taught. Homer in "Odyssey" tells about the healing of the wounds of a warrior with the sounds of music and singing. Bible says that David, playing on the harp, cured King Saul of depression [13]. It is known that in the sanctuary of Asclepius in Epidaurus, where Hippocrates was treating people, there was a music hall and a theater. Paracelsus introduced into the medical practice the method of "vibration", treatment of music.

At the initiative of V.M. Bekhterev in Russia in 1913, a committee for the study of musical-therapeutic effects was founded. In this committee, the great physicians and physiologists of Russia worked S.S. Korsakov, V.M. Bekhterev, I.M. Dogel, I.M. Sechenov, I.R. Tarkhanov, G.P. Shipulin. They revealed the positive influence of music on various systems of the human body: cardiovascular, motor, respiratory, central nervous system.

Music therapy activates emotions in interpersonal relations, offers facilities for the patients social activity. B. Karvasarsky, a Russian psychiatrist, suggests a specific programmer of music psychotherapy. Bach. Sonata in G minor, part 1., opin. Sonata No. 3, Rakhmaninov. Concerto No. 1, part 1., Chopin. Nocturne in E flat minor, Op. 9, No. 2., Schubert. Symphony No. 7 in C major, part 2., Tchaikovsky. Seasons. February., Liszt. Nocturne No. 3., Mozart. Symphony No. 25, part 2., Chopin. Waltz No. 2 [14, p.126].

Thus, art in art-therapy reforms psychic disorders of a person, without disturbing the individuality "I" and still allowing indeed facilitating a means of forming a perfect personality. While influencing emotions, art, having a perceptible and image-bearing character, activates the thoughtful feeling, and enriches the emotional world of a person as well as their mind. Art does not solely have a therapeutic impact upon a human being it makes them humane and puts the chaos of their feelings into a system, where they become reasonable emotions.

Art is able to purify (catharsis) the sensible world, to correct its direction, and, in the final analysis, to humanize the Person.

Conclusion

"Stendal Syndrome" is an indicator of the power of the influence of art on the Person. "Stendal Syndrome" is a disruption in the transmission of feelings. Mystery of "Stendal Syndrome" this is a manifestation of the character traits of a person (emotionality, romanticism, responsiveness, empathy...). Reflecting and expressing the world, art is a struggle against chaos in the human psyche. Art can be an indicator of mental disorders,

but the main mission of art is to humanization of personality [15].

References

1. Zahovaeva A.G. Art and medicine // European journal of natural history. – 2017. – № 5. – P. 51.

2. Aristotle. Ethics. Policy. Rhetoric. Poetics. Categories. – Minsk: Literature. 1998. 1391 p.

3. Hegel G. Aesthetics. V.1. – M.: Art, 1968-1973.

4. Tolstoy L.N. What is art? – M.: Contemporary, 1985. 272 p.

5. Chernyshevsky N.G. Articles on aesthetics. – M., 1938.

6. Deleuze G. Difference and Repetition. – SPb.: Petropolis, 1998. 384 p.

7. Kandinsky V. On the Spiritual in Art. – M.: Archimedes, 1992. 107 p.

8. Stanislavsky K. Experience art // Articles. Rech. Conversations. Letters. – M.: Art. 1953. 753 p.

9. Zahovaeva A.G. Personality psychology and the psychology of art // International Journal of Applied and Basic Research. – 2013. no. 10 (3).

10. Vygotskii L.S. Psychology of Art. – M.: Education. 1987. 341 p.

11. Vygotskii L.S. Psychology of Art. – M.: Education. 1987. 341 p.

12. Galeev B.M. The problem of synesthesia in aesthetics // Modern Laocoon: aesthetic problems synesthesia. – M.: Izd. Of Moscow State University. 1992.

13. Bible: 1 Kings 16: 17-23.

14. Karvasarsky B.D. Psychotherapie. – Moscow. 1985.

15. Zahovaeva A.G. Art: social and philosophical principle. – Moscow. 2005.

ESTIMATION OF THE LEVEL OF ENVIRONMENTAL SAFETY OF MARINE AQUA-ECOSYSTEMS (ON THE EXAMPLE OF AQUA-ECOSYSTEMS CONTAMINATED WITH UNDERWATER NOISE)

[1]Denisov O.V., [1]Andreeva E.S., [2]Ponomarev A.E.

[1]Don State Technical University, Rostov-on-Don;

[2]Southern Federal University, Rostov-on-Don, e-mail: ovd63@mail.ru, espmeteo@yandex.ru, ae_ponomarev@mail.ru

The article is devoted to the search and substantiation of the possibility of assessing the level of ecological safety of marine aqua-ecosystems, as well as the forecasting of the ecological state of the investigated aqua-ecosystems undergoing underwater noise pollution. Estimation of the level of ecological safety of marine aqua-ecosystems is supposed to be performed on the basis of calculations of the integral indicator of ecosystem safety described in the work. Forecasting of the condition of aqua-ecosystems can be performed using known extrapolation methods, least squares, taking into account the current characteristics of aquabionts (species diversity, the ratio of the number of species, etc.), since changes in ecosystems necessarily affect them. It is worth emphasizing that the proposed approach to assessing the level of safety and further ecological status of marine aqua-ecosystems in connection with noise pollution allows not only to obtain a quantitative safety measure of the assessed object.

Keywords: marine aqua-ecosystems, ecological safety, ecological state, noise pollution, methods of mathematical modeling, empirical series, forecasting of the state of the ecosystem

Ships, drilling rigs, construction of bridges, development of gas and oil fields, acoustic equipment, as a technogenic sources of underwater noise, are significantly affect the noise level under water during the last years. In addition, energy is becoming popular in the water areas of various states, which, as electricity generation grows, increases noise load and, ultimately, affects the speed of changes in marine aqua ecosystems. The above circumstances, among others, actualize the problem of noise pollution of marine areas in the early XX century in the world.

Discussing the problem of intensification of noise pollution of marine aqua-ecosystems in the world, it should be noted that its solution should be based on methods of geo-ecological research and implemented on the basis of an assessment of the state of the ecosystems being studied [1].

Thus, the assessment of the safety level of marine aqua-ecosystems, as well as the ecological state of these objects as a whole, can be solved by analyzing and ranking the environmental and anthropogenic factors that are significant for the implementation of this assessment, as well as by using the well-known method of mathematical modeling for forecasting or scientific foresight of the possible state of marine aqua-ecosystems under investigation in the near future.

The safety of marine aqua-ecosystems in the case of noise pollution will be evaluated by interpreting the values of the calculated integrated indicator of ecosystem safety, the formula of which takes into account a number of empirical parameters and is presented in [2].

In turn, forecasting of the ecological state of the marine aqua-ecosystems under study can be carried out by extrapolation of the currently available numerical parameters. It is important to note that the prediction of the ecological status of any ecosystem should take into account the current characteristics of aquacombs (species diversity, the ratio of the number of species, etc.), since changes that occur in ecosystems necessarily affect them [1].

The extrapolation method assumes the construction based on the ranked data of the dynamics graphs of one or another parameter that takes into account the state of the aqua-ecosystem in the past and the current moments, and also the continuation of these graphs for a certain time interval depending on the tasks to be solved. Carrying out the extrapolation method, it should be remembered that in this case there is a timeless approximation, and the obtained predictive values of the investigated parameters will not take into account the dynamic oscillations or possible changes in the values of these parameters, proceeding from the assumption that the object will develop the same way as in the past and the present [3].

In general, extrapolation methods are quite widespread and are used in a number of studies, despite their inaccuracy and “smoothness” of the numerical solutions obtained. The basis of extrapolation-prediction methods is the study of empirical series. Empirical series can be numerical sets of the results of observations of a number of parameters obtained successively in time.

Other methods of processing empirical or chronological series of empirically obtained

characteristics for solving the prediction problem of future numerical realizations are well-known and well described. In particular, in a number of research papers, methods of revealing the statistical connectivity of series members (Abbe's criteria), methods for identifying "Markovism" (revealing a complex Markov chain), and others have been used and shown very interesting results [3].

In addition, empirical series of observations can also be fairly effectively investigated using the method of least squares. It is worth noting that the peculiarity of this method is that the prognosis for the whole period of anticipation will be calculated on the basis of the chosen function, despite the changes that are taking place. If the calculated values are close or coincide with the actual values of the original series, then it can be argued that it was possible to select a mathematical function corresponding to the dynamics of the original series.

Let us consider in more detail the determination of regression equations for estimating the changes in the parameters studied by the method of least squares described above. Characteristics and changes in parameters of the aqua-ecosystem for further forecasting will be recorded in the table 1 (Fig. 1). The data from the table can be represented in the form of n pairs of values (x_j – the time meter, Y_j – the value of the monitored parameter, where $j = 1,...,n$). Suppose that the linear regression function $E(Y|x) = \alpha + \beta x$ adequately represents the situation of reducing environmental security. It is required to find estimates α and β, respectively A and B, and determining the regression line closest to the experimental points. If the "proximity" is measured by the sum of the squares of the differences between the observed values and those given by the constructed regression line, we arrive at the method of least squares (Fig. 1).

Based on the foregoing, an assessment of the level of safety can be characterized by an integrated indicator of ecosystem safety,

$$p = \frac{\sum_{i=1}^{N} C_i p_{kp_i}}{N},$$

on condition $|CP^b_{lvi}| < |CP_i| < |CP^u_{lvi}|$,

where C_i is the weighting coefficient of the i-th controlled parameter,

CPi – the value of the i-th controlled parameter,

CP^u_{lvi}, CP^b_{lvi} – the upper and lower limit values of the i-th controlled parameter,

$p_{cpi} = 1 - \frac{|2\ CPi - (CP^u_{lvi} + CP^b_{lvi})|}{(CP^u_{lvi} + CP^b_{lvi})}$ – a dimensionless index of the safety of the i-th controlled parameter,

N – number of controlled parameters.

parameter number	unit of measure / weighting factor	maximum permissible value	final inspection	current data: 1 year	current data: 3 years	current data: 6 years old	current data: 9 years old	current data: 12 years	predicted value: 18 years old
D1	0,80	$1,0^{+0,26}_{-0,t}$	1,26	1,25	1,22	1,18	1,11	1,05	0,94
D2			1,26	1,26	1,18	1,16	1,10	1,05	0,94
D3			1,26	1,26	1,22	1,15	1,14	1,01	0,91
D4			1,26	1,25	1,19	1,15	1,11	1,02	0,92
R	0,90	$1,5^{+0,5}_{-0,l}$	1,89	1,89	1,77	1,67	1,55	1,52	1,28

Fig. 1. Application of the least squares method to assess the ecological state of aquaecosystems

At the same time, if $p = 0$ – safety is 0% (that is, the safety level is zero – the state is catastrophic), if $p = 1$ (ideal) – without danger – safety is 100% – the state is ideal.

The proposed safety index, being integral in its essence, characterizes the state of the ecosystem under study, including a number of ranked parameters (Fig. 2).

An ecosystem is considered in a crisis situation and requires urgent intervention when it leaves at least one of the monitored parameters beyond the permissible limits.

As parameters of aqua-ecosystems under study, in connection with, for example, parameters can be:

– ecological (temperature, salinity, illuminance, species groups of aquabionts, ratio of species groups, indicators of population dynamics, etc.);

– Anthropogenic (levels of noise pollution, intensity and duration of noise pollution, etc.).

The investigated parameters can be obtained experimentally (measured), calculated theoretically (expert evaluation, theoretical modeling, etc.), by experimentally determining the parameters of the pollution zone / impact of the anthropogenic factor on the aqua-ecosystem under investigation.

The values of the investigated parameters in Table 2 (Fig. 2) are divided into two regions: the current data is the data obtained experimentally and theoretically up to the present moment of existence and the predicted values are values extrapolated from the known data for the further life of the aqua-ecosystem.

The graph of the regression equation for each parameter in the coordinate axes "parameter value-time" for parameters D1-D4 and R will have the following form (Fig. 3).

CP	B	A	the value of *CP*	Y	x	ρ_v
D2	–0,0017	1,17	1,14	1,16	5,16	0,96
D3	–0,0018	1,18	1,14	1,16	5,16	0,93
D4	–0,0016	1,17	1,14	1,17	5,16	0,95
R	–0,0034	1,71	1,65	1,70	5,16	1,03

$$p = \frac{\sum_{i=1}^{N} C_i p_{lgl}}{N} = 0,73$$

Fig. 2. An example of a security assessment of the ecosystem

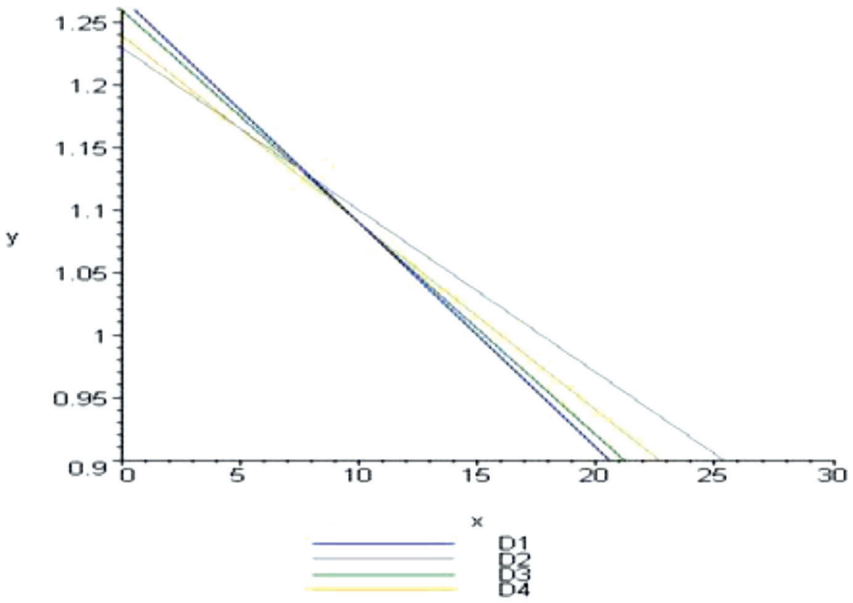


Fig. 3. Graph of the regression equation for D1–D4 (the density of the i – population)

Hence it is necessary to emphasize that the proposed approach to assessing the level of safety and the further ecological state of marine aqua ecosystems in connection with noise pollution allows not only to obtain a quantitative measure of the safety of the assessed object. Based on the calculations performed, it becomes possible to manage various, including negative scenarios, of the further state of marine aqua-ecosystems.

So, in a number of cases, an improvement in the situation is possible through the development of appropriate technical solutions, for example: the development of the foundation of wind turbine designs, bridges on piles driven into the seabed by hydraulic shock equipment; selection and design of noise-suppressing systems (dampers) based on thermoelastic alloys; air curtains; filled with air around the pile and so on.

In conclusion, it should be noted that the reduction in the level of underwater noise is the subject of highly specialized studies, since the differences between the conditions for a number of aqua-ecosystems are very significant, and this is important to consider.

References

1. Andreeva E.S. Metody matematicheskogo modelirovaniya antropogennykh vozdeystviy na vodnyye ekosistemy [Methods of mathematical modeling of anthropogenic impacts on aquatic ecosystems]. Rostov-on-Don. 2008 (in Rus).

2. Denisov O.V., Ponomareva I.A., Martynenko E.N. Resheniye zadachi ekologicheskoy bezopasnosti metodom prognozirovaniya vliyaniya tekhnogennogo podvodnogo shuma na ekosistemy akvatoriy [Solving the problem of environmental safety by predicting the impact of technogenic underwater noise on the ecosystems of the water areas]. In the collection: Fizicheskaya kul'tura, sport, zdorov'ye i dolgoletiye: osnovy priobshcheniya podrastayushchego pokoleniya k idealam i tsennostyam olimpizma [Physical culture, sport, health and longevity: the principles of acquiring the younger generation in the ideals and values of Olympism]. Materials of the third all-Russian conference with international participation at the scientific and practical conference. 2014. P. 43-47 (in Rus).

3. Andreeva E.S., Andreev I.S. O vozmozhnosti approksimatsii konechnykh tsepey Markova dlya prognozirovaniya veroyatnostey opasnykh yavleniy pogody [On the possibility of approximating finite Markov chains for forecasting the probabilities of dangerous weather phenomena] // Izvestiya Vysshikh Uchebnykh Zavedenii [Proceedings of higher educational institutions. North-Caucasian region. Series: Natural Sciences]. 2006. No. 5. P. 89-93 (in Rus).

4. Moosrainer M. Analyzing Vibration with Acoustic-Structural Coupling. ANSYS Advantage, 2009, 3 (2), P. 40-42 (in Eng).

5. Denisov O.V., Sakhabudinov R.V. Primeneniye splavov s effektom pamyati formy [The use of alloys with shape memory effect]. Rostov-on-Don. 2000 (in Rus).

STUDY OF THE RESISTANCE OF SOME SAMPLES OF SOFT WHEAT T. AESTIVUM L. TO STRESS FACTORS

Abisheva Kh.Sh PhD., Mikailova R.T., Majidova G.S.
Genetic Resources Institute of ANAS, Baku, e-mail: abishova.xayala@mail.ru, mikailova.71@mail.ru

Assessment of drought and heat resistance in the laboratory was carried out on 6 samples of bread wheat T. aestivum L. These are Saratov 29, Fin-bugdasi, Dag-Dash Jaa 15662, Lutescens 2656, Seri -82, Ferruhineum 0 704/2 varieties. In laboratory conditions, the determination of drought and heat resistance in samples of bread wheat T. aestivum L. during the sprouting period was carried out by two methods: by the ability of the seeds to germinate under physiological moisture deficiency (such conditions were created in a sacharose solution at an osmotic pressure of 16 atm.); on the heat resistance of the embryo, which was determined on the basis of the evaluation of the germination of seeds after their heating in a water thermostat for 25 minutes at a temperature of 54-55 ° C. Further studies were aimed at determining the content of nucleic acids in the nuclear genome under the influence of stress and their treatment with phytohormones. Dag-Dash Yaa 15662 was identified as a resistant sample and recommended for further breeding.

Keywords: wheat, drought, heat, stress, nuclear genome, DNA, RNA phytohormones

The climate plays a main role, both in the vital activity of individual people, and in the formation, development and death of entire human civilizations. According to the data developed by scientists of the world, and as a result of the UN Commission studies, the world average temperature by 2025 will increase by 1.4-1.8 degrees Celsius. Having regard to the increasing influence of mankind on climate change, the Intergovernmental Panel on Climate Change (IPCC) is doing everything possible to increase the number of observations to create a more complete picture of global warming. Conclusions of specialists are disappointing.

They think that negative heating results will be felt everywhere [2, 15, 16]. The grain yields will seriously fall, the amount of available drinking water will decrease. Precipitation will fall out less and less. For Azerbaijan, this problem is also extremely urgent, since most of the wheat areas is in the zones of risky farming and is subject to a permanent negative impact of environmental conditions, resulting in the loss of more than half of the crop. Studies have shown that an increase in the average temperature in 2020-2050 in Azerbaijan, according to experts, will be 2.5 degrees higher. This will have a negative impact on many spheres of life. As an example, experts led the forecast of ecologists that the level of the Caspian Sea will increase by 150 cm until 2040, and this will create a tense situation. To mitigate the consequences of temperature increase in Azerbaijan, domestic specialists, together with representatives of international organizations and the national academy of sciences, are working on a strategic plan for adaptation to global warming [2, 9, 13]. If one has the mind of an annual population growth and an increase in stress factors in the near future, our republic may feel a shortage of grain and other food products.To mitigate the consequences of temperature increase in Azerbaijan, local specialists, together with representatives of international organizations and the national academy of sciences, are working on a strategic plan for adaptation to global warming [2, 9, 13, 14]. If one bears in mind annual population growth and an increase in stress factors in the near future, our republic may feel a shortage of grain and other food products.

Therefore, it is necessary to increase the total yields of food crops, as well as to create new stress-resistant, high-yielding varieties, to improve and spread the existing species and varieties of wheat that have been created by nature, people and through selection for rational use of their benefit for humanity [1, 2, 9,10, 11]. An important task of scientists is to identify drought-resistant genotypes of agricultural crops and to study the molecular genetic bases of resistance.

Materials and methods of research

The most important task in the field of agricultural crops is to ensure the stability of high yields under unfavorable environmental conditions. Materials of our research were 6 samples of soft wheat T. *aestivum* L. This is Saratovskaya 29, Fin-bugdasi, Dag-Dash Yaa 15662, Lutescens 2656, Seri -82, Ferruhineum 0 704/2.

Determination of drought and heat resistance in samples of soft wheat T. aestivum L. in laboratory conditions by physiological parameters. The determination of the drought resistance of wheat during the shoot period was carried out by two methods: according to the ability of the seeds to germinate under physiological moisture deficiency (such conditions were created in a saccharose solution

at an osmotic pressure of 16 atm.); on the heat resistance of the embryo, which was determined on the basis of the evaluation of the germination of seeds after their heating in a water thermostat for 25 minutes at a temperature of 54-550 °C [3, 4, 8].

Further research has led to the identification of nucleic acids in the nucleic genome under the pressure of stress and treatment of their phytohormones.

In order to explain the evaluation of the genome and its functional activity, there is a deficit of moisture by PEG-3000 support. Seeds were germinated in Petri dishes, after their growth reached 6 cm, one part of the seedlings was taken as a control variant, and the remainder was subjected to stress with PEG (30 mg / 500 ml).After the 24th day of the week, each version was taken on 2gr leaves. The stain was scrubbed with water and dried out with PEG, but one part was added to the water, and the other was treated with phytohormones (gibberellin 50ml / lt). After a 48-hour treatment, the probe was investigated [5, 6].

Then the leaves were washed with water and dried in the PEG variant, one part was put back into the water, the other was treated with a complex of phytohormones (gibberellin 50 ml / Lt). the samples were taken after 48 hours of exposure [5, 6].

Results of research and their discussion

As can be seen from the data in Fig. 1: 3 of the 6 samples of soft wheat, *T. aestivum L.* were resistant. These are Saratovskaya 29, Finbugdasi, Dag-Dash Yaa 15662. At the Saratovskaya 29 sample, in comparison with the control variant, the germination of seeds in the osmotic solution was of 88 % and the percentage of seed germination after heating was 91 %. The next sample included in the group of highly resistant ones was the Fin-bugdasi in the conditions of water deficiency, the percentage of its seed germination was 80 %, and the percentage of seed germination after warming up was 75 %, Dag-Dash Yaa 15662 sample seeds germination in physiological drought conditions was 79 %, after heating was 81 %. Thus, in wheat samples, the percentage of germination of seeds in the sacharose solution varies from 75 % or more, we are conditionally evaluated them as drought-resistant. The ability of the seeds to germinate under these conditions reflects both the hereditary property of germinating with a relatively smaller amount of water, with the presence of a high suction force, ensuring rapid absorption of the required amount of water.

A relatively low percentage of seed germination was found in Lutescens 2656, Seri 82, Ferrugineum 0 704/2, where the percentage of seed germination varied in the amplitude of 26-45 %. For example: Lutescens 2656 seed germination under water deficiency conditions – 26 %, after heating 41 %, Seri 82 % seed germination in osmotic solution was -42 % and after seed-45 %, Ferrugineum 0 704 / 2- in sacharose solution 41 %, after heating-45 %. In these experiments, differences in seed germination energy were also observed in varieties with different degrees of resistance. In the seeds that were included in group 1, the major of the seeds germination 2 days after the experiment was laid. In medium-resistant and weakly resistant germination, the germination was extended for 4-5 days.

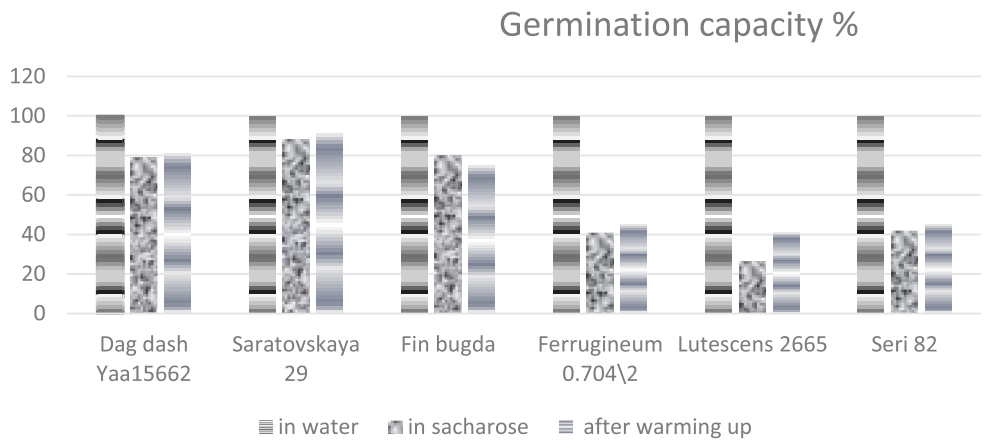


Fig. 1. Characterization of seed germination in sacharose solution, after warming up

As can be seen, in drought-resistant wheat varieties the percentage of germinated seeds is higher than non-resistant samples to drought. The high suction power of seeds causes not only better germination with a lack of moisture, but also the formation of a more powerful root system, which is important for the further vital activity of plants, especially with continuing drought.

Our research we continued on the study of changes occurring in the nuclear genome. 2 of 6 samples of soft wheat, *T. aestivum L*, were taken; resistant Doug Dash Yaa 15662, and weakly resistant Ferruguineum 0 704/2 on which the changes taking place in DNA fractions and the amount of RNA were determined under the influence of the stress factor and the action of a complex of phytohormones on them.

Thus, following the changes in the activity of the cell genome, we tried to find out the mechanism of adaptation to drought in the studied varieties. Essentially, the role of the structural state of DNA, on which adaptive reactions of the organism depend, is high. The data we obtained have been presented in Tables 1-2, and fig. 2.

As we can see from the data of the table, significant changes in the genome occur in the resistant variety Dag-Dash Yaa-15662 under the influence of stress, that is, an increase in the content of all fractions of DNA and RNA occurs. The amount of RNA increases by 9%. The relative content of DNA shows an increase in the labile fraction, where the content reaches 37%, the content of the stable fraction is 33%, the residual fraction – 11% and the total is 37%.

We pay special attention to the change in the structural and functional condition of the genome, which is reflected in the active synthesis of labile DNA. The study of the fractional DNA composition showed that, in comparison with the control, the content of the labile active fraction of DNA was significantly increased, that is, under stress, the transcription activity of DNA increased. In addition, intensive RNA synthesis occurs, showing significant changes in the functional state of chromatin, which are directly related to genome activity [4–6, 16]. Since the predominant part of the labile DNA fraction is localized in euchromatin, which has a high functional activity. An increase in the content of this fraction appears to reflect an increase in the intensity of transcription and, accordingly, causes an increase in protein synthesis. The increase in total DNA in wheat germ cells may result from the amplification of DNA or endopliploidy, more likely as a result of a combination of both processes [5–7, 11, 13, 15].

After 48 hours of stress and treatment with phytohormones, the increase in RNA was 14%, the labile DNA fraction was 69%, the stable fraction was 65%, the residual fraction was 13%, and the total fraction was 63%. From the literature it is known that the action of phytohormones contributes to the regeneration of the structural and functional state of the genome, disturbed by the impact of stress.

An increase in the content of nucleic acids in plant cells after treatment with phytohormones indicates that the regeneration processes are amplified and the genome becomes functionally active.

We also monitored the changes in the content of nucleic acids in the fractional DNA composition and the amount of RNA after stress on the weakly resistant variety, Ferugineum 0704/2 (Table 2) and Fig. 3.

Table 1

The content of DNA and RNA fractions on sprouts of Dag-Dash Yaa-15662 variety under drought and phytohormones effect (100 g wet weight in mkg)

Variants	RNA	DNA FRACTION			Total DNA
		Labile	Stabile	Residual	
Control	170,0 ± 3,7	18,79 ± 0,41	14,89 ± 0,56	2,60 ± 0,31	36,28 ± 1,86
PEG (24 hours stress)	186,0 ± 4,8	25,90 ± 0,79	19,85 ± 0,95	2,90 ± 0,51	49,71 ± 1,99
PEG + H_2O(24 hours)	169,0 ± 3,8	18,08 ± 0,81	13,81 ± 0,36	2,95 ± 0,51	34,84 ± 1,86
PEG+kinetin-gibberellin (48 hours)	193,0 ± 5,9	30,62 ± 1,82	22,87 ± 0,68	3,35 ± 0,96	56,84 ± 2,91

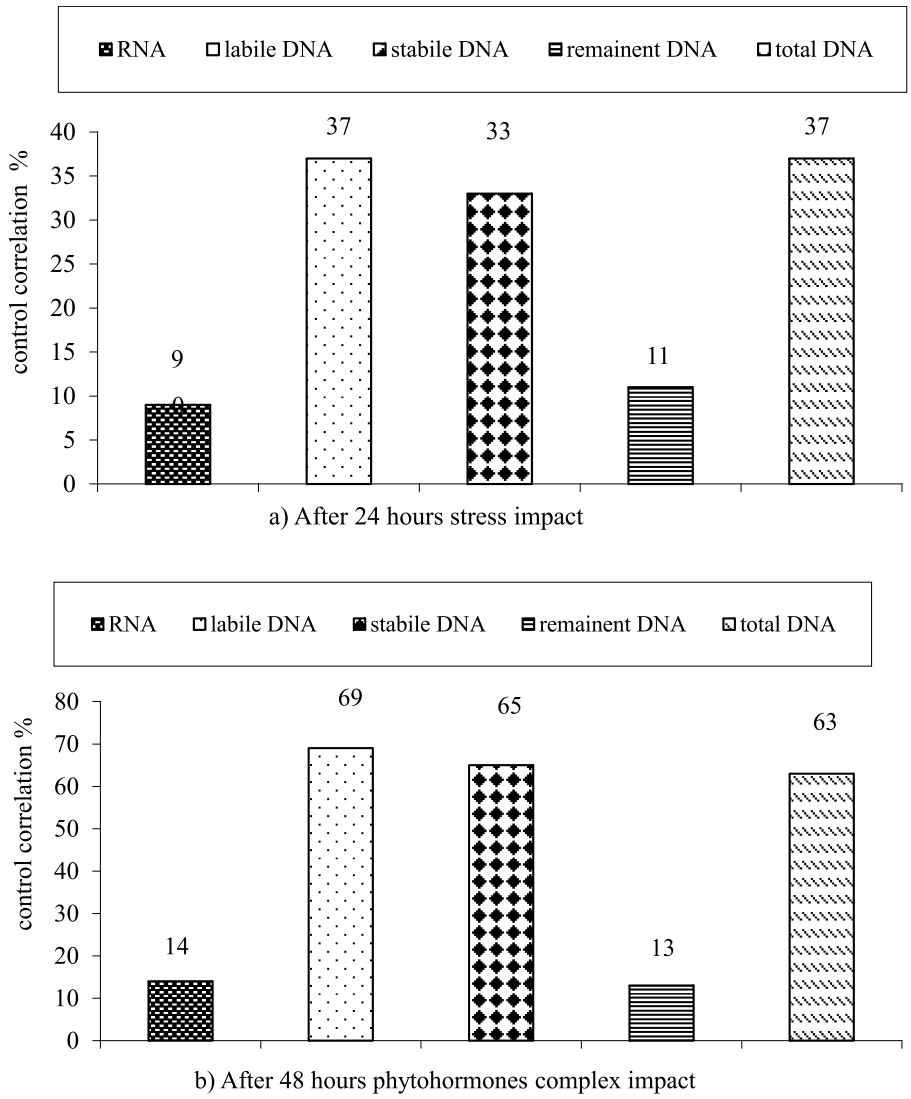


Fig. 2. Diagram of nuclein acids content in variety of Dag-Dash Yaa-15662 under stress and complex phytohormones impact (control correlation)

According to physiological parameters, the weakly resistant variety of Ferugineum 0704/2 shows a sharp decrease in both RNA and DNA content. The amount of RNA reduces by 7%, the labile fraction by 25%, the stable fraction by 5%, the residual by 25% and the total by 11%. This indicates that under the influence of stress, the activity of heterochromatin increases, that is, a significant portion of the labile DNA is converted to a stable, less active state, characterized by a relatively low intensity of RNA synthesis and weak morphogenetic activity of the cells [1, 7]. In the cultivar Ferugineum 0704/2, phytohormones contributed to an increase in the content of nucleic acids. RNA increased by 17%, labile DNA fraction by 25%, stable by 23%, residual by 11%, total by 23%.

Conclusions

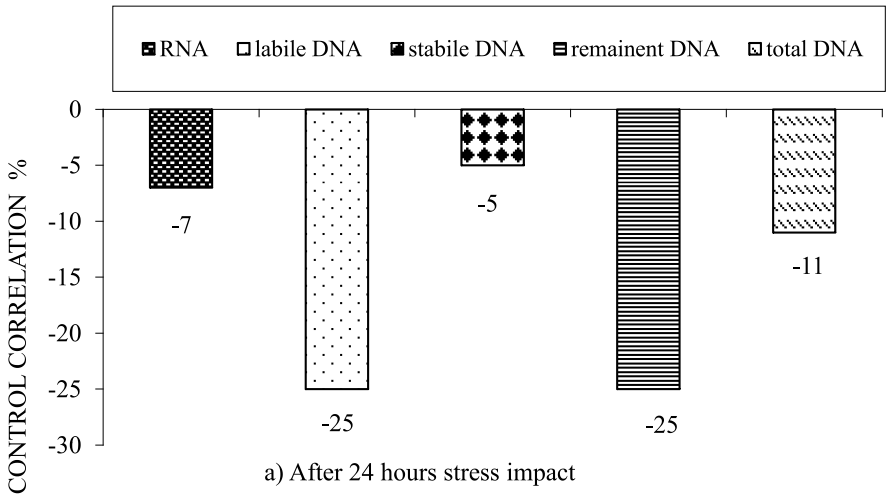
Returning to our data, it can be said that a decrease in the functional activity of nucleic acids is a protective-adaptive reaction that allows the transition of metabolism to a new stable level. The experimental material obtained by us indicates that phytohormones display a significant effect on the genetic apparatus of the cell. The data of our studies give the reason to believe that resistance to drought is interrelated with structural and functional changes in the genome, as a sharp increase in the labile

is occurring, i.e. genetically activated chromatin DNA and RNA in resistant varieties and forms [1, 3, 4, 7, 12–14]. As a result, the synthesis of the stress protein increases and the plant develops a protective-adaptive response, while for the weakly resistant varieties, the inverse process occurs. The reason for reducing the RNA content is probably the suppression of its synthesis as a result of a decrease in the functional activity of nuclear DNA and the plant weakens or dies. The experimental data obtained by us can be useful in studying the molecular genetic mechanisms of resistance to stress factors.

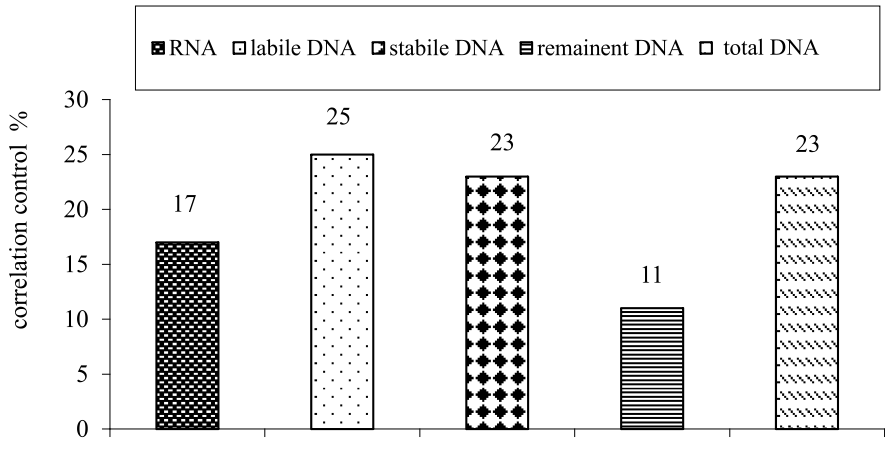
Table 2

The content of DNA and RNA fractions in plants of the Ferrugineum variety 0 704/2 under the influence of drought and post-treatment by phytohormones (100 g wet weight in mkg)

Experimental versions	RNA	DNA fraction			Total DNA
		labile	stabile	residual	
Control	96,60 ± 0,96	13,11 ± 0,21	15,03 ± 0,22	1,86 ± 0,20	30,00 ± 2,85
PEG(24 hours stress)	90,00 ± 0,92	9,75 ± 0,19	14,30 ± 0,24	1,39 ± 0,25	25,44 ± 2,22
PEG + H_2O (24 hours)	78,20 ± 0,59	12,40 ± 0,25	13,80 ± 0,26	1,35 ± 0,68	27,53 ± 2,33
PEG + kinetin-gibberelline (48 hours)	91,80 ± 0,97	15,55 ± 0,38	17,00 ± 0,68	1,50 ± 0,59	34,05 ± 3,30



a) After 24 hours stress impact



b) After 48 hours phytohormones complex impact

Fig. 3. Diagram of nuclein acids content in variety of Ferrugineum 0704/2 under stress and complex phytohormones impact (control correlation)

References

1. Aliev R.T. Dynamics of disorders in the metabolism of RNA and DNA as a function of photosynthetic apparatus under stress in rye plants / Mat. Conf. Ecological aspects intens. agricultural plants. Penza: 2002, p. 132-136.

2. Aliev DA, Akperov. Z.I. Genetic Resources of Azerbaijan's Plants // Izvestiya NAN Azerbaijan, 2002, № 1-6, p. 57-68.

3. Volkova AM, Perepad'ya Yu.G. Diagnostics of the heat resistance of wheat barley and cucumber on the germination of seeds after heating / Methods for assessing the resistance of plants to unfavorable environmental conditions. L: Kolos, 1976, p. 121.

4. Mironov K.E. Preparation of forage and physical and mechanical properties of grain // Vestnik NGIER, 2012, No. 12, p. 88-91.

5. Eilam T., Anikster Y., Millet E., et al. Nuclear DNA amount and genome downsizing in natural and synthetic allopolyploids of the genera Aegilops and Triticum // Genome, 2008, v. 51, no 8, p. 616–627.

6. Konarev V.G. Nucleic acids and plant morphogenesis // Proceedings on Applied Botany, Genetics and Selection, 1959, vol. 52, p. 395.

7. Konarev VG, Tyuterev S.L. Methods of Biochemistry and Cytochemistry of Plant Nucleic Acids // Proceedings of VIR on Applied Botany, Genetics and Selection, 1973, v. 52, p. 58-84.

8. Raskina O., Barber J.C., Nevo E., Belyayev A. Repetitive DNA and chromosomal rearrangements: speciation-related events in plant genomes // Cytogenet Genome Res, 2008, v. 120, p. 351–357.

9. Oleinikov T.V, Osipov Yu.F. Determination of the drought resistance of varieties and samples by germination of seeds on sacharose solutions with high osmotic pressure / Methods for evaluation of plant resistance and adverse environmental conditions. L: Kolos, 1976, p. 56.

10. Yurtaeva V.P. Indirect indicators in assessing the quality of winter wheat grain / Proceedings of the All-Russian Student Scientific and Practical Conference "In the World of Scientific Discoveries." Ulyanovsk: SAA named after P.A. Stolypin, 2012, vol. 1, p. 234.

11. Lyakova L.I. Creation and study of the spring bread wheat variety "Pamyati Maistrenko" with the introgression of genetic material from the synthetic hexaploid Triticum timopheevii Zhuk. and Aegilops tauschii Coss // Genetics, 2013, v. 49, No. 1, p.103-105.

12. Baum B. R., Edwards T., Johnson D.A.Phylogenetic relationships among diploid Aegilops species inferred from 5S rDNA units // Mol Phylogenet Evol, 2009, v. 53, p. 34-44.

13. Haider N. Evidence for the origin of the B genome of bread wheat based on chloroplast DNA // Turk. J. Agric., 2012, v. 36, p. 13-25.

14. Haider N. The Origin of the B-genome of Bread Wheat (Triticum aestivum L.) // Russian Journal of Genetics, 2013, v. 49, no. 3, pp. 263-274.

15. Lucas S.J., Bala A.A., Melda K., et al., Physical Mapping Integrated with Syntenic Analysis to Characterize the Gene Space of the Long Arm of Wheat Chromosome 1A // PLOS ONE, 2013, v. 8, Issue 4, p 1-12.

16. Naskidashvili P., Samadashvili T., Naskidashvili M., et al. The Results of the Crossing of Winter Triticale with Soft Wheat Cultivars and First Generation Hybrids Productivity // Bulletin of the Georgian National Academy of Sciences, 2009, v. 3, no. 1, p. 117-122.

NORMALIZATION OF OCCLUSION IN PATIENTS WITH INCREASED DENTAL ABRASION

[1]Balakhnichev D.N., [1]Subbotin R.S., [1]Fischev S.B., [2]Lepilin A.V.,
[3]Sevastyanov A.V., [1]Orlova I.V.

[1]*Saint Petersburg State Pediatric Medical University, Saint Petersburg, e-mail: super.kant@yandex.ru;*
[2]*V.I. Razumovsky Saratov State Medical University, Saratov;*
[3]*Saint Petersburg State Pediatric Medical University, Saint Petersburg*

A number of diseases, including increased abrasion of natural teeth, cause spatial changes in the masticatory-speech apparatus, which affect the masticatory muscles and TMJ, which act within their activity and rest, and going beyond this framework entails disorders with decompensation of the supporting apparatus of the teeth. The aggravating factor may be the parafunctions of the masticatory muscles, TMJ diseases and as a consequence structural changes. Therefore, it is extremely important to determine the parameters of changes in the position of the elements of the TMJ from the value of normalization of the height of the gnatic part of the face. In clinical dentistry often patients with various pathologies of the chewing-the vocal apparatus, a feature of which is reducing the height of gnatichesky part of the person patients. In the clinic of prosthetic dentistry temporomandibular joint given great importance. It is known that any dental intervention in the maxillofacial region in varying degrees, affect the temporomandibular joint. We have created a computer program to determine the optimal height of gnatichesky part of the person at patients with various forms of increased abrasion of teeth. Imaging of the temporomandibular joints (TMJ) allows to obtain correct display of the true state of the elements of the temporomandibular joint, intra-articular as well as their interactions and patterns of change with increasing height of gnathic part of the patients with increased dental abrasion. The proposed computer program allows to simulate the correct position of the elements of the temporomandibular joints taking into account the normalization of the height of gnathic part of the person at patients with different clinical forms of increased abrasion of teeth.

Keywords: orthodontia, orthopedia, increased dental abrasion

In clinical practice a dentist often encounters patients with different pathologies of the chewing- vocal apparatus, which are manifested by reduced height of gnathic part of the face as one of characteristic features of impairment. Quite a number among these are patients with increased dental abrasion: from 11.8% to 42.6% of cases [3, 4, 8, 12, 17, 18].

The cases of increased abrasion of teeth are likely to be caused by various reasons: morphological inferiority of hard tissues of teeth, overloading of teeth, chemical exposure, occupational hazards, functional status of the masticatory muscles and temporomandibular joints (TMJ) and others [2, 3, 4, 5, 8, 9, 10, 11, 15].

In the practice of prosthetic dentistry temporomandibular joint is of great importance. It is known that any dental intervention in the maxillofacial region affects the TMJ to a less or greater extent [2, 4, 12, 13, 14, 16].

Most researchers recognize the relationship between the structure of the TMJ and type of occlusion [1, 4, 5, 8, 14].

Currently existing classification of increased abrasion do not meet the systematization of the clinical manifestations of this disease [3, 5, 10, 11, 12, 15]. If the horizontal form of abrasion is clinically determined reliably, vertical and mixed as well as all other forms distinguish from each other only conditionally. Therefore, we singed out alongside the horizontal form vertical and vertically distal-mesial ones, depending on the type of bite and position of elements of the temporomandibular joints. Gnathic part of the person'face is a variable structure of the craniofacial complex. The most susceptible to change are vertical parameters, which is associated with anatomical-physiological characteristics of growth and development of the head (the change of teeth, anomaly of occlusion, loss of teeth, increased dental abrasion, etc.). Increase in the height of gnathic part of the person's face can lead to a change in the tone of masticatory muscles and cause dysfunction of temporomandibular joints [4, 5, 8, 10, 14, 16].

The purpose of the work

To study the efficacy of treatment prediction of patients with vertically-distal form of increased abrasion of teeth according to the position of the elements of the temporomandibular joints with the use of computer programmes and on the basis of their findings – assessing the quality of dental prosthetics.

Materials and methods of research

We examined 61 patients (31 women and 30 men) with a vertically distal form of increased abrasion of teeth, 28 of them (17 men and 11 women) with compensated and 33 (14 women and 19 men) with decompensated form. Decompensated vertically- distal form of PSZ is characterized by the reduction of gnathic part

of the face, while in case of compensated form reduced gnathic part of the face was not observed (or only mild reduction) due to vacant (false, substitution, reversible) hypertrophy of bone tissue of alveolar ridges of the upper and lower jaws. All patients noted various defects of dentition, but less than 6 teeth antagonists were not observed.

The distribution of patients with PSZ by age and sex are presented in table 1.

Table 1

Age	31–40	41–50	51–60	61 and older
Women	7	8	13	3
Men	8	9	12	1
Total	15	17	25	4

Roentgenologic teleroentgenogram analysis was performed by means of a computer program [19], which allows to identify anthropometric points, to build a cephalometric plane to roentgenogrammetry and formulate the preliminary diagnosis. In the study we used one angular dimension (angle n – ss – spm) and six linear (sna′ – Kme′; sn′- Kme′; gox; goy; cox ; coy) (Fig. 1).

We proposed a method for studying tomograms of temporomandibular joints on the bases of the issues including the measurement of the sagittal size of the glenoid fossa of the line drawn from the lower edge of the articular tubercle to the lower edge of the external auditory canal, measuring the width of the lower jaw head, the angle of inclination of the slope of the articular tubercle, the dimension of the joint space in front, upper front, upper rear and rear parts due to the depth of the temporomandibular fossa and the configuration of the lower jaw head (Fig. 2).

The proposed calculation formula:

$$\Delta h = K \times [(DR1 + DR2 + DR3 + DR4 + DL1 + DL2 + DL3 + DL4):8 - D']$$

where Δh is the height to which it is necessary to increase he gnathic part of the face.

K – the experimentally derived factor for increased abrasion horizontal form – 11,4; for increased abrasion vertically distal shape – 6,7; for increased abrasion vertically mesial form – 13,8;

D1, D2, D3, D4 is the width of the joint space in the front, front upper, rear upper and rear parts of the TMJ, respectively.

R – TMJ-right, L – left TMJ.

D' is the experimentally derived value of the average values of the joint space by four parameters: for increased abrasion horizontal form – 2,8 mm for increased abrasion vertically distal form – 2.2 mm; for increased abrasion vertically mesial form – 3.1 mm.

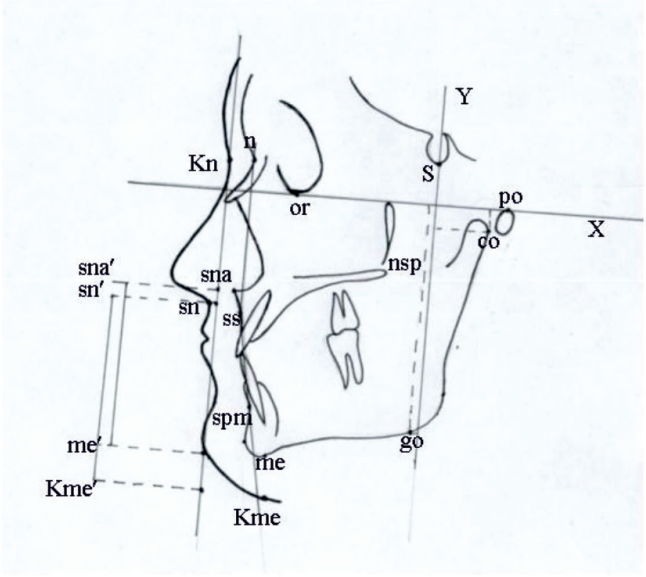


Fig. 1. Analysis of the profile telerentgenogram: X – Frankfurt plane (horizontal), held between the points po (porion) and or (orbitale); Y – the vertical, held between the points (sellion) and go (gonion); me – menton; co – condilon; n – nasion; sn' – cutaneous projection sn (subnasale); ss – subspinale; snp – spina nasalis posterior; sna' – skin projection point sna (spina nasalis anterior); Kme' – skin projection point me (menton)

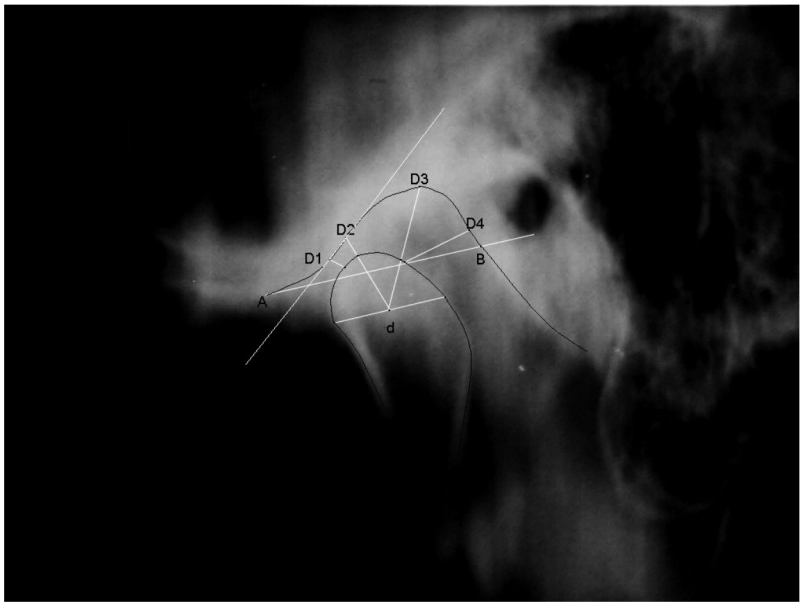


Fig. 2. Tomogram of the temporomandibular joint. A – the top of the articular tubercle; B – the lower edge of the external auditory canal; d – diameter of the head of the lower jaw; D1 – is the width of the joint space in the anterior; D2 – width of the joint space in the anterior-upper part; D3 – is the width of the joint space at the posterior e -upper part; D4 – is the width of the joint space in the posterior part

The technique allowed us to enforce valid settings in the topography of elements of the temporomandibular joint at different degrees of change of the position of the mandible in orthopedic treatment with the aim of normalizing its position. For this purpose, a computer program for determining the optimal height of gnathic part of the face in patients with various forms of increased abrasion of teeth (the Certificate on registration of software № 2015619515 Software complex to determine the optimal height of the bite in patients with increased dental abrasion (TMJ2015) [6] date of state registration in the Register of computer programs 04 September 2015 was worked out. Passport data of a patient are inserted in a computer program, followed by a tomogram of the patient's temporomandibular joints (right and left) made before treatment. Finally, reference points are set and program after calculation determines the amount by which it is necessary to increase the height of the gnathic part of the patient's face.

Quality of orthopedic treatment was tested by the tone of actually masticatory muscles. As the process of reduction of the gnathic part of the person's face takes decades, the chewing muscles get used to this particular isometric height. With the normalization of the occlusion and increasing the height of the bite, the muscle tone of the rest increases, and the tone of the muscle tension decreases. With properly determined height of gnathic part of the face, the tone parameters of calm and tension come back to the original state in for about two weeks.

Myotonometry was performed using myotonometry SZIRMA (METRIMPEX, Hungary). Myotonometry scale is calibrated in grams. Myotonometry dipstick was placed to the motor points on the right and left of actually chewing muscles and the tone of the rest (TP) and the tone voltage (VT) was measured.

For accurate location of the motor points during re-examination of the masticatory muscles we used our proposed method (Patent for invention "Method of evaluating the quality of prosthetics" No. 2617229 Registered in the State register of inventions on April 24, 2017) [7].

For this primary survey on the lateral surface of the patient's face the transparent plate (x-ray or thick plastic film) was imposed strictly to the landmarks: the middle of the tragus of the ear and the outer edge (corner) of the orbit. Motor point marked by the dye was transferred on the transparent plate (fig. 3).

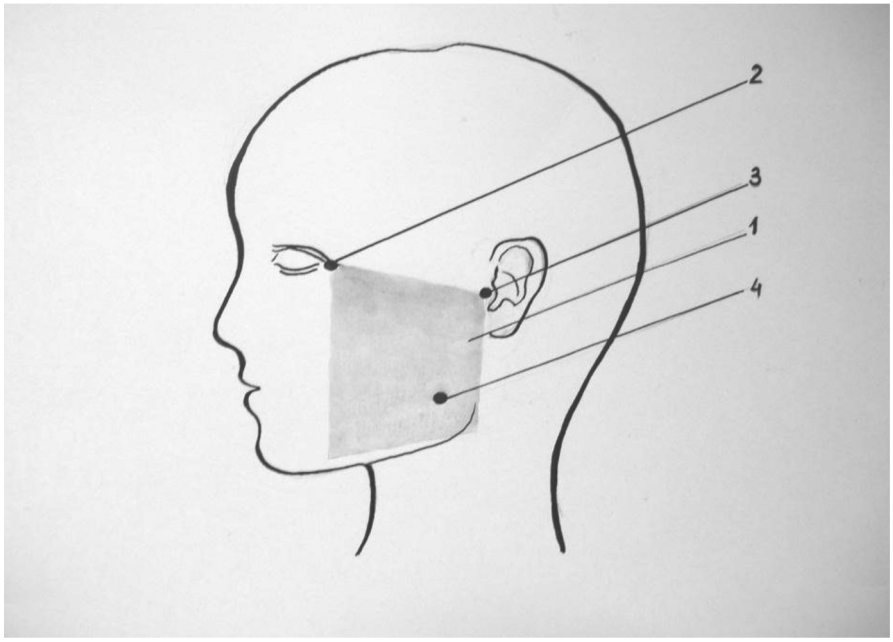


Fig. 3. Diagram of motor points of the actual chewing muscles to hold myotonometry: where, 1 is a transparent plate; 2 – the lateral edge of the orbit; 3 – the tragus of the ear; 4 – motor point of actually chewing muscles

During the second study we put the film, respectively to benchmarks and through the hole marked motor point on the skin of the patient. This method allowed to carry out identical measurements.

Results of research and their discussion

To illustrate the efficiency of complex treatment here is an extract from a case history No. 102 of patient P. 68 years with complaints of difficulty in chewing and aesthetic disadvantage (Fig. 4).

The distal position of the mandible is determined by photostations. The results showed that the height of the upper part of the face (n – sn) did not meet the lower face (sn – gn). The severity of nasolabial folds indicates a decline in the height of the gnathic part.

During the examination of the oral cavity of the patient a decrease in the height of gnathic part, the presence of defects of dentition on the upper and lower jaws, cross-bite were objectively noted. Tomography of the temporomandibular joints determined the distal position of the head of mandible, which allowed to make up a diagnosis of decompensated vertically distal form of increased abrasion of the front teeth of the upper jaw (Fig. 5).

During the examination decrease in the height of the gnathic part, moderately drooping corners of the mouth, intensive pattern of the nasolabial and chin folds was revealed. In the mouth cavity: increased abrasion of anterior and posterior teeth of the upper jaw, the 2nd degree decompensated form, the upper and lower jaws included bilateral defects of dentition in lateral parts.

The patient underwent teleroentgenographic study and imaging of the temporomandibular joints.

Measurement of parameters of the teeth and dental arches was carried out on plaster models of the jaws and directly in the mouth cavity. Occlusal relationships were evaluated, which showed non-physiological distribution of contact points, their asymmetry. In addition, the patient demonstrated the violation of the occlusal plane.

The results of the analysis of teleroentgenogram in the lateral projection showed that the position of the upper jaw corresponded to the norm, while the lower jaw was moved back, which led to an increase in ANB angle, the magnitude of which took positive values (+ 3O). Genial angle was in the range of 118 – 124 degrees, but gnathic angle (between the mandibular and spinal planes) was in the range of 20 – 22 degrees, which resulted in a decrease in the height of gnathic part (Fig. 6).

A B

Fig. 4. Face photos patient P. 68 years before treatment. A – profile, B – in front

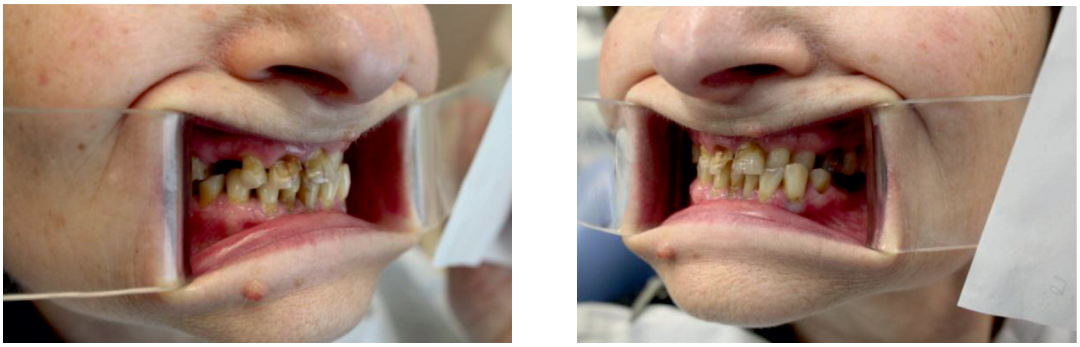


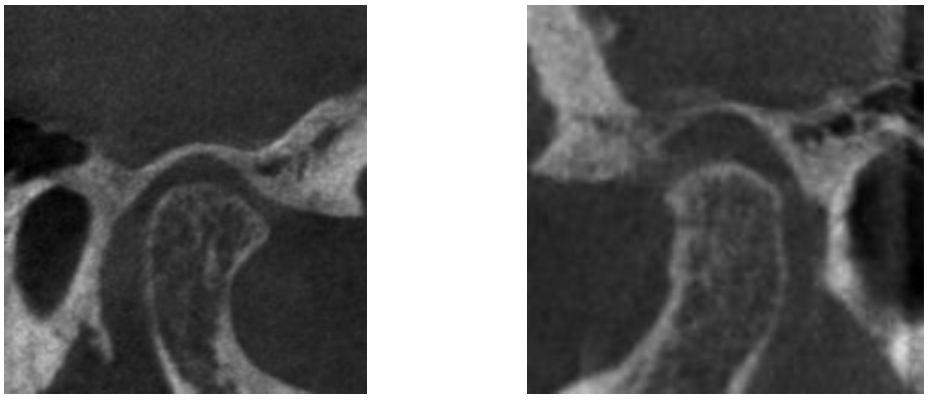
Fig. 5. The ratio of the dentition of the patient P., 68 years

Fig. 6. Teleroentgenogram of patient P. 68 years in the lateral projection

X-ray examination of the temporomandibular joints identified the impairment of the normal topographical relations of elements of this articulation. The articular heads of the mandible on the left and on the right were shifted back, the expansion of the joint space in the anterior and narrowing in the back dpts was noted. The angle of the slope of the articular tubercle, the size of which differed from the normal values on both sides was of importance (Fig. 7).

According to the computer program "Software complex for determining the optimal height of the bite in patients with increased dental abrasion (TMJ2015)" the increase in height of gnathic part 4.6 mm was recommended.

The patient was proposed a preliminary orthopedic treatment of uncoupling the bite plate with the increase of vertical dimension 4.6 mm, to normalize position of the heads of the lower jaw shifted forward by 1.5 mm.



A B

Fig. 7. Tomogram of the temporomandibular joints Patient P. 68 years before treatment.
A – right joint, B – joint left

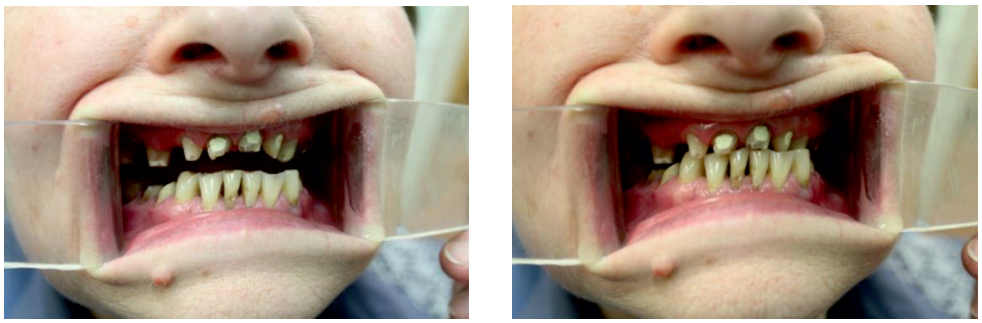
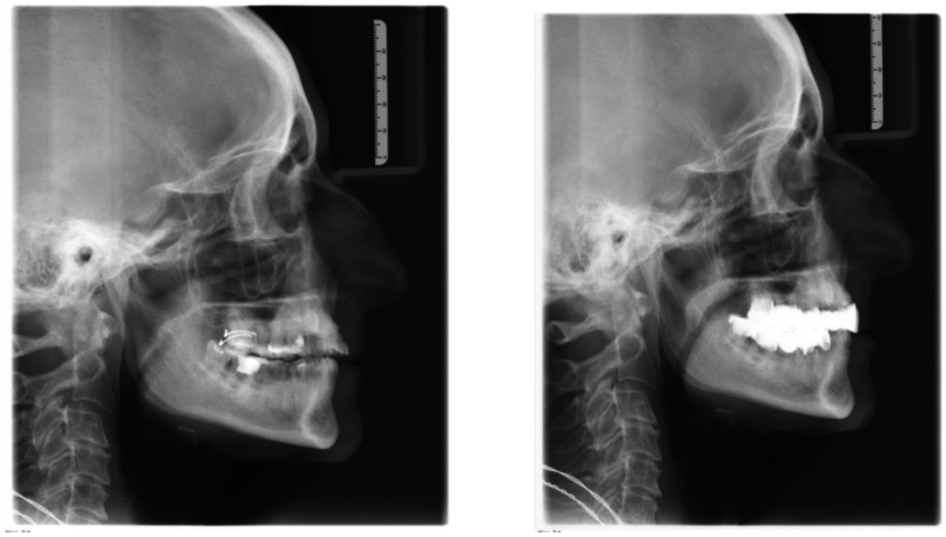


Fig. 8. Preparation of the oral cavity of the patient P. 68 years for prosthetics

Fig. 9. Patient P. 68 years on the stage of the preliminary orthopedic treatment

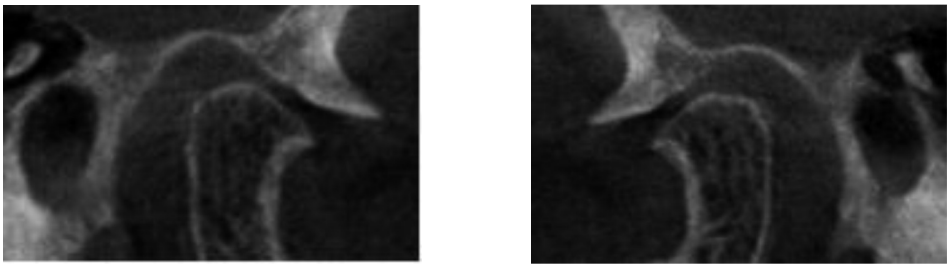
Fig. 10. Face photos of the patient P. 6 years after orthopedic treatment

Fig. 11. Metal-keramik bridges of patient P. 68 years on plaster models



A B

Fig. 12. Side telerentgenogram of patient P. 68 years. A – pre-treatment. B – after the final orthopedic treatment



A B

Fig. 13. Tomograms of the temporomandibular joints of the patient P. 68 years after orthopedic treatment

Two weeks later, the tone of the masticatory muscles of the patient returned to normal, and after 3 months (after preparation of the abutment teeth) the final prosthetic metal-ceramic bridge prostheses with increase of the gnathic part of the person 4.6 mm was performed.

The effectiveness of the mastication increased from 20.1 + 0.7 percent (preliminary phase) to 78.2 + 1,2% after orthopedic treatment. Time of chewing: before treatment – 52.9 + 1,4 sec. after the orthopedic treatment – 23.4 + 0.5 sec. (figure. 8, 9, 10, 11, 12, 13).

A number of diseases, including high attrition of natural teeth cause spatial variations in the chewing- vocal apparatus that affect the chewing muscles and TMJ, which are in their scope of activity and rest, and going beyond these limits leads to disorders followed by decompensation of supporting apparatus of the teeth. An aggravating factor can be parafunction of chewing muscles, diseases of the TMJ and as a consequence some structural changes. It is therefore essential to define the parameters of changes in the position of the elements of TMJ from the value of the normalization of the height of gnathic part of the person's face.

In orthopedic treatment of such patients the primary is clinical method, based on the doctor's experience, accompanied by laboratory methods, in particular the TWG research and imaging of the TMJ that help to clarify medical tactics, previously developed during the clinical examination of patients. Long-term results have confirmed the effectiveness of its construction in orthopedic treatment of such patients.

Imaging of the TMJ allows to obtain a correct mapping of the true state of TMJ elements and their intra relationships and to clarify the features and regularities of changes during the process of increase of the height of gnathic part of the person's face.

Conclusions

According to the results obtained studies, you can determine the amount of dissociation of dentition in patients with increased dental abrasion, taking into account the possibility of staged or simultaneous orthopedic treatment.

The proposed computer program allows to simulate the correct position of the elements of the temporomandibular joints taking into account the normalization of the height of gnatichesky part of the person at patients with different clinical forms of increased abrasion of teeth.

The proposed method of assessing the quality of prosthetics allows to check the correctness of the chosen tactics of orthopedic treatment of patients with increased dental abrasion.

The author confirms that the submitted data does not contain conflict of interests. GRATITUDE The work was prepared with the support of the Ministry of education and science Of The Russian Federation.

References

1. Attin T. Brushing abrasion of softaned and remineralised dentin: an in situ study / T. Attin, S. Siegel, W. Bucalla // Caries Res. 2004. N. 38. P. 62-66.

2. Azzopardi A. The measurement and prevention of erosion and abrasion / A. Azzopardi, D.W. Bartlett, T.F. Watson // J. Dent. 2001. – V. 29. – P. 395-400.

3. Bondermarki L. Extraoral vs Intraoral Appliance for Distal Movement of Maxil1ary First Molars: A Randomized Control1ed / 1. Bondermarki, 1. Karlsson // Angle Orthodontist. – 2005. – № 5. – P. 699–706.

4. De Boever, J. A., Adriaens P. A. Occlusal relationship in patients with pain-dysfunction symptoms in the temporomandibular joints. // J Oral Rehabil. – 1983. – Jan. – Vol. 10, № 1. – P. 1-7.

5. Ilbuldu E., Cakmak A., Disci R., Aydin R. Comparison of laser, dry needling, and placebo laser treatments in myofascial pain syndrome. / // Photomedicine and laser surgery. – 2004. – Aug. – Vol. 22, № 4. – P. 306-311.

6. Fishchev B.S., Lepilin A.V., Sevastyanov A.V.,Orlov V. I., Balakhnichev D. N. The results of treatment of patients with defects of dentition in combination with cross bite with the use of computer modeling. // Stomatology of children's age and prevention. – 2015. – T. XIV. – No. 3 (46). – P. 55-58.

7. Fishchev S.B., A.V. Lepilin, D.N. Balakhnichev et al. The Certificate of official registration program for computer No. 2007613744 // Software complex to determine the optimal height of the bite in patients with increased dental abrasion (TMJ2015 test), State Registered in the Register of computer programs on 4 September 2015.

8. Fishchev S.B., A.V. Lepilin, D.N. Balakhnichev et al. Method of assessing the quality of prosthetics / The patent for the meeting №2617229 Registered in the state to register of inventions on 24 April, 2017

9. Fishchev B.S., Lepilin A.V., Sevastyanov A.V.,Orlov V.I., Balakhnichev D.N. The results of treatment of patients with defects of dentition in combination with cross bite with the use of computer modeling. // Stomatology of children's age and prevention. – 2015. – T. XIV. – No. 3 (46). – P. 55-58.

10. Jacobson A. Retrospective cephalometric investigation of the effects of soldered transpalatal arches оп the maxillary first molars during orthodontic treatment involving extraction of maxillary first bicuspids / A. Jacobson // American Joumal Of Orthodontics add Dentofacial Orthopedics. – 2006. – № 1. – P. 81.

11. Katsoulis J., Nikitovic S. G., Spreng S. (et al.). Prosthetic rehabilitation and treatment outcome of partially edentulous pftients with severe tooth wear: 3-years results // J. Dent. – 2011. – Vol. 39, № 10. – P. 662-71.

12. Latino C. Support of undermined occlusal enamel provided by restorative materials / C. Latino, K. Troendle, J.B. Summit // Quintessence Int. 2001. – Vol. 32. – P. 287-292.

13. Leinfelder K.F. Analysis of adhesive systems of the 5th generation / F.K. Leinfelder// Стоматология. 2001. – № 3. – P. 23-24.

14. Leloup G. Meta-analytical review of factors involved in dentin adherence / G. Leloup, W. D'Hoore, D. Bouter // J. Dent. Res. 2001. – V. 80. – № 7. – P.1605-1614.

15. Mercado J. Jefferson skeletal classification system (JSCS) and how it helps in extraction and non-extraction orthodontic cases. // Int. J. Orthod. Milwaukee., 2007. – № 18(4). – P. 31-34.

16. Mok T.B. Dental erosion: in vitro mode of wine assessor's erosion // Austral. Dent. J. 2001. – N. 46(4). – P. 263-268.

17. Proffit W.R., Fields H.W. Contemporary Orthodontics, 4rd Edition. Mosby. – 2007. – 751 p.

18. Pullinger A.G., Seligman D.A. Multifactorial analysis of differences in temporomandibular joint hard tissue anatomic relationships between disk displacement with and without reduction in women. / J. of prosthetic dentistry, 2001, V. 86, № 4, P. 407-419.

19. Trezubov V.N., Fadeyev R.A., Dmitriyeva O.V. Fotogrammetricheskoye studying of regularities of a structure of the person // Materials IV international Congress on integrative Anthropology. – SPb.: SPb GMU, 2002. – P. 370-371.

PREVENTION OF TOXOCAROSIS

Bozhko G.G., Maslennikova L.A., Kovaleva I.V., Akhmetzyanova E.D.
State Budgetary Educational Institution of Higher Professional Education "Pacific State Medical University", Vladivostok, e-mail:s7577a557z@yandex.ru

Toxocarosis is caused by roundworms of dogs and cats Toxoca racanis and Toxocara mystax. There are children under 14 years in the risk group, because usually they have a longer contact with sand, kittens and puppies. Faeces of these animals occurs contamination of soil and sand. During five years we have been conducting a survey on the adjacent territories using the Romanenko method (1996). There were from 40 to 4520 eggs per 1 kg of sand in open sandboxes, accessible dogs and cats, which indicates that the contamination is dangerous. And there were no Toxocara eggs in sandboxes in which the sand was replaced and at night they were closed, this means that such a measure is one of the effective preventive measures of Toxocarosis.

Keywords: toxocarosis, human disease, contamination of sand, prevention

Soil contamination with helmints, and the number of patients does not decrease with years. This situation is shaping up not only in counrtyside, but in the cities too [7]. In cities, the contamination of soil and sand playgrounds in children's pre-school establishments, parks, yards is due to Toxocara eggs, in most cases. In the different regions of Russia soil contamination is varies from 1-3 %to 50-60 %, with intensity of infestation about1-10eggsfor 100gof soil. The huge contamination of the soil was noted in the territories of kindergartens, schools, courtyards of apartment houses, which creates the prerequisites for a high risk of infection of the child population [4, 6]. There are two toxocara eggs have been detected: Toxocara canis and Toxocara mystax. Mature forms of Toxocara – Toxocara canis, are localized mainly in mammals of the dog family, and Toxocara mystax – in mammals of the feline family. The spread of Toxocara in nature is facilitated by various mechanisms of transmission of the pathogen among animals.Infection of animals occurs with ingestion of eggs with soil particles, intrauterine infection by larvae through the placenta, through the milk of nursing animals and infection by eating tissues of reservoir (paratenic) animals [5].

A number of authors believe that virtually the entire population of the Russian Federation either suffered from or was sick with invasive diseases [1,7], since helminths have a long period of life in the host organism, they release a large number of eggs that can stay in the soil for a long time and retain invasive abilities [5].

Children under 14 years are mostly sick by toxocarosis, who are in close contact with puppies and kittens, they do not observe personal hygiene and swallow Toxocara eggs. Toxocarosis is characterized by a long, severe and recurrent course, polymorphism of clinical manifestations, which is caused by migration of larvae to various organs. Larvae from the small intestine through the mucous membrane penetrate into the bloodstream, then enter the liver and the right side of the heart. Through the pulmonary artery migrate to the capillaries, and then into the pulmonary vein, through the left half of the heart are carried by blood to various organs and tissues, sometimes they only penetrate into the eyes.

The purpose of research: to monitor the changes of the Toxocara contamination level during last 5 years. To check the effectiveness of such prophylaxis method as prevention of contamination by cat's and dog's feces on playground.

Materials and methods of research

Sand from sandboxes located in house territories and kindergartens of different Vladivostok districts was examined using Romanenko method (1996). Sand was taken from opened sandboxes and from ones with recently changed sand in it (this also prevents contamination with feces) since June till July during 5 years (2013– 2017). 25 grams samples were taken from a depth of 10 cm from 9 places of this sandbox, combined and examined according to the methodology. The amount of Toxocara eggs was counted on 1 kg of sand and the level of epidemiological risk was determined according to Sanitary-epidemiological Rules and Norms 2.1.7.1287 – 03 "Sanitary and epidemiological requirements to the quality of soils in the territory of populated areas".

Results of research and their discussion

The contamination level among dogs in Russia is 10-76 %, and among the puppies is 100 %, 15-45 % among cats [1, 5]. Daily excretion of eggs by females toxocara is more

than 200 thousand, if we take into account that there are many sick animals, the pollution of the environment is very high and it can be millions of eggs every day, in addition, after the walks, the animal hair is also can be contaminated. In the soil, eggs ripen within 7 to 30 days, depending on the conditions, since eggs have several shells, they can maintain their invasive abilities up to several years. Toxocara eggs are more stable that other helmint's one, that's why it's needed to to tighten the sanitary and helminthological control of the territories keeping animals [5]. Human Toxocarosis proceeds for a long time, it is difficult with relapses and polymorphism of clinical manifestations. Various clinical manifestations depend on the migration of larvae and theeir location. Larvae can migrate to lungs, heart, kidneys, muscles, pancreas and thyroid gland, brain, eyes, etc.The number of sick people amoung Vladivostok citizens have been increasing from 5,9 on 100 thousand and there is 77% of sick among children under 17 years. In laboratory studies of blood serum in 15% of children, the antibody titer ranges from 1: 800 and higher, which is more likely to indicate a disease. At a titer of 1: 200, 1: 400, it may be a case of visceral toxocarosis or an eye toxocarosis [2, 3]. The number of invased adults and children in the city is quite high. Among all the surveyed sandboxes in five years, the extensive pollution indicator was from 63.6% to 75.1% (Fig. 1).

The number of eggs per 1 kg of sand was different in different years of research and is not dependent on the percentage of contaminated sandboxes. The intensive indicator of pollution in 2013 was from 60 to 1200 eggs, in 2014 from 40 to 800, in 2015, from 1600 to 4520, in 2016 from 49 to 1131 eggs. In 2017, the intensity of the invasion of open sandboxes, available to the faeces for animals, was from 40 to 240 eggs per 1 kg of sand (Fig. 2).

The examination of the sand of the open sandbox of the city showed their high parasitological contamination. There were no Toxocara found in closed with tents and not available for pollution sandboxes.

Conclusion

The level of contamination of sand from opened sandboxes located in house territories and kindergartens according to Sanitary-epidemiological Rules and Norms 2.1.7.1287 – 03 "Sanitary and epidemiological requirements to the quality of soils in the territory of populated areas" is within the limits of the category from extremely dangerous to extremely dangerous.

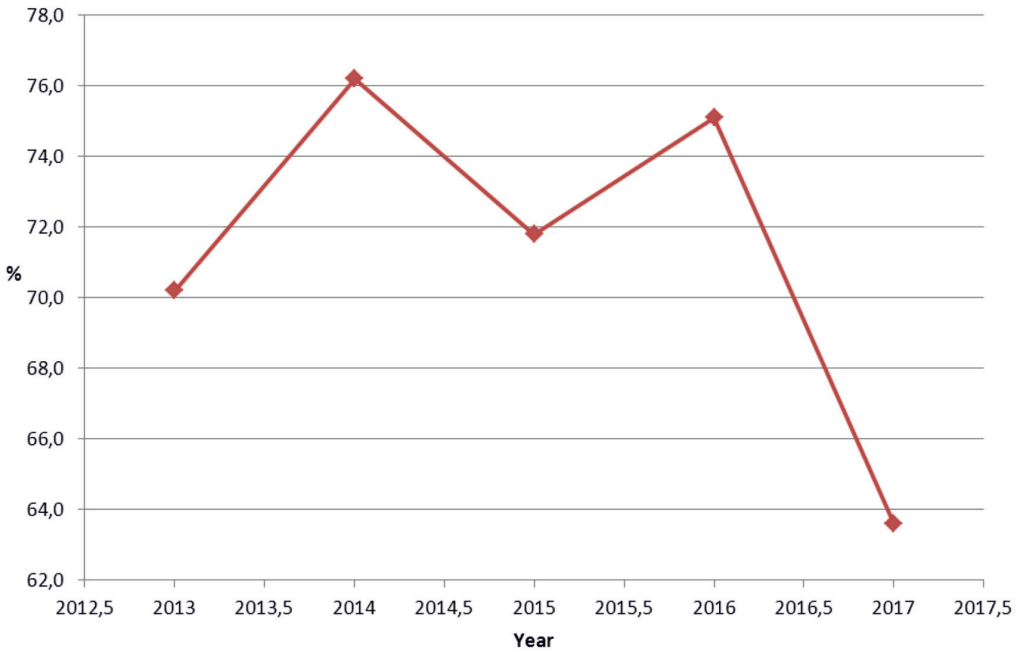


Fig. 1. Percentage of contaminated sandbox for 5 years

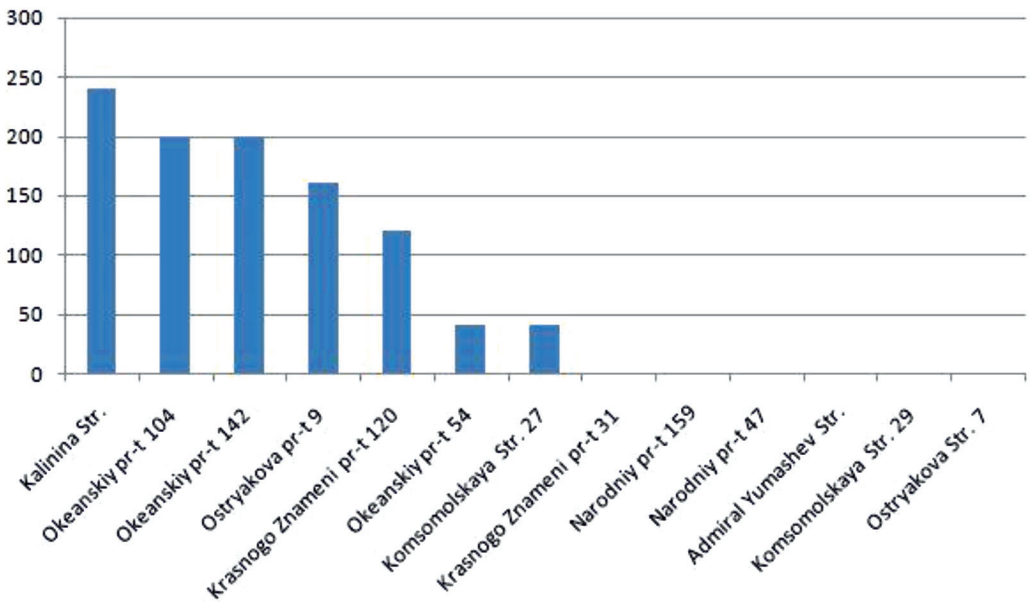


Fig. 2. Number of Toxocara eggs per 1 kg of sand

Sand from the sandboxes, that was replaced or covered with tents to protect against contamination of animal feces, corresponds to the clean category. Consequently, protecting sand from fecal contamination of animals is an effective preventive measure. However, this may not be enough, it is necessary to carry out de-worming of pregnant dogs, puppies, limit the number of neglected animals, set aside special areas for walking dogs and keep them in good hygienic condition, and raise hygiene skills for children when playing with animals.

References

1. Belimenko V.V., Khristianovskiy P.I. Toxocarosis dogs // Russian Veterinary Journal.Small domesticated and wild animals. – 2014. – No. 5. – P. 50-52.

2. Bozhko G.G., Maslennikova L.A., Goncharova T.A., Nadelyaev V.E. The occurrence of toxocara eggs in the sandboxes of the city // Modern problems of science and education. 2016. – № 4.

3. Chernova T.M., Bulina O.V. Toxocarosis in the practice of a child's doctor. // Pediatrics. – 2010. – Part 1. – No.2 – P. 119-123.

4. Malysheva N.S., Samofalova N.A., Grigoriev D.G. and others. The problem of toxocarosis in modern conditions and the improvement of approaches to its prevention // Uchenyezapiski: e-journal of the Kursk State University. – 2014. – No. 1 (25).

5. Nabisanova L.A., Zhdanova O.B., Okulova I.I. etc. Toxocarosis of fur-bearing animals and domestic carnivores, hematological indices. // Russian parasitological journal. – 2016. – Part 36. – Ed. 2. – P. 210-213.

6. Polezhaeva G.C., Bartkowa A.D., Borisova O.N., Grebenkova J.C. The Incidence Of helminthiasis of the population of Primorsky Krai / / Pacific medical journal. – 2006. – No. 3. – P. 51-53.

7. Shcheveleva T.N., Sofyin V.S., Mironova N.I., Karakotin A.A. Toxocarosis, features of epidemiology (review of literature and own research). // Scientific Review. Medical sciences. – 2016. – No. 6. – P. 124-128.

BIBLIOMETRICAL ANALYSIS OF SAMPLING FRACTIONS OF THE NUMBER OF PUBLISHED WORKS WITH APPLICATION OF MAGNETIC FIELDS, CARRIED OUT ON NEUROPHYSIOLOGICAL OBJECTS OF DIFFERENT KINDS

Chizhenkova R.A.

Institute of Cell Biophysics, RAS, Pushchino, e-mail: chizhenkova@mail.ru

Bibliometrical data on neurophysiological published works with application of magnetic fields are presented. Quantitative characteristics of published works carried out on different neurophysiological objects (the brain, the cortex, neurons, nerves) during 35-year time interval (1966-2000) are considered. Among neurophysiological published works with application of this factor predominance of published works, carried out in the brain, was established. Positive dynamics of number of neurophysiological published works of these trends was observed. Conclusion about prospects of investigations of neurophysiological effects of magnetic fields is done.

Keywords: bibliometry, magnetic fields, neurophysiological effects, the brain, the cortex, neurons, nerves

It is known what, non-ionizing radiation exerts essential action on functional condition of nervous system, that reflected on electrical activity of the brain and also on fermentative activity in the brain structures [4-6, 8].

Influence of non-ionizing radiation interested humanity for many centuries. Towards the seventies years of XXth century more 3 thousand publications on biological effects of electromagnetic fields and about 2 thousand publications on biological effects of magnetic fields were accumulated. 20 years later the total number of publications concerned action of these factors of different kinds is believed to be 10 thousand. In 2000 yarr their number reached 21606 what was considered in our monograph [1].

Now on the strength of our researches of the sixties years it was established, what leading role in reactions of organism on non-ionizing radiation of different kinds belongs to the nervous system [1, 4]. Nevertheless before our investigations bibliometrical analysis of neurophysiological aspects of action of non-ionizing radiation was not realized. Namely therefore we began to set working at this problem for the present unexplored.

Series of our recent works were devoted precisely to scientific trend of examination of quantitative characteristics of published works on neurophysiological effects of action of non-ionizing radiation of different kinds. General quantitative characteristics of published works of above-mentioned trend were examined in our recent works [1]. Quantitative characteristics of published works on neurophysiological effects of electromagnetic fields and microwaves radiation were considered in our previous paper [2, 3].

The present work is devoted to examination of quantitative characteristics of published works on neurophysiological effects of magnetic fields. Bibliometrical data were obtained according to chosen key words and concerned investigations performed in different neurophysiological objects (the brain, the cortex, neurons, nerves) with application of magnetic fields.

Materials and methods of research

Quantitative characteristics of published works on neurophysiological effects of non-ionizing radiation in world during 35-year intervals in second half of the XX century (1966-2000) were considered. Investigations were carried out by means of mainly the database “Medline”, accessible through Internet. Bibliometrical data concerned published works performed in different neurophysiological objects were studied: the whole brain, the cortex, neurons, nerves. Besides in addition published works with application of magnetic fields were selected. The numbers of published works of observed trends were determined for every analyzed year with the aid of corresponding keywords. Details of analysis of quantitative characteristics of neurophysiological published works were described in our monograph [1]. There also it brought another our published works devoted bibliometrical investigations.

The comparison of the parts of the numbers of published works, carried out on different neurophysiological objects, in general totality and the comparison of the numbers of published works in different time periods were performed as the comparison of two selective sampling fractions of variants.

Results of research and their discussion

The number of published works carried out in different neurophysiological objects reached

1401300 in 35-yaer period. The numbers of investigations performed in the brain, the cortex, neurons, nerves were 705259, 180602, 237160 and 278279 correspondingly. The total number of works with application of magnetic fields was 5316. From them only 1649 published works were carried out in neurophysiological objects. Materials concerned investigations in different neurophysiological objects under action of magnetic fields were considered for every year during 35-yaer period. Obtained data and results of them mathematical analysis are demonstrated in tables 1, 2 and 3.

General characteristics of received totalities are presented in Table 1. Sampling fractions of received data from the total number of works with application of magnetic fields and from the total number of works carried out in corresponding neurophysiological objects are shown in Table 2. Dynamics of the considered sampling fractions are demonstrated in Table 3.

Table 1 shows that investigations made on the whole brain with employment of magnetic fields predominate. Sampling fractions from total dada (1649) of neurophysiological works with magnetic fields microwaves were for the brain – 57,31 %; for the cortex – 19,89 %; for neurons – 9,22 %; for nerves – 13,58 %.

This phenomenon is the result of increased interest of specialists of applied sciences to investigation of effects of physical factors in the whole brain [1]. The point is that knowledge of special feature of influence of non-ionized radiation is necessary for medicine, psychology and ecology. Besides such scientific trend allows to receive the larger information on condition of organism.

Table 2 demonstrates that among sampling fractions of neurophysilogical works with magnetic fields from total number data with magnetic fields (5316) those, carried out in the whole brain, prevail. These facts conform to above-mentioned supposition.

Moreover similar effect is at the total number of all works of different kinds performed in neurophysiological objects (in the brain – 705259, the cortex – 180602, neurons – 237160, nerves – 278279). Marked increased sampling fraction from all works in neurophysiological objects was observed in investigations on the cortex too.

However it is necessary to note, that relatively small part of the number of investigation on the cortex in general totality of neurophysiological works (12,89 % for the cortex comparative with 50,33 % for the whole brain), which can be reflect in obtained information. The numbers of published works on investigations, carried out neuronal level and nerves were enough low. In particularly that effect was expressed at quantitative indices of published works, related with neurons.

The least quantitative was at number of published works, carried out on neuronal level. It represents interest, that by both version of analysis similar results were received.

The increase of the numbers of published works carried out in different neurophysiological objects with application of magnetic fields developed during 35-year period. Dynamics of the sampling fractions (%) of published works carried out in different neurophysiological objects during 35-year period from the total number of works with application of magnetic fields displayed non-linear fluctuations (Table 3). The greatest values for works in the whole brain were in year periods 1981-2000. The sampling fractions of the works on the cortex showed essential increase in 1986-2000 years.

On the whole dynamics of investigated indices was extremely uneven. In particular this concerned materials on neuronal level and nerves.

Table 1

General data on the number of published works carried out in different neurophysiological objects with application magnetic fields during 35-year period

Objects	Characteristics of totalities			
	Total number of papers in 35 years	Sampling variance	Average number of papers in 1 year	Standard deviation
1	945	996,35	27,00	5,33
2	328	216,83	9,37	2,49
3	152	23,35	4,35	0,82
4	224	61,78	6,4	1,33
5	1649	3321,16	47,11	9,74

Note: 1 – the brain, 2 – the cortex, 3 – neurons, 4 – nerves, 5 – sum.

Table 2

Comparison of sampling fractions of the number of published works carried on different neurophysiological objects with application of magnetic fields and from the total number of these works during 35-year period

Factors	Parts from the total number of published works with magnetic fields (5316)		Parts from the total number of published these neurophysiological works (705259, 180602, 237160, 278279)	
	Sampling fraction from these data (%)	Comparison with average quantity (U)	Sampling fraction from these data (%)	Comparison with average quantity (U)
1	17,78	15,78	0,134	2,42
2	6,17	3,20	0,182	5,87
3	2,86	11,60	0,064	6,39
4	4,21	7,73	0,080	4,33
5	7,75		0,118	

Note: 1 – the brain, 2 – the cortex, 3 – neurons, 4 – nerves, 5 – average quantity; statistically significant distinctions are underlined (U > 2,58 corresponds to p < 0,01).

Table 3

Dynamics of sampling fractions of the number of published works carried on different neurophysiological objects out with application of magnetic fields during 35-year period (% from the total number of works with application of this factor)

Factors	Indices for different five-year periods						
	1966-70	1971-75	1976-80	1981-85	1986-90	1991-95	1996-2000
1	8,93	8,03	8,97	15,09	19,18	18,74	19,36
2	5,36	1,46	3,10	3,59	5,48	6,99	7,42
3	3,57	2,92	1,03	2,26	3,06	3,27	2.89
4	0,00	3,65	4,14	2,64	5,16	4,91	3,88
5	17,86	16,06	17,24	23,58	32,88	33,90	33,55
Comparison with the number of works in “average” five-year period (U)							
1	1,91	3,18	3,78	1,27	0,76	0,55	0.96
2	0,25	2,80	2,14	2.14	1,35	0.75	1.15
3	0,30	0.04	1,93	0,67	0.25	0.53	0.05
4	2,29	0,31	0.06	1,54	0,90	0.70	0.40
5	2,23	3,85	4,72	2,97	0,82	1,34	1.24

Note: the numbers of works in “average” five-year period were: 1 – 17,78%; 2 – 6,17%; 3 – 2,86%; 4 – 4,21%; 5 – 31,02%. (U>2,58 corresponds to p<0,01). Another applications as in Table 1.

Conclusion

The results of the present bibliometrical investigations makes it possible to analyse quantitative characteristics of published works performed with application of magnetic fields in different neurophysiological objects during 35-year period of later half of XX-th century. The whole brain, the cortex, neurons and nerves were selected for examination on this trend. The total number of publications was considered for every year during period 1966-2000. Dynamics of the number of published works carried out in different neurophysiological objects and dynamics of the corresponding sampling fractions were studied.

It was established, that predominance of investigations of effects of magnetic fields on the whole brain existed. Such investigations are suitable for specialists of applied sciences. Second place belonged to works carried out in the cortex. Works on neuronal level have the slight number. The reason of this fact is their methodical complexities. Such results show necessity of neurophysiological investigations of action of magnetic fields for applied science [4, 7]. Moreover information, obtained in these investigations, is able to know functions

on nervous system, in particularly organization of cognitive function [4-6, 8].

Non-ionizing radiation is not only harmful factor. It discovered, that non-ionizing radiation is useful at disturbance of health. It is known, that application of certain kinds of non-ionized radiation is successful in physiotherapy. Hopeful results take place at investigations treatment and prophylaxis of oncological diseases [4, 9, 10].

It was found, that significant increase of the number investigations with application of magnetic fields during 35-year period and moreover the sampling fractions (%) of published neurophysiological works from the total number of works performed with this factor and those carried out in corresponding neurophysiological objects existed.

Obtained results on published works with magnetic fields is differ from data on works with electromagnetic fields and microwave radiation, considered in our previous paper [2, 3]. First, the number of works on magnetic fields was less than the number of works on electromagnetic fields in 1,3 time (2151) and was above than on microwave radiation in 1,2 time (1435). Besides dynamics of quantitative characteristics of publications of above-mentioned trends is different. The most pronounced dynamics took place at published works with microwave radiation. Increase of number of published works performed with application of magnetic fields during investigated period reached 1,3 time, with application of electromagnetic fields – in 1,14 time and microwave radiation – in 2,48 time.

Fundamental investigations of neurophysiological effects of non-ionizing radiation are played no enough attention to. However, in the future they will hold a leading position in solution of the problem of biological action of these factors, what connects whit development of applied and fundamental sciences.

Undoubtedly neurophysiological researches of effects of magnetic fields have further development in XXI century [1]. Besides investigations on neuronal level will enough successful.

References

1. Chizhenkova R.A. Dynamics of neurophysiological investigations of action of non-ionized radiation in second half of the XXth century. M.: Publ. House of Acad. of Natural Sciences, 2012. – 88 p. (in Russian).

2. .Chizhenkova R.A. Bibliometrical analysis of sampling fractions of the number of published works with application of EMF, carried out on neurophysiological objects of different kinds // European journal of natural history. – 2016. – No. 4. – P. 30-32.

3. Chizhenkova R.A. Bibliometrical analysis of sampling fractions of the number of published works with application of microwave radiation, carried out on neurophysiological objects of different kinds // European journal of natural history. – 2017. – No. 5. – P. 34-36.

4. Grigoriev Yu. Algorithms of radiobiology/ Atomic radiation, space, sound, radiofrequencies, mobile communications; One life in science. M.: Economics 2015. – 263 p. (in Russian).

5. Juutilainen J., Höytö A., Kutlin T., Naaraka J. Review of possible modulation-depend biological effects of radiofrequency fields // Bioelectromagnetics. 2011. – V. 32. – No. 7. – P. 511-534.

6. Lukyanova S.N. Electromagnetic radiation of non-thermal intensity and short exposition as a sub-threshold irritant for the central nervous system // Radiation biology. Radioecology. – 2013. – V. 53. – No. 6. – P. 625-633 (in Russian).

7. Perov S.Yu., Bogacheva E.V. Theoretical and experimental dosimetry in evaluation of biological effects of electromagnetic field for portable radio transmitters. Report 2. Homogeneous human head phantom // Radiation biology. Radioecology. – 2015. – V. 55. – No. 4. – P. 431-435 (in Russian).

8. Petrosyan M.S., Nersesova L.S., Gazaryants M.G. at al. Effect of low-intensity 900 MHz frequency electromagnetic radiation on rat brain enzyme activities linked to energy metabolism // Radiation biology. Radioecology. – 2015. – V. 55. – No. 6. – P. 625--631 (in Russian).

9. Rybakov Y.L., Anitumor and radioprotective action of low-frequency turbulent magnetic field // Radiation biology. Radioecology. – 2016. – V. 56. – No. 2. – P. 177-189 (in Russian).

10. Rozhdestvenskiy L.M. Classification of anty-radiation means relatively them pharmacological signal and connection with stage of development of radiation damage activity // Radiation biology. Radioecology. – 2017. – V. 57. – No. 2. – P. 117-135 (in Russian).

THE ROLE OF NEURON SPECIFIC ENOLASE IN HELICOBACTER PYLORI-ASSOCIATED CHRONIC GASTRODUODENITIS IN CHILDREN

[1]Dombayan S.Kh., [1]Panova I.V., [2]Kharitonova L.A.

[1]Federal state budget educational institution higher education "Rostov state medical university" Ministry of Health of the Russian Federation, Rostov-on-Don, e-mail: okt@megalog.ru;

[2]Federal state budget educational institution higher education "Russian national research medical University" named after N.I. Pirogov Ministry of Health of Russia, Moscow, e-mail: rsmu@rsmu.ru

The purpose of this study was to assess the nature of changes in the level of neuron specific-enolase (NSE) in children with chronic gastroduodenitis, taking into account the severity of the disease and the presence of Helicobacter pylori (HP) infection. The study involved 73 children with chronic gastroduodenitis. Group I included children with erosive gastroduodenitis, group II – with superficial gastroduodenitis. Each of them included two subgroups: with a positive result of examination on HP-infection and with negative tests for Helicobacter pylori. In the diagnosis of the disease was used endoscopic and morphological methods; urease, microscopy, molecular biological and serological tests were carried out for the verification of HP. The results indicate a possible role of NSE in the development of severe forms of the disease in the absence of pathogenic effects of HP and do not exclude a certain link with the function of sex hormones.

Keywords: neuron specific enolase, erosive gastroduodenitis, surface gastroduodenitis, Helicobacter pylori, children

Among children's digestive system diseases the leading place is taken by chronic upper parts inflammatory diseases of digestive tract, in particular chronic gastroduodenit (CGD) [1]. A special role in chronic gastroduodenit development is played by Helicobacter pylori (HP-infection) [2, 3]. Up to 75 % of CGD is associated with the HP-infection [4].

At the same time, there is a number of endogenous etiological factors influencing the stomach mucous membrane (MM) state and duodenum through neuro-reflex and endocrine-humoral effects [5, 6].

Recently, some attention has been paid to the biochemical indicators study to clarify the formation and development mechanisms of chronic gastroduodenitis. In particular, to the study of the neuron-specific enolase (NSE) role in these processes [7, 8]. In fundamental studies was noted that NSE is found in all human tissues and organs, including the gastrointestinal tract tissues. The significant enzyme activity is determined in the blood serum [9].

Therefore, in the study of the NSE level changes (children with CGD), depending on the HP infection, the MM gastric inflammatory changes severity and duodenal, we taking into account the gender factor as it has a certain relevance.

Research objective: to estimate the nature of the NSE level changes (children suffering from CGD) depending on disease severity and existence of the HP-infection.

Materials and methods of research

In the research group there are 73 children at the age of 8 – 15 with CGD, 34 (46,6 %) girls and 39 (53,4 %) boys were observed.

The I-st group 32 (43,8 %) included children with an erosive gastroduodenit (EGD), 20 (62,5 %) boys and 12 (37,5 %) girls.

The II-nd group 41 (56,2 %) included children with a superficial gastroduodenit (SGD), 19 (46,3 %) boys and 22 (53,7 %) girls.

The I-st group included 16 (50 %) children with an erosive gastroduodenit (EGD) associated with the HP-infection (EGD HP (+) – the 1-st subgroup) and 16 (50 %) – with negative results of HP (EGD HP (-) – the 2-nd subgroup). In the 1-st subgroup of the I-st group 12 (75 %) boys and 4 girls (25 %) were observed; in the 2nd subgroup of the I-st group – 8 (50 %) boys and 8 (50 %) girls.

The II-nd group included 14 (34,1 %) children with the superficial gastroduodenit associated with HP (SGD HP (+) – the1-st subgroup) and 27 (65,9 %) children with SGD with negative Helicobacter pylori tests (SGD HP (-) – the 2nd subgroup). The 1-st subgroup of the II-nd group included 8 (57,1 %) boys and 6 (42,9 %) girls; The 2nd subgroup of the II-nd group included 13 (48,1 %) boys and 14 (51,9 %) girls.

28 children (I-II health group) at the age of 8-15, entered the control group (CG). 17 (60,7 %) boys and 11 (39,3 %) girls.

To include in the study, we obtained the parents consent and they were fully informed about the research progress.

The chronic inflammatory pathology of the upper digestive tract (UDT) diagnosis was established on the complaints basis, data of anamnesis, general clinical and instrumental examination results. All children underwent endoscopic examination, including NBI-technology, histological examination.

The blood serum NSE research was determined by an enzyme immunoassay sets method of Can Ag Diagnostics (Sweden) in the standardized conditions (in the morning; empty stomach). The results were recorded and estimated by means of a SUNRISE photometer produced by TECAN (Austria).

To diagnosis the HP infection all the patients underwent three methods. Bacterioscopic method we used biopsy medicines in MM antralny stomach department; polymerase chain reaction for detection of Helicobacter pylori DNA in the MM antralny stomach department biopsy (test systems "Liteks" Russia) urease method – determination of urease activity in the MM stomach biopsy placing it in a liquid medium containing standard RU-Test Helicobacter pylori (Russia); enzyme immunoassay of blood serum on existence of immunoglobulins of A class and total immunoglobulins to Helicobacter pylori the "DRG" test systems (Germany).

Statistical processing of the research results was carried out by means of the Statistica for Windows program packages (version 6.1) by nonparametric statistics methods (Mann-Whitney's criterion), taking into account that distribution of NSE number didn't correspond to the normal distribution law. Data are presented in the form of a median (Me) and also the 25 and 75 quartile [25%-75%]. Reliable considered significance value of $p \leq 0,05$.

Results of research and their discussion

The analysis of the research results of the NSE level (boys with an erosive gastroduodenit (the I group)) showed the comparable indicator values which don't have statistically significant differences both in 1, and in 2 subgroups: 12,04 (10,78-13,34) μg/li and 10,7 (10,61-12,26) μg/li respectively, $p \geq 0,05$. At the same time the NSE level in blood serum (boys with EGD HP (+)) significantly exceeded control values: 12,04 (10,78-13,34) μg/li and 9,65 (8,96-11,2) μg/li respectively, $p \leq 0,05$. As for indicator values (patients with EGD HP (-)), they didn't differ from CG ($p \geq 0,05$) (Table. 1). The obtained data, apparently, don't exclude probability of formation of interrelation of the NSE level changes in blood serum (boys suffering from EGD with the HP-infection).

A similar situation of NSE level changes was found in group II with SGD, in particular: the NSE values in subgroup 1 (SGD HP +) did not differ significantly from the 2 subgroup (SGD HP-): 11,18 (9,98-11, 54) μg/li and 12,37 (10,87-13,02) μg/li, respectively, $p \geq 0,05$ (Table 1).

However, the NSE content in patients' blood (boys with SGD HP (-) significantly exceeded the control values: 12,37 (10,87-13,02) μg/li and 9,65 (8,96-11,2) μg/li, respectively ($p \leq 0,01$). Boys of subgroup 1 (SGD HP +), there was only a certain tendency to increase the indicator level relatively to the control group ($p \geq 0,05$), which probably calls into question the existence of the interrelation between the NSE dynamics and the development of HP-associated SGD in this patients category (Table.1).

It was also found that boys with SGD HP (-), the NSE values exceeded the level in the blood of EGD HP (-) patients: 12,37 (10,87-13,02) μg/li and 10,7 (10,61-12,26) μg/li, respectively ($p \leq 0,05$), which may indicate the probability of a NSE marker effect in the development of a different disease severity regardless of HP infection in this children category.

Table 1

Neuron-specific enolase indicators in blood serum (boys with chronic gastroduodenitis)

Groups	Boys, n = 39				
Indicators	CG n = 17	1 subgroup Group I EGD HP (+) n = 12	2 subgroup Group I EGD HP (-) n = 8	1subgroup Group II SGD HP (+) n = 6	2subgroup Group II SGD HP (-) n = 13
NSE μg/li Me Quartos [25-75]	9,65 [8,96-11,2]	12,04** [10,78-13,34]	10,7* [10,61-12,26]	11,18 [9,98-11,54]	12,37*** [10,87-13,02]

Note: * – the differences are statistically significant when comparing boys of subgroup 2-nd and groups I and II ($p \leq 0,05$); ** – the differences are statistically significant when comparing the boys of the CG and the boys of group I of the 1-st subgroup ($p \leq 0,01$); *** – the differences are statistically significant when comparing the boys of the CG and the boys of group II of the 2-nd subgroup ($p \leq 0,01$).

Boys with EGD HP (+), only a certain tendency was found to increase the NSE level in comparison with children diagnosed with SGD HP (+): 12,04 (10,78-13,34) μg/li, and 11,18 (9,98-11,54) μg/li, respectively ($p \geq 0,05$), which also does not exclude the above assumption (Table 1).

The study of the NSE dynamics in the girls' blood established that the index values (patients with EGD HP (+)) significantly exceeded its level in the blood, determined at EGD HP (-) and in CG: 10,62 (10,24-10,89) μg/li; 9,48 (8,74-10,08) μg/li, and 9,0 (7,8-10,0) μg/li, respectively ($p \leq 0,05$; $p \leq 0,01$). The girls suffering from EGD not associated with HP infection, the NSE level corresponded to the indicator values in the CG, with only a tendency to increase ($p \geq 0,05$) (Table 2). This circumstance makes it possible to assume a certain interaction existence of the HP-infection factor and the NSE dynamics in the formation of erosive lesion of MM of UDT (girls).

Besides, the revealed statistically significant NSE differences ($p \leq 0,01$) in the blood of girls with SGD HP (-) in comparison with patients with EGD HP (-), indicate the possible role of NSE in morphological changes aggravation in MM of UDT, not associated with participation of HP-infection (Table 2).

The study also found that the boys with EGD HP (+) and EGD HP (-), the NSE level was significantly higher than the enzyme serum levels in girls' blood in similar subgroups: 12,04 (10,78-13,34) μg/li and 10,7 (10,61-12,26) μg/li, respectively, for boys and girls of subgroup 1, $p \leq 0,05$; 10,7 (10,61-12,26) μg/li and 9,48 (8,74-10,08) μg/li, respectively, for boys and girls of the 2nd subgroup, $p \leq 0,01$. The same statistically significant trend was observed in the NSE level changes in the corresponding subgroups of boys and girls with SGD (Table 1, Table 2).

The unidirectionality of changes in the studied indicator (patients with both SGD and EGD), regardless of the HP infection presence, associated with the gender factor, can probably be explained by a certain continuum existence of action of NSE and sex hormones in the CGD pathogenetic model.

Conclusions

1. The study results showed the probability of association changes in NSE serum level with Helicobacter pylori effects in the development of erosive gastroduodenitis both boys and girls.

2. It has been proved that severe (erosive) forms of CGD associated with Helicobacter pylori infection are more often detected in boys (62,5% and 66,7%, respectively), which indicates gender differences during the disease course.

Table 2

Indicators of neuron-specific enolase in serum in girls with chronic gastroduodenitis

Groups / Indicators	girls, n = 34				
	CG n = 11	1 subgroup Group I EGD HP (+) n = 4	2 subgroup Group I EGD HP (-) n = 8	1subgroup Group II SGD HP (+) n = 8	2subgroup Group II SGD HP (-) n = 14
NSE (μg/li) Me Quartos [25-75]	9,0 [7,8-10,0]	10,62*, **** [10,24-10,89]	9,48*** [8,74-10,08]	10,07**,***** [9,91-10,12]	10,56****** [10,15-11,18]

Note: * – the differences are statistically significant when comparing girls of subgroup 1-st and 2-nd groups I ($p \leq 0,05$); ** – the differences are statistically significant when comparing girls 1-st and 2-nd of subgroup II of the group ($p \leq 0,01$); *** – the differences are statistically significant when comparing girls of 2-nd subgroups of I and II group ($p \leq 0,01$); **** – the differences are statistically significant when comparing girls of the CG and girls of the I group of the 1-st subgroup ($p \leq 0,05$); ***** – the differences are statistically significant when comparing GC girls and girls of the II group of the 2-nd subgroups ($p \leq 0,05$); ****** – the differences are statistically significant when comparing girls of the CG and girls of the II group of the 2-nd subgroups ($p \leq 0,01$);

Girls of group II. The NSE values for SGD HP (-) in comparison with patients with SGD HP (+) and CG were dominated: 10,56 (10,15-11,18) μg/li; 10,07 (9,91-10,12) μg/li and 9,0 (7,8-10,0) μg/li, respectively ($p \leq 0,01$; $p \leq 0,01$) (Table 2). These results may indicate the possible studied enzyme involvement in a pathogenetic mechanisms complex for the formation of catarrhal MM of UDT inflammation associated with HP-infection. The NSE level (girls with SGD HP (+)) also exceeded the values in the CG: 10,07 (9,91-10,12) μg/li and 9,0 (7,8-10,0) μg/li, respectively $p \leq 0,05$), which does not contradict the previously stated assumption.

3. The study revealed a NSE serum increase (boys with superficial gastroduodenitis without association with Helicobacter pylori, which casts doubt on the enzyme involvement in the genesis of catarrhal gastroduodenal mucosa inflammation. Also, an increase in the NSE level relative to the control values found in girls with SDG HP (+) may indicate the existence of a specific interaction of the Helicobacter pylori pathological effects and the specific dynamics of NSE during the superficial gastroduodenitis formation in this category of patients.

4. Higher NSE levels in the blood were detected in both boys and girls with SGD HP (-) compared with the value of this parameter of patients with EGD HP (-), which allows us to consider the possibility of using NSE as an auxiliary noninvasive marker of gravity morphological damage of the mucosa of the gastroduodenal zone in the absence of pathogenic effects of Helicobacter pylori.

5. Unidirectional changes in boys' NSE serum compared with girls, regardless of the disease severity and the of Helicobacter pylori infection involvement, indicate a certain association of effects of NSE with the functional sex hormones characteristics in the CGD pathogenesis.

References

1. Sapozhnikov V.G., Vorobieva B. Clinical manifestations of chronic diseases of the digestive system in children // Bulletin of new medical technologies. – 2015. – № 1 (22) – P. 23-27.

2. Reuka E.Yu. Features of clinical manifestations of gastroduodenitis associated with H. pylori in children // Bulletin of medical Internet conferences (ISSN 2224-6150) [Electronic resource]. – 2013. – № 3(3). – P. 543-544. Access mode: http://www.medconfer.com.

3. Panova I.V. functional state of the thyroid gland in children with Helicobacter pylori-associated pathology of the upper digestive tract during the formation of puberty // Medical science. Fundamental study. – 2013. – № 2. – P. 136 -139.

4. Nikiforova E.M., Polyakova O.V., Smykova S.V., Petrova I.V., Malyuzhinskaya N.In. Diagnosis and treatment of Helicobacter pylori – associated gastroduodenal diseases in children in the recommendations of international and national conciliation documents // Pharmaceutical Bulletin. – 2015. – № 1 (57). T.9. – P. 31-35.

5. Repetskaya M.N., Burdin O.M. Modern features of the course of chronic gastroduodenitis in children // Perm medical journal. – 2017. – XXXIV (3). – P. 19-24.

6. Vorobyov A.V. features of chronic gastroduodenitis in children (review of literature) // Bulletin of new medical technologies. Electronic edition. – 2016. – № 1. – P. 229-234. Mode of access: Publication 8-2. URL: http: //www.medtsu.tula.ru/VNMT/Bulletin/E2016-1/8-2. pdf. DOI: 10.12737/18573.

7. Domanyan S.KH., Panov I.V. peculiarities of changes in the level of neuron specific enolase in children with I-II groups of health depending on the indexes of physical development and gender // The doctor-post-graduate student. – 2016. – № 2.2(75). – P. 273 – 278.

8. Domanyan S.KH., Panov I.V., G.M. Latifov Indicators of physical development and the dynamics of changes in neurospsychology in peripheral blood in children 8-15 years old with chronic gastroduodenitis // The doctor-post-graduate student. – 2017. – № 3(82). – P. 73 – 78.

9. Ashmarin I.P. Neurochemistry. M.: Izd. Institute of biomedical chemistry of the RAMS –1996. – 470 p.

THE ROLE OF CHRONIC ENDOMETRITIS IN THE DEVELOPMENT OF COMPLICATIONS OF HORMONE THERAPY FOR UTERINE MYOMA

Khvorostukhina N.F., Ostrovskaya E.A., Novichkov D.A.

Saratov State Medical University n.a. V.I. Razumovsky Ministry of Health of Russia, Saratov, e-mail: khvorostukhina-nf@yandex.ru

A detailed comparative analysis of the results of the examination of women with uterine myoma complicated by hemorrhagic syndrome against the background of hormone therapy (group 1 – n = 112) and patients without observed complications in conservative treatment of uterine myoma with hormonal drugs (group 2 – n = 45) is presented. The control group was represented by healthy women (n = 31). The state of local immunity has been evaluated by the content of interleukins (IL-1β, IL-4) and tumor necrosis factor (TNF-α) in the aspirate from the uterus by the method of solid-phase immunoassay. In group 1, biopsy and morphological studies of the endometrium have been performed during hysteroscopy. It has been found that the occurrence of complications of hormone therapy in uterine myoma is accompanied by an increase in the synthesis of proinflammatory cytokines IL-1β (5 times) and TNF-α (4.5 times), against the background of the relative failure of anti-inflammatory IL – 4 (2 times increase) and hemodynamic changes in the uterine arteries (the speed of systolic blood flow increased 2.1 times, the resistance index-1.7 times). According to the histological study, the role of chronic endometritis in the pathogenesis of complications of hormone therapy of uterine myoma has been proved, which necessitates a more detailed examination of women to optimize the existing standards of organ-preserving treatments.

Keywords: uterine myoma, local cytokines, Doppler, complications of hormone therapy

In the structure of gynecological diseases the first place is occupied by inflammatory processes of the genital organs. The prevalence rate of chronic endometritis is in a wide range: from 0.2 % to 70 % [4, 14]. At the same time, in the population of women of reproductive age, uterine myoma are increasingly diagnosed, the proportion of which varies from 20 to 70 % [3, 18]. Identification of benign tumors of the uterus usually moves into the background its combination with chronic endometritis, even when there is indication of inflammatory processes of the genitals, which contributes to the limitation of the scope of examination of women under the existing standards.

It is known that in chronic endometritis there are no typical clinical manifestations of the disease. And the main clinical symptoms of uterine myoma, in the form of abnormal uterine bleeding, pelvic pain, anemia, frequent urination and dyspareunia, have a significant impact on the health and quality of life of women [8, 11].

Currently, the priority in the organ-preserving treatment of uterine fibroids belongs to hormone therapy, used as a neo – and adjuvant, and self-treatment options. At the disposal of the doctor today there is a huge selection of drugs for conservative therapy of uterine myoma – progestagens, gonadotropin-releasing hormone agonists, antagonists gonadotropin-releasing hormone, progesterone receptor modulators (antigestagens), as well as selective progesterone receptor modulator [10]. However, it should be recognized that in some cases, when taking hormonal drugs, side effects and complications occur in the form of pain or hemorrhagic syndromes, the frequency of which is insufficiently covered in the scientific and medical literature [1, 10]. The appearance of adverse events poses a problem for the doctor and the patient to choose further tactics of treatment: to continue conservative treatment or to lean in favor of surgery. According to the national and foreign literature, hysterectomy, as a method of treatment of uterine myoma, remains the most common operation in gynecologists around the world. The frequency of surgical interventions for uterine tumor is 50-70 %, of which the proportion of radical operations is 60,9-95,5 % [7, 15, 16].

Objective: to study the features of the local immune status and morphological picture of the endometrium in the event of complications of hormone therapy of uterine myoma.

Material and methods of research

A comprehensive examination of 157 women with uterine myoma, the size of which did not exceed 12-week pregnancy, mainly with intramural and subserotic localization of nodes, and with indications for conservative treatment. In group 1 (n = 112), complications in the form of hemorrhagic syndrome have been noted when taking hormonal drugs. In group 2 (n = 45) – complications of hormone therapy have not been recorded for 3 months. The control group (n = 31) consisted of healthy women. All patients underwent standard clinical and laboratory examination and complex ultrasound examination (ultrasound) with dopplerometry on the device “Logiq S8” from the

company GE Healthcare (USA). Local immunity was assessed by interleukin content (IL-1β, IL-4) and tumor necrosis factor (TNF-α) in uterine aspirates. The study has been carried out by solid-phase immunoassay, according to the Protocol of the manufacturer, using a set of reagents Vector-BEST Novosibirsk. In group 1, endometrial biopsy was performed during hysteroscopy for subsequent morphological examination. Statistical processing of the study results was carried out using STATISTICA 7.0, SPSS 17 packages, as well as MS Excel'2003 statistical functions, with the derivation of m+m, percent, logarithmic means (x) with 95% confidence interval and the reliability of differences (P) by student's criterion.

Results of research and their discussion

The average age of the women in the study group has been 30.5 ± 4.3 years, in the comparison group – 30.2 ± 3.7 years, in the control group-30.2 ± 5.5 years, indicating the comparability of the groups for further study. The analysis of anamnestic data has shown that only half of the patients with uterine myoma at the time of data collection were able to realize their reproductive function, which had significant differences in comparison with the control group (fig. 1).

The early onset of sexual activity has been noted by 51.8% of group 1 patients, which was 8 times higher than the control group indicator (6.5%) and almost 2 times – the same parameter of group 2 (26.7%). The proportion of infertility and spontaneous abortions in women with complications of hormone therapy of uterine myoma was also significantly higher (1.3-1.4 times) than in group 2 (fig. 1). Among gynecological diseases in group 1 prevailed colpitis, chronic inflammation of the pelvic organs and benign diseases of the cervix, the frequency of which significantly exceeded the similar parameters of group 2 and the control group. According to the modern literature, the transferred inflammatory diseases of genitals and urogenital infections should be referred to the risk factors of uterine tumor [7, 11, 13].

According to our data, ovarian-menstrual cycle disorders have been registered more frequently in patients of groups 1 and 2 compared to control data. And the use of intrauterine devices in history for contraception has been observed only in the groups of women with uterine myoma, and the obtained value in group 1 have been 5 times higher than in group 2.

The variants of conservative therapy of uterine fibroids in the groups have been characterized by a variety of hormonal drugs (fig. 2).

In group 1 there followed the randomness of the choice of means for the treatment of uterine myoma. In almost every third patient in this group, combined oral contraceptives (COC) have been used, which have never been mentioned in group 2. In every fourth case, gestagens (dufaston or "Mirena" intrauterine system) have been assigned to group 1. The frequency of Duphastone and the intrauterine system "Mirena" in group 1, respectively, 2.3 and 2.5 times higher than in group 2. Significantly less in the group of women with complications of hormone therapy for uterine myoma appointment of GnRH agonists (a-GnRH), mifepristone (Ginestre) and ulipristal acetate (ASME) (fig. 2) have been recorded. It should also be noted that 86.7% of patients (n = 39) underwent antibacterial/ antiviral and immunomodulatory therapy in group 2 before taking hormonal drugs. In group 1, only 35 women (31.3%) indicated for preliminary empirical treatment, with the inclusion of antibacterial agents, which was almost 3 times lower than the same indicator in group 2.

The results of complex ultrasound examination showed a significant increase in the average volume of the uterus in patients of groups 1 and 2 in relation to similar parameters of the control group (table 1).

Localization of the tumor of the uterus in 1 and 2 groups has been visualized predominantly interstitial, rarely subserous fibroids. The number of nodes varied from 3 to 6, and the size – from 1.5 to 3.6 cm.in the study of uterine hemodynamics in patients with uterine myoma, we did not reveal significant differences in the parameters of independent right and left uterine arteries. Therefore, for further research we used the average values of the velocity of systolic blood flow (V max), diastolic blood flow (V min) and resistance index (IR) between the uterine arteries (table 1). The analysis of qualitative indicators of uterine hemodynamics showed that patients of group 1 V max significantly increased in relation to the control group, against the background of a decrease in V min and an increase in the vascular wall IR. In group 1, an increase of V max by 2.1 times, IR – by 1.7 times, and the average value of V min decreased by 1.4 times in comparison with the standard data ($P < 0.05$), while significant differences with the parameters of group 2 have been obtained. Similar changes in hemodynamics in uterine arteries in uterine myoma in combination with hemorrhagic syndrome have been demonstrated in the work of I.E. Rogozhina et al. (2013) [15]. In the publication of D.V. Dzhakupov et al.

(2014) presents the results of morphological studies of myometrium and myomatous nodes confirming the role of hypertension in the major arteries of the uterus in the pathogenesis of bleeding in myoma [5], which, in our opinion, is a consequence of increased IR of the vascular wall [9] and is consistent with the work of other scientists [6, 12].

In determining the local immune status in uterine aspirates in patients with complications of hormone therapy of uterine fibroids, an increase in the production of macrophage proinflammatory cytokines IL-1 (5 times) and TNF-α (4.5 times) in the endometrium has been found, against the background of the relative insufficiency of anti-inflammatory IL-4, the content of which increased only 2 times in relation to the control values (table 2).

In group 2, a slight increase in local IL-1 and IL-4 has been observed against the background of a significant increase in TNF-α (1.6 times in comparison with the control group). The resulting values of cytokines in the 2 groups had significant differences with the same parameters of the 1st group. According to some scientists, the increase in the production of local cytokines in the endometrium is associated with the inhibition of antitumor immunity, which leads to increased cell proliferation in the uterine myoma node and can contribute to the development of the cancer process [2, 7, 19].

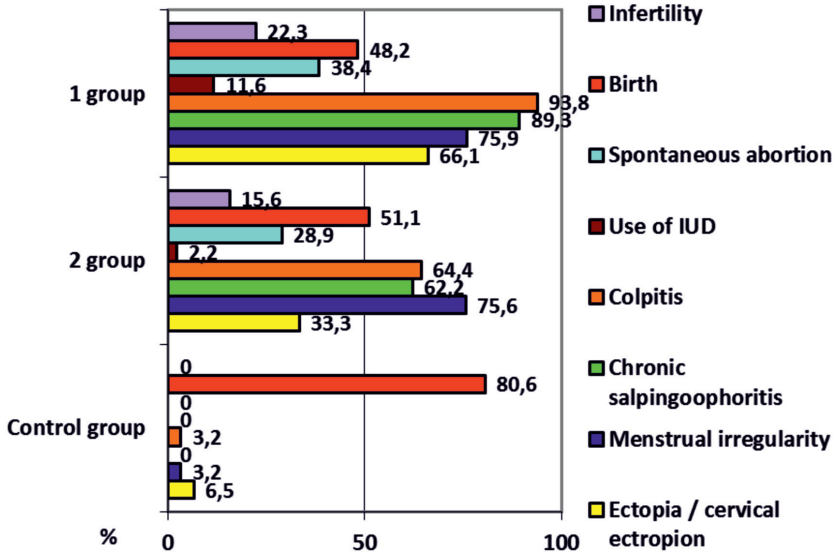


Fig. 1. Features of obstetric and gynecological history in groups

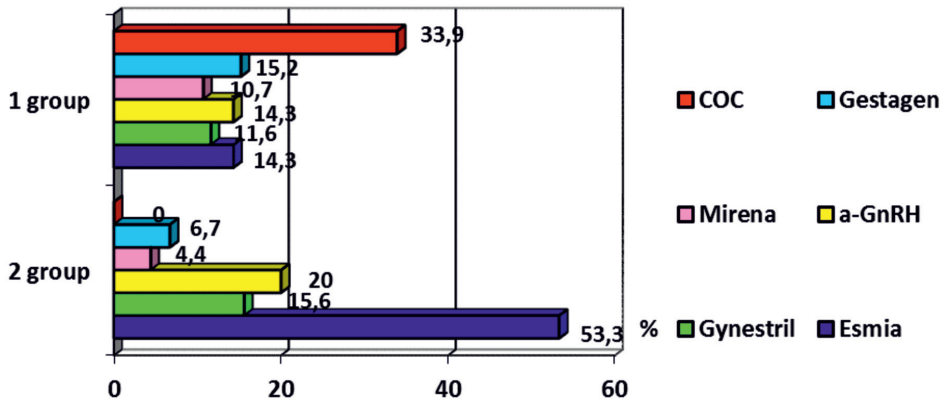


Fig. 2. Variants of hormonal therapy in groups

Table 1

Results of ultrasound and Doppler in the groups of women examined

Indicator under study	1 group (n = 112)	2 group (n = 45)	Control group (n = 31)
Average uterine volume, cm^3	357,4 ± 14,51*	349,8 ± 15,36*	84,7 ± 5,22
Endometrium, mm	8,3 ± 0,26*#	2,6 ± 0,31	1,6 ± 0,03
Average maximum node size, mm	27,16 ± 0,45	26,73 ± 0,34	0
Linear velocity of blood flow Vmax, cm / sec	30,16 ± 1,10*#	15,54 ± 0,09	14,16 ± 0,23
Linear velocity of blood flow V min, cm / sec	5,41 ± 0,08*#	7,59 ± 0,78	7,34 ± 0,14
Resistance index (IR)	0,82 ± 0,02*#	0,48 ± 0,07	0,47 ± 0,02

Notes: * – differences of indicators in relation to the control group are reliable, P< 0.05;
– differences of indicators in relation to group 2 are significant, P< 0.05.

Table 2

Results of the study of local cytokines

Parameters under study, pg / ml	1 group (n = 112)	2 group (n = 45)	Control group (n = 31)
IL-1β	19,91 ± 0,33*#	4,37 ± 0,07	3,83 ± 0,12
IL-4	3,06 ± 0,04*#	1,72 ± 0,04	1,46 ± 0,02
TNF-α	15,87 ± 0,28*#	5,58 ± 0,13*	3,51 ± 0,04

Notes: * – differences of indicators in relation to the control group are reliable, P< 0.05;
– differences of indicators in relation to group 2 are significant, P< 0.05.

Hysteroscopy and visual assessment of the uterine cavity in patients with abnormal uterine bleeding clinic on the background of hormonal therapy of uterine fibroids in 25 cases has shown signs of endometrial hyperplasia. Endometrial atrophy has been found in 10 women in group 1, polyp – in 6. In other cases the visible signs of pathology of the endometrium with hysteroscopy have not been traced. The results of the morphological study of tissue samples after biopsy (fig. 3) have shown the predominance of the endometrium corresponding to the phase of proliferation in the event of hemorrhagic syndrome against the background of hormone therapy of uterine myoma (n = 46; 41.1%).

The early stage of the secretion phase in the endometrium has been established in 21 patients. In each 5 cases, the endometrium corresponded to the middle stage of the secretion phase. Violation of the structure of tissue, characteristic of hyperplasia of the endometrium, demonstrated by 14 women 1 group. Glandular-fibrous endometrial polyp has been found in 6 cases. In addition, morphological criteria of chronic endometritis, manifested by the presence of follicular infiltrates, fibroplastic and ischemic processes in the basal layer and/or stroma of the endometrium, have been revealed in all endometrial samples in group 1. Plasma cells in endometrial tissue have been found in 102 samples (91.1%). Incomplete morphological picture of chronic endometritis (with the absence of plasma cells) was only less than 10% of the observations.

As you know, the dysfunction of the immune system plays a significant role in the emergence and progression of many diseases, including benign tumors. We have established a violation of the General immune status with the reduction of Th1 – and Th2-lymphocytes functions, as well as a significant inhibition of apoptosis in patients with uterine myoma complicated by hemorrhagic syndrome during hormone therapy [10]. In addition, in the publication of G. Wegienka (2012) suggested the hypothesis that uterine fibroids should be associated with disorders of systemic immunity against inflammatory diseases of the genital organs [17]. However, V.E. Radzinsky et al. (2016) suggested that chronic endometritis is characterized by an inadequate immune response to the presence of synanthropic bacteria that trigger autoimmune inflammation fueled by the persistence of legitimate microbes [14].

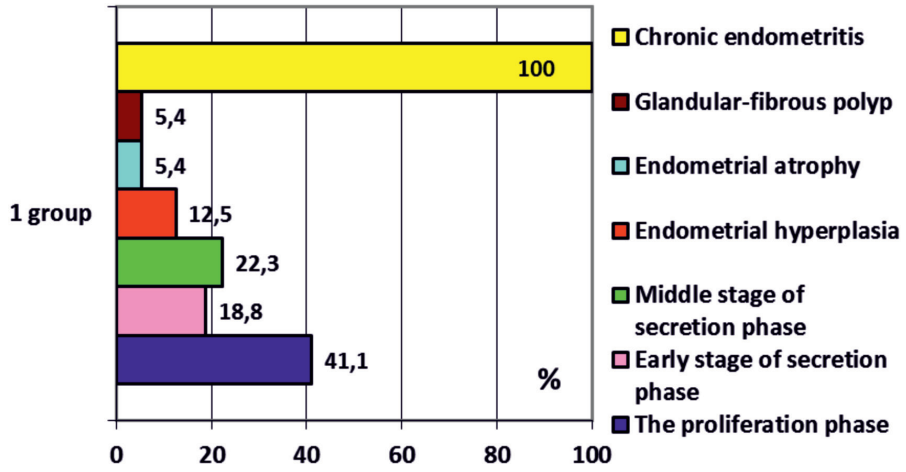


Fig. 3. The results of morphological studies of the endometrium in the 1st group

Conclusion

The results of the study have shown that the occurrence of complications of hormone therapy in uterine myoma is due to the presence in the history of inflammatory diseases of the internal genital organs (93.8%). Hemorrhagic syndrome in uterine myoma is usually accompanied by an increase in the synthesis of proinflammatory cytokines IL-1β and TNF-α in the endometrium, against the background of the relative failure of anti-inflammatory IL-4 and hemodynamic changes in the uterine arteries, which can cause further tumor growth. Hysteroscopy with endometrial biopsy in combination with uterine fibroids with abnormal bleeding has revealed the presence of histological signs of chronic endometritis in 100%, which confirms its role in the pathogenesis of complications of hormone therapy and is a pathomorphological explanation for the increase in the concentration of local cytokines in comparison with the control data. The obtained data dictate the need for a more detailed examination of women with uterine myoma before prescribing hormonal drugs to optimize existing standards and reduce the frequency of complications of hormone therapy.

References

1. Arora D., Chawla J., Kochar S.P.S., Sharma J.C. A randomized control trial to assess efficacy of Mifepristone in medical management of uterine fibroid // Med. J. Armed. Forces. India, 2017, no. 73(3), pp. 267-273. doi: 10.1016/j.mjafi.2017.02.013.

2. Borovkova N.V., Damirov M.M., Oleynikova O.N. Endometrial cells apoptosis in health and proliferative diseases of the uterus // ZHurnal im. N.V. Sklifosovskogo Neotlozhnaya medicinskaya pomoshch'[Russian Sklifosovsky Journal "Emergency Medical Care], 2016, no. 2, pp. 48-53.

3. Brüggmann D., Louwen F., Braun T. et al. The uterine fibroid/myoma tumour: analysis of the global research architecture using density-equalizing mapping // Reprod. Biomed. Online, 2018, no. 36(2), pp. 227-238. doi: 10.1016/j.rbmo.2017.10.112.

4. Cicinelli E., Matteo M., Trojano G. et al. Chronic endometritis in patients with unexplained infertility: Prevalence and effects of antibiotic treatment on spontaneous conception // Am. J. Reprod. Immunol, 2018, no. 79(1). doi: 10.1111/aji.12782.

5. Dzhakupov D.V., Lokshin V.N., Khamko V.A. Pathogenetic characteristics of change in anatomical structure in hysteromyoma complicated by bleeding // Vestnik Novgorodskogo gosudarstvennogo universiteta im. YAroslava Mudrogo [Vestnik of Yaroslav the Wise Novgorod State University], 2014, no. 78, pp. 122-124.

6. Idowu B.M., Ibitoye B.O., Adetiloye V.A. Uterine Artery Doppler Velocimetry of Uterine Leiomyomas in Nigerian Women // Rev. Bras. Ginecol. Obstet, 2017, no. 39(9), pp. 464-470. doi: 10.1055/s-0037-1604489.

7. Kan N.I., Potaturkina-Nesterova N.I., Tarabrina E.P. Pathogenetic aspects of uterine fibroid development in women with ureaplasma infection // Ul'yanovskij mediko-biologicheskij zhurnal [Ulyanovsk Medico-Biological Journal], 2016, no. 3, pp. 100-110.

8. Khan A.T., Shehmar M., Gupta J.K. Uterine fibroids: current perspectives // Int. J. Womens. Health, 2014, no. 6, pp. 95-114. doi: 10.2147/IJWH.S51083.

9. Khvorostukhina N.F., Ostrovskaya A.E., Rogozhina I.E., Novichkov D.A., Stepanova N.N. The specific features of uterine hemodynamics and hemostatic system in myoma complicated by hemorrhagic syndrome // Akusherstvo i ginekologiya [Obstetrics and gynecology], 2016, no. 6, pp. 87–93.

10. Khvorostukhina N.F., Ostrovskaya A.E., Novichkov D.A., Stepanova N.N. Cytokine profile in complications of hormone therapy administered for uterine fibroids // Medicinskaya immunologiya [Medical Immunology (Russia)], 2017, v. 19, no. 6, pp. 739-748.

11. Kichigin O.V., Arestova I.M., Zanko Y.V. Risk factors of hysteromyoma development and quality of life of patients operated in connection with hysteromyoma // Ohrana materinstva i detstva [Maternal and child health], 2013, no. 2(22), pp. 36-41.

12. Nieuwenhuis L.L., Hehenkamp W.J.K., Brölmann H.A.M., Huirne J.A.F. 3D power Doppler in uterine fibroids; influence of gain, cardiac cycle and off-line measurement

techniques // J. Obstet. Gynaecol, 2017, no. 7, pp. 1-7. doi: 10.1080/01443615.2017.1330323.

13. Ostrovskaya A.E., Khvorostukhina N.F., Stepanova N.N., Vasilevich L.K. Bacteriological landscape and infectious screening with uterine fibroids complicated by hemorrhagic syndrome // Vrach-aspirant [Postgraduate Doctor], 2017, v. 81, no. 2.1, pp. 108-115.

14. Radzinskij V.E., Ordiyanc I.M., Dobrecova T.A. Acute and chronic inflammation of the endometrium: from new views to new strategies // StatusPraesens. Ginekologiya, akusherstvo, besplodnyj brak [StatusPraesens. Gynecology, obstetrics, sterile marriage], 2016, no. 2 (31), pp. 126-132.

15. Rogozhina I.Ye., Khvorostukhina N.F., Neyfeld I.V., Prodanova Ye.V. The embolization of uterine arteries in surgical treatment of hysteromyoma // Lechenie i profilaktika [Disease Treatment and Prevention], 2013, no. 2(6), pp. 13-19.

16. Singh S., Thulkar T., Pawanarkar M., Thulkar J. Current Practices for Treatment of Uterine Fibroids // J. Midlife. Health, 2017, no. 8(4), pp. 189-190. doi: 10.4103/jmh.JMH_65_17.

17. Wegienka G. Are uterine leiomyoma a consequence of a chronically inflammatory immune system? // Med. Hypotheses, 2012, no. 79(2), pp. 226-31. doi: 10.1016/j.mehy.2012.04.046.

18. Williams A.R.W. Uterine fibroids – what's new? // F1000Res, 2017, no. 6. – p. 2109. doi: 10.12688/f1000research.12172.1.

19. Zlatnik E.Yu., Nikitin I.S., Nikitina V.P., Novikova I.A., Kravtsova O.E., Bakhtin A.V., Selyutina O.N. Factors of local immunity in endometrial carcinoma and myoma // Sovremennye problemy nauki i obrazovaniya [Modern problems of science and education], 2015, no. 4, URL: http://www.science-education.ru/ru/article/view?id = 20478 (data obrashcheniya: 05.07.2018).

DEVELOPMENT OF MEDICAL CULTURE IN THE EAST-EUROPEAN PART OF RUSSIA (THE PECHORA BASIN)

[1]Nuzhny V.P., [2]Ilyina I.V., [3]Nuzhnaya T.G., [1]Kibler N.A., [1]Shmakov D.N.

[1]Institute of Physiology, Komi Science Centre, Ural Branch, Russian Academy of Sciences, Syktyvkar, e-mail: shmakov@physiol.komisc.ru;

[2]Institute of Language, Literature and History; Komi Science Centre, Ural Branch, Russian Academy of Sciences, Syktyvkar;

[3]Syktyvkar State University named after Pitirim Sorokin, Syktyvkar

Various systems of medical care that existed in the Pechora basin, developed in connection with the geographical and economic situation of the region, and their impact on the medical culture of the population are considered. For centuries, the medical culture of the population of the Pechora basin was determined by knowledge, based on oral tradition and ascending to the folk experience. Zemstvo medicine has created new organizational forms of medical care for the population. However, the effectiveness of the official medicine was extremely low. During the first quarter of the XX century there were no significant changes in the field of health care. For the development of industrial reserves of the Komi, the era of the Gulag began. Despite the declared measures to preserve the labor force, prisoners did not receive adequate medical care. The post-gulag soviet medicine has created one of the most perfect paternalistic models of cost-effective health care system. The "historical dead-ends" of medical care development, influencing the formation of medical culture in modern society are shown. The role of the historically developed paternalistic approach in providing medical care is estimated. The reasons hindering the development of medical consumption culture are determined.

Keywords: medical anthropology, the system of medical care, ethnic group

Considering the problems of medical anthropology of the Pechora basin, one should take into account the ethno-cultural originality of this region [7, p. 171-172]. First of all, this is the territory of contacts of three ethnic groups – the Komi, the northern Russians and the Nenets, belonging to different economic and cultural types and ideological systems, which initially affected both the peculiarities of the folk-medical practices and the attitude to official medicine. In the historical context, there is also a unique situation when the indigenous and old-resident population is the bearer of the traditions of several forms of health care systems: traditional folk medicine, health care of the early Soviet period, the medical system of the Gulag, the late Soviet health care.

The traditional folk medicine

For centuries, the medical culture of the population of the Pechora basin was determined by knowledge, based on oral tradition and ascending to the folk experience. Assessing the level of development of folk healing in the second half of the XIX century, Dr A. Drzevetsky wrote that folk medicine of the Komi "is rich both in its means and its leaders, which it is not easy to compete with" [1, p. 45].

The transfer and preservation of special knowledge was provided by cultural mechanisms that acted in the form of family and social traditions, as well as sufficiently stable ideas and rituals. Training the healing occurred during the process of daily medical, religious and religious magical practice, that provided the transfer of important and valuable for the ethnos information to the next generation and imposed certain ethical obligations on the recipient of specific information and skills. With all the variety of techniques and methods of treatment depending on the disease, the individual skills of the doctor, his behavior during the delivery of medical care has an important common feature: the constant connection between the doctor and the patient in the process of treatment, which has been one of the important reasons for the effectiveness of traditional medicine. The doctors knew the limits of their capabilities, did not undertake the treatment of diseases beyond their control*: "... they still remained alive, I got them back on their feet. Only one died. She got hurt at the logging site. They have brought: can you, say help? I touched, and right under my fingers I felt the blood spurting from the ragged veins. Her, I say, take her somewhere quicker to the hospital. There is nothing I can do for her"* [3, p. 18]. **"***I can heal a man, and cattle, and a cat, even a dog. Only I can not cure appendicitis and cancer"* [3, p. 18]**.**

The activities of folk healers were under strict censorship of the collective, the emergence of all sorts of charlatans in the traditional village community was excluded. In traditional culture, the introduction of sacral knowledge and the acquisition of power imposed on the

individual special ethical obligations, the most important being the prohibition of commercialization of medical activities, which was manifested in the refusal of the healers not only from the monetary remuneration, but also from direct cooperation within any institution for a fee: "*You yourself somehow heal, since you have such a job, but I can not afford it for money"* [3, p. 37].

Given that the Pechora basin area is the territory of contacts of three ethnic groups, the question of mutual attitude of the Komi, Russians and Nenets to the healers of the neighbors is of interest. The researchers noted the facts of a special respectful attitude of peoples to the sacred persons of another ethnic group, "the Russians and Komi listened to the prophecies of the Nenets shamans", and "the Nenets turned to the Khanty shamans, considering them stronger" [4, p. 282]. Zyryan region was famous among the Russians as the land of sorcerers "known for their art to unleash the disease and to cure them" [8, p. 18; 9, p. 69], while surrounding people were afraid of the inhabitants of Ust-Tsilma and Pinega calling them sorcerers, drug-whisperers were in great respect. Assessing the activity of folk healers, it is necessary to note the factors that contributed to the preservation to our days of the institution of quackery. In the process of treatment, along with therapeutic and magical rituals there were included the means, the healing properties of which were revealed in the course of centuries of observations of nature and everyday practical activities for its development. In addition, with the undivided belief of the patient and those around him in the efficacy of the traditional treatment and the power of the healer, magical rites caused considerable psychotherapeutic effect, which itself could have a positive therapeutic effect. There is no doubt, that the majority of folk healers are exceptionally bright personalities with special, often extraordinary abilities. To date, they are the main carriers of the historical memory of traditional medical culture and keepers of institutional knowledge about folk remedies and methods of treatment.

The development of the public health system is connected with the activity of the Zemstvo

Prior to its formation in 1869, there were no stationary medical facilities in the Pechora district, "the doctor, having found himself in front of 70,000 of his patients, scattered on 137,196 square miles, should only hopelessly spread his hands: "Well, brothers! Do it as you know. If you want to live – live, if you want to die – die!" [9, p.18]. Zemstvo medicine has created new organizational forms of medical care for the population. Zemstvo doctors of the Pechora district D.A. Arkhangelsky, E.A. Panov, A.O. Shidlovsky, A.I. Markova and others, who worked at different times from 1870 to 1914, did much to improve health care for the inhabitants of the region. The traveling system was replaced by a mixed one, and then by a stationary one. Two medical stations with centers in the village of Ust-Tsilma and Mokhcha were formed. Medical personnel was increased and the posts of district doctors were introduced. The duties of the district doctor included the organization of medical care in the hospital and the management of the pharmacy, control of paramedics, midwives, smallpox-vaccinators, personal participation in the treatment at home of the seriously ill and help in difficult childbirths, taking measures for the prevention of epidemics, maintaining medical statistics and reporting to the Zemstvo board. However, "rarely where the medical helplessness of the population is felt so much as in the Pechora region. In the District with the population of 37,253 people living in villages located at great distances, with archaic ways of communication, there are only two district doctors, 6 paramedics, 4 midwives and 9 volost smallpox-vaccinators from peasants or retired soldiers. In the summer of 1903, to the question of who is treating you in case of illness, in most of the villages the answer was: "the doctor comes 1-2 times a year," "neither the doctor nor the paramedic have ever been here," "the paramedic comes once a year to impart smallpox to children" [6, p. 230]. Most of the time hospitals and medical points were left without specialists, since "doctors, like other employees, look at their life in Pechora as a temporary residence, always living with a constant thought and hope for a new place with greater comfort of life" [6, p. 245]. The main burden fell on the paramedics, who had to travel to large distances, reproducing the ineffective travelling system of medical care which the Zemstvo medicine tried to avoid. All above had led to the fact that not only the effectiveness, but also the authority of the official medicine was extremely low. In the Pechora region in 1903, out of 1,043 interrogated patients 19 people were treated by veterinarian, 177 – by midwives and healers, 262 – "by their own means," 41 – "at disease they turned to God", 394 – not treated at all and only 150 people went to a doctor or a paramedic [6, p. 210]. It is very indicative that, despite a significant change in the medical culture of the indigenous population over the past century, the Pechora villages remain quite critical to the public health system. Ethnographic research at the turn of the XX-XXI centuries recorded the existence in many settlements of the Pechora area of practicing folk

healers: herbalists, bonesetters, bloodletters, up to healers of narrow specialization among the Nenets and Komi reindeer herders of Izhma, which is a typical example of the effect of economic activities of the people on the structure of medical knowledge [2, p.178-179; 3, p. 34].

The health of the early Soviet period

The level of health care services significantly decreased due to the 1-st World War of 1914, and during the first quarter of the century there were no significant changes in the field of health care. The revolutionary events in the early 1919 in the Pechora District were accompanied by a severe public health crisis caused by the lack of medicines and medical equipment, as well as medical workers under repression. Realizing the serious social threat of the collapse of the health care system and the Russian economy as a whole, the Russian Communist Party (Bolsheviks) in March 1919 at its VIII Congress defined the tasks of public health: combating social diseases and epidemics, sanitation measures for the improvement of health of the populated areas, providing the population with free qualified medical and drug assistance [10, p. 163-171]. In August 1921, the Regional Committee of Health of the Komi Autonomous Region started creating the hospital and outpatient network, which was due to the adaptation of houses for them, from which families of the former merchants, kulaks and clergy were evicted. The state, like in the second half of the XIX century, practically refused to participate in the organization of public health care at the proper level.

The medical system of the Gulag (General Directorate of Camps)

Rapid industrial development had particular influence on the formation of the specifics of health care of the Komi region. By the decree of the Soviet of People's Commissars of the USSR of July 11, 1929 the Chief Political Administration was entrusted with the task of developing the economic life of the least accessible, the most difficult for development and at the same time possessing huge natural riches the country's outskirts through the use of labor of isolated socially dangerous elements by colonizing the sparsely populated places. In the Pechora region, comprehensive exploration and development of coal and oil fields, as well as accelerated road construction and laying of the railway, were to begin. The implementation of this program without extreme measures to attract labor force was impossible, and the Komi region in the 1930s-1940s became the place of exile, special settlements and camps for prisoners. For the development of industrial reserves of the Komi, the "great migration of peoples", the era of the Gulag began, which absorbed the nascent Soviet health care and pushed back the development of medical care, especially in the remote places. In 1937 in the Pechora basin, for the exploration and development of natural resources of the Far North, the Pechorsky forced labour camp was organized – for barge-building, in Troitsk-Pechora and Kozhva logging enterprises – forced labour camp for logging, where to labor settlers from kulaks, residents of Western Ukraine and Belarus, Poland, Lithuania were sent. For the settlers to successfully "build socialism", it was necessary to provide them with acceptable housing, canteens, baths, medical posts, hospitals, social care institutions, clubs, etc. [5]. Considering that there were many children among the settlers, nurseries, kindergartens, schools were needed. It was necessary to provide these institutions with appropriate facilities, equipment, personnel, and find funds for their maintenance. In the Gulag contract of the People's Commissariat of Internal Affairs and the People's Commissariat for Forestry of the USSR it was determined that "medical services for special settlers and members of their families are carried out by medical and preventive institutions located on the territory of the enterprise of the People's Commissariat for Forestry of the USSR on a common basis with other workers. In case of absence of medical facilities on the territory of the enterprise, special settlers and members of their families are served by the general network of public health authorities on the same grounds as other workers of these enterprises". Logging enterprises could not cope with this task, so the solution of social issues was postponed "for later". It is here that you can find the reasons for the beginning contradictory attitude to the health care system, which exists in the mass consciousness of the population. On the one hand, it is the boundless trust in the treating doctor, on the other hand – the boundless distrust to the health care system and officials. The established health service of the Gulag was guided by the principles inherent in the Soviet health care: planning, centralized management, comprehensive approach to treatment, free of charge, preventive orientation, repeated the main stages of its development as one of the departmental structures of the Soviet medicine. But much more it was connected with the history of the development of the Gulag itself. The tasks of the Gulag health service included: regulation of labor use of prisoners, being the main factor in preserving their physical condition, organization of measures to improve

the health of prisoners, carrying out measures to reduce morbidity. By order of the Gulag, prisoners were divided into a balance contingent (full workforce) and an out-of-balance contingent (sick, disabled, etc.). All above, was in line with the basic strategy of the Soviet public health care: active participation in solving the problem of preservation of labor resources. Despite the declared measures to preserve the labor force, despite the most important principle of corrective labor policy being mandatory for camps – "punishment should not pursue the purpose of causing physical suffering or humiliation of the human dignity of convicts", prisoners were subjected to both severe physical and moral humiliation, did not receive adequate medical care. Specific for the Gulag treatment-and-prophylactic institutions were the so-called health centers and health teams. It was recommended to widely use labor therapy, physiotherapy exercises, organization of rest of prisoners in the open air. Treatment of employees, civilians and members of their families was carried out under the same conditions, i.e. all were hostages of the same system.

The late medical system of the Soviet period

The post-Gulag soviet medicine has created one of the most perfect paternalistic models of cost-effective health care system, based on the declared accessibility, strong influence of inpatient care as the main pattern in the structure of health care. At the same time the remote places, "bear corners" were left to themselves. Formed over the decades of exploitation of the resources the focal and dispersed form of population settling in the Pechora basin came into conflict with the modern trends of industrial development of the Republic and the system of providing quality medical care. Together with the archaic market economy, the Pechora river went out of human control; the lack of river drainage, bottom dredging works, arrangement of the banks had led to a significant deterioration of water flow: floods became more destructive, number of backwaters increased, the channel became shallow. End-to-end navigation became very difficult. Such a situation had reduced the level and quality of life of the population of the Pechora basin. The fact is not even in an economic component, but in the socio-cultural aspect of life.

It is important that in the population the level of auto-identity of native places decreased. The self-identification of ethnic groups decreased, the tendencies of social autism intensified. The Pechora river from the system-forming is currently becoming a system of separation. In these circumstances it is difficult to speak about the medical culture, the culture of consumption of medical services, the role of health care reforms. The upper reaches of the Pechora river still represent a remote place where the dissatisfaction with the state of modern healthcare is clearly manifested, medical aid is not effective enough, all this being the reason for the dissociation of the effect of overestimated expectations from medical services and the real state of medicine. It is in these "bear corners" that the dissatisfaction of the population with medicine is clearly manifested. The culture of consumption of medical services remains at an unorganized level, which leads to the inversion of the declared medical care towards archaism. At present the attention is drawn to the constant increase in the number of the smallest settlements with the population of up to 50 people. Most of them (over 80%) are villages with the predominance of the population of Komi nationality. More than half (54%) of all rural settlements are villages with up to 200 inhabitants, in which only some institutions of the service sector are created selectively. Over ¾ of all settlements (557 settlements) do not have a demographic base for creating a full range of cultural and consumer services for the population. In the settlements with the predominance of the Komi nationality, the population is up to 200 people – 63%, up to 500 people – 84% of the settlements. With such a fractional network of settlements, it is difficult to solve the problems of the functioning of social service facilities, medical assistance, transport network development etc.

In many rural settlements with a total population of 38,484 people (4.3% of the total population of the Republic of Komi) medical services are not provided. Rural hospitals are often converted to outpatient clinics, pharmacies – to the category of drugstore points, pre-existing outpatient clinics are closed; there are corresponding changes in the number and structure of medical personnel, financing, supply of medical products. Despite the fact that Troitsk-Pechora, Ust-Tsilma and Izhma regions are located in similar natural and climatic conditions, geographical remoteness and limited communication, territorial isolation contributed to the striking differences in the culture and way of life of the population living on these territories. In the Izhma region more than 85% of the population are the Izhma Komi; in Ust-Tsilma region over 85% are the Russians, old believers who moved to these territories as a result of forced migration, many generations ago; in Troitsk-Pechora region 63.9% are the Russians, 26.2% – the Komi. Given the specifics of the development of the Russian and Soviet society, where the paternalistic model

has always been and remains the most psychologically acceptable, the question arises whether this model of the doctor-patient relationships is optimal for solving ethical and social problems that arise during treatment at the present stage of health care development? Of course, medical care, and the health care system are focused on restoring health as a physical component to perform professional physical labor. At the same time, the ongoing processes in health care do not contribute to the formation of medical culture in the population, but on the contrary, create a negative attitude to medicine. As a result, the population does not have a positive attitude to a healthy lifestyle and medical culture.

The social order in healthcare should not ignore the historical and ethnic peculiarities in the Komi Republic, since the object of medical care is a man who is more connected with ethnogenetic and historical and cultural factors that determine his attitude to health care and the health system as a whole. These factors determine the degree of his compliance in his interaction with the system, are decisive in the formation of the medical culture of the population. The social order should take into account the continuing trend of the contradictory attitude to the health care system that exists in the mass consciousness, on the one hand it is boundless trust to the attending physician, on the other hand – an equally boundless distrust to the healthcare system and medical officials. Paternalistic moods are now more common to patients, their behavior in relation to their health is formed on the basis of: a) low level of competence in medicine, b) large neuropsychic overloads and the desire to shift some of their concerns on the shoulders of a doctor, c) disorientation in new forms of medical services, prices and drugs. Medicine is perceived by society as a pattern, as part of a regulated plan, as a duty on the part of the state, and the list of medical services is considered as an official set which is correct and which does not accept alternative methods of treatment and diagnosis. Folk medicine in this context serves as part of the informal culture of indigenous peoples, as an underground of the official medical culture. This internal conflict of the official and folk medicine does not allow to integrate knowledge, creates discomfort in a part of the population. The ineffectiveness of the mobilization system of health care contributed to the fact that the ideas of diseases, the ideas about health in the population remained archaic in the religious and mythological aspect, while the population itself remained isolated or distrusted to the health care system, which does not try to change anything. The system of folk medicine in modern society, instead of coexisting and integrating into the health care system, remained isolated. At the same time, most of the state's expenditures on public health, the folk medicine could take on itself, especially in preventing diseases and maintaining a healthy lifestyle. Awareness of our society of its heterogeneity – not only social but also cultural, will allow more rational use of health resources, integrally approach to the health of the nation, taking into account the socio-economic, ethno-cultural and medical heritage.

Thus, the various medical care systems that existed on the territory of the Pechora basin formed on the basis of the geographical and economic location of the region, are considered. The formed health care systems, including modern ones, are concentrated mainly on restoring physical health to perform a certain work activity, they lack the concept of health as a value category. If to consider health as a value category, determining the quality and life expectancy of an individual in the future, then the health and medical requirements should be different. Health care should move away from the model of service delivery to the model of improving the quality of life in which the health care for patients will be considered in terms of improving not only the quality of the service itself, but also its impact on the quality of life and its duration, while for the state the medical service will be part of the creation of an economic product. Folk medicine, which is based on institutional instincts of self-preservation, rather than medical technologies, should become part of the medical culture of modern society, as it is one of the forms of the auto-identity of the ethnic group.

References

1. Drzhevetsky A.I. Medical-topography of Ust-Sysolsky Uyezd. St. Petersburg, 1872. – 106 p.

2. Ilyina I.V. Komi folk medicine // Atlas of the Republic of Komi. – M.: Izd. "Design. Information. Cartography", 2001. – P. 178-181.

3. Ilyina I.V. Traditional medical culture of the peoples of the European North-East. – Syktyvkar, 2008. – 326 p.

4. Khomich L.V. Shamans of the Nenets // Problems of the History of the Public Consciousness of the Aborigines of Siberia. – L.: Nauka, 1981. – 284 p.

5. Kokurin A.I., Petrov N.V. Russia 20th Century. Documentation. GULAG (General Directorate of Camps). 1917-1960. – M.: MFD, 888 p.

6. Martynov S.V. Pechora region. St. Petersburg, 1905. – 276 p.

7. Nuzhniy V.P., Ilyina I.V., Nuzhnaya T.G., Kibler N.A. Medical anthropology of the Pechora river basin // Izvestiya Komi Branch of the Russian Geographical Society. Materials of the Integrated Pechora Expedition. – Issue. 1 (17). – 2016. – P. 171-172.

8. Popov K. Zyryane and Zyryan Territory // Izvestia IOLEEE. –T. XI-II. – Issue. 2. – M., 1874. – 89 p.

9. Vologdin P.V. Forest kingdom // Word. St. Petersburg, 1878. – 73 p.

10. Zavyalov B.M., Vatlin A.V., Lomov V.E., Korableva N.N. Gladilov Valentin Vladimirovitch: pages of life in medical education (biography, works on the history of public health and medical education in the Komi Republic). – Kirov, 2015. – 368 p.

FEATURES OF THE LABOR INTENSITY AND OCCUPATIONAL STRESS IN THE LABOR ACTIVITY OF DOCTORS OF GENERAL PRACTICE

[1]Seiduanova L.B., [1]Karabalin S.K., [1]Niyazbekova L.S., [2]ImamniyazovY.R.

[1]Kazakh National Medical University S.D. Asfendiyarov, Almaty, e-mail: _laura_seiduanova@mail.ru;

[2]Publik health protection department of Almalinsky, Almaty

The paper presents the results of a study of labor intensity of general practitioners, depending on the degree of mastering of medical competence at the stage of family medicine in Kazakhstan. According to the time-keeping studies, it is established that the work of general practitioners in terms of the degree of tension belongs to the harmful class, which is associated with the strengthening of the compensatory mechanisms of the psychological status. In the work of general practitioners, there is a burnout that occurs as a result of the internal accumulation of negative emotions. The features of the psychological status of general practitioners at the stage of introduction and development of the service of general practitioners (family medicine) are shown. The professional activity of general practitioners, depending on the length of service at the initial stages of adaptation, contributes to the strengthening of the stress of compensatory mechanisms of psychological status.

Keywords: labor process, neuro-emotional state, intellectual loads, sensory loads, professional stress, professional burnout, emotional stress

The increase in neuro-emotional loads in the process of labor activity forms a state of stress, and often an overstrain of the functional state of the organism, which can be regarded as the formation of industrial stress [1, 2]. According to WHO / Europe in Europe, 3-4 % of the global burden of disease is stress, related to work [3], and according to Frönberg [4]. About 18 % of all health problems of the working population are stress, depression and anxiety.

This is most typical for the occupations of mental work. Different manifestations of stressful reactions, up to the syndrome of emotional burnout, have been revealed in various categories of workers, primarily social workers, doctors, law enforcement agencies [5]. The labor of medical workers is accompanied by a number of unfavorable factors, among which, in recent years, special emphasis is given to occupational stress, encountered in the work of primary care physicians. The work of the latter is connected with a sufficiently pronounced neuro-emotional tension. Elucidation of the causes and mechanisms of increased emotional stresses in the development of measures to prevent adverse effects of stress [6, 7].

Scientific research on the evaluation of professional burnout in the work of general practitioners (family doctors) in the Republic of Kazakhstan was not carried out, there is practically no information on the development of their professional stress.

The purpose of this work was to assess the intensity of work and the peculiarities of the syndrome of professional burnout among general practitioners of polyclinic institutions in Almaty, depending on the training of family doctors.

Materials and methods of research

The object of the study was the doctors of the polyclinic unit of the State Educational Institution of the city of Almaty, the total number of the surveyed was 66 people, which was divided into 2 groups: 1 group of GP doctors who did not combine the function of obstetrician-gynecologist (36 persons); 2 nd group: GP doctors, combining the function of obstetrician-gynecologist (30 people).

Each group of GP physicians was divided into 3 subgroups, depending on the length of work experience: 1a (seniority up to 5 years) – 14 people), 2a (seniority up to 5 years) – 16 people), 1b – (experience from 5 to 10 years – 11 people), 2b – (length of service from 5 to 10 years – 10 people) and 1b (seniority over 10 years – 8 people), 2b (seniority over 10 years – 7 people). The doctors of the department of narrow specialties of the polyclinic served as a control (28 people). An analysis of the time-length study of labor activity and its structure was performed. A set of factors (stimuli, irritants) was created, creating prerequisites for the emergence of adverse neuro-emotional states (overstrain). The factors (indicators) of the labor process by types of loads were studied: intellectual, sensory, emotional, monotonous, regime loads in accordance with the Manual “Hygienic assessment of factors of the working environment and labor process. Criteria and classification of working conditions”. P2.2.2006-05 [8].

To determine the level of the syndrome of professional burnout (SPB), we used the test of V. Boyko, which diagnoses the level of emotional burnout. The methodology was conducted on a questionnaire containing 84 questions

reflecting the phases: "tension", "resistance" and "exhaustion". The stages of formation were defined: 1st stage – not formed (36 points or less); 2nd stage – in the stage of formation (37-60 points); The third stage is the formed phase (61 or more).

Results of research and their discussion

Indicators of the intensity of the work process for intellectual loads were analyzed (Table 1).

Analysis of the section "The content of work" showed that GPs in the course of their labor activity solve tasks that do not require reasoning, the goal of the work is clearly articulated, many tasks are performed in accordance with the clinical protocol, with the exception of individual cases where the task can include several subtasks.

It should be noted that in GP doctors who do not combine the function of obstetrician-gynecologist, in the process of work decision-making takes place on the basis of necessary and sufficient information on the known algorithm (protocol, instructions), work on this indicator is regarded as 3.1.

Doctors of GP who combine the function of obstetrician-gynecologist, in the process of work, have to take decisions in conditions of incomplete or insufficient information, so the work they have on the indicator "Work content" is regarded as 3.2.

According to the indicator: "1.2. Perception of information and their evaluation". Labor activity of GPs of the second group of GP requires the perception of information with subsequent complex evaluation of all parameters of the diagnostic process, decisions based on thinking with the obligatory use of intelligence, i.e. mental faculties of the performer, respectively, such work on the strain refers to class 3.1.

Table 1

Indicators for assessing the intensity of the work process in general practitioners

№	Indicators of labor intensity	General practitioners	
		1st group	2nd group
1	Intellectual loads:		
	1.1. Content of the work	3.1	3.2
	1.2 Perception of information and theirassessment	2	3.1.
	1.3 The degree of complicity of the task	3.1	3.2
	1.4 Nature of the work performed	3.1	3.2
2	Sensory loads:		
	2.1 Duration of concentrated observation	2	2
	2.2 Density of signals (light,sound) on average per hour	2	2
	2.3 The number of objects of the same observation	2	2
	2.4 Load on the visualanalyzer	2	3.1
	2.5 Working with optical devices	1	1
	2.6 Watching the screensPC	3.1	3.1
	2.7 Load on the auditory apparatus	2	2
	2.8 Load on the voice apparatus	2	2
3	Emotional loads:		
	3.1 Degree of responsibility,significance of error	3.1	3.2
	3.2 The degree of risk to own life	1	1
	3.3 degree of risk for the safety of others	1	1
	3.4 Number of conflict situations	2	2
4	Monotony of loads:		
	4.1 Number of elements in operation	1	1
	4.2 The duration of the operation in seconds	1	1
	4.3 Time of active actions	1	1
	4.4 Monotony of the production environment	1	1
5	Operating mode:		
	5.1 Actual duration of work	3.1	3.1
	5.2 Interchange of the work	1	1
	5.3 Presence of regulated breaks	2	2
General assessment of labor intensity		3.1	3.2

On the indicator: "1.3 The degree of complexity of the task". The work of the GP, an obligatory element of which is the control of the fulfillment of the assignment by the employees of the nurses' assistants. Such labor is related to class 3.1.

According to the indicator: "1.4 Nature of the work performed". The work of general practitioners is performed in conditions of time deficit (class 3.1). The greatest tension (class 3.2) is characterized by work in conditions of shortage of time and information. In this case, a high responsibility for the final result of the work is noted.

Analysis of sensory loads showed that the index of the intensity of the labor process (table) – from 2.1 to 2.5 and 2.7 and 2.8 on the degree of tension, labor refers to the 2nd class, and according to the indicator: 2.6. Watching the screen of the video terminal, the stress on the tension refers to class 3.1.

Incorrect mistaken actions of the doctor lead to additional efforts with increasing emotional tension, which is the case with the surveyed persons. The work of general practitioners who combine the function of obstetrician-gynecologist in terms of tension is in class 3.2. According to other indicators, labor refers to 1 and 2 classes.

According to the indices of the section "4.Monotonicity of loads", labor refers to the first class, and according to the indices of the section "5. Mode of work" for 5.1 "Actual duration of work", labor refers to class 3.1.

Considering the dynamics of subjective sensations in the doctors surveyed, it is necessary to note some trends in the change in the indices of the psychophysiological profile. The indicators of the psychological status of GP doctors, depending on the length of service, are presented in Table 2.

As can be seen from Table 2, a violation of the status balance in the mobilization of the mental performance of the contingent under investigation is manifested by various levels of psychological status with manifestations of fatigue.

Evaluation of the psychological status indicates that the subjective feeling of tension is aggravated by an increase in the RT index from the region of low anxiety limits to the range of high anxiety. The increase in this case of RT is most likely due to the experience of doctors, the anxiety of his condition and discomfort.

As can be seen from Table 2, the mean value of the "C" indicator compared to the control is significantly lower in the following groups 2b, 1c and 2c and were 4.12 ± 0.28 units, respectively. ($p < 0.05$), 4.18 ± 0.36 units. ($p < 0.05$), 3.39 ± 0.28 units ($p < 0.01$). The average value of the indicator "A" is significantly lower in the 1c and 2b groups, and the "H" index in the group 2c. The data show that already at the initial stages of adaptation, the professional activity of GP physicians contributes to strengthening the stress of compensatory mechanisms of psychological status. This explains the low values of the "SAN" indicators and its stability below the normative scales.

Analysis of the psychological status of general practitioners with experience of up to 5 years showed that the level of self-assessment of the functional state (C) was low, indicating a reduced performance. Indicators such as activity (A) and mood (H) were also below normal values (table).

Table 2

Indicators of the psychological status of GP doctors depending on the length of service (M ± m)

Groups	C (it.)	A (it.)	H (it.)	PT (it.)	JIT (it.)
1a (experience up to 5 years)	4,75 ± 0,32	4,42 ± 0,18	4,52 ± 0,12	34,2 ± 2,2	35,1 ± 1,08*
2a (experience up to 5 years)	4,6 ± 0,28*	4,32 ± 0,21	4,68 ± 0,18	35,6 ± 2,1	36,4 ± 1,16*
1b (experience from 5 up to 10 years)	4,42 ± 0,34	4,3 ± 0,38	4,32 ± 0,38	44,6 ± 2,2	43,8 ± 1,46
2b (experience from 5 up to 10 years)	4,12 ± 0,28*	4,14 ± 0,42	4,44 ± 0,24	46,2 ± 1,84°	44,6 ± 1,44 °
1c (experienceover 10 years)	4,18 ± 0,36*	3,72 ± 0,28*	4,88 ± 0,26	45,6 ± 2,6	46,8 ± 1,48*
2c (experienceover 10 years)	3,39 ± 0,28**	3,56 ± 0,18**	4,16 ± 0,12*	48,6 ± 2,2	50,6 ± 1,28 **°
Control	5,12 ± 0,16	4,78 ± 0,31	4,82 ± 0,21	42,4 ± 2,4	41,2 ± 1,26

NOTE: * – the reliability of differences compared with the control ($p < 0.05$), ** – the reliability of differences compared with the control ($p < 0.01$); ° – the reliability of differences in comparison with the indices between groups ($p < 0.05$).

Table 3

Distribution of persons by the phases of development of the syndrome of emotional burnout, in %

Phases of emotional tension	1st group			2nd group		
		In forming stage	formed	Did not formed	In forming stage	Formed
Tension	66,0	22,5	11,5	42,0	39,5	18,5
Resistance	54,2	26,2	19,6	33,0	37,2	29,8
Exhaustion	67,5	22,7	9,8	53,0	28,8	18,2

With regard to the indicator of personal anxiety (LT), which is understood as a relatively stable individual characteristic: a trait that gives an idea of a person's predisposition to anxiety, i.e. about his inclination or tendency, as well as the reactive disposition (RT) indicator, according to which the individual's self-assessment is judged, it was revealed that initially the values of GPs 1a of the group were in the area of low anxiety limits and amounted to: LT-35.1 ± 1.08 units. and RT-34.2 ± 2.2 units, respectively.

With increasing length of service, starting from age 5 and above, the indicators of reactive and personal anxiety in the surveyed persons are increased in comparison with the control. The values of these indicators are in the border area from low to high anxiety, ranging from 34 to 50 points.

From the data in Table 2, it can be seen that the reactive anxiety in GPs 2b (aged 5 to 10 years) and 2c (with more than 10 years of experience) groups went beyond the area of high anxiety and amounted to: 46.2 ± 2.84 units and 48.6 ± 2.2 units.

In persons with experience more than 10 years, the values of RT in comparison with the control are significantly high and amounted, respectively: 46.8 ± 1.48 units. ($p < 0.05$), and 50.6 ± 1.28 units ($p < 0.01$).

The results of the analysis of the phases of emotional stress showed that the phase "Stress" – nervous (anxious) stress is a harbinger and "trigger" mechanism in the formation of emotional burnout, was formed in 18.5% of GP physicians, in 39.5% this phase is in the stage of formation, was not generated – 42.0% (Table 3).

The "Resistance" phase was formed in 29.8% of doctors, 37.2% of GP doctors are in the stage of formation, not formed – 33.0%.

The phase of "Depletion" in the formative stage in 28.8% of respondents and was formed in 18.2% of health workers, not formed – 53.0%.

Thus, in accordance with the materials received and the results of the final evaluation, the work of general practitioners who do not combine the function of obstetrician gynecologist should be classified as Class 3 of the first degree of tension, and the work of general practitioners combining the function of gynecologist-obstetrician with class 3 the second degree of tension in accordance with the Guidelines P 2.2.2006-05.

The obtained results testify that the peculiarities of labor activity in the dynamics of work experience among general practitioners contribute to the irrational use of psychophysiological resources in the form of personality properties changes, as anxiety, causing further development of adaptation-compensatory reactions.

The formation of professional stress among general practitioners occurs gradually from the stage of the functional state of stress to fatigue, to overstrain and fatigue, these phases are taken into account for the development of sound preventive measures.

References

1. Froneberg B. Old and new problems in occupational health – challenges to occupational safety and health from the global market economy and from demographic change // Bulletin of the Scientific Council Medical-ecological problems of workers 2005 – № 4 – P. 14-21.

2. Fedorovsky N.M., Grigorieva O.M., On the issue of the "burnout syndrome" in anesthesiologists-resuscitators // Bulletin of Intensive Therapy. 2004. Appendix to № 5 – "Contemporary problems of anesthesiology and intensive care" -2004 – P. 65-66.

3. Izmerov N.F., Matyukhin V.V., Professional stress from the position of occupational medicine: stressors, psycho-physiological aspects, health, prevention. Proceedings of the II All-Russian Congress of Physicians-Occupational Pathologists, 3-5 October 2006 – Rostov-on-Don – Publishing house "Polygraphist" – 2006 – P. 309-310.

4. Izmerov N., Suvorov G., Matiurkin V., Afanasieva R., Shrarinov L. // In; Proceeding of the International Symposium "Psychological Stress at Work". – Helsinki, 2000. – P. 52-57.

5. Matyukhin V.V., Yushkova O.I., Poroshenko A.S., Probability of development of professionally-conditioned pathology depending on the level of labor intensity // Professional risk for workers' health: leadership. – Moscow, 2003. – P. 207-213.

6. Manual on the hygienic assessment of the factors of the working environment and the work process. Criteria and classification of labor. R 2.2.2006-05. // Bulletin of normative and methodological documents of State sanitary-epidemiological supervision- M. – 2005 – issue. 3 (21) – P. 3-144.

7. PR1MA-EF. Guidance on the European Framework for Psychosocial Risk Managtment, Protecting Workers Health Series, No.9, WHO, 2008, 52 p.

8. Ushakov I.B., Bukhtiyarov I.V., Professional stress and mental health of the working population. – Mater. II Russian congress of occupational physicians, Rostov-on-Don, 3-5 October 2006. – Rost-on-Don: Publishing house, 2006. – P. 316-318.

INFLUENCE OF ADAPTOGENS ON THE MORPHOFUNCTIONAL STATE OF ADRENAL GLANDS IN STRESS

Solodkova O.A., Zenkina V.G.

Pacific State Medical University Russian Ministry of health, Vladivostok,
e-mail: solodkova.oksana@gmail.com

In conditions of long-term exposure, the stress response from the general adaptation syndrome is transformed into a factor of etiology and pathogenesis of ulcerative lesions of the mucous membranes of the stomach, duodenum, hypertension, atherosclerosis, cardiac dysfunction, secondary immunodeficiency states, and oncological diseases. Adrenal glands play a key role in the adaptation process, so their morphofunctional state directly affects the successful formation of adaptive mechanisms. According to modern ideas, to prevent the effects of stress, the focus is on limiting excessive stress and regulating the excess output of catecholamines and glucocorticoids. In this regard, correction of metabolic disorders that occur in pathological conditions due to stress, is one of the current biomedical problems. Over the past decades, a large clinical and experimental material has been accumulated, which has shown the effectiveness of prevention and correction of stress injuries with the help of adaptogens of plant and animal origin.

Keywords: stress, the adrenal glands, adaptogens

Stress is a non-specific reaction, by which the body adapts to the factors of daily life, industrial overload and environmental influence, i.e. adapts, which is one of the basic properties of life. The way to solve this problem is the mobilization of metabolic sources, allowing to produce additional energy. At the time of Selye identified three main stages in the development of the General adaptation syndrome: alarmrelay (alert phase), the stage of resistance and stage of exhaustion [14, 18, 22]. At the stage of alarm the regime of life support systems functioning is being reconstructed to work in extreme conditions, homeostatic regulation systems activation, organs and cells reserves mobilization due to the priority delivery of energy and plastic resources to them. This is necessary to increase the body's resistance to the effects, which is typical for the second stage – increased resistance. If extreme irritation continues, the reserves of the body are spent, and the maintenance of efficiency of cells, organs is carried out at the cost of destruction of their own vital structures [9, 10].

In the conditions of long-term exposure, the stress reaction from the General adaptation syndrome turns into a factor of pathogenesis. Currently, the role of stress as a factor of etiology and pathogenesis of neurotic, cardiovascular, endocrine, immune and other diseases has been proved [3, 19, 29]. A key role in the process of adaptation is played by the adrenal glands (NP), so their morphofunctional state directly affects the successful formation of adaptive mechanisms [8, 23]. The state of microstructure of NPP, synthesis and secretion of corticosteroids, adrenaline and noradrenaline are generally accepted indicators of stress reaction, reflect its duration, depth and stage [2, 25].

Numerous studies of a number of authors presented the results of morphofunctional state of NP of experimental animals under acute and chronic stress. When karyometry found that a single stress exposure increases the area of the nuclei of the beam zone cells, changes in the relative mass of NP does not occur. It is known that the increase in the size of nuclei in hormone-producing cells indicates their increased secretory activity [35, 36]. In the NP cortex, one can observe the pronounced fullness of sinusoidal capillaries, especially in the beam and mesh zones. Repeatedly repeated stress factors increase the area of the nuclei of the beam and mesh zones, thus indicating their significant activation. In the adrenal glands, there is a thinning of the capsule, an extension of the beam zone, a narrowing of the glomerular and mesh zones, a blurred border between the zones, a sharp expansion of the lumen of blood vessels. In addition, the expanding Stanovoy layer, which was probably due to the proliferation of cambial cells of the cortex of NP as a result of increased functional load on the body [34, 37].

Under severe stress, there is a sharp activation of NP. This is manifested by a significant expansion of the cortical substance due to the beam-mesh zone, an increase in the size of the nuclei in the cells of these zones. This is evidenced by the disappearance of lipid vacuoles in adrenocorticocytes, capillary dilation, swelling of their endothelium. In parallel, a pronounced alterative changes: granular, vacuolar and hyaline degeneration of epithelial cells, holocrine, disconnecktie epithelial cords, hemorrhage, various sizes necrosis [24, 28, 30].

Experimental data showed that if the functional load continues to increase, and the production of hormones does not replenish the

consumption – there is a complete delipoidization of the bark of the NP, the cytoplasm of all cells becomes somewhat basophilic with light grain. There are pockets of cell cytolysis. In compensation, when the production of hormones begins to exceed the demand-there are accumulation of lipids in part of the cells, i.e. part of the cells begins to work again "in reserve". Disappear foci of cytolysis. If stabilization does not occur – developing the picture of exhaustion, expressed in full delipidization bark NP. In this case, the cells are closely reduced in size, the nuclei become compact and smaller. The cytoplasm becomes basophilic, is densely granular. Speakers dramatically thinner, again showing foci of cytolysis [26, 30].

Stress effects lead to significant restructuring of the structural and functional apparatus of chromaffin cells, which are expressed in a noticeable devastation of Deposit catecholamines (KA) granules, swelling of mitochondria and enlightenment of their matrix, the expansion of elements of the Golgi complex and endoplasmic reticulum, reducing the number of ribosomes. With the continuing stress on the body, the content of SC in NP decreases gradually and changes as follows [20]. At the stage of anxiety, which is characterized by a tendency to reduce the weight of NP, reduce the mass of lymphoid organs (thymus, spleen) to 60-64 %, the KA content decreases slightly and by the end of this stage – the beginning of the adaptation stage is about 85 % of the control level. In the stage of adaptation, in which these indicators of somatic manifestations return to their values in intact animals, with the exception of hypertrophied NP, the KA content continues to decrease to 25 %. By the beginning of the stage of depletion of the KA content is reduced to the boundaries of the definition [1, 39].

Histologically method revealed that the allocation of chromaffin cell secretory material formed numerous clavate outgrowths of their cytoplasm, often with thinning of the foot to adjacent the lumen of the dilated sinusoidal capillaries. It can be assumed that the formation of these structures leads to extremely intense activity of chromaffin cells. KA content is reduced directly proportional to the time of stress exposure. The amount of adrenaline decreases more pronounced compared to the level of noradrenaline [11, 21].

Lipid peroxidation (LPO) with its excessive activation in many tissues causes destructive changes that affect the rate of cellular metabolism, and therefore, the specific function of the tissue. The bark of NP differs from other tissues by a significant amount of unsaturated lipids and a high content of transition valence metals, which is a prerequisite for the development of lipid peroxidation processes. In addition, it was found that cytochrome P450-reductase, which takes part in the hydroxylation of steroids, and located in the cells of the bark of NP on both the endoplasmic reticulum and mitochondria, can also be a link that initiates the formation of free radicals [4, 15, 16].

It is known that the adrenal glands are rich in natural antioxidant compounds that prevent the development of POL processes. This primarily applies to ascorbic acid and α – tocopherol. Their high content prevents uncontrolled development of the processes of SEX. However, with prolonged stress associated with depletion of functional resources of the crust of NP, there is activation in these glands of the processes of LPO. The reason for this may be a decrease in the content of NP in the cortex of ascorbic acid and α-tocopherol [5].

According to modern concepts, to prevent or limit the effects of stress, the main attention is paid to limiting excessive stress response and regulating the excessive output of KA and glucocorticoids [1, 23, 38]. In recent decades, a small clinical and experimental material has been accumulated, which showed the effectiveness of prevention and correction of stress injuries with the help of adaptogens of natural origin. Features of adaptogens of natural origin are due to the presence of biologically active compounds in them, which have immunomodulatory, antimicrobial, hypolipidemic, antitumor, antioxidant, wound healing, radioprotective and other effects [6, 7, 17, 32]. Dietary supplements differ from conventional medicines, above all, that carry out the regulation or stimulation of body functions strictly within the limits of physiological norm. A valuable property of biologically active additives is a characteristic adaptogenic normalizing action, which does not depend on the nature of the previous shifts [12, 27, 33].

In the work of E.I. Hasina, 2005, the effect of chitosan on the nonspecific resistance of the organism of laboratory animals in bacterial intoxication was investigated. The level of corticosterone in the blood during stress in animals on a background of reception of chitosan corresponded to the index of the intact animals. A day after the introduction of bacterial endotoxins, there was a significant increase in the relative weight of the adrenal glands, a decrease in the mass of the thymus, an increase in the level of corticosterone. Chitosan prevented hypertrophy of the adrenal glands and involution of the thymus. At the same time, there was a significant difference in the content

of corticosterone in blood plasma. The results of the study showed that chitosan increased the adaptive capacity of the body, influenced the endocrine system, in particular, the level of corticosteroids in the blood, which have a triggering effect, leading to complex changes in metabolic processes and the functional state of a number of endocrine organs and lymphoid tissues. Against the background of taking chitosan stress reaction was less pronounced [12].

The experiment shows the stress-protective effect of the drug "Derinat" in cold stress. Derinat, which is a sodium salt of native DNA and obtained from the milk of salmon or sturgeon, is a unique polymer immunomodulator with radioprotective, antiviral, regenerative activity. In animals, which before application of both 10-minute cold and 30-minute combined stress were injected with Derinat, there were no changes in corticosterone concentration in blood compared to the same index in control stressed animals. Thus, the introduction of Derinat prevented the stress-induced increase of corticosterone concentration, providing a stress-protective action [28].

Mechanisms of antistress action of dry extract of Astragalus webbed studied in the model of immobilization stress in white rats. Prophylactic administration of the tested drug was accompanied by a decrease in the severity of adrenal hypertrophy and involution of immunocompetent organs. Adrenal mass in rats of the experimental group was 24% less than in the control group. The obtained data showed that the course administration of tarragal extract on the background of immobilization stress has a stress-protective effect, reducing the severity of catabolic changes in the internal organs of white rats, which is obviously associated with the optimization of the balance of stress-implementing and stress-limiting systems of the body, as well as the limitation of hyperactivation of free radical oxidation processes and increase in the power of the endogenous antioxidant system [3].

Stress-protective effect of the extract of alfredii drooping studied on models of hypercapnic hypoxia, tissue hypoxia, and acute immobilization stress in laboratory animals. In mice of the stress control group, ulceration of the gastric mucosa was observed. Spleen weight decreased by 42%, thymus-by 25%, NP increased by 1.5 times. The introduction of Alfredo extract more than 5 times reduced the amount of hemorrhages in the stomach and prevented atrophy of NP. The authors suggest that the activity of the extract can be caused by the presence of flavonoids and other phenolic compounds in the plant, antioxidant and antihypoxic activity of which is associated with mobile hydrogen atoms of hydroxygroups, in addition, they suggest the effect of flavonoids of the extract on the functioning of cytochromes and the restoration of oxidative metabolism [19].

Echinacea purple has become the most popular among herbal remedies. Fundamental and clinical studies have shown that Echinacea purpurea can be a preventive measure, optimizing the nonspecific resistance of the body to various adverse factors, thereby slowing the development of environmentally-related diseases. In the experiment, we simulated pathologies caused by three different environmental factors: physical, chemical and biological. The level of the stress marker-corticosterone exceeded the control values in laboratory animals by 32-43%. The introduction of Echinacea in parallel with the action of stressors significantly prevented hormonal hypersecretion. The level of corticosterone in the serum exceeded the level of untrained mice only by 6-14% [12].

Experimental studies of the action of the extract and hydrolyzate from the far Eastern holoturia Cucumaria japonica on the morphofunctional state of the adrenal glands in acute and chronic cold stress were carried out. According to the literature data, the triterpene glycosides included in their composition have a corticosteroid-like effect. It is assumed that the preliminary receipt of animal food additives data, accompanied by a decrease in the degree of activation of the pituitary-adrenal system, a decrease in the blood output of glucocorticoids. It was found that the development of stress reaction after the preliminary reception of the extract and hydrolyzate from Japanese cookumaria containing triterpene glycosides was accompanied by less pronounced fluctuations in the basic quantitative parameters of the functional elements of the adrenal cortex, which contributed to the stabilization of the level of cortisol in the blood, limiting the stress reaction in the stage of anxiety, the formation of a more pronounced stage of resistance and delay in the stage of depletion of the General adaptation syndrome [30, 31].

Conclusion

Short – term and long-term stress factors contribute to a significant activation of the adrenal cortex as a compensatory reaction of the body in the form of increased hormone production. As a result, there are functional and structural damage to tissues and organs, leading to a decrease in the quality of life, loss of efficiency, disability. In this regard, the correction of metabolic disorders that occur in pathological

conditions due to stress effects, the main attention is paid. Natural biological resources are an inexhaustible source for the development of valuable food products, biologically active additives and drugs of adaptogenic action. According to modern ideas, one of the approaches in the treatment of disorders caused by stress effects is the use of adaptogens. Drugs of this type activate metabolic adaptation to the action of damaging factors and the ability to maintain the basic parameters of homeostasis.

References

1. Ajdzanovic V., Jaric I., Miler M. et al. Diosgenin-caused changes of the adrenal gland histological parameters in a rat model of the menopause // Acta Histochem. – 2017. – V. 119, № 1. – P. 48-56.

2. Antonov Y.V., Alexandrovich Y.V., Redina O.E. et al. Stress and hypertensive disease: adrenals as a link. Experimental study on hypertensive ISIAH rat strain // Clin. Exp. Hypertens. – 2016. – V. 38(5). – P. 415-423.

3. Batotsyrenova E.T., Antanova L.N., Toropov A.A. et al. Anti-stress effect of dry extract of Astragalus membranaceus // Bulletin of the Buryat state University. – 2012. – Special Issue S. – P. 55-59.

4. Bestervelt L.L., Piper D.W., Pitt J.A. Lipid peroxidation in the adrenal glands of male rats exposed to 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) // Toxicol. Lett. – 1994. – Vol. 70, № 2. – P. 139-145.

5. Bähr V., Pfeiffer A.F., Oelkers W. Is there a need for vitamin C supplementation of the normal diet? Effects of in vivo ascorbate depletion on adrenal function // Am. J. Clin. Nutr. – 2008. – Vol. 87, № 1. – P. 191-192.

6. Feng L., Liu X.M., Cao F.R. et al. Anti-stress effects of ginseng total saponins on hindlimb-unloaded rats assessed by a metabolomics study // J. Ethnopharmacol. – 2016. – № 188. – P. 39-47.

7. Filaretov A.A., Bogdanova T.S., Mitiushov M.I. et al. Effect of adaptogens on the activity of the pituitary-adrenocortical system in rats // Biull Eksp. Biol. Med. – 1986. – V. 101(5). – P. 573-574.

8. Gillis-Germitsch N., Vybiral P.R., Codron D. et al. Intrinsic factors, adrenal gland morphology, and disease burden in captive cheetahs (Acinonyx jubatus) in South Africa // Zoo. Biol. – 2017. – Vol. 36, № 1. – P. 40-49.

9. Gallo-Payet N. 60 YEARS OF POMC: Adrenal and extra-adrenal functions of ACTH // J. Mol. Endocrinol. – 2016. – V. 56(4). – P. 135-156.

10. Ibrahim I.Y., Abdel-Hakim S.M., Nazmy W.H. et al. Biological variations in adrenal gland response to immobilization and glucoprivation stressors in rats // Endocr. Regul. – 2015. – V. 49(4). – P. 217-226.

11. Jaroenporn S., Yamamoto T., Itabashi A. et al. Effects of pantothenic acid supplementation on adrenal steroid secretion from male rats // Biol. Pharm. Bull. – 2008. – V. 31(6). – P. 1205-1208.

12. Khasina E.I. Echinacea purpurnaya as a means of correction of ecologically caused pathologies // Proceedings of the Samara scientific center of the Russian Academy of Sciences. – 2014. – Vol. 16, № 5 (2). – P. 1030-1032.

13. Khasina E.I. Chitosan and nonspecific resistance of the organism // Vestnik DVO RAN. – 2005. – № 1. – P. 62-71.

14. Khnychenko L.K. Stress and its role in the development of pathological processes // Reviews in clinical pharmacology and drug therapy. – 2003. – Vol. 2, № 3. – P. 2-15.

15. Lyle N., Bhattacharyya D., Sur T.K. et al. Stress modulating antioxidant effect of Nardostachys jatamansi // Indian. J. Biochem. Biophys. – 2009. – V. 46, № 1. – P. 93-98.

16. Liu Y., Tipoe G.L., Fung M.L. Melatonin attenuates intermittent hypoxia-induced lipid peroxidation and local inflammation in rat adrenal medulla // Int. J. Mol. Sci. – 2014. – V. 15, № 10. – P. 18437-18452.

17. Liu F., Chen J., Shi F. et al. Phytosterol additive boosts adrenal response to ACTH in male Japanese quail (Coturnix coturnix japonica) // Endocrine. – 2012. – V. 41(2). – P. 338-341.

18. Lupien S. The history of the Science of Stress: From Hans Selye to the discovery of anti-inflammatory medication // Sante Ment Que. – 2015. – V. 40(2). – P. 225-286.

19. Mustafin R.N., Zelenskaya K.L., Shilova I.V. Antihypoxic and stress protective effect of Alfred extract of drooping // Chemistry of plant raw materials. – 2012. – № 1. – P. 211-214.

20. Malendowicz L.K., Markowska A. Neuromedins and their involvement in the regulation of growth, structure and function of the adrenal cortex // Histol Histopathol. – 1994. – V. 9(3). – P. 591-601.

21. Men'shikov V.V., Cherkasov V.L., Meshcheriakova S.A. Disorders of the glucocorticoid function of the adrenal cortex and metabolism of biologically activesubstances in the tissues in erysipelas // Sov. Med. – 1980. – № 12. – P. 50-53.

22. Miller WL. The Hypothalamic-Pituitary-Adrenal Axis: A Brief History // Horm. Res. Paediatr. -2018. – doi: 10.1159/000487755.

23. Panossian A., Gabrielian E., Wagner H. On the mechanism of action of plant adaptogens with particular reference to cucurbitacin R diglucoside // Phytomedicine. – 1999. – Vol. 6, № 3. – P. 147-155.

24. Pokusa M., Prokopova B., Hlavacova N. et al. Effect of blockade of mGluR5 on stress hormone release and its gene expression in the adrenalgland // Can J. Physiol. Pharmacol. – 2014. – V. 92(8). – P. 686-692.

25. Pertsov S.S., Grigorchuk O.S., Koplik E.V. et al. State of Stress-Marker Organs in Rats with Various Behavioral Characteristics during Repeated Stress Exposures // Bull. Exp. Biol. Med. – 2015. – V. 160 (1). – P. 20-23.

26. Pakkarato S., Thoungseabyoun W., Tachow A. et al. Ultrastructural histometric evidence for expansion of the sustentacular cell envelope in response to hypersecretion of adrenal chromaffin cells in mice // Anat. Sci. Int. – 2018. – V. 93(1). – P. 75-81.

27. Panosian A.G., Dadaian M.A., Gevorkian G.A. // Action of adaptogens: cucurbitacin R diglucoside as a stimulator of arachidonic acid metabolism in the rat adrenal gland // Probl. Endokrinol. (Mosk). – 1989. – V. 35(2). – P. 70-74.

28. Rybakina, E.G., Shanin S.N., Fomicheva E.E., et al. The Activity of protective functions of the organism under stress and their correction with the drug Derinat // Medical immunology. – 2008. – Vol. 10, № 4-5. – P. 431-438.

29. Rubin de Celis M.F., Bornstein S.R., Androutsellis-Theotokis A. et al. The effects of stress on brain and adrenal stem cells // Mol. Psychiatry. – 2016. – V. 21, № 5. – P. 590-593.

30. Solodkova O.A., Zenkina V.G. Cold stress and its correction by a hydrolyzate of cucumaria Japanese // International journal of applied and fundamental research. – 2016. – № 3 (part 4). – P. 591-594.

31. Solodkova O.A., Zenkina V.G. The Biological effects of cucumaria Japanese // Pacific medical journal. – 2015. – № 3 (Annex). – P. 83.

32. Studentsov E.P., Ramsh S.M., Kazurova N.D. Adaptogens and related groups of drugs – 50 years of research // Reviews of clinical pharmacology and drug therapy. – 2013. – Vol. 11, № 4. – P. 3-43.

33. Stonic V.A. Some results and trends of marine biologically active metabolites research // Pacific medical journal. – 2016. – № 4. – P. 16-18.

34. Stepanyan Yu.S. Structural changes of the adrenal cortex in case of death from General hypothermia // Medical examination and the right. – 2012. – № 4. – P. 37-39.

35. Schloms L., Smith C., Storbeck K.H. et al. Rooibos influences glucocorticoid levels and steroid ratios in vivo and in vitro: a natural approach in the management of stress and metabolic disorders? // Mol. Nutr. Food Res. – 2014. – Vol. 58, № 3. – P. 537-549.

36. Umriukhin A.E, Sudakov K.V. Open field behavior and the state of the thymus and adrenal glands in rats after exposure tostress and elevation of blood level of autoantibodies to dopamine and glutamate // Bull Exp. Biol. Med. – 2013. – V. 155(5). – P. 587-590.

37. Umryukhin A.E., Sotnikov S.V., Chekmareva N.Y. et al. Stress-sensitive organs and blood corticosterone after immobilization of active and passive rats immunized with glutamate-bovine serum albumin conjugate // Bull Exp. Biol. Med. – 2014. – V. 158(2). – P. 177-180.

38. Unno K., Hara A., Nakagawa A. et al. Anti-stress effects of drinking green tea with lowered caffeine and enriched theanine, epigallocatechin and arginine on psychosocial stress induced adrenal hypertrophy in mice // Phytomedicine. – 2016. – V. 23(12). – P. 1365-1374.

39. Yanagita T., Kobayashi H., Yamamoto R. et al. Protein kinase C and the opposite regulation of sodium channel alpha- and beta1-subunit mRNA levels in adrenal chromaffin cells // J. Neurochem. – 1999. – V. 73(4). – P. 1749-1757.

DYNAMICS OF BIOCHEMICAL TESTS IN THE SYSTEM "LIPID PEROXIDATION – ANTIRADICAL PROTECTION" OF BLOOD AND EXPIRATE FOR RESPIRATORY PATHOLOGY IN CHILDREN

Solovieva N.V., Zenkova T.L.

Chita State Medical Academy, Chita, e-mail: solovjevanv@yandex.ru, zenkovatl@yandex.ru

Nowadays both acute pathological processes and allergic diseases in the child's body are accompanied by a powerful oxidative stress (hyperproduction of reactive oxygen species) which is one of the main damaging factors. Besides the uncontrolled formation of reactive oxygen species is a huge potential danger. Some indicators of lipid metabolism and lipid peroxidation (LP) in blood plasma and exhaled air condensate (EAC) in children with acute simple, recurring and asthmatic bronchitis, acute respiratory virus infection (ARVI) and acute pneumonia (AP) were studied. EAC changes are more specific than those of the blood plasma. When condensate antioxidant activity decreased lipid peroxidation level in children respiratory diseases became high. The EAC as the method in the diagnosis of respiratory diseases is simple, easy to perform not only at the in-patient department but also at the polyclinic. It's noninvasive that is very important for pediatricians.

Keywords: exhaled air condensate, lipid peroxidation, acute respiratory viral infection, acute simple bronchitis, acute pneumonia, recurring bronchitis, asthmatic bronchitis

Free radical oxidation and generation of reactive oxygen species (ROS) are the processes inherent in the metabolism of any living organisms. ROS are formed during the normal aerobic respiration of mitochondria with the "respiratory explosion" of phagocytic cells in the process of arachidonic acid metabolism and the autooxidation of catecholamines.

In norm ROS are necessary for many important physiological and metabolic processes in the body such as regulation of intracellular processes, metabolism, accumulation and biotransformation of energy, enzymatic catalysis, transfer of information, gene expression, cell division, immune and adaptive responses [20, 18]. ROS generated by phagocytes are very significant in protecting the body from foreign objects and having a microbicidal effect. Thus, generation of ROS is an important protective mechanism underlying the nonspecific immunity. Also ROS take part in the reactions of detoxification of xenobiotics, biosynthesis of biologically important molecules, etc. [20, 18].

It is well known that ROS are chemically highly active particles reacting with a wide variety of substances. Therefore many biologically significant components of living tissues such as lipids, proteins, nucleic acids, carbohydrates can be easily undergone by oxidative modification. Due to the high reactivity ROS can irreversibly damage such biologically important molecules as DNA, RNA, proteins, lipids which lead to disruption of the structure and function of biomembranes, destruction of various cells and tissues [18].

Thus, on the one hand oxygen is the main source of metabolism of aerobic organisms, a source of metabolic energy. On the other hand, oxygen is the source of the ROS. Therefore "the high oxidizing ability of oxygen is necessary for its functioning in the respiratory system, from the good turns into the evil if to take into account the possibility of "parasitic" chemical reactions of oxygenation of various substances of a living cell". [20].

The formation of ROS is a delicate process, regulated by the body. Living systems have a deeply echeloned antioxidant defense system (AOP) which maintains the concentration of ROS at a stationary safe level. Functional deficiency of AOP leads to the break of the avalanche of the ROS which causes violation of protective and regulatory functions, bioenergetic processes, cell proliferation, and induction of apoptosis. Besides highly toxic ROS cause carcinogenic and mutagenic effects [13].

The excessive activation of free radical oxidation is a typical pathological process that occurs with a variety of damaging effects on the body and diseases. The excessive production of ROS especially in combination with a lack of compensatory capabilities of antioxidant defense systems can lead to the development of new and / or exacerbation of already existing pathological changes in the body. Consequently, the damaging effect of ROS is a significant factor in the development and progression of various diseases [13, 14].

The imbalance in the system "oxidants – antioxidants" caused by the excessive increase in ROS production and / or a decrease in AOP activity contributes to the development of oxidative stress (OS). It should be noted that today the OS is considered as a nonspecific pathological process accompanying almost any disease. OS plays the most important role in the

molecular mechanisms of the pathogenesis of lung diseases that associated with anatomical and physiological features of the respiratory system, as well as exogenous and endogenous activation factors of free radical processes (FRP) in the respiratory tract.

From the point of view of the possibility of the free radical oxidation processes, the respiratory system occupies a special place [1, 2, 7, 11, 12, 13, 19]. In the lungs the tissues interact directly with oxygen – the initiator and oxidation participant, which penetrates the membranes of the alveoli. Pulmonary tissue is rich in unsaturated fatty acids which are a substrate for lipid peroxidation (LPO). Alveolar macrophages and other phagocytes in inflammation, action of dust particles and various pollutants are activated and released ROS initiating LPO. The peculiarity of the functioning of the lungs is the constant direct action of the oxygen medium on the elements of the lung tissue with the substrate and oxidation initiators [1, 2, 7, 11, 12, 13, 19].

Many unfavorable environmental factors (tobacco smoke, radiation and ultraviolet radiation, air pollution from transport and industrial emissions), xenobiotics (drugs, anesthetics, industrial solvents, pesticides, etc.), infectious agents (viruses, bacteria and parasites), excessive physical exertion, stress, etc. [19] also contribute to the intensification of FRP.

Much attention is paid to mitochondrial and microsomal oxidation, xanthine oxidase, arachidonic acid metabolism, mutations of the enzymes of the microsomal monooxygenase system – cytochrome P 450 1A1, 1 ëA2, 1A6, 2E1, microsomal epoxidehydoldase, antioxidant system – extracellular superoxide dismutase, glutathione S-transferase, glutamatransferase, glutathione peroxidase, etc., as well as NO synthase gene.

The main types of reactive molecules generated in cells include ROS, active forms of nitrogen and their derivatives. ROS include superoxide anion radical (O2-), hydroxyl radical (OH), peroxyl radical (HO2) and alkoxy radical (RO). In the process of chain reactions such derivatives of ROS as hydrogen peroxide (H2O2) and lipid peroxides (ROOH) are formed. ROS include nitric oxide (NO) and peroxynitrite (ONOO-) [13].

The formation of ROS is a consequence of the incomplete (1-, 2-, 3- electron) restoring of molecular oxygen instead of the complete, 4-electron, leading to the formation of water. The process of complete restoring of oxygen to H2O is more energy-dependent than the processes of incomplete restoring.

The inflammatory cells in the lungs release a superoxide anion forming hydrogen peroxide by means of superoxide dismutase or spontaneously. These ROS can themselves take part in the modification of macromolecules. Besides they produce stronger oxidizers – NO, hypochlorite, peroxynitrite which are capable of damaging proteins, lipids, nucleic acids. The oxidative modification of proteins causes the appearance of antigenic properties. The oxidation of lipids leads to the appearance of chemtractants increasing the migration of phagocytes to the place of their formation. Thus the activation of phagocytes can spontaneously growth and form the "vicious circle" in the lesions [14].

Taking into account the mechanisms of initiation and features of development of FRP in lung diseases as well as the ways of their correction for the purpose of effective pathogenetic therapy, it is necessary to determine the oxidative status of the patient for each specific disease and prescribe antioxidant agents, influencing the specific links of the processes of free radical oxidation.

Bronchopulmonary impairments occupy one of the leading places in children morbidity at any age. They have a special importance due to its prevalence and frequency of manifestation for Transbaikalia with its climatic and natural specificities. The direct contact of the respiratory mucous membrane and the environment with a large number of damaging factors (bacteria, viruses, smoke, dust, toxic gases) stimulates the development of various reactions – inflammatory, allergic, irritative, etc. Current pathology as the genesis of most diseases is based on the essential role of free radical activation processes. Their intensification causes an imbalance in the "LP – antiradical protection (ARP)" system and influences the character of pathological shifts [20, 13, 14, 18].

Bronchoalveolar lavage and lung biopsy should be empathized among the methods of bronchial examination. But their use is limited due to the presence of certain deficiencies. Studies of the exhaled air condensate (EAC) as a medium reflecting the state of metabolism in the respiratory system and in the body as a whole are widely put into the clinical practice [1, 2, 7, 11, 12, 9, 10, 21]. The expirate use gave the possibility to estimate the intravital state of the damaged respiratory organs in children [3].

Materials and methods of research

We examined 168 children with nonspecific respiratory diseases at the age of 3 to

15 years (there were no significant differences in age groups). Among them: 29 children with acute respiratory viral infection (ARVI) of moderate severity, 48 with acute simple bronchitis (ASB), 31 with acute pneumonia (AP), 32 with recurring bronchitis (RB) and 28 with asthmatic bronchitis (AB). The control group included 49 children with the same age, gender and without signs of damaged respiratory system.

The materials for the study were EAC and blood serum. The expirate collection was performed according to the method of G.I. Sidorenko [16]. The following parameters were studied in the condensate: total lipids (TL) [5], acylhydroperoxides of lipids [6, 10], substances reacting with thiobarbituric acid or TBA-active products [15], antioxidant activity (AOA) [6, 10]. In the blood serum total lipids were determined using the "Bio-Lachema-Test" kits, acylhydroperoxides of lipids [8], TBA-active products [6, 10], and AOA serum [16].

The processing of the results was carried out by the method of variational statistics, Student's t test and correlation analysis. Statistical calculation of all parameters was performed with the computer.

Results of research and their discussion

Many non-respiratory functions of the lungs assume their intensive involvement in the lipid metabolism [19]. We registered an increased elimination of TL with vapors of the exhaled air. Thus in ARVI this indicator was increased by 17.3%, in case of ASB by 49.6% ($p < 0.001$), in acute pneumonia (AP) – by 107.1% ($p < 0.001$), that confirms the intensification of destruction processes in surface-active phospholipids in the alveolar lining. This increased parameter was differed in RB – by 75.2% ($p < 0.001$) and in AB – by 88.0% ($p < 0.001$) from the control values. The content of acylhydroperoxides of lipids in the exhaled moisture during clinical manifestations was 112.3% in patients with ARVI, 169.1% with ASB, and 204.0% with AP. The same indicator in the stage of exacerbation of RB increased to 184.6%, and AB to 205.1%. The content of TBA-active products increased more in comparison with the initial products of LP. Thus its increase in ARVI was 66.9% compared with the control, in the case of ASB by 103.6% and in the height of the pneumonic process by 270.5%. This indicator increased in RB by 231.6% and in children with AB by 307.6%. The reconvalescence period of all nonspecific lung diseases (NLD) forms was characterized by the decreased values of these parameters except patients with AB. The increase (66.1%) of TBA-positive material was observed in these patients in comparison with the stage of exacerbation. However biochemical normalization of lipid peroxidation parameters was registered during this period only in ARVI. The performed studies of condensate showed that the activation of lipid peroxidation processes, depending on the form and period of the disease was marked both in acute and recurrent respiratory diseases in children.

The antioxidant activity of expirate decreased at the peak of the disease by 27.9% in patients with acute respiratory viral infection, by 32.9% in persons with ASB and by 13.3% in patients with AP. It was reduced greatly in RB and AB to 48.7% and 44.9% respectively, relative to the control figures. The AOA level in children with ARVI, ASB, RB and AB during the stagnation of clinical manifestations wasn't changed significantly. In AP despite clinical radiologic repair there was a decrease of this parameter in 2 times compared to the peak period. The lowest values of antioxidant activity in the remission phase were established in patients suffering from AB.

The shifts of peroxide homeostasis in the blood serum had similar parameters as in the EAC. However the intensification of free radical processes at the level of the body was less expressed than in exhaled air vapors.

Thus at the peak of clinical manifestations, the content of acylhydroperoxides of lipids increased by 1.3; 1.4; 1.6 and 1.9 times in patients with ARVI, ASB, RB and AB respectively. In AP the increase of serum acylhydroperoxides of lipids was registered at 140.5% compared with the control. The growth of TBA-active products in the blood in acute respiratory diseases was in the range from 39.2% to 243.2% compared to the healthy people. In RB and AB it was 241.9% and 317.6% respectively. There were no significant differences between the above indicators in various stages of the disease in all forms of bronchopulmonary pathology.

The total antioxidant activity of blood serum in children with ARVI remained within the normal range. In case of ASB this indicator was reduced by 5.0% and the development of pneumonia caused its fall by 24.7% relative to normal values. For patients with recurrent respiratory pathology this parameter decreased by 35% for both nosological forms. AOA fluctuations at the periods of convalescence and remission were unreliable in all subjects.

A comparative analysis of the above data showed the advantage of studying the components of the "LP-antioxidant" system in EAC in comparison with the same data in serum. Among all nosological forms NLD with more intensification of free-radical processes in the pulmonary surfactant system was registered in children with AP and AB. It should be noted that the peak of the pneumonic process was characterized by a marked increase in the serum of acylhydroperoxides of lipids compared to expirate. The antioxidant barrier of the lungs was impaired a bit. To our mind this circumstance could be due to the increased concentration of antioxidants in the depot of lung tissue, including α-tocopherol. It forms complexes with unsaturated acyls of surface-active phospholipids, increasing the packing density. It prevents the formation of free radicals lipids. On the other hand the metabolic stimulation of alveolar macrophages stimulates the synthesis of endogenous antioxidants which provides a high antiradical status in the pulmonary surfactant system in the peak of the disease in AP. During the period of convalescence from AP the low level of water and fat soluble pulmonary membrane protectors is not able to provide the organ protection from the destructive effect of LP products. Depletion of the antioxidant reserve of the lungs is associated with uncontrolled consumption of neutralization factors for lipoperoxides and free radicals.

Thus it can be stated that the vapor condensation of exhaled air as a method of diagnosing respiratory diseases is simple, widely available both in polyclinic and at the in-patient department, non-invasive that especially important in pediatric practice.

References

1. Alyakrinskaya M.D. The value of determining the indices of lipid peroxidation in the exhaled air condensate in the diagnosis and prognosis of out-patient department and nosocomial fan-associated pneumonia: author's abstract. diss. ... cand. of medical sciences / Alyakrinskaya Marina Dmitrievna. – Chelyabinsk, 2007. – 16 p.

2. Anaev E.H. Investigation of the exhaled air condensate in pulmonology: a review of foreign literature / E.H. Anaev, A.G. Chuchalin // Pulmonology. – 2002. – № 2. – P. 57-66.

3. Analysis of the exhaled air condensate as a method of differential diagnosis of the respiratory system pathologies in newborns / A.S. Kononikhin, A.Yu. Ryndin, K.Yu. Fedorchenko [and others] // Doctor. Ru. – 2017. – No. 3 (132). – P. 31-36.

4. Andreeva L.I., Kozhemyakin L.A., Kishkun A.A. Modification of the method for determining lipid peroxides in a test with thiobarbituric acid // Laboratornoe Delo. – 1988. – № 11. – P. 41-43.

5. Bestuzheva S.V. Biochemical study of non-respiratory function of the lungs according to the condensate of exhaled air vapor in healthy persons, patients with lung diseases and in cardiovascular pathology: methodical recommendations / S.V. Bestuzheva. – Minsk, 1985. – 17 p.

6. Comparison of various approaches to the determination of lipid peroxidation products in heptane-isopropanol extracts of blood / I.A. Volchegorsky, A.G. Nalimov, V.G. Yarovinskii, R.I. Lifshits // Voprosy Meditsinskoj Khimii. – 1989. – № 1. – P. 127-131.

7. Diagnostic significance of medium-volatile organic compounds in the exhaled air condensate in bronchial asthma and chronic obstructive pulmonary disease / T.N. Anokhin, E.H. Anaev, A.I. Revelsky [and others] // Pulmonology. – 2011. – No. 4. – P. 71-75.

8. Gavrilov V.B., Mishkorudnaya M.I. Spectrophotometric determination of lipid hydroperoxides in blood plasma // Laboratornoe Delo. – 1983. – № 3. – P. 33-36.

9. Khyshiktuev B.S., Khyshiktueva N.A., Ivanov V.N. Methods for determining the products of lipid peroxidation in the condensate of exhaled air and its clinical significance // Klinicheskaya Laboratornaya Diagnostika. – 1996. – № 3. – P. 13-15.

10. Khyshiktuev B.S., Ivanov V.N., Zhits M.Z. The state of free radical processes in the pulmonary surfactant system in patients with chronic bronchitis // Voprosy Meditsinskoj Khimii. – 1991. – № 1. – P. 79-82.

11. Klimanov I.A. Mechanisms of formation of exhaled air condensate and markers of oxidative stress in pathology of the respiratory tract / I.A. Klimanov, S.K. Soodaeva // Pulmonology. – 2009. – No. 2. – P. 113-119.

12. Kolesnikova L.I. Condensate of exhaled air / L.I. Kolesnikova, B.S. Khyshiktuev. – Irkutsk, 1999. – 136 p.

13. Lankin V.Z. Free radical processes in norm and in pathological conditions: manual for doctors / V.Z. Lankin, A.K. Tikhaze, Yu.N. Belenkov. – 2nd ed. – M.: RKNPK MZ RF, 2001. – 89 p.

14. Oxidative stress: Pathological conditions and diseases / E.B. Menshikova, N.K. Zenkov, V.Z. Lankin, V.A. Trufakin. – Novosibirsk: ARTA, 2008. – 101 p.

15. Ritaboh A.E., Chaleoner D.R., Williams R.H. The test of determination of malonyl-dialdehyde with TBA // Proc. Soc. Exper. Biol. Med. – 1986. – Vol. 187. – P. 647.

16. Sidorenko G.I., Zborovsky Z.I., Levina D.I. Surface-active properties of the exhaled air condensate (a new way of determining lung function) // Terapevticheskij Arkhiv. – 1980. – № 3. – P. 65-68.

17. Spektor E.B., Ananenko A.A., Politova L.N. Determination of the general antioxidant activity of blood plasma and cerebrospinal fluid // Laboratornoe Delo. – 1984. – № 1. – P. 26-28.

18. Skulachev. V.P. Oxygen and the phenomena of programmed death / V.P. Skulachev. – M.: IMBH RAMN, 2000. – 120 p.

19. Syromyatnikova N.V. Metabolic activity of the lungs / N.V. Syromyatnikova, V.A. Goncharova, V.V. Kotenko. – L.: Medicine, Leningrad Department, 1987. – 164 p.

20. Vladimirov Yu.A. Physicochemical basis of cell pathology / Yu.A. Vladimirov. – M., 2001. – 95 p.

21. Yakovleva O.A. Diagnostic possibilities of studying the condensate of exhaled air // Terapevticheskij Arkhiv. – 1990. – № 3. – P. 102-107.

THE ROLE OF THE TEACHER IN CASE METHOD

[1]Kabenova D., [2]Uskenbaeva S., [2]Aubakirova G.
[1]*L.N. Gumilyov Eurasian National University, Astana;*
[2]*Karaganda Economic University of Kazpotrebsoyuz, Karaganda, e-mail: symbat_uskenbaev@mail.ru*

The article is devoted to nowadays-actual problem of forming critical thinking of students. The authors cover the application of the case-method in the practice of teaching language subjects. The work on situations the student can meet in future practical activities, promotes the acquisition of the basics of professional competencies, shapes cognitive interest and positive motivation for studying, with special emphasis on the functions of the teacher, whose activities are determined by the modern tasks of the education system. The article gives examples of the use of the Internet resources, their application in the out-of-class individual work of the students in the educational process. The various activities of the teacher and student contribute to the actualization of quasi-professional communication, focused on the formation of the linguistic competence of the future specialist (networking skills, competent business correspondence, enhancing the culture of international business communication). Such a vision of the article will be interesting to specialists in the field of language disciplines.

Keywords: critical thinking, case method, online resources, teacher activities

In President N.A. Nazarbayev's Message entitled "The Third Modernization of Kazakhstan: Global Competitiveness", the fourth priority of the development of our state is the improvement of the quality of human capital. An integral and important part of human capital is an education whose role is particularly significant in the new model of the country's economic growth. The tasks of the education system are the development of the abilities of critical thinking and the skills of independent information search. A priority direction is the formation of IT knowledge [1].

With regard to the President's targets, Case method, in our opinion, as an interactive method of training, meets the requirements for the education system. Case method is a synthesis of problem-based learning, information-communicative technologies and research method. This method, which ensures the application of theoretical provisions in practice, is popular in modern higher education in connection with the orientation of graduate preparation for market inquiries. Work on situations that can meet the student in future practical activities, promotes the acquisition of the basics of professional competencies, shapes cognitive interest and positive motivation for learning.

The source of case creation is life itself "in all its diversity", an education that defines the goals and objectives of education and upbringing, a science defined by analytical activity, a system approach and other scientific methods. In accordance with this, the cases are divided into practical, educational and research. A practical, "current" model of the situation, can be reduced to training of students, knowledge retention, skills and behavior skills (decision-making) in this or that situation. The training case reflects typical situations that a student may face in life. A feature of the training case is the priority of educational and upbringing aspects. The research case is aimed to forming the skills of information retrieval, carrying out scientific activity, therefore it is aimed at "strong" students [2].

Fiction, journalistic and scientific literature make it possible to create cases that can be used in the study of pedagogy, psychology, disciplines of the legal and economic cycles, almost all general educational disciplines. Materials from the media increase the cognitive interest of students, actualize knowledge of the chosen profession. In addition, works of fiction contribute to the formation of spiritual and moral values. Scientific articles, monographs contribute to a detailed understanding of a question, give descriptions of phenomena from various aspects. The case must be based on real events that cause students' interest. Such cases can cause a feeling of empathy, contain problems that students understand.

Case method has its inherent characteristics. A.M. Dolgorukov refers to the advantages of the case-study method to the acquisition of skills in solving practical problems, teamwork skills, improving the skills of generalizing the results of work and its design, discussion skills [3].

The method of teaching is understood in didactics as an orderly way to achieve educational and upbringing goals. There are three large groups of methods in modern didactics:

1) methods of organization and implementation of the educational process (verbal, visual, practical);

2) methods of stimulating and motivating educational and cognitive activities (methods

of stimulating interest in learning – motivation, cognitive games, learning discussions, methods of stimulating debt and responsibility – a method of explaining the subject purpose, requirements for subject learning, encouraging and punishing in learning);

3) methods of control and self-control (methods of oral control and self-control, written control and self-control, methods of laboratory and practical control and self-control) [4].

The case method can be thought as a complex system in which simple methods of cognition are integrated. It includes modeling, "brainstorm", problem method, presentations, description methods, classifications, discussion, game methods that fulfill its role in the case-method.

Let's consider the stages of work on the case and the methods used in them.

1. *Preparation for the lesson by the teacher and students*

At this stage, the most important are the questions that need to be studied and examined. The teacher formulates "problems", focusing on the purpose and objectives of the forthcoming activity. While determining the content of work, it is necessary to take into account the specific features of the audience perception of the educational material. Systemic, sequential submission of questions, its classification, allocation of reference schemes, tables, etc. facilitates the successful solution of case-problems.

Establishment of a list of recommended literature has considerable importance, which is necessary for students to learn a topic.

2. *Individual independent work of students with a case.* In preparation for practical situation solution, the students work with the teaching and methodological support, provide and study additional information (related facts, positions, options, alternatives) for the solid grounding of the educational topic material, tasks.

It can be work in libraries, with the Internet base, interviewing of practitioners, etc. Students become visual, distributing or other illustrative material, booklets "Work with case", a list of recommended literature.

It is important to start designing a lesson plan after having a clear purpose, objectives, content, methods and forms of work.

3. The organizational part of the lesson consists of presenting the topic, purpose and procedure of the lesson, giving the case. It is recommended in cases to give a detailed description of practical situations, accurately put the questions, specify tasks.

4. *Verification of the absorbing of theoretical material on the topic.* Before proceeding to work on solving the case situation, it is necessary to check the level of absorbing of the theoretical material. Methods to verify the assimilation of new material can be an oral frontal interview, cross-checking, work on cards, testing, etc.

5. *Student teamwork.* Teamwork on the case-situation develops the ability to cooperate, collectivism, creates responsibility, instills skills of self-control and self-evaluation [2].

The most optimal for teamwork, in our opinion, is the method of "brainstorm", which stimulates the creative activity of students. The result is the issuing of a wide variety of ideas by students in certain period of time.

The next method is a creative analysis of ideas in order to find a constructive addressing of the problem.

A special place in teamwork has a discussion, where students present options of the situation solution, arguing. At this stage of the work, the skills of putting a question, arguing the answer are improved. Students come with arguments, listen to others, analyze the result, design and model the solutions and actions. During the discussion, students find contradictions, mistakes, inaccuracies, defend the opinion of the team.

The result of the discussion is the adoption of a single, most optimal solution, the formation of skills of solving non-standard problems and the development of logical thinking.

6. Registration of the results of work by the students. At this stage students presenr results of the work and use the presentation as an effective way of information of presenting. Widely distributed multimedia presentations are slides containing a few fragments of texts, drawings and the illustrative part (images). According to scientists N.V. Akimova, Yu.A. Bessonova, the usage of presentation in the study of speech or linguistic material allows to structure it by highlighting key issues (linguistic terms, categories) using color, changing the font, heading, etc. The presentation in Russian language classes assumes the active creative activity of students: collecting and processing material, streamlining information, creating slides, project defence and project discussing. The ability to present an intellectual product, to show its merits, maximizes the skills of public activity and participation in the discussion, becomes a demonstration of speech and logical skills of students. Communicative moment according to the opinion of scientists is one of the keys in the process of such training activities and involves the development of appropriate language competencies [5].

7. Summing-up by teachers.

Different methods of conducting studies using the case method suggest different approaches to student evaluation. When applying the case method, students' abilities are evaluated to analyze a specific situation, to make a competent decision, to think logically, therefore, the score is shown for the discussion or presentation, measured by the level of student activity, for the prepared written works. It is necessary to pay attention to the novelty and originality of the problem solution, the brevity and clarity of the presentation, the quality of registration of the problem solution, the ethics of the discussion, the activity of all the team members [2].

The role of the teacher in the application of case method is enormous. The activity of the teacher, who uses the case-method in his practice, – creativity, which promotes the development of students' critical thinking. To create an interesting case, questions for its analysis, the teacher should conduct creative work, which includes research, methodical and constructive activities. Versatile pedagogical activity consists of several interdependent functions.

1. An epistemological function that is associated with the formation of new knowledge in the taught discipline and methods of teaching and upbringing.

2. The design function assumes the definition of the specific content of the work, the implementation of which will ensure the planned result. It is connected with the creation of a holistic model, consisting of logically interrelated goals, specific tasks, content, methods, tools, curriculum of teaching. Design function of the teacher also includes consideration of interests, motives, degree of their satisfaction with students, taking into account the material base of the university. The creative activity of the teacher facilitates the systematic synchronous use of instructor-led and extracurricular time, in which the optimal methods and methods of instruction are applied.

3. Prognostic function, which involves the setting goal of the activity and its tasks, the prediction of the result, the consideration of possible deviations from the intended goal, the definition of the stages of activity, the distribution of time, the planning of optimal activity.

4. The organizational function, through which various stages of the organization of the educational process are realized. It is important to emphasize the activity of the teacher in the audience, where he introduces the opening and closing words, divides the group into teams, says the topic theme, determines the discussion questions, supports the business mood in the audience, assesses the students' contribution to the search for information, and analysis of the situation. When advancing the topic and issues of discussion, it should be remembered that case analysis and the ability of students to find an effective form of presenting the result of search activity in the audience is a difficult stage of the lesson. In this regard, the teacher needs to teach off-site advisory activities. The teacher can constantly support students' interest, set the pace and direction of the lessons.

5. Communicative function, which is oriented to the subject-subject relationship between the student and the teacher. Case method promotes effective learning through active participation of students. Communicative activity of the teacher involves the providing of a culture of interpersonal communication for students, building communication based on trust, empathy, cooperation. Teacher teaches to create and develop relationships in a positive emotional mood, to establish contact and to correct the situation of communication, to develop the ability to persuade, immediately formulate thoughts. In this regard, it is important to have a tolerant attitude towards the student and the ability to delicately criticize.

6. Educational function, which aims to form the spiritual and moral values of the student, his general and professional socialization. In the implementation of this function a huge role is played by the teacher's diplomacy, his ability to "catch" the mood, the true motivation of the student.

The purpose of carrying out case studies is to organize the work of students in the selection, systematization, analysis of the material to prepare for the performance of research work. The teacher realizes the presentation of the course, determines the terms and methods for performing assignments, introduces the assessment system to the students, divides the group into teams, and so on. There is a confronting into the problem situation. In regard to the lack of time, the control over the completed tasks of the case can be organized remotely. Course materials are posted on the training site. Students can use the Internet communities as a platform for tasks discussion; here also the results of team work are published. The teacher observes the activities of students, reviews the work, corrects inaccuracies and determines the readiness for the final presentation of the case. The process of work on the case should not only teach students to find the necessary information, find the optimal solution to the problem, but also replenish the case file with

their own problem situations, thereby placing the student in the rank of ally, active figure in the learning process. Here is an example from our practice of using case studies in Russian language lessons.

The purpose of our work was to pose the questions, to form a hypothesis hypotheses, to shape a plan for self-paced study materials to the topic with which students worked in libraries. One of the objectives of the lesson was the promotion of electronic learning technologies, and therefore the electronic copyright textbook of S. Uskenbayeva was actively used on the lessons. The content of practical tasks, tests and text was enriched with information about the scientific discoveries of medicine. The teams worked with great interest, because the tasks of the electronic textbook were focused on the students' cognitive activity. Except demonstrating the team method of teaching, the teacher also used problem training applying various means of Internet technology. The usage of scientific and research activities in the teaching and cognitive process is facilitated critical thinking creation. A case method was used to implement this goal, which is often used for distance learning. The topic of discussion and subsequently of student research work was the problem of abortion among youth.

Integration of the means of Internet technologies into the educational process is possible with the use of e-mail, participation in forums, chatting, etc. The students participated in the 7th International Student Scientific Forum, which was held in Moscow. The scientific works generate great interest of the participants and were discussed in the studied language, which actualized cognitive activity also in extracurricular time. Students improved their writing skills, worked with network resources, with the help of which the tasks set by the teacher were solved. These means have a great pedagogical potential in the educational process of higher education: their integration contributes to the better professional training of future specialists. On the lessons were showed the Internet resources exhibited in the "Russian language" community, which was created by students and used in extracurricular individual work of students in the learning process: 1. hotlist (list of Internet sites according to study topic); 2. multimedia scrapbook (a list of multimedia resources with links to photos, audio files, video); 3. Subjects samples (links to text and multimedia materials with discussion of acute social and conversation topics); 4. WebQuest (research activities of students on the discussed topic using Internet resources) [6].

Versatile work contributed to the actualization of quasi-professional communication, focused on the formation of the linguistic competence of the future specialist (skills of business communication, competent business correspondence, enhancing the culture of international business communication).

This experience is one of the ways to solve the problems posed by the modern education system.

We believe that the professionalism of the teacher includes the unity of his theoretical and practical readiness for the implementation of pedagogical activity and characterizes his creative potential. The functions of the teacher, identified in the article, are the mechanism for realizing the tasks in inculcating critical thinking, the ability to independently search for information, IT knowledge generation.

References

1. Message of the President of the Republic of Kazakhstan to the people of Kazakhstan N. Nazarbayev "Third modernization of Kazakhstan: global competitiveness" // Kazakhstan's truth. – 2017. – 31 January.

2. Methodological materials on the course "Case study method". Compiled by O. N. Kalachikova https: refdb.ru/look/1347224.html

3. Dolgorukov A.M. Method case-study as modern technology of professional-oriented teaching. Reference: http://www.vshu.ru/lections.php?tab_id=3&a=info&id=2600.

4. Bondarchuk E.I., Bondarchuk L.I. The basics of phsycology and pedagogy: Lecture course. – 3rd edition, stereotype. – K.: MAUP, 2002. – 168 p.

5. Akimova N.V. Russian language and speech culture in interactive exercises: theory and practice: teaching manual / N.V. Akimova, Yu.A. Bessonova. – M. – Berlin: Direct-Media, 2015. – 128 p.

6. Kabenova D.M., Uskenbaeva S.T., Gainutdinova G.F. To the question of case-method usage on english lessons // International journal of experimental education. – 2017. – № 5. – P. 49-52; URL: http://www.expeducation.ru/ru/article/view?id=11664.

THE SYSTEM OF PSYCHOLOGICAL DISCIPLINES IN TECHNICAL INSTITUTIONS OF HIGHER EDUCATION

Sharipov F.V.

Ufa State Aviation Technical University, Ufa, e-mail: bettaq1941@gmail.com

The article shows the importance of psycho-pedagogical science for a modern specialist as well as for the organization of educational process. The structure of the education program on psychology and pedagogics is presented. The need for study of psychological basis of management is demonstrated. The paper outlines the experiences of the Ufa state aviation technical university in teaching this subject. Many teachers of the University are found to take part in organizational and management practices. A study guide "Pedagogical management" has been published as a manual for teachers of this subject. The article outlines the content of the study guide and summarizes the experiences of the author in adoption and application of education programs for disciplines "Engineering psychology and ergonomics" and "Psychology and pedagogics in higher education institutions". Methods and procedures for improving methodological skills of teachers are presented. The problem of enhancement of vocational guidance work among schoolchildren is raised. The idea of establishing a psychological service in education institutions is suggested.

Keywords: inner world of human, reflexive conscious and behavior, continuous psychological and pedagogical training of specialists, engineering psychology, pedagogical management, humanization of education, vocational guidance work, psychological service

Teaching psychology and pedagogics in technical and other institutions of higher education (except teacher training schools) is provided for in the elective component of Federal State Education Standards of Higher Education (FSES HE).

So why the high interest in psychology and pedagogics among educational community and FSES developers? What subjects does psychological and pedagogical training of future engineers include? What goals and objectives do they pursue? What role do psychology and pedagogics play in the organization of education process? The article tries to answer these questions.

First of all, *let's consider the relevance of psychological knowledge for life of a modern human (including students and specialists)*. Psychology is the only science studying the inner world of human, the world of psychic phenomena, processes, properties and states. Gaining psychological knowledge is necessary for self-exploration and reflexive actions. Every young man should understand the specifics of his own psyche – motivation, psychic processes, perception, memory and cogitation, emotion, temperament, habitus, abilities, etc. Reflexive conscious and behavior of human intends implementation of the following actions – self-analysis, self-control, self-evaluation, self-criticism, self-direction, self-evolution, etc. It is thought that human self-consciousness should not be limited to only self-perception, awareness of individual psychological attributes. It is important for a person to find his place in the group or collective, to define goals and objectives of his activity, to make relationships with other people, to develop his view on the problems, events and situations. Self-consciousness implies knowing of one's own nationality (national self-consciousness), mastery of mother tongue, knowledge of history and culture of one's own people, sense of pride in fatherland, etc.

Psychological knowledge helps to know better the inner world of other persons, to understand mentality of other people – members of the family, friends, fellow students and others with whom the student (specialist) interacts. Studying human psyche means identifying and evaluating his psychological attributes, state, orientation, relationships and aspects of cognition, emotion and volition. On the basis of this knowledge he builds relationships with other people, chooses the proper behavior, the tone of conversation, etc.

Knowing elementary psychology and pedagogics the student can organize better his study, control and evaluate his knowledge, correct in time his actions of doing homework. Learning activity is known to be based on mental processes of attention, reception, memory, and thinking. Knowledge of details of these processes enables enhancing cognitive activity and improving performance. Every student should realize the structure of learning and cognitive activity (subject, goals, means, actions, operations and result). These elements should be scheduled and implemented in all forms of education. At classroom studies they are explained by the teacher, during unsupervised activities they are defined and studied by the student on the base of the knowledge of activity psychology [2].

The education program on psychology and pedagogics provides for the study of the following: the subject and objectives of the discipline, personality psychology, cognitive psychical processes, nature and regularities of education process, methods and procedures of study. As result of study the students should know: the relevance of psychological and pedagogical knowledge in modern specialists' life; nature and structure of psyche; aspects of the processes of perception, attention, memory and thinking; psychological structure and personality psychological features; nature and structure of activity and_communication; psychological phenomena and processes in a small group; nature, structure and regularities of education process. The students should be able to reveal the content of these problems so as to use the knowledge in their reflexive activities: for improvement of study and communication, solution of conflicts, etc. Besides, the students perform different creative tasks which refer to unsupervised activities: drawing up a self-concept (psych profile), psychological profiling of other people, description of the structure of a specific activity, drafting the texts of dialogues, socio-psychological profiling of the team (collective).

Based on findings of the study of psychological and pedagogical training of future engineers, we have proved and confirmed by experiment the hypothesis that psychology study needs to continue at undergraduate level. The fact is that specialists while working communicate with managers of various levels, colleagues, workers and solve together different problems. In this context the significance of psychological aspects of interpersonal communication, skills of interaction, joint decision-making, proper responsibilities allocation increase greatly. Many young specialists become leader personnel soon after graduation of the institute or a bit later. Market economy requires new culture of management from modern leaders. The main objective of the manager is to create conditions for good performance and social development of every worker and the whole team (organization). For this to succeed, the manager should know the nature of work and techniques (goals, means, process, etc.) on one hand, and workers (employees), their qualification, abilities, incentives, character traits and other attributes on the other hand.

Psychological background of the manager makes it possible for him understand himself and other people, first of all employees. The knowledge of psychology helps him to better interact with people, establish emotional contact, influence if necessary, communicate effectively, supervise the staff, establish a favorable psychological climate in the team (collective), and develop positive reinforcement of work and creative activity.

Thus, future specialists of all profiles should have organizational and managerial skills. In view of this the organizational and managerial activities are included in FSES for all master's programs. A connected problem in this regard is training process design. An education program for discipline "Psychology of management" has been developed and implemented at our University by the Department of Social Science and Technologies to address this problem. The program incorporates the following subjects: social and psychological profile of the manager, psychology of manager's activity, employees' incentive, business communication, personnel psychology, management decisions and execution. The unsupervised activity of students includes along with study of source material the following creative activity: social and psychological profiling of the director, his management activity analysis, social and psychological profiling of the team, labor incentive, development of an activity scenario, drawing-up a management decision-making plan (through the example of resolving any problem) [4].

We have developed a study guide for this subject. While explaining the importance of psychological knowledge for engineering one should mention engineering psychology. As it is known, the developers of current technologies must take into account all human factors: human and environmental safety when in operation, automated control system operator's specific mental processes, performance and exhaustion, comfort, etc. At the confluence of engineering, psychology and design there emerged ergonomics which is meant to improve labor environment during designing man-machine system. With this in mind, we have included "Engineering psychology and ergonomics" into curriculum of some engineering subjects. It encompasses such topics as subject and objectives of the course, operator's activity in "Man-machine" system, operator's psychological characteristics, engineering and psychological development of operator's activity, operators training, etc.

Graduates with master's degree are eligible to teach at vocational schools of all levels. They should have psychological and pedagogical competency. One of the main education subjects aimed at solving this problem is Psychology and Education of High School (72h),

included into curriculum of master's courses (elective component of education program). It embraces the following topics: subject, basic concepts and objectives of the discipline; purpose and content of higher vocational education; Federal State Education Standard of higher education; vocational education structure principles; nature and regularities of learning process; methods and organizational forms of education and training of students; modern teaching technologies; teacher's activity and personality, etc. Psychological knowledge comprises: psychology of learning and cognitive activities of students; psychological characteristics of students; student body psychology; teaching activities psychology; personality of high school teacher; teacher communication psychology. The author has published a study guide on this subject "Psychology and pedagogics of high school" which is considered to be one of the best textbooks and is popular among teachers and masters of universities [5].

The author has a long teaching experience which shows that the most effective teaching methods are: problem-based learning, group methods of problem solving (brainstorming, case study, group discussion, gaming), testing (personality examination and evaluation), psychological experiment, solution of psychological and teaching problems, etc. Implementation of group forms and methods of learning and cognitive tasks solution is aimed at overcoming the conflict between teacher-centered teaching and team work in industries. Work activity in industries is known to be collective, where each specialist should possess such qualities as corporate feeling, tact, mutual understanding, sociability, respect for the opinions of other people, etc. In teacher-centered teaching the abilities of the student group and cognitive activity potential are not realized, the educational importance of training declines, organized interaction between students is not put into practice. To overcome these shortcomings it is necessary to apply different forms and methods of team work at classroom and extracurricular activities. Implementation of these methods implies search activity of students, so these methods are called heuristic ones.

In group learning and cognitive activities every student takes an active part in problem solving. He interacts with other participators, communicates, and shows his well minded and emotional attitude, thus realizing his mental potential. The student becomes active and thoughtful player. Students of small groups (3-7 people) have higher; knowledge level; a better organized and united group is more efficient than the same number of people working alone. Group training provides with a sense of accomplishment. Hypothesizing, listening to and taking stock of the opinions of other people, compromising, cooperating with each other, the students gain experience of decision-making and professional communication. Besides, the skills of future professionals are formed [1].

It is difficult to overestimate the importance of psychology and pedagogics for teaching activities. Psychological knowledge is necessary for the teacher to understand psychological and age characteristics of students, for communication, cooperation, the student group guiding and learning activity management. Psychological knowledge is used by every teacher in development of teaching methods and teaching materials. During this process the following issues emerge and are to be developed: determining learning needs and students training, selecting teaching materials in accordance with the education program, choosing adequate methods and tools, scheduling of all kinds of studies (including extracurricular activities) in accordance with the education program, tests development for knowledge control and evaluation.

Analyzing professional activities of the teacher it cannot go unnoticed that these activities comprise elements of guidance. There is a number of organizational challenges meeting which the teacher acts as a leader: a curator, a leader of graduate internship, a scientific advisor, a chairman of methodological council, a head of department, a deputy head of the department, or a head of a scientific laboratory, etc. Even if the teacher just gives a lesson – he acts as a training provider, as a curator, i.e. as a manager. In order to provide a methodological assistance for teachers and heads of structural units of the University we have published a study guide "Pedagogical management" [1]. It comprises the following parts: the subject and objectives of pedagogical management, basic theory of the discipline, educational organization as a subject of teaching activities, educational process as an object of management, control of learning and cognitive activity of students, cooperation and communication of teachers and students, quality management, etc.

It stands to reason that *the department functions go beyond just teaching of psychological and pedagogic disciplines*. Teachers of Psychology and Pedagogics carry out research on psychological, educational and social issues. As a result of the research, there have been defensed four Doctoral Theses and many

Candidate's ones. The articles and monographies of the authors are published by leading publishers of the country. *Teachers and assistants of the department are engaged in scientific and methodological work, the aim of which is to provide education process with a complex of educational and program materials, teaching aids and information (academic and methodological complex)*. Besides, the department's methodological work pursues the following aims: constant improvement of training methods; development of new techniques of education process arranging; improvement of teaching skills, etc.

Pedagogization of education process intends constant professional development of the University teachers with the active involvement of educational psychologists of our department. Synthesis and analysis of our University work experience show that the most efficient methods of teachers upgrading are:

Aubakirovaregular self-education in order to improve professional knowledge of the subject taught, of pedagogics and psychology, and of teaching methods;

– scientific and methodical work aimed at development of academic and methodological complex and improvement of nature, techniques and organizational forms of education;

– carrying out methodological research;

– teachers' involvement in scientific conferences and seminars (The Ufa state aviation technical university has been hosting annual Education Issues all-Russia scientific and methodological conference under the aegis of the Russian Federation Ministry of Education and Science Research Centre since 1990);

– teachers' participation in publishing a collection of scientific articles (our University publishes annually the collection of research papers [3];

– study, synthesis and implementation of advanced teaching experience;

– theses writing and defense (Master's, Candidate's and Doctoral ones) on Psychology, Pedagogics and Methodology;

– arrangement of pedagogical excellence seminars and lectures on Psychology and Pedagogics for young teachers;

– study at Advanced Training Faculty for young teachers.

As a rule, the first-year students face the problem of adapting to university studies specifics. This personal adaptation makes up one of personality development strategies. Adaptation as a psychological process of entering social, professional environment occurs as the environment becomes personal fulfilment area. The level of social adaptation of the first-year students depends on many factors: personality psychological features, nature, business proficiency, behavior, values-based orientations, academic efforts, health, social environment, etc. In order to assist the first-year students we have published a study guide. It embraces the following topics: personality psychological features, requirements for a modern specialist, professional identity, psychological characteristics of students, learning activities psychology, creativity development, arrangement of students learning and research activities, self-management secrets, etc.

The Ufa state aviation technical university has developed the first-year students adaptation measures comprising: student groups formation; curators assignment; student initiation ceremony; experienced teachers presentation; introduction to the University history and famous graduates; dormitory consultation organization by efforts of teachers and senior students; declaration of education process goals and structure as well as the rights and responsibilities of students; teaching of "Psychology and Pedagogics"; curators', teachers' and senior students' assistance in arrangement of learning activity of student group; intersession efficiency report to monitor extracurricular activities and render assistance in time.

Curators assigned by the Dean are responsible for educational work with first-year students. In fact every teacher takes part in this work (worldview and social significance of the subject, teacher's personal influence on the students conscious and behavior, teachers' cooperation, etc.). Besides, every department uses various kinds of educational work involving both students and teachers. These include: students competitions; "The best student group" competition; disputes; hobby clubs; movies and theatre-going, visits to museums and exhibitions; celebrities, war and labor veterans, production workers meetings; amateur art activities; bulletin-board newspapers publishing; student dramatics, concerts, discos; participation in voluntary work, sports competitions; tourist rallies; themed nights; participation in local, regional and national actions; development of students self-management; arrangement of productive labor of students.

Thus, we can conclude that psychological and pedagogical knowledge in education process of institutions of higher education are of a great importance. In fact designing and functioning of all elements of education process should be based on modern advances in pedagogics and psychology.

However, *analysis of national education system concerning evaluation of youth psychological culture, communication and labor culture in all spheres of social life shows that pedagogics and psychology teaching is not sufficient.* It is time to have a new look at the problem of the younger generation psychology grounding. Lack of psychological knowledge, poor communication culture result in conflicts, rudeness (in family, at school, in the military and at enterprises), alcohol abuse, family disruption, etc. Violent behavior increase is seen among young people during sport events, meetings and festivals. Juvenile crime becomes an area of strong concern.

Psychological knowledge is of great importance for schoolchildren occupational guidance as well. Currently the problem of occupational guidance for schoolchildren is partly solved through profilization (introduction of profession-oriented subjects). The Russian Federation Ministry of Education and Science has established 11 specialties including physics and mathematics, science, information technology, industrial technology relevant to engineering. The purpose is to study and evaluate schoolchildren psychological features in accordance with these options by psychodiagnostic tests.

Unfortunately it should be acknowledged that the problem of professional identity at school is solved insufficiently. However it is very important for school leavers (prospective students) because sound decision influences occupation choice and future life.

In conclusion it is worth pointing out another aspect – psychological aid delivery (by analogy with medical aid delivery). To my opinion *it is necessary to establish a psychological service at schools, colleges and universities in order to render psychological aid, to monitor psychological state of students, teachers and members of the staff.* At present psychologists are considered to be needful only in extremal situations for rendering psychological support for victims and their relatives. But psychological aid is necessary in real life too. In fact psychological aid should be widely available. Under free market conditions, goods flow, scarcity of money, income inequality, intensification of labor, information overload, conflict situations increase and other factors of modern life result in psychological tension, depression, inadequate and aggressive behavior, etc.

Upgrading psychological background and culture of the younger generation should eliminate negative developments in people's conscious and behavior, as well as pave the way for their mental and social evolution.

References

1. Andreev V.I. Pedagogy of the higher school. Innovative-prognostic course. – Kazan: Center for Innovative Technologies, 2006. – 500 p.

2. Karandashev V.N. Methodology of teaching psychology: a textbook. – Moscow: Izd. Yurayt, 2014.

3. Technology and organization of training: collections of scientific articles. – Ufa: Editorial and ed. Complex USATU, 2006-2016.

4. Sharipov F.V. Pedagogical management: uch. allowance. – Moscow: University Book, 2014, – 480 p.

5. Sharipov F.V. Pedagogy and psychology of higher education: uch. allowance. – Moscow: Izd. Logos, 2012.

SYMBOLIC IMAGES IN THE SYSTEM OF ENGLISH AND FRENCH LANGUAGES

Issina G.I.

Karaganda State University named after E.A. Buketov, Karaganda, e-mail: g.issina@mail.ru

The article is devoted to the analysis of symbolic images and the language picture of the world in the system of English and French languages. Symbols are the result of the work of human co-knowledge; they accompany it from the moment of birth. The symbolic nature of the language and the symbolic activity of people are interrelated. The main purpose of the work is the research of national and cultural specifics of a language which promotes identification of the cultural background of lexis, including knowledge of features of the cultural environment, existence of an object, knowledge of stereotypic and figurative associations and also the stereotypic and valuable relation to the object of nomination. Representatives of culture should interpret and eventually reinterpret the symbol. Cultural symbols, in fact, reflect the ideas and concepts that are the foundation of a particular culture. Symbols are found in various forms: verbal or non-verbal, written or oral.

Keywords: symbolism, language picture of the world, symbolic images, cultural background

It is a well-known fact that any language imposes a certain imprint on the vision of the world of people speaking on this language. Thanks to the national language, a person realizes his spiritual essence and comprehends the ancestral consciousness, which is deeply hidden in each of us. Nowadays, the issue of this awareness is particularly acute. Modern philosophy, linguistics and culturology, shows an increased interest to the symbolic content embodied in the lexical system of a language, which is part of the language picture of the world of a particular nation. The language picture of the world is displayed in the forms of the language of the device of the non-linguistic reality. Extra linguistic reality or cultural space is called specific cultural codes, which are represented as a "grid" that attacks the outside world, thus, the structure of culture, divides and classifies the surrounding reality by evaluating it. The somatic cultural code can be represented in the language picture of the world in several ways, the main ones of which are metaphors, phraseological units, symbols are considered as linguistic exponents of cultural signs.

There is a particular importance of the research that is aimed at comparative analysis of the realities of one language in comparison with others, which gives a more complete picture of the world of the bearer of another language.

Symbolism is a system of signs and symbols, which are usually, differ in the variety of their content, through which abstract concepts are expressed. For example, "the swastika", in ancient times it was the emblem of fertility, in the twentieth century has also become a symbol of fascism and cruelty. The value of symbols lies in the fact that they reflect the culture, history and way of life of different countries.

In modern science there is a set of approaches for understanding culture. In a symbolic approach an attention is focused on the use of symbols in culture. Y.M. Lothman writes that "Culture is a symbolic universe" [6: 115]. Some elements of culture acquire a special ethnic meaning and turn into peculiar symbols of the nation: for example, for the French, it is +cheese; tour Eiffel (Eiffel Tower); the English – oatmeal for breakfast, Big Ben (clock tower of Westminster Palace) and legends of castles; etc. Semiotic function of culture is manifested in the fact that any product of culture can become a symbol or a sign of a specific national culture. For example, a scarlet rose with inner white petals became a floristic symbol of England, and a cock, a lily and a young woman (Marianne) – symbols of France. Shanyrak, for example is a symbol of the Kazakh people, birch is the symbol of the Russians.

Representatives of culture should interpret and eventually reinterpret the symbol. Cultural symbols, in fact, reflect the ideas and concepts that are the foundation of a particular culture. Symbols are found in various forms: verbal or non-verbal, written or oral. It can be anything that conveys the meaning, for example words on the page, drawings, images and gestures [5: 201]. Clothing, homes, cars and other commodities are symbols that imply a level of social status. According to O.A. Leontovich, the most effective way of "subtracting" national-specific linguistic symbols in systems of different languages is their interlingual juxtaposition [5: 223]. Thus, in this work we will compare and analyze the national symbols inherent in English and French languages, sustainable cultural associations, compiled on the basis of the national image of people who are the historical speakers of the language, their stereotypes of behavior and their historical homeland.

There are certain signs that testify to the ethnic and cultural originality of the nation. For example, words-realities that reflect the characteristics of the natural and geographical environment of the Great Britain, express its national identity. Among them you can note such as dale, white cliffs, fen country (swampy places in the east of England), etc. Sometimes the names of animals and plants widely distributed on this territory are perceived with a whole range of stereotyped associations, fixed in the background knowledge of the linguistic culture bearer. Thus, they gradually become symbols. For example: the emblems of England – Rose, the lion and the Unicorn. A huge role in the life of the English is played by the house, which is evident not only from the world-famous proverbs "East or West home is best" and "There's no place like home", but also from a large number of nationally-labeled units, such as: *anglepoise lamp* – table lamp, *villadom* – world of luxury country villas, *teathings* – tea service, *purdonium* – a bucket of charcoal for use inside the house, *sheltered housing* – shelter for pensioners and elderly people in a new apartment building, snug – lounge with bar (in the hotel, beer and etc.).

The distinctive features of a typical Briton can be considered in a spirit of independence, freedom and endurance. The family and the school are aimed at the upbringing of these qualities [6; 76]. The British have a practical approach to moral and aesthetic problems: all institutions emphasize human behavior. These features also manifest themselves in the language picture of the world: *toffee-nosed* (si.)/ *Upstage and county* (coll.) – arrogant, *waffle* (coll.) -shorting for a long time and for nothing; *weasel* – behaving evasively, cater to-condone bad taste; *div* (si.) – an eccentric person, an idiot; *a swollen head* – too much self-conceit [2: 147].

England is a country of monarchy and tradition. The English treat with great respect all that is somehow connected with these two concepts. And this, of course, is reflected in the vocabulary: *backwoodsman* (coll.) – a peer who rarely visits the House of Lords, *take silk* – become a royal lawyer, *toff* (obs. Coll.) – a gentleman, a dandy, a high society representative, *Trooping the color* – annual solemn ceremony with banner removal in London, *true-blue* – consecutive conservative, *wowser* -strong puritan, *crown estate* – state lands, *Christmas box* (obs.) – Christmas gift to the postman, milkman and other people for their services, *the Flower of Cities All*- London [4].

The Englishman feels himself to be a part of nature and does not think of his existence outside of it. Hence the presence of such britishisms as: *beer garden* – a small garden in the "pub", where customers can sit in good weather, *lung* – city park, *spinney* – a scaffold, a grove, *a spring garden* – a public park, *unspoilt* – a beautiful, virgin (about the place, which is not built up by houses, roads, etc.), *conservancy* – a nature protection body; Protection of a Nature [4].

The following symbols occupy an important place in the system of cultural symbols of the British: the lion as a symbol of the British people and of the United Kingdom itself; Unicorn as a symbol of honor and purity; the symbol of the monarchy is the crown; symbols of the service of the monarchy of honor – the Life Guards; a symbol of British rule on the seas – frigate "Victoria"; symbols of the royal dynasties of England – for example, the Tudor Rose; one of the symbols of the world – a poppy flower, which is an indispensable attribute of marches in defense of peace. The British have a sense of dignity, pride in their nation, their country and its world achievements. The song "Rule, Britannia!" ("Rule, Britain, the seas!") is still a patriotic anthem of the British.

Somatic symbolic images and the most commonly used stable expressions of English language: *as fast as one's legs can carry one* (literally: as quickly as the legs are carried away); *be up to one's neck in smth*. (to live, having everything you need, in abundance"); *body and soul* (completely). In the English language system there are many examples of anthropocentric symbols: *as one man* (all as one, unanimously), *avoid smb. like a leper* – (avoid, avoid anybody).Thus, national symbols occupy an important place in the minds of the British. In English, this unity is based on common national pride, which is caused by various representations: visual (for example, a national flower), verbal (for example, a national anthem) and sign (for example, a flag) [1].

Next step of the research are symbols and symbolic images of French language. France and French language are associated with the following associations: wine – *le vin*, cheese – *le fromage*, love / romance – *l'amour / romance*, gallantry – *de la galanterie*, Jeanne Dark – *Jéanne Dark*, revolution – *la révolution*, marseillaise – *la marseillaise*, constitution – *la constitution*, special national cuisine – *la cuisine nationale*, gastronomic pleasure – *le plaisir gastronomique*, art of living – *savoir vivre*, etc. The national symbolism reflects the national character of the French:

1. The motto: "Liberte, Egalite, Fraternite", means "Freedom, Equality, Brotherhood".

2. The French flag Tricolor consists of three vertical bands of equal width, reflecting the national colors of the country: blue, white and red. Red is associated with Saint Denis, and blue with St. Martin.

3. Marianne: she takes pride of place in town halls and courts. It symbolizes the "Triumph of the Republic".

4. One more historical symbol of France is the national flower – lily. It symbolizes beauty and purity.

Summarizing all the above, it can be noted that the basis for all national symbols are three basic concepts: *la patrie* (homeland), *la gloire* (fame)*, la force* (force / power).

The first group is the somatic symbols. The carrier of the somatic code of culture is the human body as a whole. For example, in French linguistic culture, the liver was seen as a symbol of courage, and its discoloration is interpreted as a sign of fear, from which the internal form of the phraseological unit is *avoir les foies blancs* (to be afraid, afraid). The internal form of a number of phraseological units contains somatisms such as a spleen (*rate*) with semantics of joy (*bile*) with the semantics of anger (*allumer la bile, avoir de la bile, echauffer la bile a qn*).

In French linguistics the rose is perceived as a symbol of joy, pleasure: *etre dans ses roses* (to be in a joyful state). Or, for example, there are expressions with the word cat. The state *avoir une mine de chat fache* stands for "being in a state of anger, anger; to be furious as a tiger". *Triste comme un bonnet de nuit* (sad as a nightcap), *triste comme une porte* (sad as a door), these are national phraseological units which in most cases are not translated.

Phraseological units, which are based on popular beliefs and traditions, in most cases date back to the distant past. Thus, for example, the phraseological composition of the French language contains the phraseological units with the semantics of anger, irritation. *Marcher sur une mauvaise herbe* (based on an ancient belief about the miraculous power of herbs).

Another source of cultural interpretation is the system of pattern images captured in "walking" steady comparisons. In the role of the standard there are stable comparisons, which are one of the bright figurative means, capable of giving a clue to the solution of the national consciousness [8: 16]. For example, in French traditional reference comparisons, joy is a bird: *gai comme un merle* (cheerful as a song thrush), *gai comme un pinson* (gay as a finch), *gai comme une alouett* (cheerful as a lark), *gai comme un oiseau* (cheerful as a bird).

There are three main groups of symbolic images in French language. The first group is the phraseological unit of somatic symbolic images: *avoir la main ouverte* – to be generous – (literally: to have an open hand); *casser les pieds à qn* – bored (sit down with someone in the liver); *comme deux doights de la main* – (as two fingers on one hand, inseparable); *de bonne main* – (from a good hand, from a reliable source).

The second group of symbolic images, according to I.G. Pendikova and L.S. Rakitin, is a group of anthropocentric symbols. The main factor that determines the development and functioning of the linguistic units of this group and the idiomatics of the people is the human factor [7: 32]. In French language anthropocentric symbols are widely distributed. The most commonly used expressions are: *avoir le coeur lourd* (to carry a stone to the heart); *enfoncer une porte ouverte* (break through the open door); *marcher sur les pas de qn* (go at someone else's footsteps).

The third group of symbolic images of the French language include the symbols of nature and the universe: *il n'y a pas de fume sans feu* (there is no smoke without fire); *le monde est petite* (the world is small); *come un coup de foudre dans un ciel serein* (like a thunderbolt from a clear sky); *il n'y a point de roses sans épines* (there is no rose without thorns).

Such examples illustrate all the brightest moments and aspects of the life of the French nation, which make up the national and cultural specifics of the French people and, consequently, of the French language.

Our research is based on the comparative method and it is necessary to consider the symbolism of the color in the system of French and English. In the color picture of the world of the French, red color (*rouge*) connects different symbols: beauty, love, joy, as well as enmity, revenge and war: for example, *chapeau rouge* in French means decapitated, *travailler dans le rouge* – to kill. In English, the orange color symbolizes *the grace of God, angels and heavenly fire*; in the case of the French, the lexeme orange is given a negative meaning, it is used in the name orange fruit (*orange sanguine*), in the collective meaning of *aller porter des oranges à qn*, which in Russian means to carry a transfer to someone (in prison, in a hospital), as well as in the name of actions related to striking someone's fist, *balancer une orange à qn* – to hit someone. In English, yellow color symbolizes *sadness, pretentiousness, sickness and death*, *yellow life, melancholy*; for the French it is a symbol of similar concepts: for

example, *jaune comme un citron* – yellow as a lemon, *être jaune comme du safran* – to suffer jaundice. In the color pictures of the world of English and French, purple color symbolizes serenity, pacification and the spiritual sphere of human existence: for example, in French, parti des bas violets is a spiritual career. This fact speaks of the romanticism, vulnerability and credulity of the studied ethnoses.

The symbolic values of green in the perception of the English and French have a number of differences. The English green color symbolizes longing, resolution, freedom of action, holiday, New Year, ecology and protection of animals, as well as hope: green boredom, green trees, green street, green corridor, etc. Green is also associated with inexperience – green youth. In French, green is associated with something incomplete: du bois vert (raw wood), vin vert (young wine).

Two national cultures, each culture consists of national and international units. That is why the language is considered in close connection with the facts of life of its bearers, with their history, geography, and way of life, culture and literature [3]. And the totality of this knowledge is the world of the language of a given society. We can conclude that the symbolism is inextricably linked with the national characteristics of the British and the French and expresses the mentality of these two nations. The English and the French, like all other nations, perceive the surrounding reality in different ways, which is reflected in English and French. Thus, despite the differences in the language picture of the world, there are common features in the systems of French and English. Symbols are the result of the work of human co-knowledge; they accompany it from the moment of birth. The symbolic nature of the language and the symbolic activity of people are interrelated.

The study conducted within the project research: № 0118PK00057/MES of Kazakhstan, 2018.

References

1. ABBYY Lingvo x 3, 2009. // https://www.abbyy.com/ru-ru/support/lingvox3/sr/

2. Alimzhanova G.M. Comparative linguoculturology: the interaction of language, culture and man. – Almaty, 2010. – 300 p.

3. Andreeva K.A., Timofeeva A. Lingvocoloured picture of the world and the dialogue of cultures. – 2006. – [Electronic resource] – Access mode. – URL: http: // frgf.utmn.ru/last / No11/text07.

4. Cambridge dictionary // https://dictionary.cambridge.org/

5. Leontovich O.A. Methods of communicative research. – Moscow: Gnosis, 2011. – 244 p.

6. Lotman Yu.M. Symbol in the system of culture // Symbol in the system of culture. Proceedings on sign systems. – Tartu: Publisher TSU, 1987. – Issue. 21. 754 p.

7. Pendikova I.G., Rakitina L.S. The archetype and symbol in advertising. – Moscow: Unity-Dana, 2008. – 303 p.

8. Whitehead Alfred North. Symbolism, its meaning and impact. – Tomsk: Aquarius, 1999. – 64 p.

TRANSLATION OF MULTIPLE SENSES IN UNRESTRICTED TEXTS

Polat Ya., Bacak S., Zakirov A.

Ala-Too International University, Bishkek, e-mail: yahya.polat@iaau.edu.kg, satylmysh.bacak@iaau.edu.kg, alymzhan.zakirov@iaau.edu.kg

This paper addresses the problem of how to identify the primary and secondary senses in translating the various senses. To discriminate senses, a translator should consider the characteristic of words that a single lexical item may have several meanings other than that which most readily comes to mind. These meanings are often called secondary meanings, or secondary senses. Our discussion will include how the the meaning is suggested by the word when it is used alone, when the word is said in isolation. It is the meaning learned early in life and is likely to have reference to a physical situation. Here we will describe how the same word may have a different meaning when used in context with other words. We will also discuss ambiguity caused by senses in translation.

Keywords: Primary sense, secondary sense, multiple senses, ambiguity.

Primary sense is the core, basic, literal meaning of a lexeme. A primary sense is generally the first meaning that comes to mind for most people when a lexeme is uttered alone. Usually it refers to an actual physical thing, an action, or a characteristic of a referent [1]. The primary sense is the meaning suggested by the word when it is used alone. It is the first meaning or usage which a word will suggest to most people when the word is said in isolation. It is the meaning learned early in life and is likely to have reference to a physical situation. But the same word may have a different meaning when used in context with other words.

A secondary sense is a meaning that is more abstract than a primary sense of a lexeme but still shares some of its semantic components. Because it has a different range of reference, its usage contexts and collocates are different from those of a primary sense. For example the word 'oksamak' in Turkish has a primary sense meaning 'to caress, to fondle.' As in the example "adam cocuğun basını oksadı", "The man caressed the child's head". However, oksamak can also mean; 'to resemble to someone' as a secondary meaning. "Fatma teyzesine oksuyor", means "Fatma looks like her aunt".

The "unpacking" of the concepts or meaning components contained in a word all deal with the fact that the same meaning may occur as part of the meaning of various words [2, 112]. In order to define the problem more clearly we can look at the ways of unpacking the word:

(a) By looking at Lexical items from the point of view of the meaning components of which a given word is composed.

(b) By contrasting one lexical item with another in a system.

(c) Pairs of words which have some meaning in common may be contrasted; whole semantic sets may be contrasted.

(d) Taxonomic studies, componential analyses, the study of antonyms and synonyms.

These ways given above are all about one sense of a given word, the primary meaning. However, most words have more than one sense.

For example the word *run* in isolation will mean something like move rapidly by moving the legs rapidly. But if the same word is used in the context of river as in the river runs, *run* has nothing to do with legs or rapidity, although the idea of motion is still there. Run in the context of river means to flow. Secondary senses are dependent on the context in which a word is used [2, 112].

Methodolgy

I collected the data and analyzed them descriptively by using both qualitative and quantitative methods. The analysis of this study took several steps. The data were numbered into a comparative chart, classified into a specific comparative chart to be the related data to the research subject, then the data were analyzed according to the theory used in this study.

Secondary meaning or secondary sense

A speaker of Turkish (Turkey) will tell you that "yemek" means to eat. This is the primary meaning. But a speaker of Turkish will also use this same word in phrases as shown below [3, 32]:

Examples:

Ayvayı yemek: (To eat quince) (Be screwed).

Basının etini yemek: (To eat smb's skin of the head) (nag at smb)

Damga yemek: (Be branded, to be sealed). (to blacken smb's name)

Feleğin sillesini yemek: (To be hit by heavens). (Come down in the world)

Halt yemek: (Make a great blunder). (To do sth improper)

Hazırdan yemek: (Spend the money you saved for you do not work)

İci icini yemek: (To be very anxious for sth bad will happen) (Eat one's heart out)

Kaymağını yemek: (To skim) (To get benefit from a good position)

Nane yemek: (Make a blunder) (Do sth stupid)

Papara yemek: (To be in the dog house) (To be told of, be reprimanded)

Basını yemek: (Cause the death of) (Get smb into trouble)

Bıcak yemek: (Be stabbed)

(bir is birinin) vaktini almak (yemek): (Steal smn's time)

Birbirini yemek: (Go at it hammer and tongs) (To eat each other)

(birini) ciğ ciğ yemek: (eat smn alive) (be violently angry at)

Translating the primary sense of a lexical item is usually much easier than a secondary sense. This is because the receptor language will often have a lexical equivalent for the primary meaning which very nearly matches the meaning of the lexical item in the source language. However, the secondary senses of those same two words will probably not match [2,113]: A native speaker knows immediately by the other words which occur in the phrase or sentence which sense of the word is being signaled. Learners of a second language often have a great deal of trouble to use a word in its many secondary senses.

Turkish	**English**
Asker kaleye yürüdü:	Soldiers marched to the castle
Dedemiz Hakka yürüdü:	Our grandfather has passed away
Dallara su yürüdü:	Water moving up to the branches

Any word used in a non-primary sense will probably not be translated by the word in the receptor language which is equivalent to its primary sense, but by a different word. For example, the primary sense of key would be translated into Turkish with "anahtar". But notice the following list which shows how they differ in translating secondary senses:

English to Turkish

key – **anahtar** (of a lock)

key – **sifre** (of a code)

key– **tus** (of a typewriter)

Turkish to English

anahtar – **key**

anahtar – **switch**

anahtar – **clue, clef, cipher, cotter, cock, spanner, interrupter, wrench, toggle**

Analyzing senses of words

The process for discovering the various senses of words is rather complicated but can be very crucial for making dictionaries, learning a second language, and may also be helpful to the translator when no dictionaries are available which give an adequate description of the senses of words in the language [4]. A translator who is truly bilingual in the source and receptor languages will usually recognize a non-primary sense. Nevertheless, there is always the possibility that a literal translation of a word may be used in a secondary sense. This literal translation sets up a strange collocation and wrong meaning [2, 113].

Step 1. Collecting data.

One must first collect as many examples of the use of the word as possible. If a person knows the language he can simply think of all the possible combinations with other words. If not, he will need to find the word in as many texts as possible. A concordance done on the computer will greatly speed up the search, learning a language, or hoping to make a dictionary, will want to begin early in his research to collect data on each word of the language, building up more words and more examples of their co-occurrence with other words. The goal is to list as many collocate as possible. For our purposes, we shall now assume that we have found the following [4].

Cam kırdı	Broke the window
Ayağını kırdı	Broke his leg
Cesaretimi kırdı	Discouraged me
Kalbini kırdı	Broke heart
Fiyat kırdı	Made discount
Tavlada pul kırdı	Hit a checker
Umudunu kırdı	Dashed my hopes
Direksiyonu kırdı	Turn the wheel hard
Kemiklerini kırdı	Broke his bones
Boynunu kırdı	Broke his neck
Dersi kırdı	played truant
Direncini kırdı	broke his resistance
Dümen kırdı	veered
Rekor kırdı	broke the record
Fındık (ceviz) kırdı	mess around women
Gurur kırdı	humiliated
Onur kırdı	insulted
Hatırını kırdı	offended, worried
Hevesini kırdı	dissuade,
Askını, sevkini kırdı	dishearten
İnadını kırdı	overcome his stub bornness (will)
Kabuğunu kırdı	broke the shell
Kesek kırdı	harrow
Kibrini kırdı	abase
Kirisi kırdı	got away
Kod kırdı	broke the code
Nefsini kırdı	mortify the flesh
Not kırdı	took points of a student
Pot kırdı	dropped a brick

Step 2. Sort the collocates into generic classes.

Each grammatical form should be analyzed separately. In this example, we have used only

intransitive verb forms. If the noun run occurred, this noun form would need to be separated and analyzed separately. One begins by making best guesses, refining the analysis as he goes.

(1) Human body: Leg, bone, neck
(2) Human senses: Courage, heart, hope, resistance, honor, pride
(3) Objects: Window,
(4) Run away: lesson (play truant), got away
(5) Change direction (car, ship): veer, wheel
(6) Decrease: note, price
(7) Having affair: mess with woman
(8) Mistake: drop a brick
(9) Game: Hit a checker
(10) Change sth: broke the shell
(11) Achievement: broke the record

Step 3. Regroup the contexts according to the collocates which belong to the same generic classes as follows.

3.1. Human body
(1) Ayağını kırdı: Broke his leg
(2) Kemiklerini kırdı: Broke his bones
(3) Boynunu kırdı: Broke his neck

3.2. Human senses
(1) Cesaretimi kırdı: Discouraged me
(2) Kalbini kırdı: Broke heart
(3) Umudunu kırdı: Dashed my hopes
(4) Direncini kırdı: Broke his resistance
(5) Gurur kırdı: Humiliated
(6) Onur kırdı: Insulted
(7) Hatırını kırdı: Offended, worried
(8) Hevesini kırdı: Dissuade,
(9) Askını, sevkini kırdı: Dishearten
(10) İnadını kırdı: Overcome his stubbornness (will)
(11) Kabuğunu kırdı: Broke the shell
(12) Kibrini kırdı: Abase
(13) Nefsini kırdı: Mortify the flesh

3.3. Objects
(1) Cam kırdı: Broke the window
(2) Kesek kırdı: Harrow

3.4. Running away
(1) Dersi kırdı: Played truant
(2) Kirisi kırdı: Got away

3.5. Change direction (car, ship)
(1) Dümen kırdı: Veered
(2) Direksiyonu kırdı: Turn the wheel hard

3.6. Earn or punish by decrease
(3) Fiyat kırdı: Made discount
(4) Not kırdı: Took points of a student

3.7. Having affair
(5) Fındık (ceviz) kırdı: Mess around women

3.8. Mistake: drop a brick
(6) Pot kırdı: Dropped a brick

3.9. Game
(7) Tavlada pul kırdı: Hit a checker

3.10. Penetrate a secret
(8) Kod kırdı: Broke the code

3.11. Achievement
(9) Rekor kırdı: Broke the recor

Step 4. List and label the senses of the words.

Once the data is reorganized by the generic classes of the collocates, it is much easier to see the senses of the word. For animate beings with legs, the meaning seems to be to move oneself from one place to another rapidly; for liquids, simply to flow, for vines, the meaning is to grow, etc.

Sense 1: Changing the form of body in an unwanted way.
Sense 2: Changing the human senses
Sense 3: Changing the form of objects.
Sense 4: Running away from responsibility
Sense 5: Change direction
Sense 6: Changing value
Sense 7: Changing the value of heart
Sense 8: Mistake
Sense 9: Game
Sense 10: Penetrate a secret
Sense 11: Achievement

Translating the Various Senses

If the above analysis were of the receptor language word, that is, if one were translating into English, the analysis would point up the necessity of including, in the context of run, a collocate from the generic class mentioned in order to insure the correct meaning. When the meaning is signaled by the context in which the word occurs, it is very important that the context be built into the translation.

The word “ucmak” occurs in the following contexts, each signaling a different sense of the Turkish word. It is possible to restate the meaning in Turkish.

Kus uctu: A bird flew
Ucak uctu: Plane took off
Gaz, buhar uctu: Gas, steam evaporated
Rengi, benzi uctu: He grew pale
Catı uctu: The roof structure was uplifted by the hurricane
Toprak, evin üstüne uctu: Soil eroded over the house
Patlamadan dolayı bina havaya uctu: Building exploded
Sacları havada ucuyor: Her hair was flown in air
Araba cok hızlı gidiyor, ucuyor: The car was very fast
Yarın istanbul’a ucuyorum: I am flying to İstanbul tomorrow
Yok oldu sanki havaya uctu: Lost, disappeared suddenly
Sevincten havalara uctu: He was very very happy

Uyusturucu almıs ucuyor: He tripped out
Bizim kitaplar ucmus: Our books were stolen
Cennete uctu: Flew to haven, died

The idea of "flying in a presentable form" is common to all the senses. The common thread of meaning shows that we are dealing with a single word rather than with two or more separate words [4, 97], but each sense will result in a different form for the translation.

A secondary sense will almost always need to be translated by a different word than the word which denotes the primary sense. In English there are many synonyms of the word powerful". They include *strong, muscular, muscly, sturdy, strapping, robust, brawny, burly, heavily built, athletic, manly, well built, solid;* and others. All belong to a common semantic set and can be contrasted and components of meaning analyzed as presented in the previous chapter. The nuclear component of each would be POWER. "Tiger" has the contrastive component "animal, wild"; "King" has the contrastive component of being a human, authority, etc. That is, each of these contrasts with the others in the semantic set. But in addition, each of these words has a primary sense and a number of secondary senses. Some of them are being used in a secondary sense when they are included as part of the semantic set, POWERFUL BEING. For example, "king" has the primary meaning of head of a country. However, it also has a secondary meaning of "the most important chess piece". A word may be a member of various semantic sets. In some, it will be used in its primary sense and in others in one of its secondary senses. This, of course, adds to the complications of translation.

In the display which diagram the senses of the word "powerful", notice that ten senses have been identified. (The kind of analysis which leads to this type of charting is described in [5, 99-113].

In the analysis of the English word "powerful", the senses are numbered at the bottom with the primary sense "strong" as number six. In the discussion of secondary senses above, we showed how the sense is signaled by the collocates that go with the word. However, it may not always be a specific word that signals the meaning but the presence of some signal of the components of meaning within the word when used in that sense. For example, to signal the sense of "woman", rather than "shark" for "powerful" something in the context must signal "human" rather than "wild water mammal" since "wild" (powerful) is not the primary meaning of powerful.

"Powerful" has at least ten senses. But the meaning will be signaled only if the translation into English has built into the context the semantic components that will trigger the meaning. If not, the wrong meaning may result even when the right word is used. For example, if we use the collocate "woman" for the context, the meaning would still be ambiguous. It could refer to her body power, or a wealth of her. If an English said, "they have a powerful media", it would immediately be understood that their media has a lot of influence on people of that country. If someone said, "There is a powerful leader in our country", it would immediately signal a man, since it must be animate. The collocate *powerful leader* signaled this. The choice of meaning is signaled by including in the context some other lexical item which will activate the semantic components indicated at the nodes of the chart. The king had a powerful time on his throne is understood to be a rule over people because the throne indicates this sense. John saw a powerful bite in the body would mean tracks because of the collocate body.

Powerful

Animate								Inanimate
God	Man				Animal			Nature
Absolute	Natural	Wealth	group	Authority	Wild		domestic	Water, rain flood
One	children	man	army	police	land	Water	ram	wind hurricane
1. Omni potent	man	woman	media	King	Tiger	Crocodile	rooster	earthquake
	2. Sturdy	3. Wealthy	4. Influential	5 Authoritative	6. Strong	7. powerful	8. Fast	9. Devastating

The two main rules about secondary senses are

1) the secondary senses of the source language can probably not be translated literally but will need to be understood in order to find a good equivalent, and

2) the secondary sense of words in the receptor language will only mean what they are intended to mean if the context includes collocates which will signal the sense desired.

Ambiguity Caused by Senses not Clearly Signaled

Something is ambiguous when it can be understood in two or more possible senses or ways. If the ambiguity is in a single word it is called lexical ambiguity. In a sentence or clause, structural ambiguity [6].

It is important to know the meaning components of the primary sense. For example, in the Chuj language of Guatemala, the word *say* turned out to be a problem for the translator. The word *say* was used in the sentence, "The people said, "This man is God". "In the story where this was used, the man was not God. The people said it, but it was not true. However, what the translator did not know was that the word *say* in its primary sense includes the component of the truth. The word *say* in Chuj means to say the truth; that is, the unmarked meaning. In order to indicate that what they said was not true, *say* must be marked. So it had to be translated "The people said falsely, "He is a God", to avoid wrong meaning [4, 115].

It should also be noted that lack of context will lead to ambiguity in many cases example, the sentence "study like your brother, do not be lazy!" is ambiguous. It could mean that his brother is hard working or lazy. The ambiguity comes because of the two senses, and lack of context to make it unambiguous. It would be possible to simply say "study like your brother, do not be lazy" or "study, like your brother do not be lazy!" Here, change of comma, changes the meaning of the sentence.

No equivalent lexical items will have the same senses from language to language. Even primary meanings that look the same at first may have additional components that can distort the meaning if used without care. One of the most important things in translation is to be sure that the context is sufficient to mark the meaning desired. Ambiguities often arise when the translator knows only one or two senses of a word and does not know the context needed to signal the correct meaning.

Notice the three Turkish sentences below:

1. Kol yedi (he ate meat)
2. Kol gerdi (he protected)
3. Kol bastı (soldiers swooped, busted, raided)

The first means that he ate the meat of the front arm, the second that he protected someone and the third that police or soldiers raided a house or some place. All of them use the word *kol* which has the primary sense of *arm*. This is the unmarked meaning which all native speakers would give as the meaning of *kol*.

When Zahir Faryabi a Persian poet was praising the king Kılıcharslan, he said "when contemplating to kiss his feet, they had put the seven heaven under his feet like a stool. But Kılıchaslan's one foot was shorter. Zahir's enemies told him that "the poet meant that you were lame, limping. So they made him butcher the poet [7, 14].

Conclusion

Above we have talked about the problem of how to identify the primary and secondary senses in translating the various senses. We have considered the characteristic of words that a single lexical item may have several meanings other than that which most readily comes to mind. We have seen the examples of secondary meanings, or secondary senses.

We have discussed how the the meaning is suggested by the word when it is used alone, when the word is said in isolation. How meaning learned early in life and is likely to have reference to a physical situation. We have described how the same word may have a different meaning when used in context with other words.We have discussed ambiguity caused by senses in translation.

References

1. http://www.glossary.sil.org/term/secondary-sense.

2. Larson M.L. "Meaning Based Translation" University Press of America. New York, 2012. – 589 p.

3. Barnwell K. "An analysis of strategies used in translating the short story". High Wycombe: Summer Institute of Linguistics. 1980.

4. Beekman J., Callow J. "Translating the Word of God". Zondervan Pub. House, Jun 1, 1974 – Religion. – 399 p.

5. Eugene A.N. "Toward a Science of Translating" Leiden, E.J. Brill Netherlands, (1964) 331 p.

6. Quiroga-Clare C. "Language Ambiguity: A Curse and a Blessing" Translation Journal, Literary Translations. (2003) http://translationjournal.net/journal/23ambiguity.htm.

7. Shirazy S. "Bostan ve Gulistan" İstanbul, Cagaloglu, 1984. 473 p.

ACTUAL PROBLEMS OF THE KAZAKH LANGUAGE DURING THE TRANSITION TO THE LATIN SCRIPT

[1]Yermekova T.N., [1]Odanova S.A., [1]Zhangabayeva N.A., [2]Esenbayeva G.Zh., [2]Akylbayeva T.Zh.
[1]Kazakh State Women's Teacher Training University, Almaty, e-mail: ken_tina@mail.ru;
[2]Kazakh Academy of Sport and Tourism, Almaty

Along with the problem of transition to the Latin alphabet, there are questions of orthography. This is because there is a significant difference between writing characters of Kazakh sounds in Cyrillic and in Latin characters. While these issues do not find solutions, we can not talk about raising the level of literacy. Therefore, problems with spelling are of paramount importance. In this project, we will seek to find solutions to spelling problems based on past experience, as well as to solve the problems that arise after the transition to the Latin alphabet using mobile technologies. One of the main goals of this work is to create the possibility of using mobile applications based on multimedia technologies using modern devices. And the transition of the Kazakh society into a Latin alphabet is one of the most effective solutions of modernity. Given that about 5 million Kazakhs live in different parts of the world today, 80 percent of them use the Latin alphabet, and the Latin alphabet is an indication of national identity achievement.

Keywords: programs, mobile applications, game programs aimed at teaching Latin graphics will be created

The globalization process of the world requires the unification of the Turkic-speaking peoples from the socio-economic, cultural and spiritual point of view. The unification of the spiritual values of the Turkic world serves to uplift the historical and cultural heritage of the Turkic peoples and the socio-cultural potential of the modern Turkic peoples, deepen their historical roots and determine the place of Turkic civilization in human civilization. At the same time, there is no danger of turning the spiritual and cultural development into a different direction if the world's civilizations do not support the historical roots of the Kazakh people. There are also nations that have not been able to move on to the new era all over the world. This global process, which has a positive or negative impact on the future of our independent state, requires a great deal of responsibility on our nation. Independence of the country gives opportunity to Turkic peoples to explore our common cultural heritage, to recognize their true nature, to use it for the benefit of the nation, to re-evaluate and re-evaluate our spiritual values. The Turkic languages, including the formation of the Kazakh language, the way of development of the ways of development, the active activity of the way of development of the national world, which are of interest of the researchers at different periods of time, require further study of the national cognition and historical arteries, including the special methods of research at the turn of the century. First of all, Latin is recognized as the international language of science and literature, even though it is not specifically enforced by law. Of course, there are also artificial languages represented as an international language. The extensive support of artificial languages – the Esperanto language, made by Polish doctor L. Zamangof in 1887, and so forth [1].

Not one of the more than 200 artificial languages presented in this way has denied the historical role of the Latin language. The third language of our era was the only language of culture in the western part of the gentle Mediterranean, the Latin language, – writes Ya.M. Borovsky [2]. Even after the fall of the Western Roman Empire, and even in XIII-XIII centuries, artistic creativity and scientific thinking remained the main means of Catholic religion. It is well-known that some of the Turkic written heritage published in this period was also printed in Latin.Now the Latin language is the language of natural sciences, as well as the main language of the anatomical, medical and pharmacological nomenclature, and continuously enhances its potential in the terminological system of all fields of science and technology. Moreover, the language, which has become the main tool of historical education, has been the main language of European culture since antiquity. The classical historical record proves the viability of the language because the linguistic, general philosophical analysis of the data is inadequate, and the fact that higher education institutions fail in the curriculum of the philology profession. It is no secret that civilized countries, in the age of IT, have modern technology and computer information, the main language and terminology of this industry is still in Latin. It is no secret that the social and economic system of the society moves to the path of innovative development and the world of science and education, the main language of the world – the Latin lan-

guage, is in the center of the world to be able to increase its openness to the outside world. And the transition of the Kazakh society into a Latin alphabet is one of the most effective solutions of modernity. Given that about 5 million Kazakhs live in different parts of the world today, 80 percent of them use the Latin alphabet, and the Latin alphabet is an indication of national identity achievement.

At the moment, the problem of training of the Kazakh written system on the national basis is in the foreground. The Decree of the President of the Republic of Kazakhstan dated October 26, 2017 "On transferring the Kazakh language from Cyrillic to Latin graphics" was amended on February 19, 2018 and a new version of the Kazakh alphabet based on Latin graphics was approved [3]. Some of the issues discussed in the alphabetical versions of the first alphabet were discussed and resolved. The reason was that if we were to take the maximum number of letters in the English alphabet, we would lose our original language. The use of the principle "One-to-one" is one of the most effective ways to save the original sounds in the Kazakh language – most of the correspondents support it.

The head of State noted the transition to the Latin alphabet in his Missive to the people of Kazakhstan "Strategy of Kazakhstan-2050": a new political course for the state ": " We need to start translating our alphabet into Latin alphabet, starting in 2025. This is a matter of principle, which the nation must solve. "And on the eve of the new year at a meeting with representatives of the main domestic television channels, he said: "The transition to the Latin alphabet also has its own deep historical logic. These are the features of the modern technological environment, and features of communications in the modern world, and features of the scientific and educational process in the 21st century. This means that from now on we must start the transition to the Latin alphabet in all areas. This is the requirement of the future. Therefore, we must strive for it" [4]. In addition, N. Nazarbayev in his report "Looking into the Future: Modernizing Public Consciousness" offers a number of projects that can stand the test of the era to solve problems in time. One of these projects is the transition to the Latin schedule. The president said that the Kazakh alphabet is deeply rooted and added: "First, it is necessary to begin work for a phased transition of the Kazakh language to the Latin alphabet. We very carefully and tactfully approached this question. This requires a quiet staged. And we prepared for this with caution all the years of Independence". "This means that from now on we must start the transition to the Latin alphabet in all areas. In other words, by the year 2025, we begin to publish office work, periodicals, textbooks and everything else in the Latin alphabet. And now we will start preparing the beginning of the transition to the Latin alphabet" [5].

And also the goal is to present their own individual perspectives and prove their effectiveness proceeding from the opinion "with the help of scientists until the end of 2017 we must adopt a single standard version of the Kazakh alphabet in a new graph with reference to all members of the community".

Since every patriot, especially for linguists, should take part in solving these national problems, we consider it necessary to consider ways of theoretical and practical implementation of this task in a higher educational institution.

It is appropriate to listen to the views of the scientists, especially the Turks who have experience in this case, in a state-of-the-art question such as moving to Latin. It shows our culture. Yes, of course, not all Kazakhs in Kazakhstan speak, write, work in Kazakh. It's our fate, and it's our fate. If we dig the cause, we will go deeper. It is well-known that if all Kazakhs do not speak Kazakh they will have difficulty in moving to Latin. That is why the President suggested that Strategy Kazakhstan-2050 not only Kazakhs but also 95% of the population in Kazakhstan will master the state language in 2025. That is, in the meantime, when we have a massive mastering of the whole population, we can easily get into Latin. Taking this into account, we must acknowledge the greatness of the President.

Along with the problem of transition to the Latin alphabet, there are questions of orthography. This is because there is a significant difference between writing characters of Kazakh sounds in Cyrillic and in Latin characters. While these issues do not find solutions, we can not talk about raising the level of literacy. Therefore, problems with spelling are of paramount importance. In this project, we will seek to find solutions to spelling problems based on past experience, as well as to solve the problems that arise after the transition to the Latin alphabet using mobile technologies.

It is known that at the beginning of the 20th century, the Kazakh people repeatedly changed the schedule. What actions were taken to teach writing and linguistic literacy at this time? Of course, one can not compare methods of teaching spelling in those days with current methods. In the beginning and middle of the twentieth

century, special dictionaries were published and used to verify the correctness of words. Of course dictionaries are now important in teaching, but at the same time, due to the development of technology, new learning opportunities are being created. Today, for optimal solution of spelling problems in connection with the transition to the Latin alphabet, it is possible to create special mobile applications.

There is an opinion that for the development of literacy it is necessary to rewrite all the time. It's probably no one will deny. "... The acquisition of spelling was represented as a process of gradual accumulation of "visual images", i.e. memorization of the spelling of individual words, supported by repeated visual perception and motor-motor reactions of writing "[6]. Therefore, the correct method was to re-sound the spoken word, then its spelling. But beyond this, there are visual-audiovisual methods that take into account the knowledge of the meaning and root of the word. Using these methods, spelling skills are formed.

The linguistic basis for the transition to the Latin schedule was made in 1929. The basic rules of the linguistic basis for the transition to the Latin schedule was made in 1929. The basic rules of Kazakh graphics and spelling and the first version of spelling were discussed at a conference in the city Kyzylorda. The conference was attended by linguists: E. Omarov, T. Shonanuly, K. Kemengerovich, E. Polivanov, K. Zhubanov. At the conference, the use of phonetic principles, phonemic principles, morphological principles and traditional principles in writing was analyzed, and the work carried out then significantly contributed to the construction of a sequence of Kazakh spelling [7].

Many things were discussed at this conference, however K.Zhubanov draws attention to the lack of spelling rules, and notes that this indicates not the positive side of spelling, but vice versa for its lack [8].

K. Kuderinova, who examined the theoretical foundations of Kazakh script, says: "The basis of today's spelling rules comes from the concepts of K. Zhubanov" [9]. She notes that when we consider the full transition of the Kazakh script to the Latin alphabet, at the stage of preparation for this process, we are faced with the task of examining the weaknesses of the previously created rules, taking into account the "remaining unaccounted" aspects of the existing spelling rules and improving them.

S. Abdrakhmanov, member of the Senate Committee on Science and Social and Cultural Development, said: "First of all, we must rely on the experience of neighboring Turkic-speaking countries that have already switched to the Latin alphabet, through what problems they went through with the transition to a new writing system, we must all this is taken into account and analyzed "and added that it is necessary to take into account the experience of countries that have passed into the Latin schedule [10]. And also noted the fact that 23 years have passed since Uzbekistan switched to the Latin script, but they are still actively using Cyrillic. To avoid the occurrence of a similar situation and find a solution, it is planned to create innovations based on the development of interactive training programs and the use of multimedia technologies.

This project is very important on a national scale. Therefore, it is clear that the problem of language training will arise from the first day of the beginning of the process of transition to the Latin schedule, which is a new era of the development of Kazakh script. After the beginning of the transition, there will be problems with reading and learning the language. The presented research project will contribute to a positive resolution of these problems.

The importance of the project "Linguistic foundations and multimedia technologies for the creation of interactive training programs, in connection with the transition to Latin graphics" is aimed at eliminating linguistic complexities in the transition to Latin graphics. This is a promising project that will meet the future demands and needs of society. The implementation of this project with the participation of programmers also indicates the desire to meet this need, which is aimed at developing literacy and correct spelling.

One of the main goals of this work is to create the possibility of using mobile applications based on multimedia technologies using modern devices. In the scale of this project, for the first time educational programs, mobile applications, game programs aimed at teaching Latin graphics will be created.

When Kazakhstan switches to the Latin schedule, it is necessary to take into account the experience of the transition of other Turkic-speaking countries to the Latin schedule. During the transition to the Latin schedule on June 18, 2001, Azerbaijani President H. Aliyev noted in his message "On improving the use of the state language" that the transition to the Latin schedule is slow, although 10 years have passed. He pointed out that Azerbaijani linguists did not take into account the fact that transition and training are two different things [11].

At one time, an automated system for teaching the Tatar language based on Latin script was created. The authors of this work are: R. Khadiev, R. Bagavieva, P. Aukhadiev, R. Bagaviev, K.R. Khadiev. The textbook describes the need to use computer-multimedia tools for teaching students writing on the basis of Latin graphics. For young children, different kinds of games are offered in the Tatar language, which are aimed at teaching the Tatar language on the basis of Latin graphics. Attention is also paid to the formation of skills and teaching the basic rules of spelling (literacy) of the Tatar language on the basis of the Latin alphabet. There are suggested tasks for graphical representation of texts recorded on audio recordings, and vice versa correct execution of orthoepy of written words.

In addition, in neighboring Turkic countries, there are almost no mobile applications or special language training programs based on Latin graphics. In the teaching of the Kazakh language, based on the linguistic basis for the transition to Latin script, interactive training programs created on the basis of special mobile technologies will be developed for the first time. Therefore, the possibility of financing this project should be high.

The main benefit is that the products that will be prepared on a scale of this project will allow individually, each trainee himself to master the presented material. The main task of education today is constant self-development, and in this respect the presented project will have great opportunities in implementing the teaching of writing on the basis of Latin graphics.

At present, we are searching for solutions to such topical issues of transition to Latin script of the Kazakh alphabet, as a solution to spelling problems, spelling, creation of special training programs, etc.

After learning Latin graphics, the question of how to train it is also important. Taking into account the fact that the Kazakh State Women's Teacher Training University is a pedagogical university, it is also planned to begin training of new alphabet experts and textbooks for kindergartens and secondary schools this academic year. For this purpose the rector of our university G. Aldambergenova, we have created a Latin center and plan to do our job.

There is a growing need for curriculum related to the transition to Latin graphics. In this regard, our university is actively working on the fundamental research project financed by the Ministry of Education and Science of the Republic of Kazakhstan. The specific feature of the research project is the collaboration of philologists and IT specialists. As the first result, you can say the electronic tutorial "Literacy education". This tutorial is ideal for learning alphabet in pre-school classes. The language of the program is very easy, it has a positive impact on the child's ability to visualize, visualize, memorize and visualize. The program has a good picture of an e-teacher, and the latter has the opportunity to learn and repeat it to formulate the listening, listening and speaking skills.

In addition to the problem of transition to Latin graphics, the problem of orthography also occurs. Because of the differences in the sounds of the Kazakh sounds in the cyrillic graphics and Latin graphics, it creates spelling problems. These issues will not be solved and literacy will not rise to a higher level. That's why the problem of spelling is an urgent issue. It is obvious that one of the actual problems is to solve the problems of orthography, to solve the problems of the spelling of the Latin graphic, based on the past experience and the views of scientists. At this point, a special site on Latin alphabet teaching is being developed at the university. The content of the site is based on the spelling of spelling, preparing test tasks for the correct writing skills. We believe this method is an indispensable method for performing a well-trained, easy-to-use test.

Nowadays, it is possible to build effective, easy-to-use skills and critical thinking skills through the incredible learningapps program that teaches teachers effectively to organize the learning process. Based on this program, we have already done a number of tasks in teaching the Latin alphabet. Here the task is structured in a variety of shapes and content. The content includes texts of educational importance. That is, it is not possible for the learner to become bored and focused.

Let's now have a look at some of the issues that need to be settled in some of the issues that arise in the writing of the Latin alphabet:

– Writing complementary words should be based on the spelling of the original orthoopic law of the Kazakh language, based on the national articulation base, using its internal capabilities;

– In the Company, as a solution to the problems that have become the subject of many debate, we support the following statement: In the case of joint Kazakh roots s and h (x), the letter q is used instead of h (x) in order to maintain a meaningful resistance. For example: Ashat, ashana (dining room) words Asqat, asqana and others. If we write this word is read in Kazakh, it will be read as hungry mother, ashat, and the

meaning of the first one changes, the value will disappear.

After making a change in graphics, Kazakh phonetics and spells will be completely changed. Analysis and analysis of this doctrine is the work of all intellectuals (scientists), scientists, teachers, teachers, writers. Without doubt, it will be a good result when it comes to analyzing, analyzing and analyzing the various Latin alphabet problems in the formation of the intellectual nation.

References

1. Artificial languages (electronic resource) – URL: https://kk.wikipedia.org (date of the application: 22.03.2018).

2. Borovskiy Ya.M. Latin language as an international language of science // Problems of the international auxiliary language. – M., 1991. – P. 70-76.

3. Official periodical. The material is taken from the official site of the newspaper Independent Kazakhstan – URL: https://egemen.kz/article/165178-latyn-alipbiininh-nusqasyna-oezgeris-engizildi (date of the application: 22.02.2018)

4. Nazarbayev NA Strategy "Kazakhstan-2050" is a new political course of the established state ". Astana, 2013.

5. Nazarbayev NA Orientation for the future: spiritual revival // True Kazakhstan. 12.04.2017. No. 70 (29051).

6. Bogyavlensky D. N. Psychology of the formation of orthography. M.: Education, 1966. – 304 p.

7. Stenographical report of the scientifically – spelling commission 2-4. 06. 1929. Scientifically – methodical consultation with the NCC CCCI. Kyzylorda city 1930. – 482 p.

8. Zhubanov K. Studies in the Kazakh language. – Almaty: Nauka, 199. – 581 p.

9. Kuderinova K. Theoretical Bases of the Kazakh Law. – Almaty: Center for Development of the State Language, 2010. – 380 p.

10. Abdrakhmanov S. https: //egemen.kz/.../ 158174-uaqyt-pen-undesken-rukhani-ur ...

11. Ospanova B. Language Policy of the Independence of Azerbaijani State. URL: www.rusnauka.com/15_KPSN_2015/.../7_193467.doc.htm (date of the application: 17.01.2018).

PREREQUISITES FOR THE FORMATION OF ABU MANSUR AL-MATURIDI'S TEACHING AND ITS INFLUENCE ON THE SPIRITUAL KNOWLEDGE OF KAZAKHS

Karatyshkanova K.R., Myrzabekov M.M.

Kh.A. Yasawi International Kazakh-Turkish University, Turkistan,
e-mail: kymbat.karatyshkanova@ayu.edu.kz, muratbek.myrzabekov@ayu.edu.kz

The article outlines the prerequisites for the formation of religious views of the great scientist Abu Mansur al-Maturidi and the role of the environment, the time and space where he lived, and where various religions and cultures coexisted. Special attention is paid to the comparative analysis of the text of Abu Mansur al-Maturidi's book "Kitab al-Tawhid" and the dogmas of such religions as Zoroastrism, Manichaeism, Christianity, Judaism, Buddhism, Tengrianism. The characteristics of various debates and ideological discussions aimed at forming the principles of the teachings of Abu Mansur al-Maturidi are given. It is claimed that the source of the worldview of Kazakh thinkers is the teaching of Abu Mansur al-Maturidi, who was able to synthesize issues of religion and morality.

Keywords: ideological environment, murgia, scholars of Hanafi, Abu Mansur al-Maturidi, morality, spiritual knowledge, madrasah, Kazakh thinkers

Abu Mansur al-Maturidi, popularly known as "Imam-l-Mutakallimin Alamu-l-Huda", "Raisu-s-Sunnah", "Musakhihu Ahadi-l-Muslimin", "Imamu Zahid", "Raisu Ahli-s-Sunna", "Mahdiu-l-Umma" [1, s. 94] is a great theologian, born in the city of Maturid, near Samarkand. In the formation of the great scientist, a great role was played by time and space, where he lived and an important role played by a philosophical environment with a high culture. The city where the scientist was born was at the crossroads of the roads that connected the whole world. The caravan route, heading west, passed through this city and breathed life into such cities as Taraz, Yasy, Otyrar, Shash, Bukhara, Samarkand, etc., which were along the lines of the Silk Road. For this reason, at first these cities emerged as a haven along the caravan routes, but over time they turned into the largest shopping centers. Initially caravan routes emerged as shopping centers, the cities of Maverannahr retained their significance for thousands of years as centers of trade and crafts. This is why this territory always attracted the eyes of the great empire and the states that aspired to conquer it. As a trading center, this area was created by an environment in which different religions and cultures coexisted side by side, representatives of the doctrine and ideas, and, in addition to trade, debates and ideological debates took place here. As historical and archaeological evidence prove, representatives of such religions as Zoroastrianism, Manichaeism, Christianity, Judaism, Buddhism, Tengrianism were also living here in the pre-Islamic period and during the period of wide spread of Islam on this territory. Even the renowned scholar Abu Mansur al-Maturidi, in his valuable book, "Kitab at-Tawhid", attached great importance to these religions by devoting a separate chapter to them, analyzing their creeds and dogmas.

By the way, even supporters of the dualism of Zoroastrianism and Manichaeism left a deep impression on the territory Maverannahr. There is evidence that the founder of Zoroastrianism, Zoroaster lived in Iran and Central Asia, and the sacred book of the religion of the Avesta was written on the lands of Turan [21, p. 267]. So, in Maurya, Persians and Sogdiana lived in the neighborhood with the Muslims practicing dualist belief. For this very reason, during the time of Abu Mansur al-Maturidi agenda were topical issues of faith in the dualist belief and among the Muslims were the questions of the existence of God, his unity, divine attributes, etc. .. Dualism was what Abu Mansur al-Maturidi deeply discussed in "Kitab al-Tawhid" where he devoted a chapter and seeks to prove the invalidity of their arguments, also separately studying the dualism and idealistic refutes of their position. Abu Mansur al-Maturidi separately examined the doctrine of "Munnania", "Daysanya", "Markawini", "Majusia" [17, pp. 196-217]. Relating to Zoroastrianism and Manichaeism, gave an analysis of their creeds in order to determine the invalidity of their doctrine.

One of the world's religions as Christianity expanded its territories in the middle Ages. Especially, it is known from the sources that these tribes of Christianity, as the Nestorian and Jacobite, since V century spread in Maverannahr and in Samarkand begin the work of Christian churches and monasteries [20, 2003, p. 18]. And that through Maverannahr, this religion penetrates the territory of Kazakhstan [12, p. 73]. Despite the fact that Islam in

the XIII century is widely penetrated in the territory of the Turks by Naiman, Kerey and long timed Christians [12, p. 82]. Al-Maksidi indicates that along with the Christians also resided here the Jews [10, p. 92]. Apparently, in a society where the Abu Mansur al-Maturidi lived, Christians were around him and he arranged with them debates on religious subjects. Besides Abu Mansur al-Maturidi studied Christianity and Christian denominations, especially he analyzed the Christian concept of Jesus and draw conclusions about the invalidity of their beliefs [7, pp. 266-272]. Thus, the views of Abu Mansur al-Maturidi about Christianity and about the prophet Jesus were approved.

The infiltration of Islam in the territory of Maverannahr begins with the Arab conquests in the Umayyad era. More specifically, during the time of the conquest of the Caliph Walid bin Abdul Malik carried out under the supervision of Kutaiba bin Muslim spread Islam in the Maverannahr and the security of the eastern lands, as well as to control of the Silk Road [4, pp. 214-216]. From this period, the territories of Maverannahr Sogdiana (Bukhara and Samarkand), Khorezm, Sogdiana, Fergana and Shash were incorporated into the Caliphate [7, p. 90]. In general, despite the fact that the Umayyad unfairly treated non-Arabs, the religion and culture of Islam begins to spread to the territory of Maverannahr. Due to asylums in the Maverannahr and Khorasan, opposition to religious movements was far from the Islamic centers of Islam discussed problems [22, pp. 16-17]. And yet close communication with the people of Islam and the mass conversion to Islam is associated mainly with the battle of the Talas [4, pp. 232-233]. Since shortly before the Abbasids took over power, the people who accepted Islam were treated warmly, even were taken to the public service and on furrows of Board. So, long before the time of Maturidi in Maverannahr, cities such as Bukhara and Samarkand, as a result, religious scholars debates with representatives of other religions, for in and of Islam, were laid out the rich depths of religious and philosophical Sciences. Opposition to religious movements had a huge impact, and in particular, within the Shiite during kaysaniya mubaydiya [23, pp. 122], Due to them Islamic issues, as the essence of faith, purity of soul, califato-Imamate, etc. were discussed. At the time of arrival of Maturidi in IX-X centuries, Islam world received further development and perfection of ideological trends and thinking. As centralized power that has survived since the rise of Islam, when the Abbasid caliphs collapsed, the appearing of independent or semi-independent emirates and sultanates began. In addition, the pride of Islamic culture has given an opportunity to get acquainted with the ancient, namely the Greek heritage, thanks to which the Muslim community became available to new and alien thoughts, especially the notion of belonging to the Greek philosophical trends and schools. For example, representatives of the naturalistic, dahriysk, Sofia, Peripatetic philosophy offered philosophical solutions to the problems, questions on creation of the world, the primacy of its God, the essence of God, prophecy, peace which was listed for discussion in Islamic theology. Therefore, Abu Mansur al-Maturidi in his book "Kitab al-Tawhid" alone refers to naturalists [17, pp. 147-150], Dariya [17, pp. 178-191], Representatives of Sumanni [17, pp. 191-192], The Sophists [17, pp. 192-196] and criticizes their views and beliefs.

At this time, the Samanids, seeking sovereignty from the Abbasids, were in the vicinity of the Buyahids, promote ideas of the Shia Imams, Zaydi and the state, to adhere to Shi'ism, and the Ghaznavids, supporters of Sunni and Turkic tribes, stick to Tengriism. Samanids, from 875 up to 999 years with its neighbors were in a state of war and armistice. At the beginning of the Samanid period, peace and tranquility reigned in Maverannahr in heart of developing science and culture. Of course, peace and stability are the main guarantee for the development of science and culture, ideas and thoughts. Samanid rulers show respect and honor to people of science and art, religious scholars. Historical sources report that especially in the month of Ramadan, they collected all the scientists and discussed the problems, even established a tolerant attitude to the non-Muslims [19, p. 15]. Samanid period gave the world such famous men of science, such as Abu Nasr al-Farabi, Abu Ali Ibn Sina, Abu Mansur al-Maturidi.

Purpose of the study

The article is aimed at revealing the justified conclusions that the Abu Mansur al-Maturidi doctrine is at the center of the theological, spiritual and even philosophical views of the Turkic peoples to this day. As is known, now our society is subject to attacks of the newly emerged direction, which harm the national system of thinking of the Kazakh people, the unity and tranquility of society. Therefore, it is necessary today to identify the maturidic teaching as the fundamental force of the Kazakh clergy and its propaganda, thereby demonstrating the teachings of Maturidi as the only force that can resist these areas.

Of course, the support of men of science and religious scholars on the one hand provide stability within society, and on the other hand, made it possible to resist penetrated religious trends from outside. Since the tenth century, Sunni Islamic world was a threat in the face of Shi'ism. Supporters of the government of Ali – the Shiites, in the caliphate has always been on the side of religion and held the opposition direction, but with time under the influence of another's cultures and religions, absorbed elements of ancient, Hellenistic philosophy, Shiism appears in several directions and they violently attacked traditional Sunni theology. One of the Shiite Imam was chosen by Buwayhids, which is almost completely controlled by the Abbasid Caliphate, and in North Africa, they built their own state. It is known that they are competed with the Abbasid caliphs for religious leadership, and that the Ismaili Fatimids, through their missionaries (Da'i) tried to organize the religious riots in Transoxiana [15, p. 502]. Besides, in the neighboring Transoxiana territories in Sistan Kharijites, Shi'ites in Kashan and Isfahan, Qom and Reye, Zaidi in Tabaristan, Mu'tazilites in Istakhri, Armenia and Azerbaijan propagated their ideas [19, p. 18]. In neighboring Maverannahr, Khorasan Mu'tazilites was their propaganda. For this reason, the power to ensure stability in the society relied on the teachings of murjites-Hanafi and Sunni schools, since the majority of people in society were on their side.

According to the teachings of Hanafi, Sunni came here at a later time. In the IX century in the cities of Khorasan and Maverannahr such as Bukhara, Nasaf extend to hashauiya (supporters of Hadith). And in the tenth century, they became the largest trend. Based on the evidence presented in the book Maqdisi, published in the year 990, in the IX-X centuries in such cities as Nishapur, Shash, Tus, Nasa, Bukhara and Isfarain number of Shafi'i equalized with Hanafi [6, p. 116]. If we keep in mind the fact that such well-known scholars of Hadith like Bukhari, Abu Dauit, Tirmidhi, Ibn Ḳutayba originate from Maverannahr, we can assume a growing majority of the supporters of the hadith [6, p. 117]. Although today it is known that the Shafi'i and Hanafi are part of Sunnism, in the middle ages in Maverannahr and Khorasan between them was a terrible competition. Even in mosques, there were clashes, most of which ended in bloodshed [7, p. 92]. Such disputes and debates took place during the time of Abu Mansur al-Maturidi. For example, in his book "Kitab al-Tawhid" Abu Mansur al-Maturidi analyzes problems of predestination [17, p. 406], great sin [17, p. 428], Faith [17, p. 497], thus, he pointed to the teachings hashuitov (supporters of Hadith Shafi'ites) and he explained his thoughts, which he accepted, and where he does not agree with them.

It is known that the Samanid rulers were mostly supporters of the Hanafi doctrine, and supported Hanafi scholars. For example, the Samanid ruler Ismail ibn Ahmad (892-907 years) gathered all the Hanafi scholars of Samarkand, Bukhara and other settlements of Maverannahr, in order to shut out the pathways of foreign religious movements, asking them to promote Sunni. Scientists in order to strengthen the principles of Sunni beliefs, assign the job to Hanafi scholar Iskhaḳ bin Muhammad al-Hakim al-Samarkand. After the end of a given work, this work was approved by the ruler and the religious scholars. Known under the name "Al-Sauadu al-Azam", this work is becoming popular in the period of Samanids [10, p. 87]. Based on this, one must assume that Hanafism, compared to other Islamic movements, was much deeper, wider and has a lot of supporters.

Hanafi doctrine was built on the beliefs and methods of Kufan scholar Imam Azam Abu Hanifa. The peculiarity of his views and methodology was that in solutions to problems in addition to the Koran, he emphasizes the role of reason. Therefore, Abu Hanifa is the true originator of the school of Ahu Paradise. This, on one hand, expanded the horizons of human thought, and on the other side, Islam began to take non-Arabs. School of Ahl al-Rai took into account the non-Arabs needs, and even in VII century, the school of Dahl al-Rai was widely distributed in the territory of the Eastern Caliphate, Khorasan and Transoxiana. With the support of the people of Transoxiana and Khorasan, the Abbasids came to power, and the disciple of Imam Azam Abu Yusuf appointed Chief Justice [18, p. 498]. A friend and disciple of Abu Hanifa, Omar bin Maimun a-Ramm (787-88 y.) Is appointed a judge of Balkh, and later Hanafi scholar, Abu Muti al-Balkhi for many years in this city became judge. Another scholar of Abu Hanifa, Abu Ismail Nuh ibn Abi Maryam is appointed a judge of Merv, the student Abdul-Aziz bin Khalid al-Tirmidhi, judge of Tirmidhi. Famous student of Shaibani, a scholar of the Hanafi fiqh, Suleiman Abu Musa bin al-Suleiman al-Juzjani, was a native of the city of Juzjan. Regional Hanafi school was built by the student of the Hanafi school, Abu Hafs al-Kabir (Ahmad bin Hafs) (d. 832 f.) [10, p. 84-87]. In Balkh and Ray there is concentrated majority of Hanafi students.

In one of the scientific and cultural centers – Samarkand, home of Abu Mansur al-Maturidi, as widely promoted Hanafi doctrine, during the life of Abu Hanifa, all held the doctrines of Hanafi. Writing the biography of Abu Hanifa, Kardari gave lists of students of Abu Hanifa, who spread the Hanafi doctrine in Samarkand – Abu Mukata Hafs bin Salm (Suhail) al-Farrazi, Nasr bin Abi Abdilmalik al-Attacks, Ball bin Abi Mukata, Muhammed bin Hassan, Yunus bin Is'haaq and perform in this city the work of judge Ishaaq bin Ibrahim al-Hanzalah [9, p. 123]. This is also evidenced by one of the famous scientist of the school of maturidity – Abu Muin al-Nasafi. According Nasafi, Merv, Balkh and other cities of Khorasan, Maverannahr fully, the TURKSOY and even the people living along the border, from the outset adhered to the methods of the school of Abu Hanifa [9, p. 124]. Thus, to get an education and upbringing in this environment, Abu Mansur al-Maturidi further develops the Hanafi doctrine, equating reason and religious revelation.

Materials and methods of research

The methodological basis of the article is a hermeneutic and existential analysis of the work of Abu Mansur al-Maturidi entitled "Kitabi at-Tawhid". The reason is that with the help of these methods, the interpretation of the text makes it possible to understand the prerequisites for the formation of Abu Mansur al-Maturidi's teaching. At the same time, from the point of view of religious knowledge, it is possible to determine the continuity of opinions of great thinkers and Kazakh thinkers. The second method, comparative analysis, compares God's evidence with the principles of Abu Mansur al-Maturidi and other religions.

The sources particularly listed the names of the teachers of Abu Mansur al-Maturidi – Hanafi scholars, Abu Bakir Ahmad bin Is'haaq bin Salih Al-Zhuzzhani, Abu Nasr Ahmad ibn al-Abbas al-Iasi, Muhammad bin Mukatilar-Razi, Nusair bin Yahiya al-Balkhi, Abu Bakir Raja Muhammad bin Ahmad al-Zhuzzhani [1, pp. 41-43]. There are versions with different chains of teachers of Abu Mansur al-Maturidi that include Muhammad Shaibani, Abu Yusuf, Abu Muti al-Balkhi, Abu al-Mukata Samarkandi. Ibn Yahiya, Bayezid, Zabid, U. Rudolf [1, pp. 37-40]. Number of the names of the teachers listed does not match, but all of them are Hanafi scholars. All medieval and modern scholars recognize that the source is maturidity teachings of Hanafi School. This means that Abu Mansur al-Maturidi imbued with the birth of the teachings of Abu Hanifa, and at the level of their understanding commented on this teaching. In addition, it is necessary to recognize the special role of some of the works that have contributed to the development of maturidity doctrine, a complete collection of theological and religious-legal views of Imam Azam "Fiqh al-Akbar", a collection of thoughts Abu Hanifa "al-Fikhul-Asbat", which was compiled by a disciple of Abu Hanifa, Abu Muti Hakam bin Abdillah al-Balkhi (814 died.), "Kitab al-Alim wa-l-Mutaalim" [1, pp. 75-76], collected yet by another disciple of Abu Hanifa, Abu Muqatil as-Samarkandi.

Results of research and their discussion

In our opinion, the positions that refer to the origins of the Maturidi teachings to the views of the Murjia stem from the assumption that Abu Mansur al-Maturidi and Abu Hanifa were Murjites and the identity of their views with the views of the Murjites, and that their opponents called them Murjites. There are also opinions that go beyond the Sunni, connects the doctrine of Abu Hanifa with directions of murdzhit. For example, considering Ash'ari Abu Hanifa and his followers as the ninth direction of murdzhit, thus defines it as a period that goes beyond the Sunni [9, p. 122].

It is known that Murgia takes its name since the Battle at Syffine where he faced Ali and Mariyah. At this time, on the agenda considering issues such as the value of faith, a great sin and the human condition in the afterlife who has committed a great sin. First thoughts around these problems have been proposed by murdzhits. Kharijites both for members accused of unbelief at Syffine battle and who oppose the commandments of Allah, commits a great sin, repents, and criticized them, history will remember them as ignorant. Although the Kharijites were reputed to be ignorant, and for fans, thanks to them, the problem of great sin, the state of man in this life who have committed a great sin, the value of faith, etc. were discussed. Current murdzhit contradicted Kharijites in matters of great sin, the earthly condition of the person who has committed a great sin; murdzhity called a sinner, the believer who has committed a great sin, but this man is considered to be the faithful sinner, and in the hereafter everything except Allah bring companion, all the great sins are forgiven, or will be punished. After he had washed away his sin, he goes to heaven. Therefore, they were called murdzhits, which meant "leaving for later, postponing", "and giving hope".

We believe that, Murgia appears as the opposite during the Kharijites, who kept the people in fear, fiction and who agree with their opinion were accused of unbelief; as a protest against the struggle between the Umayyad and the Hashemite; Umayyad against unfair treatment to the people, the humiliation of non-Arabs and extremely unreasonable taxes [8, p. 172]. Founded in about the first century after Hijra, Murgia is widely distributed in Iraq – the centerpiece of most non-Arabs. And at the end of the first century of Hijra, the center of the Murgia became Kufa. Religious and legal issues of Murgia were prepared by Hammed, and then Abu Hanafi. The main reason for the wide spread of Murgia becomes doctrine, which gave equal rights of Arabs and non-Arabs [20, p. 51-52].

However, Murgia in religious and theological matters did not stick to one idea and conditions. The dichotomy of faith and action, a person has committed a great sin remains a believer, a person's position in other worldly world, if in these issues murdzhity share the same opinion, the decision of a number of theological issues, they offered different views and concepts, however, decided differences among murdzhit on various issues of doctrines, the largest differences existed among them in the definition of faith (Iman). For example, one of the branches of Murgia – Yunus believed that a person has committed a great sin to avoid hell, because sin cannot be called perfect work, sin is when a person has the intention and desire to make a sin, it is the state of man in the afterlife when he has committed a great sin and is solved differently; Salih bin Omar believed that prayer is not a mandatory action, binding effect – is the belief [18, pp. 248-249]. This gave rise to a protest of the traditional Sunni scholars, which supported by most people, murdzhit were accused of excesses. Judging by the position, murdzhity divided into two major areas: the extreme and moderate. The second direction may be called Hanafi or Hanafi murdzhit, it retained equality between reason and doctrine, and even combine them. Based on the classification, Abu Mansur al-Maturidi divides murdzhit into two groups: worthy of "praise" and "charge", thereby supporting praiseworthy Hanafi of murdzhit. In his view, worthy of praise are those who trust in God in human state, has committed a great sin. Since Allah forgives all except the worship of something else, if you wish [2, p. 194]. We note that the Murjits in the creation of deeds, the responsibility was laid not on man, but on Allah [2 p. 195]. Thus, it supports a moderate murdzhism, matching actions with the Sunni.

The path laid by Abu Mansur al-Maturidi subsequently became an occasion for laying Maturidi School. This doctrine, which is at the origin of Hanafi doctrine, can be considered in several subsections. The emergence of the Hanafi School and its development was one of the prerequisites for the spread of the religion of Islam in Central Asia. The questions of further development of the Hanafi doctrine were solved by Abu Mansur Maturidi and established the Maturidi School. This was the second of the preconditions for the adoption of the Turkic peoples of the religion of Islam. In these times, Maverannahr became the center of the Hanafi School of Maturidi. Put differently, the works of Abu Mansur Maturidi such as "Kitab al-Tawhid" and "Tavilat al-Qur'an" provided further development of Maturidi School. Starting with Maturidi teachings, this trend is reinforced by the teachings of Abu Moein al-Nasafi, al-Hakim al-Samarkand, Abu Mohammed Abdulkarim bin Musa Pazdaui, Omar Nasafi, Fergana scientist Sirajuddin Ali bin Osman al-Ears, Bukhara scientist Nuraddin al-Sabuni, and etc. .. Thus, Maturidi School blocked the penetration of Central Asia to other Islamic schools.

In our opinion, the Maturidi teaching is at the center of the theological, spiritual and even philosophical views of the Turkic peoples to this day. The reason for this is the penetration of the minds of Turkic religious thinkers with the teachings of the Hanafi-maturidite trend. By the way, in the pre-Soviet period the school-madrassas of Bukhara and Samarkand, saturated with the Maturidi teaching, were very authoritative. In addition, the majority of Kazakh thinkers of the XIX and early XX centuries were pupils of the religious madrassas of Maverannahr, or madrassas opened in Kazakh, Tatar, Bashkir lands on the example of Samarkand and Bukhara madrassah. For example, a well-known adviser, Abylaikhan Buhar zhyrau [16, 2014], known theologians of the nineteenth century N. Talasov, Sh. Kosshygulov [24, p. 13] were educated in the madrassas of Buhabay.

This means that there is sufficient evidence of the mosques and madrassas operating in the pre-Soviet period, where education is given in the Hanafi-Maturidi direction. For example, usually along with the Hanafi jurisprudence (fiqh) taught by Aqedah Maturidi madhhab. In particular, the main textbook in madrassas served the essay "Akaidi Nasafi" [5, p. 5] Omar Nasafi, representing a summary of Maturidi Aqedah. The well-known scientific centers of Central Asia – hundreds of Bukhara

madrassah, such as the Arab world, Kokiltash, madrasah in Samarkand, Shir-Dar, Tilla-Kari madrasah in Tashkent, Barak Khan, etc. studied students not only from Maverannahr, but also from other regions of the Islamic world, or deepen their knowledge. For example, some teachers, who took the formation of the Tatars of the Volga and the Urals, were brought up in educational centers of Transoxiana. By the way, in the Orenburg madrasah "Husain", in the Ufinsk madrassas "Galia", in the Trinity madrassas "Rasul" and "Muhammad", besides in many madrassas in Taraz, Shymkent, Turkestan, Karnak, Samira, Akmeshita, Shame, Akmola, Karkaraly, Urals, Aktobe, Kostanay, Atafu, etc. were built samples of madrassas of Transoxiana, and the main textbook in these madrassas were major compositions of representative of Maturidi school – Omar Nasafi "Akkad" and its commentary "Sharh acid en Nasafi" Sagduddin Taftazani [11, p. 186].

Kazakh religious thinkers, educated in these madrassas, built their world under the influence of the Hanafi school-Maturidi, wrote his works. In particular, in the works of prominent statesman Aktamberdy, Bukhar Zhyrau, in the works of Kazakh thinkers and educators of the nineteenth century as Abay Kunanbayuly ("Words of edification"), Ibrai Altynsarin (Introduction to Islam) and Shakarim Kudaiberdieva ("the adoption of Islam Terms") are religious and educational edification of faith and requirements of Islam for the younger children in line with Hanafi-Maturidi school.

The XIX century was dominated by Sufi motives in the works of Kazakh religious educators. Since the doctrine and culture of Kazakhstan retained its importance in the Kazakh traditions and views in religious philosophy. However, Kazakh scientists can skillfully combine Sufi motifs with Hanafi-Maturidi teaching. For example, in poems and words of edification Abaya Sufi themes intertwined with an explanation of the problems of Kalam, such as the nature of God and His attributes, predestination of human action, human choice in line with the teachings of Maturidi. In addition, in the works of Kazakh religious educators of the nineteenth century, such as Akmola, Ibrahim Abu Bakir Kerderi, Nursha Naushabayuly, Mashhur Zhusip Kopeyuly, Shadi Zhangiruly, Shakarim Kudayberdiuly, Makysh Kaltayuly, Shortanbay Kanayuly, Balmagambet Balkybayuly, very common Allah greatness questions and His attributes, the freedom of man's will, the essence of life and its meaning, the frailty of worldly life, etc.

Similarities of Maturidi teachings containing composition of Kazakh thinkers were limited to issues such as the confession of faith, the unity of God and His attributes, prophecy, freedom of choice and the will of man. In general, the basis of religious beliefs of Kazakh religious educators is the question of the confession of faith. The main reason for that, most likely, is – a confession of faith, which is the foundation and beginning of all religion and religious knowledge. All of the traditional works of kalam, including Maturidi doctrine recognize the confession of faith, committed with the participation of the heart (tasdiқ). So the believer will have to strengthen their faith by knowledge of sustainable evidence. Abu Mansur al-Maturidi faith of the believer blindly (taqlid) devoid of evidence for their faith did not accept. However Maturidi imams in later time acknowledged the confession of faith through taqlid, but because of not strengthening their faith, they were perceived as people who have committed a great sin. These views are found in the works of Kazakh religious thinkers. For example, Ibrahim Altynsarin in his book, "Introduction to Islam", written for the purpose of religious instruction of children, considering the faith in three sections, it is – faith Tahqeeq, istidlali and taqlid, and provides an analysis of each section [3, pp. 190-191] Shakarim Kudayberdiuly emphasizes that faith must maintained by the heart, if the heart of man has no faith in the Creator, then that person has no true faith [13, pp. 7-8], he believes that the person is not strengthening our faith by the mind and not brought her to the true faith is a sinner [13, pp. 7-8]. In their view, based on the fact that man's heart accepts the unity of Allah and the Prophet Muhammad His Messenger, he is considered to have reached the stage of Mu'min, Muslim. Muslim, because of committing great sin does not become disbelievers in this life, he is perceived as a true Mu'min. Because of sin he will be perceived as fasiq, immoral Mu'min. In accordance with the sin committed, he may be punished by Allah. In the Day of Judgment, the condition of that person is decided by Allah, the Creator to either forgive sins or punish. Man, because of their sins should live a life without hope of forgiveness, but to live in fear or to hope for forgiveness of sin [13, p. 8]. Hence, human life must be located between hope and fear. Acts cannot be a part of faith. They are required, but differ from the faith. A believer must speak the words of confession of faith without any doubt that he is a believer [3, pp. 189-190]. That is, he should say "I am a true believer. Due to the

separate consideration and acts of faith, people who perform acts of faith is not required to increase and does not decrease because of not performing. It is only considered a sinner and will be punished. A person who commits a crime, opposed by religious laws, is considered lost faith. This determination takes place in the works of Shakarim and Abay. All Muslims and the believers in faith are the same question. Faith of someone cannot be high or low. The differences are only the acts.

Differences of actions and beliefs are the foundation of Maturidi philosophy of faith. In accordance with the teachings of Abu Mansur al-Maturidi, Kazakh religious thinkers distinguish between faith in compulsory execution of acts and not performing them, knowing their commitment. A man who does not believe in mandatory religious Canon, becomes an unbeliever who believes in commitment, but not fulfilling them, he is considered to be a believer [13, pp. 35-36]. In their view, prayer, fasting, tax, pilgrimage – is not faith, rites only is faith, or principles of faith and Islam.

The views of Kazakh religious thinkers around the position of faith are completely similar to the teachings of Abu Mansur al-Maturidi. That is, in the words of Shakarim, symbols of faith, is "believe in the existence of Allah, in His unity, believe in the existence of angels, believe in all the books sent to the prophets, believe in the prophets, believe in the Day of Judgment, believe that what is good and evil does not come without preselected by Allah, believe in life after death "[1, p. 8].

Belief in the Great Allah, as the main symbol of faith and as the main theme of the teachings of theology, Kalam, which took place in the works of Kazakh thinkers, in parallel with the evolving doctrine of Abu Mansur al-Maturidi. That is, in all doctrinal matters are descriptions that Allah exists, is one and has no equal. Methods of proving the existence of Allah, taking place in the theological works, artfully used in the works of Abai:

Bas zhogary zharalgan, Myin tomen,
Qarashy, Dene bitken retimenen,
Istin bas – retin tanymaqtyq,
Iman bilmes tagatty qabyl Demen [14, pp. 268].

In addition, proof of causality are listed in the "Three true" Shakarim.

The question of the divine attributes is one of the classic polemical theologies. Therefore, in the teachings of Kalam, questions of the divine attributes considered. In general, in the teachings of Abu Mansur al-Maturidi, the Creator is unmatched. In the words of Abai, in accordance with the teachings of the Maturidi, Great Allah has the following attributes Hayat, Ilm, Kudrat, Basir, Sami'e, Irada, Kalam, Takvim [14, p. 352]. The attributes of Allah cannot be unified or separate from the objects [14, p. 355]. The attributes of the absolute Creator, the created mind cannot explain them [14, p. 353]. Abay believes that in them, Azali and Abadi [14, p. 354].

Divine attribute was considered by Maturidites and distinguished it from other schools, it's – takvim. According to them, takvim attribute – one of the eternal attributes such as "ilm", "Kudrat", "Irada", "Sami'e" and "Basir". The inherent attribute of creation of Allah is eternal. However, the created world cannot be eternal. After all, the creator and the created world are two different things. The created world was created by God, having a divine quality of creation. According to Maturidi, human mind is incapable of understanding the essence of takvim. In this situation, the only proof offered is that the whole of the created world was created by the divine mandate "be (kuna)". The Attribute of divine creation (takvim) is described in the works of Kazakh educators. For example, if the work of Shakarim "the creator, works or not [13, p. 11], Then the following combination of Ibrai is creator creates out of nothing [3, p. 197]".

According to Maturidi, nothing is created without a purpose in the world. On the contrary, there is a reason, the purpose and plan of creation. In this regard, all what Allah does is part of his characteristic of inherence and reasonable principles and not contradict. Everything in the world is excellent and accurate. Apparently, the idea has two kinds: the first – justice, the second – mercy. Justice – puts everything in its place. If we talk about the mercy of God, he has no limits. So divine acts cannot contradict the idea. Otherwise, it is – madness, it does not correspond to the status and honor of Allah. For this reason, Abai words of edification intends to say the following "The Great Creator did not create anything without a plan" [14, p. 368]. Knowledge of God – was unanimously recognized as rationally possible by Maturidi scientists. If Allah had not sent a prophet, the people through their minds must know that Allah is there, and is one, worthy to give an explanation of the divine attributes. Since the mind is able to make such a conclusion. Therefore Shakarim work states that a person who is not aware of the divine revelation is obliged to believe in the Halach [13, p. 8].

The issue of prophecy as well as in the works of Maturidi Imams was considered in the works of Kazakh thinkers. The essence of

prophecy, the prophecy of Muhammad, and his exemplary life is the subject of stories and legends. For example, Jusipbek Shaikhislamov in the poems "Poem about how al-Hazrat Rasul was a guest in a mirage", "Poem of departure of Muhammad, the Messenger of Allah with the world mortal to the world of the eternal"; Shadi Zhangiruly in his poems "The history of the Prophet Ibrahim", "Nezam Siyar Sharif" describe the qualities of the Prophet Muhammad.

According to Maturidi teaching, issues such as this, as the last prophet – the prophet Muhammad, the proof of his prophecy is the Qur'an, there is no equal to the Qur'an, the meaning and said it, he says that it was not anyone we know, and what is relevant to the future, reports of past prophets, the Qur'an is a miracle as was described by illiterate man, these and other issues were discussed in the works of Kazakh thinkers. For example, in the work of Shakarim, conditions for the adoption of Islam were as follows: "Is it not a great proof that our prophet, being illiterate, knew of the previous prophets, knew the fate of nations? While readers of the Torah, asked various questions during the Bible testing, he answered everyone, is proof that in a short time Islam had spread in many lands, not by animals, the troops, and the true religion of Islam and prophecy?" [13, p. 13].

However, the charity of the Prophet Muhammad, addressed to the weak, the hungry and the homeless, the constant propaganda of the right, the true path, warning people away from bad deeds, prayers, training, cleaning of material and spiritual filth, the promotion of social justice, the spread of religion, useful to society and to individual who served as proof of His prophety [3, pp. 198-199], all fully documented in the poems of religious enlighteners and poets.

Human action and its role in the action is one of the factors determining the life. Therefore, from the very beginning of Islam, the freedom of human choice, the predetermination of human activity can become a cause of controversy between the schools given a few views. One of them was Garrity (gills), who denied the freedom to choose the person they support and strengthen the belief that everything is in God's hands; second were qadariyah and Mu'tazilites, denied the divine choice and power, supported by the opinion of Otomi, that everything is in the hands of man; and a theological opinion, claiming that the person gets (kasb) created by God. However, issues related to the choice and will of man are actively discussed by Kazakh thinkers. Twenty-seventh edification of Abai and Shakarim conditions for the adoption of Islam claimed inconsistency of the positions of zhabritov, qadariyah even Asharites about human action, and that they do not correspond to the spirit of Islam, a charity that looks contradictory to each other and are not viable. They adhered to opinions that are not worthy of forgiveness and God's justice [14, p. 338] restrict human actions.

According to Maturidi, man is a true master of his actions, it is possible to strengthen the mind, feelings and Quranic verses. The Creator warns that together with the freedom of man there is an imposed number of responsibilities and tasks, the fulfillment of which will determines if a person will be punished or thanked. Man has been given strength and power to work and perform actions. So human action is power, and the result has not yet created the desire (Irada juz'i). It is a guarantee of responsibility to human actions. A person with such abilities of action, choose it as desired and performs. The origin of good and bad human act depends on the power of Allah. This means that in the implementation of the action, there is involvement of the role of man and the power of Allah. Here, the human role is an intention to perform an action, choice of action and its implementation. Allah Almighty – creates it. The birth, an influential power to act, that is, the creation of action belongs to Allah. In other words, in the implementation of specific actions of choice is inherent to man, and the exercise of choice, is inherent in the creation of Allah. This moment in the words of Abai's edification is explained as follows: "you – there is a God, the Creator of good and bad, but the implementer is not a god, God creates the disease, but you do not have a cause of the disease, God creates wealth and poverty, but you are not the cause to grow rich and impoverishment, I could understand [15, p. 339]". Thoughts of Abai commented by Shakarim through the prism of Maturidi doctrine: "You have to understand yourself. Allah Almighty will never incite his slave to bad actions. Bad acts a person commits yielding bodily pleasures, deception of Satan, Allah Almighty and the words by Sharia religious ministers suppresses his actions ... always punishes only to do good, and encourages the soul to make good [13, p. 17-18].

Conclusions

Concluding, Maturidi doctrine is the spiritual pillar of the Turkic peoples, including the Kazakh people. The article is aimed at identifying valid conclusions that Maturidi doctrine is

at the center of theological, spiritual and even philosophical views of the Turkic peoples today. As you know, today our society is exposed to attacks of latter-day direction, damaging the national system of the Kazakh thinking, unity and peace of society. Therefore, necessary today are revealing Maturidi doctrine as a fundamental force of the Kazakh clergy and its promotion, thereby to show the doctrine of Abu Mansur al-Maturidi as the only force which is able to withstand these areas.

We are grateful to the Ministry of Education and Science of the Republic of Kazakhstan for grant financing of the research project on the theme "The Hanafi tradition in Central Asia and the foundations of Kazakh spirituality", within the framework of which this article was prepared.

References

1. Ak A. Maturidi in the sources: Maturidi and Maturidilik / A.Ak. Ankara. 2006. P.34-76.

2. Ak A. Abu Mansur al-Mâturîdî's View of Murcie / A. Ak. // Religious Studies. 2007. Vol.86, P.194-195.

3. Altynsarin I. Life and works / I. Altynsarin. Almaty, Rauan, 2013. P.194-199.

4. Bulutay M.Zh. Ancestor religion Why did the Turks become Muslims? / M.Zh.Bulutay. Almaty, 2000. P.214-233.

5. Kholnazarova L. State and public libraries in the Bukhara emirate in the XIX – early XX century / L.Kholnazarova // KazNPU Bulletin. History, polistics and social series. No. 3 (26). Almaty, 2010. P.135.

6. Kalayci M. Relation of Maturity in Historical Process / Doc.diss. Ankara, 2011. P.116-117.

7. Korkmaz S. Imam Ebu Mansur al-Maturidi's Life and Works / S.Korkmaz // Religious Studies, May – August. 2001. P. 92-94.

8. Kutlu S. Mezheb Murcie: Birth, Ideas, Literature and Attitudes to Islamic Thought / S.Kutlu // Journal of Gazi University. Corum, Theology Faculty. №1, Ankara, 2002. P.172.

9. Kutlu S. Mazhebî Background of Ebu Mansur al-Mâturîdî / S.Kutlu. İmam Maturidi and Maturidilik. Ankara, 2007. P.123-190.

10. Madelung W. The spread of the first Mursi and Hanafi in Horasan and Maverannehir / W. Madelung. İmam Maturidi and Maturidilik, Ankara, 2007. P.84-87.

11. Makhmutova A.Kh. Revival and development of the education system of Muslim Tatars in the Volga-Ural region in the late 18th – early 20th centuries / A.Kh.Makhmutova // Nauchnyi Tatarstan. №1, 2011. P.186.

12. Orynbekov M. The Origin of Kazakh Faith / M.Orynbekov. Almaty, 2002. P.73-82.

13. Qudaiberdiuly Sh. Muslim conditions / Sh. Qudaiberdiuly. Almaty, 1993. P.8.

14. Qunanbaiuly A. A lot of sorrow passes away. Poems, black words / A.Qunanbaiuly. Almaty, Rariret, 2008. 358 p.

15. Saffet Sarykaya M. The place of sects and sects in the process of Islamization of Turks / Sarykaya M Saffet // Turks. Ankara, 2002. P.498-502.

16. The history of studying madrassa of the work "Diwani Hikmet". Available at: http://azretsultan.kz (date of access:2014).

17. The Book of Tawheed. El-Maturidi Ebu Mansur / Explanatory translator: B.Topaloglu. Ankara, 2002. P.196-497.

18. Tok F.Two Claims About Ebû Hanifa/İtham: Murciîlik and Halku'l-Qurân / F.Tok // Journal of Islamic Law Investigations. No.13, 2012. P. 248-249.

19. Tuglu N. Assessment of the Khalami Hadiths in the framework of the Mahlûdî Kelam School. Doc. sci. diss./ N.Tuglu. Isparta, 2003, P.15-18.

20. Unver M. Verses that Feed the Background of the Abu Hanifa thought / M.Unver // Islamic research magazine. Vol. 15. No. 1-2, 2002. P. 18-52.

21. Zatov K. Historical roots of Zoroastrianism and religious doctrine. Cultural heritage of the Kazakh people. Ancient nomads' outlook. Vol.1. / K. Zatov. – Astana, – 2005. 267 p.

22. Zhandarbek Z.Z. Yassawi way and Kazakh society / Z.Z. Zhandarbek. Almaty, 2006. P.16-122.

23. Zhandarbek Z.Z. Nasab-name versions and history of the Turkic / Z.Z.Zhandarbek. Almaty, 2002, P.23.

24. Zholseyitova M. From the history of Muslim education in Kazakhstan (the second half of the XIX century – beginning of the twentieth century) / M.Zholseyitova. Almaty, Aziat. 2004. P. 13.

FORMS AND MODELS OF SOCIAL ADAPTATION AND INTEGRATION OF FOREIGN STUDENTS

Talanov S.L., Aleshin V.V.

Yaroslavl State Pedagogical University, Yaroslavl, e-mail: talanov_sergei@mail.ru, aleshin_vladislav@lenta.ru

Forms and models of social adaptation and integration of foreign students are analyzed. Within the sociological study, it was established that for foreign students, social integration takes place in three scenarios. So, for a large part of foreign students from the CIS countries, social integration occurs in the form of assimilation. For a significant part of foreign students from the Baltic countries, social integration takes place in the form of acculturation. For a small part of foreign students, social integration occurs in the form of absorption. In addition, it was found that foreign female students, regardless of their ethnic origin, are less likely to join an international union than male. It was also found that the interethnic adaptation of ethnically mixed student families in Yaroslavl obtains the character of ethnic assimilation. According to the results of the study, it is generally concluded that, despite the different scenarios for the social integration of foreign students, an absolute majority of them can be characterized by integration, which is described by an integrative model – multiculturalism. In other words, foreign students actively interact with the local population, while retaining their traditions and custom

Keywords: social adaptation, interethnic adaptation, acculturation, assimilation, universities, foreign students

The relevance of the study

According to the Federal State Statistics Service in 2016-2017 academic year 132,700 foreign students were enrolled in the Russian Federation, while in 2015-2016 academic year the number of foreign students was only 124,0 thousand.

The majority of representatives are from Kazakhstan – 50.7 thousand people. The second place is for Uzbekistan – 16.8 thousand people. The third place is for young people from Turkmenistan – 15.9 thousand people.

According to the positional experts, our country actively uses education as a soft power, mainly in respect of students, bachelors from the CIS countries which is linked to originally highly developed cultural and economic communication level [10].

Political scientists and sociologists express their concern over the frequent cases of propaganda of the ideas of Islamic radicalism in the universities. So in 2015, five students who came from Tajikistan to study in YSTU went to fight on the side of ISIL. And these are only the established facts [1]

According to the Ministry of Internal Affairs of the Yaroslavl region, the number of people brought to criminal account is rising among migrants. According to the UFSIN (Penalty execution authority) of the Yaroslavl region, the correctional colonies in the region contain a significant number of citizens from the CIS countries, mainly for the distribution of drugs. Only one correctional colony #8 is serving a sentence of about 700 citizens from Tajikistan.

Given the above, it is important to facilitate successful adaptation of foreign students.

Empirical basis of the study

A survey of Russian students conducted in 2015-2016 in:

– Yaroslavl State Pedagogical University (YSPU);

– Orel branch of the Russian Academy of National Economy and Public Administration under the President of the Russian Federation.

A survey of foreign students conducted in 2016-2017 in:

– Yaroslavl State Pedagogical University (YSPU);

– Yaroslavl State University (YSU);

– Yaroslavl State Technical University (YSTU);

Quota sample. Selection n = 200. Quota variables: gender, age, citizenship, university.

In-depth interview of university teachers has been conducted n=8.

A secondary analysis of the following data was carried out:

– Federal Service of State Statistics of Russia;

– Judicial department at the Supreme Court of the Russian Federation;

– the results of sociological research conducted by Russian Public Opinion Research Centre, the Center for the Study of Interethnic Relations of the Institute of Sociology of the Russian Academy of Sciences (Moscow).

In addition, in-depth interviews carried out with the positional experts – employees of Migration Service (UFMS of Yaroslavl).

In 2018, a content analysis of the publication in the media on this issue was conducted.

Method used for empirical data processing: IBM SPSS Statistics 20.0 and MS-Excel.

Methodological basis of the study

The methodological basis of the study is the model of the acculturation strategies by J.W. Berry.

Within the study, we relied on the scientific works of sociologists of the Center for the Study of Interethnic Relations of the Institute of Sociology of the Russian Academy of Sciences (Moscow): L.M. Drobizheva, S.V. Ryzhova, I.M. Kuznetsov, V.D. Shapiro, E.M. Arutyunova and others. Also, we used the scientific works of the following authors: J. Baudrillard, B. Bjerregaard, J.K. Cochran, Laura K. Donohue, J.S. Coleman, O.V. Eparkhina, R. Inglehart, S.A. Baburkin, O.A. Koryakovtseva, A.V. Lymarev, S.F. Messner, R. Rosenfeld, V.D. Shapiro and others [3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20].

Main hypotheses

1. A small part of foreign students plan to stay for permanent residence in Russia.
2. For a significant part of foreign students from the CIS countries, social integration occurs in the form of assimilation.
3. For a significant part of international students from the Baltic countries, social integration occurs in the form of acculturation.
4. For a small part of foreign students, social integration occurs in the form of absorption.

Working hypotheses

1. Interethnic marriages are formed mainly according to the scheme "foreigner-local" and only a small percentage according to the "foreigner-foreigner" scheme.
2. Foreign female students, regardless of their ethnic origin, are less likely to join an international union than male.
3. Interethnic adaptation of ethnically mixed student families in Yaroslavl obtains the character of ethnic assimilation.

Results of the study

First we as researchers were interested, if it is important for foreign students to maintain their own cultural identity? As a result of the survey, it was found that for 36% of respondents this is important. 54% of foreign students indicated that it is important for them to maintain a relationship with another group, especially with representatives of the titular nation.

The survey on the attitude towards mixed marriages showed that 23% of girls and 40% of young men are ready to marry with representatives of another nationality or religion. So this group of foreign students explained that the main thing in concluding a marriage is love, not citizenship, nationality, religion, financial status, etc. They pointed out that they would go against the will of parents if they were prevented from marrying for love with a representative of another nationality.

Next, we studied the leisure of foreign and Russian students. It was established that foreign students spend their free time, first of all, socializing in social networks, actively go in for sports and communicate with friends. It was also revealed that foreign students three times more often spend their free time for concerts, theaters, and museums.

65% of foreign students noted that they keep friendly relations with Russian citizens

A number of foreign students have difficulties with accommodation. So 45% of the 1st year students indicated that they would like to change their place of residence. A survey of university teachers showed that, unfortunately, not all universities have the opportunity to provide comfortable accommodation.

Within the survey, the following dependence was established, that with each subsequent course of study, foreign students are more satisfied with their higher education. In addition, the higher the course of study, the less difficulties in learning and the less difficulties appear in communicating with representatives of other nationalities.

Coming to a more specific issue of adaptation difficulties, a gender imbalance is revealed, so only 27% of girls and 63% of young men are satisfied with the sanitary condition of the kitchen and bathrooms in the dormitory. The situation with the sanitary condition of the rooms is even worse, so only 11% of the girls and 42% of the young men named sanitary condition of the rooms as perfect.

Girls (78%) experience more than young men (53%), who do not have the opportunity to see their relatives and friends.

Only 39% of girls and 21% of young men indicated difficulties in adapting to climatic conditions (cold, rain, snow, etc.). This group of respondents explained that the winters are too cold.

A small number of foreign students (18%) are dissatisfied with food and water quality

It can be noted as a positive moment, the fact that a significant number of respondents 78%, positively assess the teaching methodology.

Foreign students explained that the university the following forms of teaching are used often: problem lecture, lecture-visualization, lecture together, lecture with pre-planned errors, lecture – press conference.

Especially students like active imitative teaching methods: business game, pedagogical situations, pedagogical tasks, situation if initiation of various activities.

Foreign students studying in the YSPU explained that they are given the opportunity to obtain, in addition to higher education, various other abilities, knowledge and skills in the framework of additional education at the Institute for Human Resource Development.

The survey of university teachers showed that no difference is made for Russian or foreign students when teaching. Students are provided with lectures in Russian. It is necessary to note, that there is a huge amount of scientific literature in foreign languages in universities. This literature is recommended usually for self-study only.

In addition, the university teachers explained in their interviews that an increasing number of foreign students in Russian universities do not lead to the erosion of national identity. On the contrary, the growth in the number of students from the CIS and Baltic countries, and more recently the increase in the number of applicants and students from China, means an increase in the prestige of Russian education

Absolutely all university teachers and Russian students indicated that during the study they had never encountered interethnic and inter-confessional conflicts. 76% of the Russian students interviewed explained that scientific and practical conferences and round tables are actively implemented at their universities, and during these activities the students are getting familiar with the specifics of the culture of different peoples. 65% of students indicated that they have friends among foreign students and representatives of non-Russian peoples living of Russia.

Then we studied the opinion of Russian students about the reasons that lead to the fact that foreign youth come to Russia. The following answers were received (respondents could indicate several answers when responding):

– low level and quality of life in the native country of foreign students – 83%;

– the lack of worthy universities in their countries, and the relative cheapness of studying in Russian universities – 54%;

– foreign citizens do not have the opportunity to realize themselves in their native country – 44%;

– personal or family problems – 26%;

– high level of education in Russian universities – 25%;

– other reasons – 9%.

As it can be seen from the presented data, Russian students, in their majority, do not have a high opinion of the quality of Russian education.

A similar opinion is shared by experts. In addition, experts confirmed that many foreign citizens come to study in Russia, because in their countries the quality and standard of living are lower.

Experts explained that many foreign students from countries such as Uzbekistan and Tajikistan prefer not to return to their native country after receiving a diploma of higher education, but to create a family in Russia, and with a representative of their own nationality. Although in the last five years, there has been a different trend, namely, an increasing number of men from Tajikistan and Uzbekistan concluding inter-ethnic marriages.

Positional experts also noted that interethnic marriages are formed mainly according to the scheme "foreigner-local" and only a small percentage according to the "foreigner-foreigner" scheme. The same trend was revealed also by our sociological study.

Positional experts explained that in some regions around 30% of all crimes are committed by migrants. In addition, the growth of social conflicts occurs when foreign citizens have a cultural and educational level, significantly lower than the one of Russian citizens.

We agree with the opinion of S.A. Baburkin that "*in order to reduce interethnic and interconfessional conflicts, it is necessary to introduce special courses in the educational process aimed at forming a tolerant consciousness among students"* [1].

Within the framework of the study, testing was conducted among foreign students and teachers. It was important for us as researchers to find out how well they have developed the skills and abilities of tolerant communication.

Testing showed that absolutely all teachers know that equity of all people in front of the law irrespective of gender, race, nationality, etc. is enshrined in the Constitution of the Russian Federation of 12.12.1993. It was also revealed that teachers know all the main provisions of the country's basic law. This seems logical, since all employees of higher education are required to know the Constitution of Russia and to follow its provisions in their daily practice.

Unfortunately, testing with foreign students has shown that many provisions of the Constitution of the Russian Federation are not familiar to them. So, 47% of foreign students do not know what rights and obligations Russian and foreign citizens have according to the Constitution of the Russian Federation.

In addition, it was found that 32% of the foreign students surveyed believe that

xenophobia is intolerance towards people of a different nationality, 17% of respondents believe that xenophobia is ill-will toward all strangers, 13% of respondents indicated that it is the obsessive fear of the whole new and strange.

It was found that 23% of male and 41% of female students believe that tolerance is a respectful attitude towards people of other nationalities or denominations. 12% of young men and 17% of girls believe that this is humility. 7% of young men and 6% of girls believe that this is the ability to adequately assess themselves and others.

Only 25% of boys and 12% of girls heard about gender tolerance. None of those participating in the survey is aware of sexual-orientational tolerance.

Only 14% of young men and 18% of girls have the knowledge of educational tolerance. 23% of boys and 19% of girls showed a high level of knowledge in inter-class tolerance sphere.

22% of young men and 24% of girls do not have a clear idea of the reasons for not tolerating people.

100% of those who passed the test have a clear idea of racial and national tolerance.

Foreign students have demonstrated a high level of knowledge on such a phenomenon as a melting pot.

On the other hand, only 67% of young men and 55% of girls know the concept of cultural mosaic.

Unfortunately, only 7% of young men and 5% of girls know that there has been a "Declaration of Tolerance Principles" approved by UNESCO since 1995.

The situation with the knowledge of the international day devoted to tolerance is a little better, as 12% of young men and 10% of girls noted that this day is celebrated annually on November 16.

None of those, who answered to the test questions, knows that, the "International Day of Nonviolence" is celebrated annually on October 02.

Unfortunately, none of the testing participants knows that the European Council for Tolerance and Reconciliation is functioning, and there is a model national law on the development of tolerance.

Participants of the test have discovered superficial knowledge in such terms as anti-Semitism, antifeminism and hate crimes.

Only 42% of boys and 31% of girls are acquainted with the basic provisions of the Universal Declaration of Human Rights.

Only 4% of foreign students know the resolution adopted by the General Assembly on December 20, 2012, No. 67/185 "Promoting efforts to eradicate violence against migrants, migrant workers and their families".

Only 5% of foreign students know about the resolution adopted by the General Assembly on December 20, 2012 No. 67/178 "The fight against intolerance, the formation of negative stereotypes, stigma, discrimination, incitement to violence and violence against people based on religion or belief".

The resolution adopted by the General Assembly on December 19, 2017 No. 72/179 "Protection of migrants" is known to 34% of young men and 61% of girls, which is a pleasant result.

24% of young men and 16% of girls are familiar with the main goals and tasks of the leading intergovernmental organizations (UN, OSCE, Council of Europe).

Only 7% of boys and 5% of girls are acquainted with the concept of "irredentism".

Foreign students, which passed the test, showed a high level of knowledge on such concepts as "diasporas", "national minority", "emigration", "migration". 65% of young men and 78% of girls correctly indicated that the economic reasons for migration are decisive. All participants of the test correctly answered that the larger the city, the more attractive it is.

89% of male and 90% of female respondents know that there is internal and external migration. 68% of boys and 74% of girls know that there is border or transit migration. 92% of young men and 88% of girls know that migration can be temporary and long-term.

The thing that seems to be very positive is that foreign students are also familiar with such a term as ruralization, that is, migration from cities to rural areas

Absolutely all foreign students who participated in the testing correctly indicated the main reasons for migration.

Excellent knowledge has been shown in issues related to current trends in international migration. 89% of young men and 94% of girls correctly noted that the main trends are: growth of illegal migration, growth of forced migration, increase in the demographic significance of international migration.

Foreign students have good ideas about the consequences of migration.

73% of young men and 67% of girls know all the scientific approaches to the study of migration.

Only 13% of boys and 9% of girls have an idea of existential migration.

Absolutely all foreign students correctly indicated the list of documents necessary for moving to Russia.

Unfortunately, only 41 % of boys and 32 % of girls have knowledge in the field of migration law.

Testing involved not only checking students' knowledge of legal issues, but also main issues of psychology and sociology.

Thus, during the testing it was found that 32 % of young men and 41 % of girls believe that empathy – is compassion and sympathy for another person.

Foreign students do not have a proper understanding of such concepts as emotional empathy, cognitive empathy, predicative empathy.

More than half of foreign female students have fragmentary ideas about sexual harassment. And what is most worrisome, do not know what to do if they encounter such sexual abuse.

Then, the test had a question about nationalism. It was established that 31 % of young men and 24 % of girls believe that nationalism is an ideology that proclaims the superiority of one nation over another. 15 % of young men and 17 % of girls, that nationalism is cultural, ethnic and religious intolerance.

8 % of boys and 9 % of girls believe that nationalism and patriotism are synonyms.

As part of the testing, it was found that 37 % of young men and 71 % of girls are well treated with migrants and refugees. On the other hand, 45 % of young men and 62 % of girls believe that the level of crime in the country and the region is associated with increased migration.

What is interesting is that foreign students themselves, 57 % of boys and 82 % of girls believe that a significant part of foreign citizens from the nearest abroad behave defiantly and provoke conflicts, because their views on life differ significantly from the views and values of the local population

Only 33 % of young men 11 % of girls believe that migrants and refugees do not influence the growth of crime. They responded in the test that the local population itself provokes migrants to conflicts.

63 % of boys and 73 % of girls believe that it is not right to periodically conduct personal inspection of foreign citizens by the police in the streets.

52 % of young men and 69 % of girls indicated that their documents were checked by the police several times during the year.

As a result of the testing, it was established that foreign students in many important aspects have superficial views. In other words, it is necessary to conduct special lectures for foreign students and their successful adaptation aimed at raising their educational level and increasing their legal literacy.

Conclusion

In order to increase the effectiveness of multicultural policies for the integration of foreign students it is necessary to:

– systematically and purposefully conduct cultural events on the basis of universities within the framework of which to involve representatives of different nationalities;

– invite to universities of representatives of various diasporas, for discussions and open lectures for informing about the traditions of different peoples;

– for the teachers, first of all the curators of the groups, to raise the level of knowledge in the field of interethnic interaction on the periodical basis;

– universities should provide funds for the repair of rooms located in dormitories, primarily for foreign students. Either to provide a compensation for the cost of renting apartments;

– student canteens to find the opportunity to make a menu considering the traditions and customs of various nations of the world.

We believe that it is necessary to carry out sociological researches aimed at studying the forms and models of social adaptation and integration of foreign students. We also consider that a systematic study of this issue will allow to avoid a number of negative phenomena, in particular, such as the growth of deviant and delinquent behavior among migrants.

References

1. Baburkin S.A., Talanov S.L. International relations in high school of Central Russia (the case of Yaroslavl region) // Alma Mater. High School Herald. 2017. No 1. pp. 27-32.

2. Baudrillard J. For a Critique of the Political Economy of the Sign. – US: Telos Press, 1981.

3. Bjerregaard B., Cochran J.K. Want Amid Plenty: Developing and Testing a Cross-National Measure of Anomie // International Journal of Conflict and Violence. – Vol. 2, No. 2, 2008. – P. 182-193.

4. Bordo S. Unbearable weight: Feminism, Western Culture, and the Body. Berkeley: University of California Press, 1993. P. 201.

5. Burkatzki E. Is the Market Eroding Moral Norms? A Micro-Analytical Validation of Some Ideas of Anomie Theory // International Journal of Conflict and Violence. – 2008. Vol. 2, No. 2, P. 268-287.

6. Chalk Peter. The Response to Terrorism as a Threat to Liberal Democracy / Peter Chalk // Australian Journal of Politics and History. – 1998. – Volume 44, Number 3.

7. Coleman J. S. Vision for Sociology // Society. 1994. № 32. P. 31-32.

8. Donohue Laura K. US CT Measures 1960-2000 / Laura Donohue // Terrorism and Political Violence. – Vol. 13, No. 3, London: Frank Cass, 2001. – pp. 15-60.

9. Eparkhina O.V. On the problem of possibilities and perspectives of studying historical sociology at Russian universities // Alma Mater. High School Herald. 2016. No 6. pp. 25-29.

10. Gavrilov A.V., Talanov S.L. Education as a tool of "Soft Power" in foreign policy of Russia // Alma Mater. High School Herald. 2017. No 6. pp. 24-30.

11. Inglehart R. Culture Shift in Advanced Industrial Society. Princeton, 1990.

12. Koryakovtseva O.A. On the way to the implementation of the national idea // Kostroma State University Herald: scientific and methodical journal. – Kostroma: 2016. – № 2. Series of Pedagogy, Psychology, Social Work, Juvenology, Socio-kinetics. pp. 17-21 (co-authored with T.V. Bugaychuk).

13. Lymarev A.V., Talanov S.L., Baburkin S.A. Vision of the Future and Values of University students // European Journal of Natural History. 2016. № 6.

14. Messner S.F., Thome H., Rosenfeld R. Institutions, Anomie, and Violent Crime: Clarifying and Elaborating Institutional-Anome Theory // International Journal of Conflict and Violence. 2008. Vol. 2, № 2. P. 163-181.

15. Ritzer G. The Mcdonaldization of Society. Pine Forge Press, 2000. P. 1-2.

16. Shapiro V.D. Azerbaijani, Armenian, Georgian teenagers in Moscow: ethnic self-identification and inclusion in interethnic relations // Diasporas. 2007. № 3.

17. Turner B.S. The Body and Society: Explorations in Social Theory. Third Edition. London: SAGE Publications Ltd, 2008. P. 101.

18. Talanov N.S. Present and future in the views of Yaroslavl schools' students. // Start in science. – 2017. – No 1. – pp. 67-69.

19. Watts Jacqueline. The Outsider Within: Dilemmas of Qualitative Feminist Research within a Culture of Resistance. Qualitative Research. 2006. P. 385-402.

20. Talanov S.L. Problems of hogher education and criminality in Central Federal district // Alma mater (Vestnik vysshei shkoly). – 2015. – No. 1. – P. 40-44.

SECURITY OF INFORMATION DATA

Ivanko A.F., Ivanko M.A., Kulikova E.V.

Moscow Polytechnic University, Moscow, e-mail: alekfed@mail.ru, mihaleks@mail.ru, elena@kulikova.pp.ru

The development of information technology makes it possible to use new opportunities in various spheres of life for a wide range of users. Often, personal problems are required to solve urgent problems, this is necessary to perform financial calculations, transfer funds from one card to another, to make utility payments and pay for goods in foreign online stores, etc. Unfortunately, on the Internet spaces and in the WEB-space there are scoundrels and dexterous swindlers who use various methods of deception to achieve their criminal goals. Our article is devoted to the study of systems used to protect personal data on modern information spaces. In the work, the most common methods of attacking encrypted data are studied in detail and presented. In addition, the problem of ensuring a high level of security of cryptosystems was considered, and some recommendations for its improvement were formulated. Our work can be useful for a wide range of users using information technology in everyday life.

Keywords: information security, cryptosystems, cryptographic algorithm, key, data protection

First of all, a few general considerations about the safety of Internet browsing. Try never to go to various other familiar sites where you are offered “free cheese”. Remember, this is a trap. On such sites you can easily pick up computer viruses or become a bait for scammers. It can be a message that you have become the heir of a rich relative in a distant country, it may be a message that you need to take away the winnings. There may be reports of a desire to meet you, etc. Remember: all this entails negative consequences and can lead to the loss of your data, which later can be used by scammers. Today, various methods are used to protect information and our personal data, including cryptography methods.

The art of cryptography has been of interest to mankind since ancient times. Attempts to create unique cipher combinations were made at different times by the “great minds” of society. To date, cryptographic knowledge is used universally in virtually all spheres of human life, especially in the virtual world. And in its development, cryptography has reached its apogee today. In whatever time interval we have not considered this phenomenon, its main goal remains to this day unchanged – to protect information from unauthorized access. Is it possible to consider the developed cryptosystems reliable? How in the current conditions of the rapid development of information technology can secure personal data? We will try to answer the above questions in this work.

So, first of all, let us turn to the definition of the basic concepts. Cryptography, as a rule, is understood as the “science of data security, which searches for solutions to four important security issues – confidentiality, authentication, integrity and control of participants in the interaction” [7, p. 56]. In this case, security is achieved by converting existing information of one type into another, more unique and “closed”, access to which is either impossible or impossible, or very difficult. This is due primarily to the fact that data protection is based on the creation of a so-called “key” – “the specific secret value of a set of cryptographic algorithm parameters that ensures the selection of one transformation from the set of transformations possible for this algorithm” [9, p. 72]. In turn, a cryptographic algorithm is called “a set of rules that is used to encrypt information, allowing to generate encrypted text that can not be read without decryption” [10]. Thus, a cryptosystem is, in fact, “a family of reversible transforms that can be selected with the help of a key, which transforms the protected information block into a ciphertext and vice versa” [7, p. 67].

There are many different types of cryptosystems, based on the division of which are the functions performed and the tasks assigned. Today, cryptosystems are used to ensure the secrecy of data, to authenticate their authenticity, as well as to prevent unauthorized access to a certain set of information [8]. In accordance with this, three types of cryptosystems are distinguished.

In turn, cryptosystems designed to “hide” information can be divided into encryption systems and cryptographic coding systems [8]. As you know, encryption consists in “converting data into an unreadable form using encryption-decryption keys”. It is worth noting that encryption is the oldest method of cryptography. Recollections of this system were found by researchers in the works of Aeneas Tacticus, dating from the IV century BC [1]. Cryptographic coding has a slightly different character. It is caused by the transformation of messages into

message-dependent codes, depending on the messages themselves, in order to hide their content.

Cryptosystems of information authentication are divided into systems that help in establishing the authenticity of messages and systems, focused on establishing the reliability of the information sources used (users, networks, etc.) [8]. Here it is important to understand that the methods of authentication of information will be used different, depending on the conditions that ensure the authenticity of the data.

The last kind – cryptosystems, which are responsible for accessibility to a set of information – today is not independent, but consists of two of the above types.

Thus, many tasks put forward today in the information world can be solved by using cryptographic algorithms. As you can see, there is a multitude of ways to protect sensitive data from unauthorized treatment. But to what extent do the above systems meet the current realities that prevail in the vastness of the infomir? Is it possible today to get by with existing knowledge about data coding? Are these cryptosystems reliable in the 21st century?

So, it is already proved that by applying a sufficient amount of effort, it is possible to crack any cryptosystem. The amount of time is fully determined by the complexity of the planned work. Along with the development of cryptography as applied science, there is a continuous process of inventing more and more new ways of hacking cryptosystems, which it is not possible to list. But the most common ones are listed below.

1. Attack aimed at encrypted text. This method of "hacking" is one of the most difficult, because in this case the attacker operates with a minimum amount of information. He tries to "unravel" the cipher by all possible methods. The most banal in this case is the selection method, which, by the way, today can be implemented not by a person, but directly by a "machine", which uses certain programs in its work.

a) Attack on "block" ciphers.

This method of obtaining the necessary data is one of the simplest. It is known that "block" ciphers are applied to certain fragments (blocks) of the text. In modern conditions, block fonts are used for blocks of text, the length of which is 128 bits. Encryption of information occurs on the basis of the implementation of 32-bit operations, which is a significant drawback. After all, according to a number of scientists, the use of such operations makes it almost impossible to obtain an odd key. Thus, all "block" fonts generate even combinations. Consequently, this makes it easier for attackers: to build a simple discriminator based on the generation of possible even combinations is not difficult. With regard to the "breaking" of "block" fonts, the so-called "attack with the solution of equations" is singled out, the essence of which lies in the construction of linear and quadratic equations based on the received fonts and their further solution.

2. Attack with known "open" text. This method is relatively easy, because the attacker already has not only encrypted, but also "open" or original data. That is, the main goal here is to find the necessary key. Based on the operations performed, such attacks can be, firstly, autonomous. In other words, one in which a previously prepared "open" text or a fragment of it is processed by a cryptanalyst before obtaining the necessary ciphers. Secondly, the described attack can be autonomous. In this case, the "open" text is selected taking into account the font received by the attacker. Autonomous attack is more effective, efficient and efficient.

3. Attack on asymmetric cryptosystems. In 1975, an idea was put forward, based on the mathematical knowledge of a one-way function, on the development of cryptosystems with an "open" key, which provide a public encryption algorithm, and therefore have several keys: unclassified (encryption) and secret (decryption). Hence the name of the systems described is asymmetric [2]. To obtain the data of these systems, it is most expedient to apply the RSA algorithm (an abbreviation from the names of the creators Rivest, Shamir and Adleman). Scientists drew attention to the fact that the keys (open, closed), in fact, are functions of two large primes. It was concluded that the receipt of plain text on the available code and the "open" key is identical to the process of decomposition of a number into two factors. Thus, the protection of RSA is due to the difficult operations of factoring specific numbers.

Thus, today it is very difficult to give an example of a cryptosystem that would not have been hacked. How can I improve the level of protection of personal information?

Traditionally, information security is commonly understood as "the protection of information and supporting infrastructure against accidental or deliberate natural or artificial impacts, fraught with inflicting damage to owners or users of information and supporting infrastructure" [9, p. 85]. While the protection of information is called "a set of activities aimed at ensuring the confidentiality and integrity of

information processed, as well as the availability of information for users" [6, p. 45].

Very often security of cryptosystems is compared to a strong chain, the reliability of which directly depends on the quality of each link. Drawing an analogy, you can see that every element – key, protocol, etc. – must be thoroughly thought out in the protected cryptosystem. It has been scientifically proven that cryptosystems in which the ciphertext does not provide information about the "open" text are the most secure. You can only send information about the length of the latter. In this case, the key should not be shorter than the main message. As a rule, such a key does not provide for reuse.

Speaking about the security of cryptosystems, special attention should be given to choosing a reliable cryptographic algorithm, because, first of all, the level of protection of information depends on this. So, you can refer to already known algorithms that are published in specialized publications, you can use the services of professionals, profiled organizations, in rare cases, you can try to create your own algorithm. In other words, when deciding on the choice of an algorithm, it is necessary to concentrate as much as possible, to approach this issue in detail.

In order to increase the level of protection of cryptosystems based on encryption, one should perform block decoding, since in this case the code used will not be displayed in computer memory in an open form. It is also effective to carry out encryption with feedback, in which the key for decoding data depends on the information previously transmitted by the user. Today, researchers talk about the high effectiveness of using the "code in code" method. When implementing this scheme, "part of the protection mechanism is designed in the form of a resident module, whose task includes, for example, prohibiting writing to disk for some time or monitoring segment registers for changes" [5, p. 102]. To improve the level of data security is positively affected by combining cryptographic methods with compression. Separately, it is worth highlighting weak keys, the use of which reduces the level of cryptographic stability. To date, the problem of lack of verification of keys by the above parameter is quite common. Secure information can be provided when storing the key separately from the original data. Otherwise, even encryption, carried out with the help of a crypto-stable algorithm, is easily decrypted by intruders. Finally, the human factor plays an important role in the protection of information. After all, only the proper handling of the security system can cope with the task. Errors here are highly undesirable.

Conclusions

I would like to note that although cryptosystems today are important elements in the protection of personal data, all methods of possible attacks have not been properly studied. It's hard to say what will happen over time, after all, we should not forget that simultaneously with the development of cryptosystems there is an improvement in the ways of "hacking", "interception" of ciphers, mortgages. Thus, in the current conditions of information gluten, the study of ways to ensure the reliability of cryptosystems, the derivation on their basis of new options for preventing unauthorized access to private data is of fundamental importance, since it is already clear that existing methods, which are being used everywhere, quickly become obsolete, scammers continue to search for new ones methods to deceive honest Internet users.

References

1. Gardner M. A New Kind of Cipher That Will Take Millions of Years to Break. – Scientific American, 1977. – 124 p.

2. Wiener M.J. Cryptoanalysis of Short RSA Secret Exponents. – IEEE Transactions on Information Theory, 1990. – 558 p.

3. Belov E.B., Los V.P., Meshcheryakov R.V., Shelupanov A.A. Fundamentals of Information Security. – Moscow: Hot line – Telecom, 2006. – 544 p.

4. Introduction to the protection of information in automated systems: A manual for universities. – 2nd edition. – Moscow: Hot line – Telecom, 2004. – 147 p.

5. Devitin P.N., Mikhalsky O.O., Pravikov D.I., Shcherbatov A.Yu. Theoretical Foundations of Computer Security. – M.: Radio and Communication. 2000. – 190 p.

6. Protection of information in personal computers / A.V. Spesivtsev, V.A. Werner, A.Yu. Krutyakov et al. – M.: Radio and Communication, 1993. – 192 p.

7. ZEGZHDA PD Theory and practice of ensuring information security. – M.: Yachtsmen, 1996. – 302 p.

8. Classification of cryptoalgorithms [Electronic resource] Access mode: URL: lomasko.com/_ld/0/12_LV_.doc. (circulation date 11.12.2017).

9. Neil Koblitz, Course in Number Theory and Cryptography. – M., Scientific Publishing House: "TVP", 2001. – 254 p.

10. Basic information about the protection of software products. Cryptographic methods of information protection. Software systems for protection against unauthorized copying // Lectures on TRPP, SPP, Information Security, Standardization, Metrology and Certification [Electronic resource] Access mode: URL: http: //starik2222.narod.ru/trpp/lec2/34.htm (date 11.12.2017).

11. Ivanko A.F., Ivanko M.A. Information technologies in publishing. Tutorial. Moscow-MGUP them. Ivan Fedorov, 2013. – 136 p.

12. Vinokur A.I., Ivanko A.F., Ivanko M.A. Information systems in publishing: Textbook. allowance / A.И. Vinokur, A.F. Ivanko, M.A. Ivanko; Moscow. state. University of Ivan Fedorov. – Moscow: MGUE named after Ivan Fedorov, 2015. – 196 p.