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EXPERIENCE OF DEVELOPMENT OF AUTOMOBILE TOURISM IN FOREIGN COUNTRIES AND IN RUSSIA

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Annotation. *The article presents the results of a study of automobile tourism in the United States, European countries and the Russian Federation. Special attention is paid to the development of caravanning in foreign countries and the prospects for its development in Russia. For Russia, the development of automobile tourism is an opportunity to preserve the income of citizens in the country, will contribute to the development of related industries - the hotel business, road and construction companies, catering establishments, etc. This will also allow the development of "weekend tourism", which significantly reduces seasonal fluctuations and increases the profitability of tourism in general.*
Keywords: *automobile tourism, USA, European countries, Russia, caravanning.*

According to statistics, in 2023, Russians made about 78 million trips around the country, of which just over a third (27 million) were by car and bus. In the next six years, the Cabinet of Ministers of the Russian Federation plans to almost double these figures - to 140 million and 48 million, respectively. According to estimates by the Russian Union of Travel Industry (RUTI), there are more than 42 million auto tourists in the Russian Federation.

Automobile tourism refers to travel by people to countries or locations other than their permanent place of residence, in which the main means of transportation is a private or rented car.

The development of this type of recreation in Russia will give domestic tourism a more civilized character and increase the turnover of the tourism industry.

This type of tourism will help return to the country part of the money "flowing" abroad, which is spent annually by our compatriots on vacations abroad, and will create a large number of new jobs. With the availability of campsites and the appropriate infrastructure in the regions, such a promising a type of tourism such as "weekend tourism", which significantly reduces seasonal fluctuations and increases the profitability of tourism as a whole.

Automobile tourism has a long history. The first trips on personal vehicles began when the automobile industry began to develop–at the beginning of the 20th century, but this type of tourism gained its greatest popularity in the post-war period. During this time, automobile manufacturers began to actively produce new models of personal vehicles, and states–build long routes.

Auto tourism has become widespread in the United States. The development of auto tourism in the country was facilitated by the invention and mass production of a car by Henry Ford at the beginning of the 20th century, which was affordable to the middle class. In 1916, a car rental service began operating in Omaha, USA. In 1918, one of the largest car rental companies in the United States today, Hertz, appeared.

With the construction of the largest federal highways in the United States during the Great Depression, there was a need to form a roadside infrastructure. The first roadside infrastructure facilities appeared in the 1920s. At first, these were tourist sites, which were later converted into motels. The first motel was built in 1925 in the small town of St. Louis. The development of automobile transport also led to the emergence of a system of roadside diners, the first of which was opened in 1927. If travel by car began its history closer to the 1920s of the last century, then travel by trailer began in the 1930s. In 1934, Wally Byam, the founder of the Airctream Trailer company, invented the first trailer, which was called the Air Stream. The first model was equipped with heating, water supply and a bio-toilet. Two years later, an improved Strimer model was released, which had electricity, a battery, an analogue of a modern air conditioner and a transforming kitchen that turned into a bed [1].

The growth of citizens' well-being and the active development of the automobile industry in the country in the mid-1920s contributed to the more active development of auto tourism. In the 1950s, the US government allocated money for the construction of new roadside infrastructure. Global changes in the road network led to the popularization of such a type of recreation as car travel with the whole family. The largest number of motels, namely 36 thousand, were built in 1959-1962 in the USA. Roadside hotels were distinguished by their cheapness, modest furnishings and minimal service, as a rule, they were one-story or two-story. The new type of hotels was focused on providing travelers with a place to spend the night on the way to their main destination.

Currently the USA – one of the most motorized countries in the world (there are 908 cars per 1000 people). Also, car rental services have a high weight in the country, according to the publication Mordor Intelligence, the market size is estimated at 132.1 billion US dollars in 2024 and is estimated to reach 220.1 billion US dollars by 2029. The main purposes of autotourism trips of Americans are visiting attractions and natural sites, more for 30%, the purpose of the trip is gastronomic tourism and visiting new cities, the rest choose shopping and meeting new people and road games while traveling [2].

The length of all highways in the USA is 4,177,073 miles or 6,683,316.8 km. The USA ranks first in the world and occupies approximately 10% of all roads in the world, followed by India, China, Brazil, Russia, Japan, Canada, France, Australia, Spain.

According to experts, 82% of American tourists traveling in the United States say that their purpose of travel is vacation, 12% say business. Of the means of transport, they prefer a car or trailer (78%), and only 16% travel by plane after September 11. Buses and trains are not in favor in the United States (2% and less than 1%, respectively) [3].

One of the most common types of automobile tourism in the USA is caravanning – traveling with accommodation in motorhomes or trailers. This country is the world leader in the number of roadside motels, the first of which appeared in the second half of the 20th century and immediately became popular, since trips out of town to neighboring countries are very popular among Americans. In the USA, there are a huge number of campsites (RV parks) along highways, which provide all the necessary conditions for travelers: drinking water, electricity, sewerage, shower, bathroom, kitchen, garbage collection points, places for walking animals, etc. In the USA, there are firms and companies specializing in mail delivery for recipients who do not have a permanent place of residence (mail forwarding services). For a fee, they deliver letters and parcels to any pre-arranged location. American campsites, like European ones, are divided by “star rating” depending on the list of facilities they provide. There are their own brands and networks of campsites. The cost of renting a camping site with water and electricity is about $ 25 per day (50% discount for pensioners, disabled people and military personnel). If desired, you can find primitive sites with toilet cabins and a summer (cold) shower, without connection to electricity - their cost is from $3 to $5 per day. According to the latest estimates, there are over 16,000 camping sites in the United States, while in the countries of the European Union this figure is several times lower - 3-5 thousand units [4].

From the point of view of prevalence, the level of development of car tourism in Europe is also of interest, the total volume of which in 2022, according to estimates, was 662.1 million people, or per person European residents make 1.47

trips. According to Eurostat, the TOP-3 car tourism destinations in 2022 include France, Germany and Spain [5].

The total number of motorhomes and caravans registered as a means of transport in Europe amounts to 1,353,140 and 4,044,900 units, respectively. As for caravanning as a tourist segment, according to the European Federation of Camping and Caravanning Associations (EFCO&HPA), the camping and caravanning sector (this sector covers various places, sites, park areas equipped for recreation and tourism, where full self-service is provided, and payment is taken only for accommodation) accounts for, on average, 23% of all holidaymakers in Europe each year. Statistics also show that a European car tourist makes at least 3-4 trips a year, half of which involve long trips over 1,000 km.

In Germany, there are more than 680,000 motorhomes and 570,000 caravans officially registered. Taking into account residential static caravans (used for stationary camping on long-term sites), the number of caravans exceeds one million units (according to a study conducted by the German Tourism Association and the Association of German Caravan Manufacturers (Caravanning Industrie Verband, CIVD).

Automobile tourism in the Soviet Union developed much more slowly and was significantly inferior to the USA and Europe, since cars were not a mass "product" for a long time. The situation began to change some time after the Second World War. Auto tourism began to develop with the motorization of the population, although it is more widespread in the West. Auto tourism began to develop actively in Russia in the 1950s. Since 1970, in connection with the emergence of the AvtoVAZ plant, auto tourism began to acquire a mass character. New models of cars appeared, which went on sale. And by the mid-1970s, an automobile infrastructure was formed in Russia, and the traditions of auto tourism were formed. This type of tourism acquired a mass character since the 1970s, when almost all owners of personal transport became auto tourists, since the car was mainly used for trips to the country, less often for long trips, mainly in the direction of the Black or Baltic Seas. Guidebooks with a brief description of objects located along the route appeared in the bookstore network. With their help, the driver could find out the location of the car on the route, calculate the mileage between campsites, find gas stations, service stations, etc. On these locations the first campsites were built in these areas, which meant summer camps for tourists, mostly traveling by car. At first, such camps were simple structures with a common kitchen block and a common toilet, and there were also places for tents, trailers, summer cottages, and mobile homes. Campsite networks were usually located along the most popular highways in the country. In the 1970s and 1980s, camping or camping was considered a special pleasure. This is how the first special automobile trips along historical and natural routes appeared. Vacation on the shore of Lake Peipus was

one of the popular destinations. In the warm season, camps for auto tourists were set up on the lake, who returned to their favorite places for many years. Mostly, residents of the Murmansk and Leningrad regions came here in their own transport, they relaxed in the fresh air, admired the natural beauty of their native land, sang songs. There were even special mobile shops, which actively delivered agricultural products. People understood that a car is bought for the purpose of moving around and travelling [6].

In the late 1980s and early 1990s, the craving for automobile tourism began to decline due to changes in the political and economic situation in the country. The USSR collapsed, the Russian ruble became convertible, and imports of cars from abroad were permitted, but the models were outdated and imperfect. After some time, the situation changed, and they gave way to new, competitive foreign cars.

The total number of vehicles increased, but car tourism stopped, because after the financial reform of 1992, summer vacations at the seaside became an unaffordable luxury for most people. The decrease in the number of car tourists led to the destruction of the already weak transport infrastructure. An important factor was the crime situation in 1990-1996, when going out onto the main highways of the country was perceived as a mortal risk. Car tourism lost its classical traditions. The situation began to resemble the Middle Ages, when moving from city to city became associated with highway robbers. Due to the transfer of state borders, former tourist routes either changed or became completely inaccessible, for example, the picturesque highways of the Baltic and the Caucasus became virtually inaccessible to Soviet citizens. The situation with customs control worsened, crossing the border by car could take more than three days, which played an important role in choosing a travel destination. The revival of auto tourism in the Russian Federation began only at the beginning of the 21st century. The financial situation of citizens is stabilizing. A huge flow of used cars became available to citizens of the country. In connection with this, the total number of personal vehicles among the population has increased significantly. Forgotten routes have begun to be restored, and automobile infrastructure is developing [7].

The relevance of the development of automobile tourism in our country is determined by the following conditions:

- a change in lifestyle for the majority of the country's population, leading to the daily mass use of personal cars;
- growth in annual car sales, which in the coming years will amount to more than three million units;
- the level of provision of the population with personal cars, reaching At present, for various regions of the country, there is one car per 2.5-3 residents. In Russia as a whole, the provision of passenger cars per 1,000 residents is 322 units as of the beginning of the current year. This was reported on April 24 by the analytical agency "Autostat"[8]:

- an increase in the number of Russians travelling in their own cars;
- a clear lag in both quantitative and qualitative terms from the modern requirements of the existing infrastructure of service zones in auto tourism;
- the presence in the country of great potential for natural tourist sites that do not have the status of specially protected areas.

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FEATURES AND TRENDS OF BUSINESS DIGITALIZATION DEVELOPMENT

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Annotation. *The article examines the current state and global trends in the development of the digital economy, as well as modern trends in the digitalization of business processes, its new strategies and models, use in the modern economy.*

Keywords: *digital economy, information and communication technologies, digitalization, digital technologies, e-commerce, digitalization of business processes, Digital Transformation, digital technologies in business.*

As is known, the modern development of the world economy is marked by the advent and development of the so-called "post-industrial", "new" or "smart" economy based on intelligence.[1]

This is exactly what it is connected with rapid development of digital technologies, which lead to radical changes not only in the economy, but also in society as a whole. By reducing information costs, digital technologies significantly reduce the cost of economic and social transactions for the state, companies and individuals, promote innovation, in which transaction costs become almost zero, and also dramatically increase efficiency: existing activities and services become cheaper, faster or more convenient. Digital technologies promote integration: people get the opportunity to use services that were previously inaccessible to them. Now the entire population of our country receives a significant part of social services through their accounts on may.gov uz and has appreciated the advantages of digital technologies in all areas of their lives and activities [1].

With the advent of global digitalization and the development of digital platforms, the modern market has begun to actively change and introduce innovations into its processes. The surge in digitalization became especially noticeable during

[1] Makhmudov E.R.World economy: modern economic systems.T.2006-237s.

the pandemic, when the only way out of the crisis was to restructure the business for the consumer with a smartphone in hand. Today, in order to keep up with the times and be prepared for changing conditions for entrepreneurs, it is worth remembering that now one of the main advantages among competitors is the digitalization of the company.

In the modern IT world, no matter whether it is small or international, a business needs digitalization. Digitalization contributes to business transformation: it simplifies processes, reduces errors, makes work safe and coordinated. It helps to perform tasks more productively: produce more goods, provide high-quality customer service. Digitalization allows you to model business processes and predict the results of a company's activities. With the help of data analytics and specialized software products, entrepreneurs can conduct scenario modeling and forecasts, analyze marketing trends and make informed decisions for their business. Digitalization of business areas is necessary for everyone. Digitalization of business is the consistent implementation of information technologies into the company's work processes, optimizing and simplifying routine operations. However, the work is not limited to the use of software alone.

To successfully digitalize a company, you need to go through several stages.

- ✓ Digitization is the initial connection of the system and the creation of digital copies of the entire company database.
- ✓ Digitalization is the stage where Big Data is implemented and a digital copy of the company is created. At this stage, processes are tested, which allows extracting the values of data management.
- ✓ Digital transformation is the final stage, where the company's business model is already changing, and management is carried out using digital tools.[2]

Today it existsnew business strategy: Digital Transformation. This is essentially a new strategy for business growth. Digital Transformation improves capabilities and survival. Under the influence of a combination of technological developments - namely, cloud technologies that are moving to digital technologies, they gain a significant competitive advantage. If we explain it from our point of view: Digital transformation is a product or enterprise that is customer-oriented, analyzing the capabilities and survival among other competitors.

Digital is a broad concept that covers everything related to digital technologies. Digital technologies are technologies that collect, store, process, create and transmit data electronically. The transition from traditional ways of doing business to using digital technologies allows enterprises to be more flexible and efficient. Digital transformation not only speeds up processes, but also opens up new oppor-

[2] Digitalization of business: why is it especially relevant now?https://ru.linkedin.com/school/skolkovo/17августа2022год

tunities for companies that actively interact with digital tools. In the era of rapid development of the digital sphere, more and more attention is paid to professions related to marketing. We have figured out the concepts of "digital" and "transformation" is the introduction of new changes to the process, a new transition. Digital transformation is the process of introducing digital technologies into the company's activities in order to modernize and optimize its work processes necessary to transform the business structure and move it to a new level of creating products and services.

Thanks to the constant development of technology, today "digital" is also associated with a separate profession. It is the basis of business. Specialists in digital marketing, data analytics, website development and other related fields are becoming increasingly in demand. They work with digital tools, analyze data and build effective strategies to achieve business goals.

In the modern economy, the process of digitalization accelerated during and after the pandemic due to the self-isolation regime, the introduction of remote work, study, shopping, etc. modern business began to master digitalization, and thus the world economy emerged from the general crisis thanks to digitalization. And from that moment on, the Digital Transition accelerated and had an impact on various countries of the world. For example: American entertainment company Netflix went completely digital. In the automotive industry, Tesla brings new levels of intelligence to its new cars based on data management to improve full-scale performance. Other car manufacturers are going through their own versions of digital transformation to remain competitive. This is happening in many other industries.

Digital transition is not just a buzzword, but a necessity for survival. Digital transition has become a buzzword, often used.

Digital transformation is perhaps the most important activity a company must engage in to remain competitive. It allows a company to adapt to the digital world by bringing technology to the very strategic "heart" of the business. It changes how you interact with your customer base, how you improve efficiency, how your product or service is perceived. Everything is technology-driven. It is a major challenge. Digital transformation involves cultural and technological change.[3] Progress along the path of digital transformation is cyclical. When planning the transition, it is necessary to start with the use of data. This is necessary for defining business strategy and business transformation. The example of digitalization of The Washington Post is notable here.

The Washington Post didn't just change its technology operations; it saw a unique opportunity to transform its business and seized it. And it had no choice,

[3] (https://eastbanctech.com/our-work/washington-post-captures-mind-share-with-custom-ipad-android-app/).

given the decline of print media. Ignoring the critical challenges of the digital age would have meant the Post retreating into the shadows of Digital Darwinism.[4]. Faced with a new, nimble competitor or disruptive technological developments, Post would also face extinction. Having gone through the digital transition, Post is now well prepared to deal with such threats.

Thus, Digital technologies transform business with the creation of any digital products and product delivery. Analysis of the transformation of digital technologies creates new services and types of goods associated with them. Having studied the digitalization of business in 2020-2024 in various industries, we can conclude that today digital transformation is in demand. Financial institutions and retail banks were among the first to become interested in it. But in the manufacturing sector today, both manufacturing and mining companies find application for digital technologies in their daily activities.

At the same time, the digital transition of the company increases labor productivity, improves the quality of customer service and helps to gain a competitive advantage: increases GDP growth, optimizes services, reduces the level of corruption, ensures the efficiency of services and this is only a small part of the advantages of digitalization of the economy. Analysis and experience of companies in our country in this area, these are our upcoming studies and publications.

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PROSPECTIVE DIRECTIONS OF COOPERATION BETWEEN KAZAKHSTAN AND INDIA IN ECONOMIC SPHERE

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Abstract. *This paper explores the prospective directions of cooperation between Kazakhstan and India in the economic sphere, focusing on the potential opportunities and challenges in their bilateral relations. Both countries, with their dynamic economies and strategic positions in Central Asia and South Asia, have significant potential for collaboration in various sectors. The paper highlights key areas for future cooperation, including trade, energy, infrastructure, information technology, agriculture, and education. It also discusses the role of the diplomatic and political landscape in fostering stronger economic ties. The research emphasizes the importance of enhancing mutual investments, diversifying trade routes, and strengthening the economic partnership under the frameworks of international organizations. By analyzing historical trends and contemporary economic policies, the paper provides recommendations for both countries to leverage their resources and enhance economic integration. The findings aim to contribute to the development of a comprehensive and sustainable economic partnership between Kazakhstan and India.*

Keywords: *Kazakhstan, India, cooperation, economic sphere, energy, prospective directions.*

With the growth of Kazakhstan's economic potential and its establishment as a regional leader, India's interest in Kazakhstan has increased significantly. High-level visits and warm relations established between the leaders of both countries indicate a generally positive dynamic of bilateral cooperation.

However, the current level of Kazakh-Indian cooperation, despite the existing potential, is not high enough. It appears that the political and economic resources of bilateral relations have not been fully realized.

Among the factors hindering the establishment of closer cooperation, four main ones can be identified:

1. India's geographical remoteness and lack of direct transport links;

2. Instability in Afghanistan;

3. Economic competition from Russia and China, which have significant competitive advantages in the region;

4. Caution of Indian and Kazakh business circles.

At the same time, in our opinion, India is a very promising market for Kazakh products. The domestic consumer market in India is huge, which opens up significant prospects for Kazakh companies and suppliers of goods and services. Of course, it is not possible for Kazakhstan to compete with Indian technologies today, but in the area of raw material supplies, good prospects are opening up for the development of Indian technologies [1].

In addition, great prospects are opening up in the sphere of small and medium-sized businesses.

Let us highlight the most promising areas of Kazakh-Indian economic cooperation. In our opinion, there are:.

1. Energy. Of course, today the energy resources of Kazakhstan are of particular interest to India - fast-growing India is in dire need of energy resources. The predicted growth in oil prices in the coming decades, as well as the high political speculativeness of this resource, acutely raise the issue of energy security for India. Currently, oil supplies to India from the Middle East region account for 87%. It is clear that the high level of instability existing there puts the stability of oil supplies from this region at risk.

India is actively looking for new ways to diversify oil supplies. In this regard, Kazakhstan is considered as an alternative source of energy resources. However, despite India's great interest in energy resources from our country, no real steps were taken until 2008. Here, with a high degree of certainty, one can trace the influence of potential instability in our region on interstate cooperation.

India's activity in developing other global oil and gas fields and the lack of practical measures for energy cooperation in Kazakhstan indicate the wariness of Indian companies - both in the region and in Kazakhstan - at least until recently. The successes demonstrated in the Kazakhstan market by large companies from other countries, as well as other global processes in the oil market, have prompted India to reconsider its attitude to the region and to more active cooperation with Kazakhstan in this area. Since 2008, the Indian oil and gas company Gujarat State Petroleum Corporation Ltd (GSPC) has been negotiating with EmbaMunaiGas to acquire a significant stake in the project. In the future, GSPS plans to invest in new assets, including pipeline assets [2].

Currently, the Indian state oil and gas company Oil and Natural Gas Corp (ONGC) is planning to sign an agreement with the government of Kazakhstan on obtaining a 25% share in the Satpayev field (in the Caspian Sea) [2, P.13]. The

signing of this agreement was expected back in May 2010, when Indian Foreign Minister Somanahalli Malaya Krishna visited Kazakhstan.

The activation of Indian companies can be seen as a rethinking by the Indian leadership of the role of Central Asia and, in particular, Kazakhstan, as a serious global energy supplier - against the backdrop of India's growing needs and increasing competition for oil and gas sources.

It should be noted that in the Kazakh energy sector, with the presence of well-established Russian, American, European and Chinese companies, there are very few low-risk projects left for Indian business. Nevertheless, it is quite advantageous for Kazakhstan to have another major partner in India - to maintain a balance between the major oil producers, as well as to stimulate the growth of prices for extracted oil. Nuclear energy also has great potential for bilateral cooperation. In 2009, during the visit of the President of the Republic of Kazakhstan N. Nazarbayev to India, a Memorandum of Understanding and Cooperation was signed between JSC NAC Kazatomprom and the Indian National Atomic Energy Corporation [3]. This concerns investments by Indian companies in the uranium mining industry of Kazakhstan, the production of uranium ore, as well as the construction of nuclear reactors.

It is expected that the Kazakh-Indian intergovernmental agreement on cooperation in the field of civil use of nuclear energy, which is currently being prepared, will open up opportunities for the construction in Kazakhstan with the participation of India of small nuclear power plants (pressurized heavy-water reactors (PWHR) that will conveniently use uranium mined in Kazakhstan.

The agreement, which will allow obtaining Kazakh uranium, is of great importance for Delhi as well: India is actively developing nuclear energy and is experiencing a shortage of nuclear fuel, while Kazakhstan has large reserves of uranium, and in 2009 it became a world leader in its production.

3. Kazakhstan is interested in cooperation with India in the field of information technology as well. Moreover, cooperation in the field of information technology is the area where Kazakhstan is striving to open up new opportunities for the implementation of its internal development goals.

Currently, India ranks second in the world in IT developments. Indian technologies are not inferior to Western ones and are cheaper than the latter. Today, Indian IT specialists are in high demand on the world market and are an important component of the world market of specialists in the field of information technology. Moreover, India has achieved significant results in training highly professional specialists in the field of information technology. Every year, India graduates about 0.5 million IT specialists who are competitive both within the country and abroad. Thus, cooperation with India in training specialists in the field of information technology will allow Kazakhstan to grow a new generation of domestic

highly professional IT specialists. Training Kazakhstani specialists in India, as well as the creation of joint educational institutions in the information sphere, can play a major role here.

Serious positive trends are also noted in the telecommunications cooperation sphere. In 2009, the Kazakhstan Information Park "Alatau" signed a memorandum of understanding with the Indian IT-technology incubation park "Paharpur". The agreement on mutual cooperation was signed by the Agency of the Republic of Kazakhstan for Informatization and Communications, the Kazakhstan National Infocommunication Holding "Zerde" and the National Indian Association of IT Companies (NASSCOM), which includes more than 1,200 companies operating in the field of programming, Internet technologies and e-commerce. The association of legal entities "Kazakhstan Association of IT Companies" also agreed on close contacts with NASSCOM [4].

The program of information cooperation with India may have a positive impact on the further development of the "electronic government" in Kazakhstan.

4. A promising direction in the Kazakh-Indian interaction is cooperation in the joint study of space and the development of space technologies. In 2009, a Memorandum of Cooperation was signed between the National Space Agency of the Republic of Kazakhstan and the Indian Space Research Organization. Having started an independent space program in 1969, with the formation of the Indian Space Research Organization (ISRO), today India has made significant progress in this area. Over the course of these years, India has managed to create its own launch vehicles and launch from its space stations, which gives Indian astrophysicists reason to expect a new breakthrough in the space sector. Given India's progress in space exploration, it would be beneficial for Kazakhstan to establish large-scale cooperation in this area, since today Kazakhstan faces a serious need to diversify cooperation in the space field. The traditional partnership with Russia could be diversified by the Indian direction. There is a possibility of acquiring very valuable experience of Indian astrophysicists in the field of rocket engineering, creation of a high-precision navigation system.

5. Another attractive area for Kazakh-Indian cooperation is the pharmaceutical industry. India ranks second in the world in terms of the level of development of this industry. Today, the sector is the leading scientific industry in India. Being a highly organized sector, the pharmaceutical industry in India is valued at US$ 4.5 billion, growing at over 9% annually [4, P.33]. Currently, pharmaceutical companies in India produce approximately 25% of all drugs in the world. With such a dynamically developing pharmaceutical industry and low market value, the Indian pharmaceutical industry has great prospects. In this regard, India could become an important partner for Kazakhstan in the development of pharmaceuticals. Kazakhstan annually imports medicines worth 500 million US dollars. By creating

a network of pharmaceutical factories in Kazakhstan, both sides would receive great benefits. For Kazakhstan, the attractiveness of this project is undeniable: the population would have the opportunity to purchase high-quality medicines at lower prices.

In addition, Kazakhstan with its rich and unique medicinal and herbal fund could become a significant base for cooperation with Indian pharmaceutical companies. With the deepening of cooperation with India, prospects would open up for Kazakhstan regarding the acquisition of experience of Indian manufacturers and the creation of new medicinal products. Oncological and cancerous diseases are widespread in the territory of Kazakhstan - in ecologically unstable zones. India has high-tech devices for the treatment of such diseases. In cooperation with India in the field of medicine, Kazakhstan could advance in this area, as well as gain experience in the production of such high-tech equipment in Kazakhstan. Cooperation in the training of Kazakh pharmacologists in India will open up prospects in terms of the formation of a group of domestic specialists in this field.

6. Another promising direction is cooperation between the two countries in developing the North-South transport corridor – from Aktau through the Caspian Sea to Iran and to the Arabian Sea [5]. This project has great prospects for both countries and regions of Central and South Asia. At the same time, India already cooperates with Kazakhstan in the financial sector.

7. Tourism development. It would be useful for Kazakhstan to obtain advanced Indian experience of international management in the tourism sector.

In general, the following tasks can be identified for the development of economic cooperation between India and Kazakhstan. It is necessary:

- to promote greater interaction at the level of the business community and chambers of commerce and industry;
- to undertake an expert audit of the effectiveness of the Technical and Economic Cooperation Program and consider the possibility of expanding projects in the territory of Kazakhstan;
- consider the possibility of holding a bilateral meeting of the working group in the field of energy security and cooperation. India's access to the development of Kazakhstan's hydrocarbon resources should generally be designated as a signal for building more active interaction with India across the entire spectrum of bilateral relations;
- despite the existence of great potential for joint projects between Kazakhstan and India, there is no contractual and legal basis for bilateral relations of a strategic nature. In general, the contractual and legal basis for bilateral relations requires further development in the areas of cooperation.

In conclusion, the economic cooperation between Kazakhstan and India holds significant potential for mutual growth and development. Both countries, with

their expanding economies, geographical advantages, and complementary resources, are well-positioned to strengthen their economic ties. The key areas of collaboration identified in this paper—trade, energy, infrastructure, information technology, agriculture, and education—offer valuable opportunities for both nations to diversify their economic portfolios and enhance bilateral relations.

While challenges such as logistical barriers and geopolitical factors remain, these can be mitigated through enhanced diplomatic efforts, improved trade routes, and greater investment in joint ventures. A focus on fostering innovation, expanding cultural and educational exchanges, and deepening financial and technological cooperation will be essential for the sustainable growth of their economic partnership.

By capitalizing on their respective strengths and exploring new areas of cooperation, Kazakhstan and India can pave the way for a robust and resilient economic alliance, contributing not only to their national prosperity but also to regional and global economic stability.

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FEATURES OF THE LEGAL STATUS OF MUNICIPAL SERVICES AND BUDGETARY SERVICES IN THE CONTEXT OF A MUNICIPAL ASSIGNMENT

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Annotation. *The article analyzes the legal status and features of various types of municipal services. Comparative characteristics of municipal services are given. The need for a clear distinction between administrative municipal services; social municipal services provided by municipal institutions within the framework of a municipal assignment; paid social municipal services provided by municipal institutions additionally outside the framework of a municipal assignment is substantiated.*

Keywords: *municipal service, municipal task, administrative reform, local government bodies, municipal institutions.*

In recent years, the relevance of solving existing problems related to the provision of municipal services has been voiced in the Budget Messages of the President of the Russian Federation[5]and the Concept of Administrative Reform in the Russian Federation in 2006-2008[6].

During the administrative reform in the Russian Federation, the federal law of July 27, 2010 No. 210-FZ “On the organization of the provision of state and

[5] List of annual messages and budget messages of the President of the Russian Federation to the Federal Assembly of the Russian Federation [Electronic resource]: Consultant, URL:http://www.consultant.ru

[6] On the Concept of Administrative Reform in the Russian Federation in 2006-2010: Order of the Government of the Russian Federation of 25.10.2005 No. 1789-r as amended on 10.03.2009 [Electronic resource]: Consultant, URL:http://www.consultant.ru

municipal services" was adopted.[7](hereinafter -Law No. 210-FZ). The said law regulates relations arising in connection with the provision of state and municipal services by federal executive bodies, bodies of state extra-budgetary funds, executive bodies of state power of the constituent entities of the Russian Federation, as well as local administrations and other local government bodies exercising executive and administrative powers.

Russian legislation uses the general term "services" quite widely and interprets it ambiguously.

In accordance with the provisions of Federal Law No. 83-F3 "On Amendments to Certain Legislative Acts of the Russian Federation in Connection with the Improvement of the Legal Status of State (Municipal) Institutions"[8]amendments were made to the Budget Code of the Russian Federation (hereinafter referred to as the BC RF). Thus, according to the law, all municipal institutions, previously considered as budgetary municipal, are transformed into one of three types: state-owned, budgetary or autonomous. For the last two, the order of municipal financing changes fundamentally: "...now... we are not talking about financial funding... institutions, but about the financial support of their activities"[9].

In accordance with the provisions of Article 6 of the Budget Code of the Russian Federation, municipal services are services provided by municipal bodies, institutions and, in cases stipulated by law, other legal entities.[10]This legal definition was formulated by the legislator on the basis of only one feature - the subject of the provision of services.

As part of the gradually implemented administrative reform, the concept of municipal services gradually began to include not only and not so much social services, but, first of all, actions and decisions of an administrative and legal nature.

Federal Law No. 210-FZ of July 27, 2010 "On the Organization of the Provision of State and Municipal Services" introduced the concept of "municipal services provided by local government bodies": "a municipal service provided by a local government body is an activity to implement the functions of a local government body, which is carried out at the request of applicants within the powers of the body providing municipal services, to resolve issues of local importance established in accordance with Federal Law No. 131-FZ of October 6, 2003 "On

[7] On the organization of provision of state and municipal services: Federal Law of July 27, 2010 No. 210-FZin ed. from 28 Dec. 2024[Electronic resource]: Consultant, URL:http://www.consultant.ru

[8] On Amendments to Certain Legislative Acts of the Russian Federation in Connection with the Improvement of the Legal Status of State (Municipal) Institutions: Federal Law of May 8, 2010 No. 83-FZin ed. from 13 Jul. 2024[Electronic resource]: Consultant, URL:http://www.consultant.ru

[9] Vavilova A.A. Comparative characteristics of state, budgetary and autonomous institutions // Handbook of the head of an educational institution. 2010. No. 9. [Electronic resource]: http://www.mcfr.ru/journals/48/177/29023/29024/

[10] Budget Code of the Russian Federation: Federal Law of 31.07.1998 No. 145-FZ as amended. from 26 Dec 2024 [Electronic resource]: Consultant, URL:http://www.consultant.ru

General Principles of Organization of Local Self-Government in the Russian Federation" and the charters of municipalities"[11].

Based on the analysis of the regulatory framework on issues of providing municipal services, a clear definition and typology of municipal services has not yet been developed.

For example, A. Danilin suggests that the following definition be considered working: "a municipal service is a normatively established service provided by municipal authorities to citizens, businesses or other municipal authorities."[12]However, this definition does not carry any semantic load, representing an example of the logical error "definition through the defined": definition of one through the same. Indeed, municipal services are provided to citizens, businesses and municipal authorities, but this does not say anything about their essence and specificity.

Other researchers adhere to the point of view that municipal services are no different from private services, that is, those for which the definition of S.I. Ozhegov's dictionary is correct: "an action that brings benefit, help to another."[13].

Thus, the concept of "municipal services" is found in Federal Law No. 83-FZ "On Amendments to Certain Legislative Acts of the Russian Federation in Connection with the Improvement of the Legal Status of State (Municipal) Institutions" (hereinafter - No. 83-FZ) and in Federal Law No. 210-FZ of July 27, 2010 "On the Organization of the Provision of State and Municipal Services". However, it is necessary to clearly understand and distinguish between services in the context of these two laws:

1.Budget KThe Code of the Russian Federation interprets this concept as public social municipal services provided on the basis of a municipal assignment or order by municipal institutions or other legal entities.

Consumers of municipal services provided by municipal institutions are not only individuals and legal entities, but also government bodies. Municipal institutions provide these services in accordance with municipal assignments.

Municipal services provided by municipal institutions in accordance with the Federal Law No. 83-FZ, are included in the departmental list of municipal services and works.

2.LawFederal Law No. 210-FZ defines municipal services as public administrative municipal services provided by local government bodies to resolve issues of local importance.

[11] On the organization of provision of state and municipal services: Federal Law of July 27, 2010 No. 210-FZin ed. from 28 Dec. 2024[Electronic resource]: Consultant, URL:http://www.consultant.ru

[12] Danilin A. Electronic government services and administrative regulations. - Moscow, Infra-M, 2004. - P. 126.

[13] Ozhegov S., Shvedova N.Yu. Explanatory dictionary of the Russian language. M.. 1999.

Such services are provided at the request of the applicant (an individual or legal entity in accordance with the requirements of the administrative regulations. This service is subject to inclusion in the register of municipal services.

A municipal assignment for the provision of a state (municipal) service by an authority is not formed.

Such services are of a non-economic nature, they are entirely regulated by public (primarily administrative) law, the structure of the contract between the consumer (applicant) of services and their supplier is not applied, and the activities of the service provider are not aimed at generating income.

It seems that delegating functions for providing administrative municipal services to the private sector (for example, using municipal procurement instruments) is hardly acceptable at the current stage of development of public relations in the Russian Federation. In the sphere of social budget municipal services, on the contrary, such a trend reflects one of the directions of the modern reform of public administration.

In accordance with paragraph 2 of article 24Federal Law No. 7-FZ states that a non-profit organization may carry out income-generating activities only to the extent that this serves to achieve the goals for which it was created and is consistent with the stated goals, provided that such activities are specified in its constituent documents.[14].

Income-generating activities are recognized as activities involving the provision of services (performance of work) for a fee that meet the goals of creating a non-profit organization, the acquisition and sale of securities, property and non-property rights, participation in cases stipulated by the legislation of the Russian Federation in business companies and participation in limited partnerships as a contributor.

Thus, three types of municipal services can be distinguished:

- administrative municipal services;
- social municipal services provided by municipal institutions within the framework of a municipal assignment;
- paid social municipal services provided by municipal institutions additionally outside the framework of the municipal assignment.

According to the provisions paragraph 2 of article 4Federal Law No. 174-FZ “On Autonomous Institutions”[15]And Articles 9.2 Federal Law No. 7-FZ, an autonomous and budgetary institution carries out its activities on the basis of a municipal assignment formed in accordance with the types of activities classified by the institution’s charter as its main types of activities.

[14] On non-profit organizations: Federal Law of 12.01.1996 No. 7-FZin ed. from 14 Jul. 2022[Electronic resource]: Consultant, URL:http://www.consultant.ru

[15] On autonomous institutions: Federal Law of 03.11.2006 No. 174-FZin ed. from 21 Nov. 2022[Electronic resource]: Consultant, URL:http://www.consultant.ru

The municipal assignment must contain:

- determination of categories of individuals and (or) legal entities who are consumers of the relevant services;
- the procedure for providing relevant services;
- maximum prices (tariffs) for payment for relevant services by individuals or legal entities in cases where the legislation of the Russian Federation provides for their provision on a paid basis, or the procedure for establishing the said prices (tariffs) in cases established by the legislation of the Russian Federation.

An exception to this rule is institutions that provide exclusively medical services using compulsory medical insurance funds.

Municipal assignments are formed for budgetary and autonomous institutions by bodies that exercise the functions and powers of their founder, and for state institutions - by the main administrators of budgetary funds under whose jurisdiction these institutions are located.

The decision to form a municipal assignment for municipal state institutions is the right, and not the responsibility, of the main administrators of budgetary funds under whose jurisdiction such institutions are located.

It is advisable to form one municipal assignment for one institution.

The indicators listed in Article 69.2The Budget Code of the Russian Federation, which a municipal assignment must contain, may be supplemented by a legal act establishing the procedure for forming a municipal assignment.

According to Article 69.2According to the Budget Code of the Russian Federation, the body exercising the functions and powers of the founder has the right (but is not obliged) to include in the municipal assignment indicators of the quality of municipal services.

The activities of municipal institutions to provide services for a fee are recognized as income-generating activities.[16].

Income-generating activities are recognized as activities involving the provision of services for a fee that meet the objectives of creating a non-profit organization, the acquisition and sale of securities, property and non-property rights, participation in cases stipulated by the legislation of the Russian Federation in business companies and participation in limited partnerships as a contributor[17].

All types of institutions, except for state institutions that perform the functions of local government bodies, have the right to provide paid services.

[16] On Comments (comprehensive recommendations) on issues related to the implementation of the provisions of the Federal Law of 08.05.2010 No. 83-FZ: Letter of the Ministry of Finance of Russia dated 22.10.2013 No. 12-08-06/44036 [Electronic resource]: Consultant, URL:http://www.consultant.ru

[17] On non-profit organizations: Federal Law of 12.01.1996 No. 7-FZas amended on 14 July 2022 Article 24.[Electronic resource]: Consultant, URL:http://www.consultant.ru

Mandatory conditions for the provision of paid services are:

1. Determining the procedure for providing paid services. Paid services are usually provided during regular working hours by increasing the intensity of work or in additional time beyond the standard working hours. In the case of a large volume of paid services, staff units may be introduced at the expense of funds from income-generating activities. Services are performed at the main workplace, in areas and equipment free from the performance of municipal assignments.

In order to carry out paid activities, an institution often needs to adopt local regulations: regulations on the provision of paid services, a list of paid services, the amount of payment (price list), regulations on the remuneration of employees of the institution engaged in the provision of paid services, etc. Requirements for them may be contained in industry, regional or municipal regulations.

2. Establishing the procedure for determining the fee and (or) the amount of the fee.In government institutions the procedure for determining the fee and (or) the amount of the fee for services rendered is being installed state (municipal)organ, which is in charge of a state institution.

In relation to municipal institutions Federal law from 06.10.2003 No. 131-FZ "On the General Principles of Organization of Local Self-Government in the Russian Federation"[18](hereinafter referred to as Law No. 131-FZ) provides for exceptions. For example, determining the order of decision-making on the establishment of tariffs for the services of municipal institutions, with the exception of cases provided for by federal laws, falls within the exclusive competence of the representative body of the municipality (p. 6 part 10 art. 35Law No. 131-FZ).Local government bodies in order to resolve issues of local importance, they have the authority to setting tariffs for services (works) provided by municipal institutions, unless otherwise provided by federal laws (see, for example, p. 4 part 1 art. 17Law No. 131-FZ).

Order determining the fee for main paid services provided by budgetary institutions, sets body exercising functions and powers founder, unless otherwise provided by federal law (p. 4 art. 9.2Law No. 7-FZ).

Fee for non-core paid services are established by a budgetary institution on one's own.

3. Conclusion of an agreement for the provision of paid services. According to Articles 161According to the Civil Code of the Russian Federation, for the provision of paid services, as a rule, an agreement is concluded in simple written form.

Industry-specific regulatory legal acts may provide for mandatory conditions or information to be included in the contract.

[18] On the general principles of organizing local self-government in the Russian Federation: Federal Law ofOctober 6, 2003No. 131-FZ as amended. from 13 Dec. 2024[Electronic resource]: Consultant, URL:http://www.consultant.ru

The assessment of the quality and efficiency of municipal services has not only social, but also economic significance: “With a shortage of financial resources, local governments are constantly faced with the issue of which budget services and in what volume to provide”, and which to refuse. At the same time, in the structure of budget expenditures, it is necessary to take into account and evaluate not only the direct costs of providing a particular budget service, but also administrative costs associated with the organization of this work, as well as possible indirect costs. The efficiency of municipal services is calculated using indicators that determine the degree of satisfaction of certain needs of the population or losses from the absence of a given service. The key criterion of this type is an increase or decrease in the number of requests and complaints from the population about the absence or low quality of services.

It should be noted that the services of local government bodies and the services of budgetary institutions should be understood differently. The creation of a system of criteria for the effective operation of budgetary institutions is a rather complex problem, which requires the participation of competent representatives of the relevant authorities, so an example of similar work can be the proposals of L. A. Vasilyeva and Yu. F. Kislitsky on the calculation of the cost standard, in which the authors see the basis for managing the effectiveness of services[19].

A unified approach to the formation of a systemic assessment should be presented as a set of interrelated indicators, the content of which is determined by the scope of the service provided.[20].

Local government bodies must be able to evaluate the effectiveness of each service, compare the result obtained with the full costs of achieving it (i.e., evaluate the effectiveness of the service provided) and, based on such a comparison, select priorities”[21]In general, it is clear that in a comprehensive assessment of municipal services it is necessary to take into account both the price that they cost to those who provide them and the beneficial effect for the consumer.

[19] Vasilyeva L.A., Kislitsky Y.F. Calculation of cost standards as a basis for managing the efficiency of public services // Budget. 2011. No. 12 (December). [Electronic resource]: URL: http://bujet.ru/article/1651O5.php

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SCIENTIFIC BASIS FOR THE FORMATION OF THE INTERNATIONAL IMAGE OF THE PRC

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Abstract. *The article is devoted to the problem of forming the international image of the People's Republic of China. This problem is very relevant today, since a positive perception of the state, its population, the level of its economy and cultural characteristics on the world stage allows for a more stable, thoughtful and profitable foreign and domestic policy. A country's image is one of the important components of a country's soft power; to a large extent, it reflects the comprehensive strength and influence of a country.*

Keywords: *People's Republic of China, country image, great power, soft power.*

The strategic task of any modern state is to form the image component of the country. A country's effective formation policy testifies to the level of its economic and cultural development and is an important component of successful policy both within the state and beyond its borders.

However, creating a stable, fundamental image based on solid foundations is impossible without defining the value systems that unite society. The image of a state is a multifaceted, multi-layered category as it includes economic, social, political, religious, ethnic and cultural aspects.

The formation by the state of its unique image plays a colossal educational, informational and educational role for the younger generation. A positive image of a country determines the level of competitiveness, success, influence, stability, and attractiveness of a political entity (country) in the domestic and foreign markets.

Forming a positive image of a country is important for enhancing its national status, promoting national development, ensuring national security, strengthening integrated national power and international competitiveness.

To begin with, I would like to consider the publications available in the scientific literature on determining the image of the country.

The explanatory dictionary interprets the concept of "image" as (from English image, from Latin imago - image, appearance) a purposefully formed image (of a person, phenomenon, object), designed to have an emotional and psychological impact on someone for the purpose of popularization, advertising, etc.

In the late 50s of the 20th century, American specialist Kenneth Boulding, substantiating the importance of studying image for success in business and politics, formulated the definition of image as "a behavioral stereotype based not on actual facts, but on prestige, opinions, illusions that people create about themselves, on a mythological idea of the past, on an imaginary idea of the future, which is capable of influencing both the actions of individuals or groups, and the behavior of entire nations." It was he who gave an analysis of the influence of the national image on the features of the policies pursued by the state.

According to F. Kotler, the image of a state is "the sum of people's beliefs, ideas and impressions regarding this place."

E. A. Galumov - specialist in political science, Doctor of Pedagogical Sciences. formulating the concept of the image (image) of a country, determines that it is a complex of objective interconnected characteristics of the state system (economic, geographical, national, cultural, demographic, etc.), formed in the process of evolutionary development of Russian statehood as a complex multifactor subsystem of the world devices, the effectiveness of the interaction of links of which is determined by the trends of socio-economic, socio-political, national-confessional and other processes in the country.

According to the definition of the World Tourism Organization, the image of a country is a set of emotional and rational ideas resulting from a comparison of all the characteristics of the country, one's own experience and rumors that influence the creation of a certain image.

Thus, taking into account the above, the author of the article tried to formulate the following definition:

Our research is devoted to the problem of forming the international image of the People's Republic of China and therefore we also turned to specialists from the middle state who studied this problem.

For example, Zhang Kun believes that "the so-called national image is a comprehensive impression of a particular country in the eyes of the public around the world, or a cognitive and subjective assessment of the objective existence and realistic behavior of the local and foreign population. public in a particular country."

Fu Ling believes that "a positive image of a country within the country itself helps to strengthen national cohesion and is a unifying force, and also helps to build its external attractiveness and ensure its influence on global processes. It is

obvious that creating an attractive image of the country is important for streamlining and pooling political and economic resources, integrating society and strengthening national identity." Forming the image of the state requires the development of a long-term strategy and the use of appropriate tools for its implementation, as well as significant resources, the most important of which are the optimistic expectations of the population regarding the national economy and public policy in solving social problems (poverty reduction, social protection, the fight against crime and corruption, healthcare, education, etc.).

The development of China's national image is closely related to China's national strength. China is one of the few countries in the world whose image has been formed over several centuries. From the perspective of historical facts and humanistic perspectives, China's national image has undergone historical changes from ancient times to the recent three stages, each of which presented its own characteristics of the times. Ancient Chinese image of the country. [22]Ancient China was an era with a prosperous economy, highly developed culture and education, and enormous military power. Despite the existence of schisms in ancient China, national strength was always at the forefront. Since ancient times, China has been a prosperous and powerful country with a vast territory and a rich population. During the Han Dynasty, the image of China was associated with silk, which was exported from the country to Europe and other parts of the world along the Silk Road. At this time, China was a mysterious country to the outside world. Beautiful and elegant silk became part of the country's image in this era. The image of China in modern times is one of decline and resistance. Since the Opium Wars, the Chinese nation has always faced two main challenges: national independence and national prosperity. During this era, the image of the new China had a dark and negative side. The national image of this stage is influenced by the restrictions and development trends of the world. After China's defeat in the Opium Wars, it [23][24]gradually became a semi-colonial and semi-feudal society, and its image was characterized by backwardness and corruption. In 1936, American journalist Edgar Snow traveled to the Shaanxi-Gansu-Ningxia border region and wrote the book Journey to the West. The journalist, in his work, reported to the whole world about the Chinese labor force and the Chinese Red Army and many Red Army commanders. The image of China in modern times. The "Long March" of the

[22] Zhang, K. (2018). Ideal and Reality: The Changes of China's National Image in the Past 40 Years. Academic Frontier, 6, 84.

Фу Лин. Имидж Китая в России: формирование образа страны в контексте инициативы «Один пояс и один путь» / Фу Лин, Ма Ися, Ху Фань // Научный диалог. — 2018. — № 6. — с. 198–208. — DOI: 10.24224/2227–1295–2018–6-198–208.

[23]

[24]

Red Army, the War of Resistance against Japan, the Civil War, etc. gave China a revolutionary image of the country, and red became the symbolic color of China.

Today, the People's Republic of China continues to establish itself as a power with a real opportunity to claim leadership in international relations, and is increasingly emerging as a new global force. Over the past decade, China has shown itself to be a country actively integrating into the global economic system. And at present, the economy is an important factor contributing to improving the image of the PRC. Speaking at the 12th collective meeting of the Politburo of the CPC Central Committee, Chinese President Xi Jinping noted: "We must pay special attention to shaping the country's national image. It aims to portray the image of a great civilized country with a deep history, diverse ethnic groups and diverse and harmonious cultures. Political clarity, economic development, cultural prosperity, social stability, unity of the people, a beautiful image of the East; We will maintain the image of a responsible major power that will be peace-loving, promote common development, support international justice and contribute to human development. [25]However, despite the above, the PRC's desire for rise, even peacefully, has given rise to a vision of a "Chinese threat" in foreign specialist circles, which has led to a tense situation in foreign policy. Reacting to the concerns that arose, the PRC leadership replaced the term "peaceful rise" with "peaceful development" in the official vocabulary. At the same time, to determine the status of the PRC in the world community, the formulation "responsible developing great power" was proposed, which also influenced the change in the international image of China. In the field of international relations, China maintains a peaceful diplomatic policy. China's policies are aimed at creating an image of a responsible big country, China is an important force in combating financial turmoil and stimulating economic growth in the world. China attaches great importance to its behavior on issues of global importance, such as disarmament issues, nuclear weapons issues and environmental issues. China plays an extremely important role in global peace and development. In practice, one can see that China, occupying a vast territory and having a long maritime border, is characterized as a large country, rich in natural resources, with an advantageous geopolitical position for foreign economic activity. Using its potential, China, based on its existing advantages, is building an image strategy in a special way, which allows it to occupy an important strategic position, especially in the Asia-Pacific region. A well-built image strategy creates a favorable climate for economic development and attracting investment, thanks to the implementation of an active economic policy, the image of the country is formed, with high rates of economic development, which has a positive effect on

[25] Си Цзиньпин. (2013.) Создание сильной социалистической культурной силы и улучшение мягкой силы Китая в культуре. URL: http://www.xinhuanet.com/politics/2013–12/31/c_118788013.htm

the standard of living of the population. In order to prove to the world that China is not only a "great", but also a "responsible" state, the PRC is properly trying to build its image strategy. In the international arena today, this is manifested in the choice of globalizing strategies, development concepts, participation in international cooperation, in pursuing a peaceful foreign policy, etc. A well-built image strategy creates a favorable climate for economic development and attracting investment, thanks to an active economic policy , the image of the country is emerging, with high rates of economic development, which has a positive effect on the standard of living of the population. Thus, the image strategy of the PRC has its own distinct Chinese specifics. China strives for a peaceful international environment, paying special attention to its own development, at the same time, thanks to this, it maintains and promotes peace on the planet, positioning itself as a country with a positive image, as a state responsible for its actions, whose strategy is based on history country and its ever-increasing role in world civilization.

The speed of formation of an image strategy in line with "China's global responsibility" will directly depend on the speed of the "rise" of China itself in the world. In any case, this will be a rather lengthy and complex process that can only be fully realized in the long term.

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METHODOLOGICAL APPROACHES TO SOLVING THE PROBLEM OF SPIRITUAL AND MORAL DEVELOPMENT OF FUTURE PRESCHOOL TEACHERS

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Annotation. *The article emphasizes the importance of solving the problem of spiritual and moral development of future preschool teachers. The main positions of a number of methodological approaches are highlighted, the reliance on which allows us to consider the problem under study deeply and comprehensively, as well as to outline ways to solve it.*

Keywords: *methodological approaches, spiritual and moral development, future preschool teachers, students.*

In the modern conditions of a deepening spiritual crisis, scientific research aimed at solving the problem of spiritual and moral education and personality development at all levels of education is especially valuable. It is especially important to solve this problem in the process of training teaching staff for preschool education, laying the foundations for the development of the child's personality, the formation of his general culture, including spiritual. In this regard, it is important to comprehend the problem of spiritual and moral development of future preschool teachers, referring to the leading provisions of such methodological approaches as: axiological, personality-oriented, synergetic, cultural and system-activity, which will allow us to consider the problem from different angles and model the process of spiritual and moral development of an educator in modern conditions.

Let us justify the choice of the methodological approaches we have listed in solving the identified problem.

Axiological approach. The reliance on the provisions of this approach is due to the need for an individual to comprehend and accept the system of values in the process of his spiritual and moral development. The main ideas of the axiologi-

cal approach are disclosed in the works S.F. Anisimova, B.M. Bim-Bada, O.G. Drobnitsky, A.G. Zdravomyslova, V.A. Karakovsky, A.V. Kiryakova D. A., Leontyeva, N.D. Nikandrova, Z.I. Ravkina,M. Rokicha, V.A. Slastenina and others [18; 10; 13; 17; 22]. According to the provisions of the axiological approach, the spiritual and moral values adopted by future preschool teachers (in accordance with the Decree of the President of the Russian Federation "On the approval of the Fundamentals of State Policy for the Preservation and Strengthening of Traditional Russian Spiritual and Moral Values (life, dignity, human rights and freedoms, patriotism, citizenship, service to the Fatherland and responsibility for its fate, high moral ideals, strong family, creative work, priority of the spiritual over the material, humanism, mercy, justice, etc.):

– are integrated into the core of the personality and act as a regulator of its behavior, including professional behavior;

– determine the humanistic focus of the teacher's activities;

– play a decisive role in setting goals, searching for and defining the meaning of life, in modeling own strategy of professional, personal and spiritual-moral development;

– work to "define" the value of a person and childhood as a special period of life;

-are the goal in modeling and implementing educational and upbringing processes;

– act as an ideal to which it is important to strive in the process of spiritual and moral development;

– are an invisible "moral locator" that allows an individual to find an appropriate way of behaving in society;

- provide moral stability of behavior;

– contribute to the cultural development and ennoblement of the individual;

– contribute to the acquisition of meaning in pedagogical activity based on the analysis and comparison of existing meanings in the pedagogical community;

– contribute to the formation of experience in spiritual and practical activities;

– adapt to socio-political changes in society.

Person-centered approach. The main provisions of this approach are reflected in the works of Sh. A. Amonashvili, R. M. Asadullin, E. V. Bondarevskaya, S. V. Kulnevich, V. V. Serikov, V. A. Slastenin, O. F. Turyanskaya, O. V. Frolov, I. S. Yakimanskaya and others [1; 2; 4; 15; 20].Reliance on the provisions of a personality-oriented approach in solving the problems of spiritual and moral development of future teachers ensures:

– the formation of a bright, creative personality, capable of maintaining his individuality in rapidly changing social conditions and finding in future professional activities pedagogically appropriate means of influencing the developing personality of the student (only a personality can educate a personality (K.D. Ushinsky));

– formation of one's own opinion, one's own concept of the world (worldview), one's own style, one's own structure of activity;

– development of students' natural abilities;

– development of the student's personality orientation towards humanizing the relationship between the teacher and the students (humanity is nurtured by the teacher's humanity, love is nurtured by love (Sh.A. Amonashvili));

-perception of man in the unity of his three essences (natural, social and cultural) and, accordingly, modeling the educational process in higher education on the basis of such perception;

– the use of dialogical forms of work with students, through which the transfer of culture and the exchange of spiritual experience between the teacher and students is carried out;

– preparing the heart and consciousness of the teacher to accept the child as a value;

– inclusion of students in various creative projects based on their interests and demonstrated initiative;

– inclusion of students in situations of moral choice;

– development of spiritual needs in knowledge and self-knowledge, reflection, beauty, communication, creativity, search for the meaning of life, happiness, ideal;

– self-knowledge and self-construction of the personality of both the student and the teacher, which contributes to a more successful implementation of the process of spiritual self-creation of the personality.

Synergetic approach. The main provisions of this approach are reflected in the works of V.E. Voitsekhovich, K.K. Delokarova, G.N. Dulneva, V.A. Ignatova, E.N. Knyazeva, S.P. Kurdyumova, N.V. Lezhnevoy, M.A. Fedorova, Y.I. Shemakina et al. [9; 11; 14; 16; 21; 25].

Reliance on the provisions of the synergetic approach in solving the problems of spiritual and moral development of future teachers ensures:

– demonstrating to students a synergetic picture of the world, in which everything is interconnected and subject to uniform universal laws;

– understanding the goal of humanity (the attractor of evolution), which is important to strive for: in religion – this is God, in morality – goodness, in art – beauty, in science – truth, in human life – love;

– understanding the essence of bifurcations – critical points for the system, at which it is important to make a reasonable decision to move towards the attractor;

– understanding the role of the teacher and his responsibility for raising a person who is capable of making the right decision at the bifurcation point;

– training a specialist who is capable of establishing a new dialogue with nature based on human knowledge and wisdom, to accept the child as part of nature, as a microcosm in the macrocosm (J.A. Komensky), developing according to certain laws (the principle of conformity to nature);

– creation of a synergetic educational environment that promotes the realization of students' creative potential, achievement of a high level of reflection, self-organization, modeling of their own path of professional and spiritual development and formation;

– changing interpersonal relationships between teachers and students based on dialogue and cooperation;

– implementation of the process of pedagogical education as a spiritual ascent to the profession based on the cultivation of professional and personal qualities and the formation of a spiritual and moral model of professional behavior;

– development of students based on the unity of education of mind, body and soul, the formation of their understanding of the nature of the child and the perception of him as a unique creation, as a holistic personality;

– teaching students how to analyze knowledge and process large information flows;

– integration of various ways of human understanding of the world (art, philosophy, mythology, science) with the aim of increasing the level of spiritual and moral development of the individual;

– development of the ability to integrate knowledge from different areas to develop a constructive solution;

– creation of conditions for a personal focus of the educational process, personal experiences and awareness of the image of the world, opportunities for creative self-realization and spiritual self-development of the individual;

– development of non-linear and critical thinking, individual responsibility in students;

– developing a willingness to engage in dialogue with representatives of other points of view and to consider alternative positions when making decisions;

– formation of a personality with developed spirituality.

Cultural approach. The main provisions of this approach are reflected in the works of V.S. Bibler, E.V. Bondarevskaya, L.P. Bueva, G.I. Gaisina, M.S. Kagan, N.S. Rozov and others [3; 4; 5; 7; 12; 19].

Reliance on the provisions of the cultural approach in solving the problems of spiritual and moral development of future teachers ensures:

– filling the content of pedagogical education and various types of activities in higher education with cultural meaning;

– understanding culture as a fundamental component of the life of every person and society;

– developing students' attitudes towards higher education institutions as cultural centers;

– understanding of pedagogical education as a process of mastering culture, aimed at transforming the individual, developing his spiritual powers, and becoming a subject of culture;

– creation of a cultural and educational environment;

– enrichment of the individual with cultural values;

– development of cultural identity of future teachers;

– dialogue of cultures in the process of professional development;

– the use of the cultural experience of humanity: religious, spiritual, philosophical, etc. in the development of personality;

– students' understanding of the importance of preserving, increasing and transmitting culture in the process of educating the younger generation, using its achievements to obtain the best results in the development of the child's personality;

– formation of students' understanding and explanation of the object of study as a cultural phenomenon, including a pedagogical one;

– providing assistance to the student in finding himself in culture, in forming his own cultural image, as a person of culture.

System-activity approach. The expediency of turning to this approach in solving the problem of spiritual and moral development of future preschool teachers is due to the unity of consciousness and activity. The psyche and consciousness, being formed in activity, are also manifested in this activity. The more the individual is active in the activity, the more effective is the process of developing his/her consciousness. That is, activity is a means of developing the individual (K.A. Abulkhanova-Slavskaya, B.G. Ananyev, A.G. Asmolov, L.I. Bozhovich, D.A. Leontyev, S.L. Rubinstein, D.I. Feldstein, etc.).

The main provisions of this approach are reflected in the works of R.M. Asadullin, O.I. Vaganova, O.E. Ermakova, T.N. Suvorova, O.S. Toisteva and others [2; 6; 23; 24].

Reliance on the provisions of the system-activity approach in solving the problems of spiritual and moral development of future teachers ensures:

– systematic organization of a holistic educational process as a unity of different types of student activities (educational, educational and professional, scientific research, extracurricular, extracurricular, socio-cultural, etc.), coordinated by higher education teachers to achieve the set goals and objectives;

– interdisciplinarity in professional training and spiritual and moral development of the individual;

– the use of various interactive technologies of teaching and education in the educational process, facilitating the creation of conditions for quasi-professional activity, providing for the active involvement of students in solving professional tasks and problems of varying levels of complexity and, accordingly, the formation of methods of professional activity;

– development of personality in various types of activities;

gaining professional, spiritual, moral and social experience;

– self-actualization, self-determination, self-development of the individual;

– a high level of manifestation of personal and developing professional qualities;

– students discover new knowledge in the process of independent research activities under the guidance of a teacher and apply it in practice;

– the organization of professional training of students as a process of smooth transition from joint work with a teacher to an independently productive level of activity and then to creativity.

Thus, relying on the provisions of the axiological, personality-oriented, synergetic, cultural and system-activity methodological approaches gives us the opportunity to consider the problem of spiritual and moral development of future preschool teachers comprehensively and outline ways to solve it.

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CREATIVE LEADERSHIP AS A RELEVANT COMPONENT IN THE STRUCTURE OF THE ORGANIZATIONAL ABILITY OF A FUTURE SOCIAL EDUCATOR

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Abstract. *This article reviews a new role of a social educator in the social educational process and describes the position of the creative leadership of a social educator in the structure of organizational abilities*

Keyword: *Creativity, leadership, creative leadership, social educator, organizational ability*

Contemporaries assess our era as a difficult time, when common truths are challenged and revised, and a person becomes a researcher of the new world of information, the guide to which is often not an educational organization, but global information technologies. Thus, an educational organization can no longer claim a monopoly on knowledge; the previously indisputably assigned to the educator function of transferring knowledge no longer belongs solely to the educator and requires to master a new role in the educational process. The search for a new role position as a leader of the educational process implies a change in the nature of interaction between the subjects of the educational process, which consists in the transition to a partnership dialogue and the creation of a dialogue space for effective interaction and creativity.

Moreover, the new challenges facing education also lie in the fact that the issues and problems of the modern world are becoming more complex and require preparedness of students with a higher level of knowledge and intelligence. But we don't know, according to Anders Sandberg, a futurist researcher at Oxford's Future of Humanity Institute, what challenges the new generation of graduates will

face in just a few years: “We are currently preparing students for jobs that don’t yet exist … using technologies that haven’t been invented … in order to solve problems we don’t even know are problems yet.” [5] Thus, an educator teaching modern students, as a leader of the educational process, must not only have knowledge, which will always be insufficient in a constantly changing world, but to have a skill that stimulates independent identification and search for solutions to problems and the manifestation of creativity in students during educational and quasi-professional activities in the process of professional training, teaching practice and, finally, independent professional activity. This skill is relevant especially in the professional activity of a social educator, whose work, unlike a subject teacher, is always situational, problematically variable, individualized and less standardized. The professional activity of a social educator is carried out within the framework of social and pedagogical assistance, social and pedagogical support and is associated with the skill at influencing others, that is, to be the leader of the social educational process, because influence is, first of all, leadership. The new leadership role of a social educator, in our opinion, should be built on influencing, strengthening and developing others, stimulating others to independently search for answers and show creativity.

To move from a culture of ready-made answers and knowledge transfer to a culture of partner dialogue and creative search for answers, you need to be able to create a dialogue space for effective interaction and co-creation. A higher educational institution requires new educational technologies that require teachers of a higher educational institution to be ready for constructive interaction with students and to implement the principles of social partnership, communicative parity, and mutual learning as a situational change in the role positions of the educator and students. New educational technologies are designed to implement the new role of the educator as a creative leader, sharing leadership with the student and supporting the student in self-development and creativity. The concept of creative leadership can subsequently be implemented by the student himself, a future social educator, through the technology of creative leadership in interaction with future students during his future professional activities. Thus, the technology of creative leadership can and should be transferred to the practice of a future social educator to encourage students’ desire for self-development and creativity in situations of unpredictability, variability, complexity and ambiguity of the modern world.

First of all, it is necessary to prevent the issue of the seeming incompatibility of the phenomenon of creativity and the technology of its formation. The fact is that technology, which in its essence is a kind of algorithm, can be psychologically perceived only as a strict task that suppresses the independence of students’ thinking and prevents formalism in mental operations. Firstly, the concept of “algorithm” is not so unambiguous. [6] Secondly, technology can be called an algorithm only by

suggesting the essence of its definition. This, however, does not imply that there is a single universal algorithm developed by someone or a set of such algorithms for all occasions. In our case, we are talking about a certain logic of constructing the educational process, which affirms and promotes the concept of a partnership nature of interaction between the subjects of educational processes. This nature of interaction is established by promoting a culture of partner dialogue and setting educational tasks that stimulate independent search for solutions and the manifestation of creativity instead of providing the student with ready-made answers, which assumes student passivity. Firstly, this technology, which involves the design of the educational process for a specific pedagogical task, is itself creativity and, secondly, the implementation of this technology stimulates the willingness to demonstrate independence and creativity among students, and when transferred to subsequent professional practice of future social educators - manifestations of independence and creativity among the students of future social educators. In this regard, let's borrow from E.V. Titova's concept of "creativity algorithm", which communicates the creative nature of the design and organization of the educational process. [6] Thus, we reconcile the concept of "technology" and "creative leadership", developing the technology of creative leadership as a relevant technology that implements and consolidates new pedagogical principles: social partnership, communicative parity, mutual learning as a situational change in the role positions of the educator and students.

Implemented through pedagogical technology, creative leadership presupposes a new leadership position of the educator, and subsequently his students - future social educators, in the organization of social and pedagogical processes. The new role of the leader of the educational process is not the function of a manager or controller, but in stimulating the processes of self-development, self-realization, self-education, and also in the ability to create a subject position for participants in educational processes, seeing them as partners.

Creative leadership formed through pedagogical technology requires clarification and determination of its place in the structure of pedagogical abilities.

We consider creative leadership to be the skill at implement a new role position of an educator, which involves partnership interaction in expanding leadership, that is, the transfer of authority and, accordingly, responsibility for one's own success to the student, and subsequently - to the student's future pupil to demonstrate independence and creativity in the conditions of unpredictability, variability, complexity and ambiguity of the modern world.

An analytical review of the results of the study of the problem of general and pedagogical abilities, accumulated in domestic science, made it possible to substantiate the definition of the content of creative leadership as one of the relevant skills for implementing the organizational component of pedagogical activity

among future social educators in the process of professional training at a university.

In the psychological and pedagogical literature, quite a lot of attention is paid to the study of the influence of the level of development of pedagogical abilities on the effectiveness of educational activities. This issue was studied by N.A. Aminov, R. Berne, L.I. Bozhovich, V.N. Druzhinin, I.A. Zyazyun, S.P. Ivanova, Ya. L. Kolomensky and N.A. Berezovin, O.B. Kolushova, S.V. Kondratyeva, O.M. Krasnoryadtseva, V.A. Krutetsky, N.V. Kuzmina, M.A. Markova, L.M. Mitina, K.K. Platonov, J. Ryans, V.A. Slastenin, M.I. Stankin, B.M. Teplov, V.D. Shchadrikov and others.

The results of the studies of the above-mentioned authors confirm that the effectiveness of professional pedagogical activity, the mastery of teachers as the highest level of its implementation is largely determined by developed pedagogical abilities, and the means that impart integrity, coherence of direction and effectiveness are pedagogical skills.

Thus, taking as a basis the provisions of B. M. Teplov and his followers about general and special abilities, we define creative leadership as a new skill in the implementation of the organizational component of pedagogical activity, which determines the successful implementation of organizational activities in the context of professional social and pedagogical activity of a specialist, aimed at developing creativity, independence and responsibility for their success in students. [3] Following B. M. Teplov, we interpret this skill as an individual psychological feature that distinguishes a successful educator from a less successful one and explains the ease and speed of solving social and pedagogical problems in the professional activities of a social educator.

Based on the scientific reports of B.M. Teplov, N.S. Leites, N.V. Kuzmina, I.E. Shvarts, A.I. Sannikova, S.B Elkanov and others, we consider “creative leadership” to be one of the skills in the structure of organizational ability, which is not an innate ability, however, following B.M. Teplov, we recognize the fact of the presence of inclinations that underlie it and determine the degree and quality of its manifestation. The basis of creative leadership skills, following N.S. Leites, N.V. Kuzmina, we consider a specific predisposition to serving others, which N.S. Leites calls a special moral talent associated with the manifestation of selflessness, selfless readiness for assistance and sympathy. [2] In this aspect, S.L. Rubinstein characterizes this phenomenon as the most fruitful “work, literally selfless.” [4] And the creator of the scientific school of pedagogical abilities N.V. Kuzmina, in turn, declares a kind of self-denial of the teacher, due to the fact that the teacher realizes that the main result of pedagogical work is not what the teacher himself says and how he acts, but in how his student learns to think and behave. In the manifestation of self-denial, influence for the purpose of strengthening another, according to N.V. Kuzmina, and a truly professional pedagogical position is manifested. [1]

Taking into account that different levels of development of the skill at applying creative leadership in organizing social-pedagogical activities determine different degrees of effectiveness of the activities of the future social educator, we identified experimentally three levels of effectiveness of social-pedagogical activities, building them on the principle of a cumulative scale:

the level of understanding of the concept of creative leadership and the validity of considering it as a relevant skill in the structure of a teacher's organizational abilities. We call this level "I Accept". Pedagogical diagnostics of skill development is carried out through questionnaires, conversations, and interviews. The assessment method used at this level is expert assessment;

the level of reproduction of technology for developing the skill at applying creative leadership in simulated pedagogical activities in practical classes during the development of special disciplines. We call this level "Creating". Pedagogical diagnostics of the formation of the skill at using techniques for implementing creative leadership is carried out through observations, questionnaires, conversations, interviews, pedagogical experiments. The assessment method used is expert assessment, self-assessment and mutual assessment;

the level of inlay of technology for the formation of the skill at applying techniques for implementing creative leadership in transferring them to the pedagogical practice of future social educators in children's health camps. We call this level "Stabilizing". Pedagogical diagnostics of the development of skills is carried out through conversation, interviews, and pedagogical experiments at the end of teaching practice. The assessment method used is expert assessment, self-assessment and mutual assessment.

Let us note that the problem of the formation of skills in the structure of organizational ability in the system of professional activities of teachers was dealt with by such scientists as N. A. Ershova, I. A. Zimnyaya, B. D. Krakovsky, A. Ya. Megaberidze, M. V. Makarova, I. L. Rudenko, O. V. Tyuptya, L. I. Umansky and others. Among the organizational skills that implement the organizational component of socio-pedagogical activities, researchers include:

- skill at planning work;
- skill at coordinating team members' actions;
- skill at distributing work among team members and timely delegating organizational functions to them.

Among the above-mentioned relevant skills within the framework of organizational pedagogical ability, creative leadership will ensure the demand for a social educator as a leader of the educational process in a new role position of a partner, stimulating the manifestation of creativity in students, so necessary in the context of VUCA challenges to education.

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PROBLEMS OF INTERACTION BETWEEN A PRESCHOOL EDUCATIONAL INSTITUTION AND A MODERN FAMILY

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Annotation. *The article addresses the issues of interaction between families and preschool institutions at the present stage. The authors propose an analysis, on one hand, of the problems of cooperation between preschool educational organizations and the families of their students, and on the other, of the crisis of the modern family. It is essential to integrate family and public preschool education more closely, while maintaining the emphasis on the priority of family upbringing, taking into account the interests, needs, and values, as well as the educational and cultural level, social, and material conditions of families.*

Keywords: *interaction, family, preschool educational institution, crisis, problems.*

The organization of interaction between a preschool educational institution and the families of its pupils is a pressing issue in the modern Russian education system. This issue is primarily related to the change in educational standards and approaches to raising children in a preschool educational institution, as well as changes in the views of the overwhelming majority of parents on raising children, which consist of passive participation or complete lack of interaction with kindergarten teachers. Currently, in the Russian Federation, there are a number of regulatory documents (Federal Law “On Education in the Russian Federation”, “Federal State Educational Standard Preschool Education”) that oblige a preschool educational institution to build effective interaction with the family in the interests of the child’s development [2].

The main goal of interaction between the kindergarten and the families of the pupils is psychological and pedagogical support for parents in matters of upbringing and development of the preschooler, establishing trusting relationships between teachers and parents, and revealing the age-related psychological and physiological characteristics of the child.

Today, a number of problems have arisen in the interaction of preschool educational organizations and families of pupils. These problems can be divided into 4 groups.

The first group of problems includes the problem of teachers understanding the search for the most effective organization of interaction between the kindergarten and parents.

The second group of problems consists of the search for relevant forms and methods of interaction between the preschool educational organization and the family, taking into account the age and intellectual characteristics of the new generation of parents.

The third group of problems is the definition of qualitative indicators of interaction between the kindergarten and the family on issues of education.

The last group includes the unpreparedness of parents of pupils for active participation in interaction with the preschool educational institution in matters of raising the child [3].

At the present stage, the institution of the family is experiencing a protracted crisis. Its causes are varied. These are global political and social changes, increased population mobility, the process of urbanization, a sharp change from spiritual and moral values to material values. These and other factors have a significant impact on the institution of the family. The result of the influence of these factors is a diminution of the importance of family relationships and feelings, a decrease in family communication, which directly determines the level of physical and mental health of children and adolescents, and contributes to an increase in the level of social orphanhood [5].

The number of families in which both parents prioritize self-realization and professional growth over raising a child is increasing. Such families are called "two-career families." As a result, such values as kindness, compassion, respect for other people and nature, and justice are lost [7, p. 54].

The modern Russian family differs significantly from the traditional family: the number of single-generation families is increasing, the birth rate is decreasing and families with one or two children are increasingly prevalent, the number of divorces and repeated marriages, civil marriages and, as a result, children born out of wedlock is increasing. In modern families, family values are being lost and there is no desire to contribute to their development in subsequent generations [4]. From the above, we can conclude that the family, being the main institution for the

socialization of children, for various reasons currently does not fully perform its main functions. These reasons include the type, structure, needs and value orientations of the family, the position of family members in relation to the child [6, p. 10]. Proper upbringing of children and protecting them from difficulties in modern reality is increasingly becoming a rare phenomenon.

Despite the significant level of theoretical knowledge, implying high education of most parents of pupils, erudition and awareness of pedagogical and psychological literature on issues of child upbringing, many of them do not have sufficient practical skills and abilities in raising their own children. At this point, teachers are assigned a key role. They must assist, support, and complement the developmental and educational activities of the family. As a result, the question arises of how to organize such activities in which parents will be active participants in the pedagogical process, during which their pedagogical competence will increase [2].

The interaction of preschool educational organizations with families at the present stage continues to be studied in order to find the most effective and optimal forms and methods of cooperation with the new generation of parents, strengthening and awareness of their importance in the upbringing of their own child and increasing the possibilities of influencing the educational process. Thus, the importance of establishing interaction between teachers of preschool educational organizations and families of pupils is emphasized in the psychological and pedagogical studies of L. Artemova, A. Bogush, R. Bure, O. Usov and others [8].

I.A. Dyadunova suggests using such concepts as traditional and non-traditional forms as a classification of communication forms. She classifies traditional forms of interaction as visiting families at their place of residence, open day, conversations, consultations, and parent conferences. Non-traditional forms of work with parents include the development and implementation of socially significant events, joint projects, organizing “creative workshops”, family evenings, a weekend club, and a helpline where parents describe the problems that have arisen.

In addition, I.A. Dyadunova divides all forms of interaction into several groups:

1. Information and analytical (survey, tests, questionnaires)

They provide an opportunity to take into account the interests and requests of parents, to establish trusting relationships in the “teacher-child-parent” system.

2. Leisure (holidays, exhibitions, joint excursions)

They are used to establish warm, trusting relationships between teachers and parents, parents and children.

3. Educational (conferences, seminars, talks, memos)

Their main goal is to improve the level of pedagogical culture and parents’ knowledge of the child’s psychological and physiological characteristics.

4. Visual and informational forms (open classes, open days)

They are designed to evaluate the activities of teachers and the use of methods and techniques by parents in the course of family education of children [2].

The named forms of interaction between preschool institutions and families are implemented in the conditions of continuous unity of public and family education. They are based on partnership, cooperation between teachers and parents.

In the conditions of modern reality, due to the lack of time of parents, the most popular form of communication is virtual, implemented in the form of information webinars, consultations in an online format, using the potential of the kindergarten website to post relevant information for parents (consultations, materials from holidays and events, master classes, assignments for individual completion at home).

O. L. Zvereva, in her work with parents, considers an innovative form of interaction with the family, the "Parenting Academy," on the Internet. She cites several options for an Internet academy. The first option is to create a page on the website of a preschool organization. As a second option, she suggests using interactive communication between parents and teachers. The third option is an Internet club. This form is aimed at parents whose children, for objective or subjective reasons, do not attend kindergarten [4].

Currently, the fundamental principles of interaction with the family have been formed in preschool pedagogy: professional competence of teachers; diagnostic approach to families; focus of pedagogical education of parents on the personality of the child, his individual, creative development; individual approach to families. The process of interaction with the family puts forward the main requirement of adherence to a differentiated approach: with some parents it is necessary to work individually, with others - together with other parents, playing the role of assistants to teachers [1, p. 138].

Thus, the interaction of the preschool organization and the family should be based on respect and cooperation. The activities of teachers and parents should integrate with each other. The main goal of interaction between the preschool organization and the family is the upbringing of the child and his/her further successful socialization, the establishment of trusting relationships in the triad "teacher - child - parent", the involvement of parents in the life of the educational organization through the use of effective forms of interaction. When building work with the family, it is necessary to develop and use both traditional and modern forms, focusing not only on the goals and objectives of educational and upbringing activities, but also on the interests and needs of the parents of the pupils.

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SENSORIMOTOR DEVELOPMENT OF CHILDREN WITH DISABILITIES THROUGH PROPRIOCEPTIVE CONTROL

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The research materials were prepared within the framework of the project implementation: "Sociocultural and creative development of children with cerebral palsy and support of their parents by means of sociocultural education and rehabilitation" with the support of the Presidential Grants Fund (01.07. 2024 -31.05.2025. Agreement No. 24-2-013989).

Annotation. *As dominant positions aimed at sensorimotor development children with disabilities, processes are indicated, indirect proprioceptive control interactions of children with disabilities with the surrounding environment.*

Keywords: *sensorimotor development, children with disabilities; proprioception; physiological mechanisms of proprioception, proprioceptive control.*

Sensorimotor development of a child is a systemically organized and dynamic process, regulated by the central nervous system and changing with age based on the ontogenetic mechanisms of interaction with the environment. The work of the brain is characterized by the ability to: operate various action schemes, control the functions of the body, organize and regulate the development of motor, vegetative, mental, cognitive and speech functions [3], the development of which becomes possible thanks to the "motor indicator of higher nervous activity" [2, p. 449]. Physiological mechanisms of proprioception occupy a regulatory and coordinating position in control of body movements, muscles of the hands, fingers, face, ar-

ticulatory apparatus, oculomotor muscles. In interaction with objects that differ in their characteristics, the child develops proprioceptive sensations that control the applied muscle force in accordance with the shape, size and texture of the object, taking into account the situation in which this object is used.

Proprioceptive mechanisms that develop in children with disabilities (CWD), who have impairments in gross and fine motor skills, hyperkinetic disorders, hearing, vision, speech, behavior, general mental underdevelopment, and delayed mental development, are characterized by undifferentiated processing of sensory information coming from sensations of body position in space, movement, sight, sound, and smell. It is clear that the state of these functions affects the process of mastering every day, object-manipulative, play, and educational activities, the development of which is characterized by qualitative uniqueness. Therefore, the increased interest in issues related to the development of proprioceptive control in children with disabilities is quite justified, as it correlates with addressing corrective and developmental tasks in the area of their sensory-motor development.

In the context of the stated topic, the following provisions seem fundamental:

– proprioceptive sensations are processed in the central nervous system through proprioceptors located in the skin, muscles, ligaments, and joints. These receptors are the primary regulators of sensing and maintaining the position of one's body, the coordinated movement of limbs, and the direction of movements, which correspond to the properties, characteristics, and positioning of objects in the surrounding space [5, p.182];
– proprioception is directly related to the organization of movements. In this regard, physiological mechanisms play a key role in regulating a child's ability to reproduce actions in patterns of bending - straightening, lateral abduction - adduction to the midline, and circular movements of various body parts. Proprioception serves as a link between external sensory stimuli and the developing components of complex motor skills (chains of sequential actions). There is a connection with tactile processing of sensory information and the muscle-movement sense, which integrates the applied effort, the sensation of gravity, and touch [4, p. 15].

In correctional and educational practice, various methods and techniques are used to develop sensorimotor functions in rhythm classes, indirectly in the didactic form of conducting game exercises. In this case, the development of partial proprioceptive-oriented correctional or rehabilitation programs is carried out based on individual indicators in the child's development, taking into account his motor capabilities and has its own specific focus, due to the fact that in complex corrective classes include exercises that activate the development of proprioceptive control through imitation the child's activities in the process of integrating the analytical systems. For example:

- development visual-motor control. Score a goal. Follow the tracks (along a narrow path, on an inclined surface). Step over obstacles. Throw the ball (at a target, basket, box). Inlays. Finishing drawings. Dominoes. Games with pyramids, nesting dolls, cubes, geometric figures. Feeding the doll. Treating the bear. Making a snowman, etc.

- development visual-auditory control. Photographer. Orchestra. Clap-stop. Drum and pipe. How a big or small cat (other animals) sounds;

- development auditory-motor control. Edible-inedible. Hot potato. The sea is worried. Freeze. Fish-wolf-snake-hare. Unique. Faster - slower. Velcro, etc.;

- development kinesthetic-motor control. What's in the hand. The eyes are asleep, but the hands are working. Get it out of the bag. Guess which hand has more. Stop signal. Repeater. Pantomimes. Annoying fly. Ring, etc.;

-development of visual-auditory-motor control. Playing musical instruments accessible to children. Call ... (mother, cat, chicken) loudly, quietly. Slow and steady wins the race. Scare the evil wizard, etc.;

-motor techniques. Picking. Carrying. Round dances, jumping rope. Throwing. Tag. Hide and seek. Bouncers, etc.;

-motor-rhythmic exercises. Knock-knock. Claps. Follow the command (instruction). Musical-rhythmic movements accessible to children.

It is important to focus attention on how the child moves, performs object and instrumental actions, assimilates sensory standard systems and perceives speech addressed to him [6].

In order to increase the effectiveness of correctional work aimed at the sensorimotor development of children with disabilities, it is necessary to identify proprioceptive mechanisms in various types and practical activities, assess the level of mastery of these actions, select and offer the child interesting options for using familiar objects in an unusual game form. For our part, we will give examples of exercises with pencils [7]:

- roll the pencil between your palms;

- take the pencil with the index finger and thumb in the middle and, imitating the rotation of a helicopter propeller, reproduce rotational movements with the hand (alternately with each hand and with both hands at the same time);

- tap a pencil on the table at a fast, slow and medium pace, with different rhythmic patterns (children repeat what they heard and come up with their own options);

- shift pencil from one hand to the other (add one pencil each time and perform similar actions with several pencils)

- Place the pencils on the table at a small distance from each other and step over the "barriers" with your index and middle fingers one by one, trying not to touch the pencils lying there.

The exercise “Caterpillar” evokes an emotional response in children. Place the pencil vertically (writing end down). Take it with the index finger and thumb of the right hand. Alternately changing the right and left hand, move up and down the pencil rod, placing the index finger and thumb under each other (the caterpillar crawls up, the caterpillar crawls down).

The continuation of the storyline consists of putting the tired caterpillar to sleep. The fingers of the leading hand stop in a position ready to draw or write, while the ring finger, placed under the pencil, becomes a pillow. Calming and lulling the caterpillar, we swing the hand from side to side. A strong wind will be a command to reproduce circular movements. Further actions are performed in reverse order.

All the listed exercises are performed by the child together with the teacher. In a more complicated way, the combination of exercises can be presented in a different scheme of actions: holding the pencil with the pads of the index fingers of the right and left hands in a horizontal position at chest level. Slightly swing the pencil, simultaneously moving the fingers to the right and left (swing). Returning to the initial position, straighten and bend the arms forward and backward while counting.

Holding the pencil in the same position, perform the “Wheel” exercise, alternately rotating your hands with the pencil away from you and towards you.

Having fixed the vertical position of the pencil, continuing to hold the pencil with the pads of the fingers, we make circular movements first clockwise, then in the opposite direction.

Moving on to wave-like movements, we play out a marine scene.

You can complicate the task by gradually adding more pencils (take pencils from the table with the fingertips of your right and left hand, index, middle, ring and little fingers) or, in parallel with the hand movements, add side steps forward, backward and to the side. Raise your hands with pencils up and ask the children to spin.

We are sure that every teacher has his own exercises in his arsenal. It also happens that children themselves begin to come up with options for actions with pencils.

In conclusion, we note that the proposed set of exercises aimed at the sensorimotor development of children with disabilities through proprioceptive control is a powerful energy resource for corrective work.

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PROBLEMS OF USING THE METHOD OF WORKING WITH TEXT TO ACTIVATE STUDENTS' COGNITIVE ACTIVITY

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Absrtact. *Teaching a foreign language is a complex process that is influenced by the trends of the time, due to global changes.*

The purpose of this study *is the theoretical and practical justification of the use of texts as the main component of the educational process, stimulating the students' cognitive activity.*

Materials and methods. *The material of the study was the questionnaire. To systematize the data obtained the following methods were used: theoretical and empirical.*

Results and their discussion. *As for the students' interest in reading and the difficulties associated with it, here we can observe a trend common to the modern type of students - 45% of students from the total number of respondents (450 people) are neutral about reading. A positive fact is the extremely low percentage of students who do not see the point in reading (5%). Some students have difficulties reading educational texts, but, according to the overwhelming majority of responses, the implemented methods of working with texts help to overcome them.*

Conclusion. *Working with text at foreign language classes will help to activate cognitive activity if: texts are selected within the framework of the students' professional focus, if they are adapted to reading and stimulate the search for additional information.*

Keywords: *foreign language, the cognitive activity, text, methods, theoretical, practical, reading, difficulties.*

Teaching a foreign language is a complex process that is influenced by the trends of the time, due to global changes.

The main focus of the work is such element as reading, since it is a key tool of teaching a foreign language according to the main goal of teaching a foreign language to medical students.

The actuality of the work is due to the fact that, despite a large number of studies on the problem of teaching reading students of non-linguistic universities, to increase motivation for working with literature on the specialty, at present the level of skill proficiency graduates of non-linguistic specialties does not always meet modern requirements. At this stage, students have difficulty with coping the process of reading in general, and reading professionally oriented literature in particular.

Under conditions of limited time for the discipline, insufficient linguistic competence of students and lack of motivation when working with difficulty for perceiving texts in the specialty, the issue of improving the methods of teaching reading to activate the student's cognitive activity is especially acute. The problem of the research can be defined as follows: a text in foreign language being the main means of teaching language and speech for centuries, in modern conditions ceases to be an effective tool for activating the students' cognitive activity.

The purpose of this study is the theoretical and practical justification of the use of texts as the main component of the educational process, stimulating the cognitive activity of students.

To achieve this goal, the following tasks are defined:

1. to study the literature on the topic of cognitive activity;
2. to determine the main methods stimulating cognitive activity;
3. to determine what place the method of working with text occupies in the structure of students' cognitive activity;
4. to analyze the pedagogical conditions for using the method of working with text.

The object of this work is the students' educational activity of a medical university. Subject of the study: application of the method "working with text at a foreign language lesson" to activate the cognitive activity of students.

The hypothesis of the study is that working with text at foreign language lessons will contribute to the activation of cognitive activity if:

- texts are selected within the framework of the professional orientation of students;
- texts are adapted for reading;
- texts stimulate the search for additional information.

Within this study, we used an extensive theoretical and methodological base which we relied on.

Practical basis of the study: Novosibirsk State Medical University of the Ministry of Health of the Russian Federation.

The conducted study is based on the following methods:

- theoretical - analysis and generalization of methodological, linguistic, psychological scientific publications in the context of the issues under consideration; analysis of the current textbook on English for special purposes used at the university.
- empirical - conducting a survey.

The theoretical significance of this study is that we have summarized, identified and substantiated the main requirements for a text acting as a source of knowledge and stimulates the cognitive activity of medical university students when working with a scientific text.

The practical significance is underlined by the fact that we have considered how following the requirements for working with a scientific medical text is implemented using the example of a work method used in the foreign language textbook for medical students; and also helps maintain the interest of students and interdisciplinary connections with other disciplines studied.

So, one of the primary tasks is to consider the concept of "cognitive activity". This concept implies an active study of the surroundings by a person, in the process the individual acquires knowledge, learns the laws of the existence of the surrounding world and learns not only to interact with it, but also to influence it purposefully. The basis of cognitive activity is cognitive activity, which allows one to be active and independent in the process of cognition.

Before talking about how the "working with text" method helps stimulate cognitive activity, we should first consider its components.

The process of cognition is always due to a certain necessity, i.e. some impulse arises stimulating the process of acquiring knowledge. During its development, cognitive activity that helps a person to master knowledge, skills and abilities acquires a more complex form - scientific knowledge.

One of the important criteria of cognitive activity is the high activity of its manifestation:

- it acts as a factor of personal development;
- is a stimulus for all thought processes;
- is a source of intellectual activity, mobilization of creative forces to solve academic and professional problems;

- contributes to the expansion and deepening of the knowledge system;
- is an indicator of the development of individual personality traits.

Another important concept is cognitive motivation, since it creates the basis for cognitive activity and is a system of motivation that encouraging effective educational activities.

The main task of training is to support curiosity in order to form a deep cognitive interest, helping the student understand the structure, logic of the course, the methods of searching and proving new knowledge used in it, when he is captivated by the process of achieving new knowledge, and independent solution of problems and non-standard tasks brings pleasure. Cognitive interest consists of intellectual and emotional-volitional processes that acts as a motivating force for active learning.

Drawing conclusions from all of the above, we put in first place the need to develop cognitive motivation as a fundamental element that determines the cognitive activity of the student. In this regard, applying the "work with text" method in practice, we use the most interesting and relevant topics related to the professional focus. In addition, the subject matter of the texts should provide interdisciplinary connections with specialized subjects: anatomy, physiology, botany, Latin, thereby supporting the development, repetition and consolidation of theoretical material.

According to the Federal State Educational Standard, the ability to learn is determined by the development of universal learning activities. Universal learning activities (ULA) according to the Federal State Educational Standard in a broad sense are the ability to learn, the ability to self-develop through active cognitive activity. This is a set of techniques that helps to acquire new knowledge and skills successfully [9].

Thus, the further main task is to reveal the close connection and undeniable significance of the "working with text" method in the structure of cognitive activity and its integral influence on the development of students' cognitive activity.

Text is a universal source of information. It is a reflection of mental activity, a unique speech product that conveys knowledge, national, cultural, educational characteristics. It can also be a source of philosophical reflection, the search for truth; inspiration or a force stimulating action.

Text is the main tool for communication, it serves to store and transmit information being the basis for the characteristics of the mental life of an individual. Text is the result of the actual use of language units. It turns out to be the only source of knowledge of students in the field of lexical and grammatical organization of a foreign language [1].

Since the text is the central link in the study of any subject, it does not matter what source it is taken from: a borrowed authentic or adapted text compiled by the

author of the manual; the main thing is that all the relevant and inherent features of the text are preserved. The content and linguistic design of the text are often subordinate to the linguistic material: it is compiled/adapted by the author in such a way that to represent students with new linguistic units (show their meaning, compatibility, etc.) [6].

Several main functions of the text in the learning process can be distinguished:

1) Expansion, replenishment of students' linguistic knowledge.

2) Training - reproduction of the text or parts of the text.

3) Development of semantic understanding of the text.

4) Development of oral speech - reproduction of the content of the read text.

The information given in the texts should be interesting and, what is more important, relevant to the students. It ensures the successful perception and assimilation of information.

Observation of the educational activities of students at a medical university revealed that they do not know how to work with text information, and often do not want to. It is difficult for them to perceive and assimilate a large amount of information. The need to process information is especially difficult. This means that complex information containing a large number of terms can be simplified by selecting simpler forms of its transmission, but this requires a number of clarifications, the ability to separate the important from the unimportant, which is difficult for many students.

In a scientific article written by college teachers in Kuwait, certain trends in "e-reading" were mentioned. According to the results of the study, devoted to the comparison of electronic reading with traditional reading, electronic reading has a number of disadvantages. For example, when reading from a gadget screen, students spend most of their time browsing and scanning the text, they are more selective in choosing the text and tend to read the text only once. Accordingly, less time is spent on in-depth, careful, concentrated reading. Thus, students tend to use electronic media for browsing, rather than for intensive reading. Thus, reading from an electronic media develops the skills of fast types of reading, but is not characterized by a high level of depth to understand the text and does not develop the skills of slow types of reading [7].

This information allows us to understand the nature of electronic reading, and also to assume that students experience fewer problems with search types of reading compared to generalizing or creating ones. This, in turn, allows us to pay more attention to poorly formed skills in students from the standpoint of reading texts.

The formation of language knowledge, skills and abilities consists in the fact that the student has a certain vocabulary, can read words correctly, using the rules of reading; can recognize words in context or guess the meaning of certain words, relying on word-formation elements or other words from the context; has a certain

set of knowledge regarding the grammar of the foreign language being studied; can recognize, correctly interpret and use grammatical constructions and phenomena, as well as transfer skills from the native language to the practice of the language being studied.

Students of the Novosibirsk State Medical University study the discipline "Foreign Language".

The main objective of the discipline: the formation of intercultural communicative professionally-oriented competence in the totality of its components: speech, language, intercultural, educational and cognitive. According to the goal and objectives specified in the work program, a foreign language textbook was developed for students of the Novosibirsk Medical University. A clear lesson structure was defined for this textbook, which is repeated in each lesson. The central element of each lesson is the text. Based on the text, new vocabulary and grammatical material is introduced, repetition, practice and consolidation of vocabulary and grammatical material is carried out.

The texts, which, as mentioned above, are the central elements of each lesson in the textbook, were taken from authentic sources. The texts were adapted and shortened. The maximum volume of texts is 3000-3500 characters. When adapting the texts, the vocabulary and grammar were verified, that is, the structure of some sentences was changed in accordance with the grammatical material, which is indicated within the lesson.

The structure of each lesson is divided into several parts:

- questions introducing the topic of the lesson;
- new vocabulary and exercises for practicing;
- exercises for introducing, practicing and consolidating grammatical material;
- reading the text, its lexical and grammatical analysis in order to clarify the translation;
- post-reading tasks aimed at checking the understanding of what was read, the ability to present facts, give explanations, and also provide additional information within the topic;
- authentic video on the topic.

It is very difficult to find a way to check to what extent students are motivated by reading professionally oriented texts and how it contributes to further activation of their cognitive activity.

Working with text at foreign language classes contributes to activation of cognitive activity if:

- texts are selected within the framework of students' professional focus.
- texts are adapted for reading.
- texts stimulate the search for additional information.

All specified conditions are given in the textbook presented to students.

During the study, we conducted a survey. The goal was to identify students' interest in the topic of foreign language texts; to understand how important and interesting they find the information; whether they think that it helps or can be useful to them when studying other specialized subjects; whether it stimulates the search for additional information.

We developed a number of questions for the questionnaire:

1) "How do you feel about the need to read texts at foreign language classes?"

2) "Do you have difficulty reading educational texts at foreign language classes?"

3) "Are you interested in the topics of educational texts at foreign languages?"

4) "Do you think that the topics of texts at foreign language classes are related to the professional focus of your studies?"

5) "Do you think that the topics of texts at foreign language classes allow you to learn necessary and important information?"

6) "Do you think that the information you learn from educational texts in foreign languages will be useful to you in the future?"

7) "Does reading texts at foreign language classes cause lively discussions with your classmates?"

8) "Did reading texts at foreign language classes motivate you to learn more about the topic because you were interested?"

9) "Have you ever read texts in a foreign language, running ahead of the topic because you were interested?"

The survey results showed that students see a connection between the topic of the texts and their future profession; the topics of the texts are interesting to students. As for the students' interest in reading and the difficulties associated with it, here we can observe a trend common to the modern type of students - 45% of students from the total number of respondents (450 people) are neutral about reading. However, a positive fact is the extremely low percentage of students who do not see the point in reading (5%). Some students have difficulties in reading educational texts, but, according to the overwhelming majority of responses, the implemented methods of working with texts help overcome them.

Thus, working with text at foreign language classes will help to activate cognitive activity if: texts are selected within the framework of the students' professional focus, if they are adapted to reading and stimulate the search for additional information.

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LINGUACULTURAL CHARACTERISTICS OF HINGLISH

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Abstract. *This paper studies linguacultural features of Hinglish, i.e. cultural traces in this hybrid language which is a mixture of Hindi and English. Alongside with the code switching, there are other characteristics typical of Hinglish that seem to be related both to the Indian culture and the structure of Hindi. Namely, the following features are described: particle "ji" to express respect, suffix "wala" to express certain relation, explicator compound verbs with "karna", and reduplication for emphatisation. The results of this research show that, on the one hand, English is deeply rooted in everyday life of Indians, and on the other, the English language used in this cultural context is enriched by the local languages and cultures, which corresponds to the concept of World Englishes.*

Keywords: *Hinglish, linguacultural features, World Englishes, Outer circle, Hindi.*

Introduction

Modern society is characterized by a high level of globalization. From a linguistic point of view, globalization is accompanied by diversification, during which many varieties of the English language appear, and each of them reflects the cultural features of the societies it exists in and peculiarities of the native languages of its users. In other words, the diversification of the English language proceeds as the nativization/localization of its varieties. Such English varieties form the World Englishes Paradigm [Kachru, 2006].

Once in new and unfamiliar contexts – national, social, cultural, and linguistic – the language develops features that were not inherent to it. Therefore, new varieties of the English language emerge in the situation of contact with other languages. The varieties spoken in countries where English has the status of an official language and where it is spoken as a second language are called "new variants of

the English language" [Mesthrie, Bhatt, 2008: 3] and belong to the Outer circle, according to Kachru's Concentric Circles theory [Kachru, 2006]. That is the case of the Indian variant of English, with Hinglish (Hindi+English) being part of it.

The history of the English language in India began in the 17th century,when on December 31, 1600, Queen Elizabeth I issued a decree granting London merchants a monopoly on the trade with India.This is how the East India Company was founded,which marked the beginning of the British rule on the Hindustan peninsula [Graddol, 2010: 8].

After the end of British colonisation in 1947, it was necessary to determine the status of the English language in the emerging new Indian state and society. Indian nationalists believed that one of the local languages should become the official language. Hindi was best suited for this role, since its speakers, according to various sources, made up from 30 to 70% of the Indian population. But English continued to be widely used in India as the lingua franca for different ethnic groups. Thus, in the Constitution of the Republic of India English remained as the language of communication between the states along with Hindi. It should be noted that this was a temporary status for within fifteen years Hindi was supposed to completely replace English in all its functions and contexts. However, this did not happen, mainly because the southern regions of India are inhabited by ethnic groups that do not speak Hindi, with their native languages being Tamil, Malayalam, Kannada, etc. Representatives of these ethnic groups would feel professionally and socially disadvantaged if Hindi became the only national language. As a result, the three-language formula was introduced in India to promote multilingualism and national integration. It mandates the study of Hindi, English, and a regional language across the country [Fasold, 1984: 20-31]. At present, according to Articles 343-351, Part 17 of the Constitution of the Republic of India, Hindi and English are the official languages, with 22 other languages called scheduled languages [The Constitution of India, 2007: 212-217].

However, it should be noted that there is an ongoing debate in the Indian society about the negative impact of English on the local languages. The viewpoint of some researchers, namely Phillipson, on English as a killer language finds its supporters [Phillipson, 2001: 192]. Many Indians are concerned with the problem of preserving the languages of the peoples of India, which, according to some researchers, are gradually being displaced by English [R.B. Mastoi et al., 2018]. Hence, the situation around English in India is quite complex.

Despite all the controversies, it is certain that in terms of the variety of English we are dealing with a full-fledged, independent and standardized Indian variant of English [Kachru, 1983; Kachru, Smith, 2008; Mehrotra, 1998; Parasher, 1991; Proshina, 2007; Schneider, 2003]. Hinglish, a hybrid of English and Hindi, which is the focus of the current paper, is only a part of the Indian variant, as Eng-

lish comes into contact with other local languages and cultures of various ethnic groups living in India, enriching it and thus forging Indian English.

Methods

For the purpose of our research we chose Indian TV show "Kuch Rang Pyar Ke Aise Bhi"/"Different colors of our love". It is a modern Indian TV series released on February 29, 2016, that includes 504 episodes divided into 3 seasons. The series is a saga about a big modern Indian family with several generations living together. All the characters are of different ages, education and occupation, with all of it being reflected in their language. The creators of the series have repeatedly said in their interviews that they tried to bring the storylines closer to the real life of Indians and their socio-cultural patterns, so the realistic story managed to quickly win the hearts of the viewers.

Not only the plot twists, but also the peculiarities of the characters' speech turned out to be believable. The writers and actors underlined that they aimed to make the linguistic portrait of their characters as realistic and plausible as possible. The characters of the series speak Hindi, but there are a lot of English words in their speech, and not just borrowings, but constant code switching and loanwords adapted to the norms of the host language and culture, which we regard as examples Hinglish.

The characters' speech is abundant in Hindi and English code switching (9,212 contexts). This feature appears to a greater extent in the speech of young and middle-aged characters, while in the speech of the older generation it is less frequent. Moreover, we did not find any dependence on the type of communication - informal or formal, since this feature can be observed in the everyday conversations between family members or friends as well as in business discourse. In the end, we decided to exclude this feature from the final analysis and count, for, although prolific, it is not discriminative, i.e. specific to Hinglish only. Code switching is a common feature in other variants of English in the Outer circle. In this paper, we focus on the distinctive features of Hinglish, unique to this variant. Therefore, we have analyzed 3,853 contexts of Hinglish features found in the described above material.

Results and Discussion

As a result of the analysis, the specific features of Hinglish in terms of frequency were arranged in the following order:

1. Explicator compound verbs - 3024 contexts (78.48%);
2. Particle "ji" - 746 contexts (19.36%);
3. Suffix "wala" - 63 contexts (1.64%);
4. Reduplication - 20 contexts (0.52%).

Table 1.

Linguistic and cultural features of "Hinglish"

Linguacultural features of Hinglish			
Explicator compound verbs	Particle «ji»	Suffix «wala»	Reduplication
3024 contexts	746 contexts	63 contexts	20 contexts

1) Explicator compound verbs

An explicator compound verb is a structure that consists of a sequence of two verbs V1 and V2, where the main verb V1 (semantic core) is followed by the delexicalized verb V2 [Abbi, Gopalakrishnan, 1991: 161]. Explicator compound verbs in Hinglish also include two components:

1. The first component is a noun or a verb which carries out the semantic function.

2. The second component is a verb that takes all the inflections and bears the grammatical load. This component helps to adapt the first one to the Hindi language system, conjugating according to Hindi rules.

In Hinglish, an English lexeme is used as the first component, for example, *argument karna - to argue*. This is an example of how the first component can be a noun, and the second component is a Hindi verb that conjugates according to the grammatical paradigm of Hindi.

The first component can be an English verb and the second is usually the Hindi verb "karna" ("to do" in Hindi). The combination "verb + verb" can be divided into two groups: one of which is a classical two-component structure in which the first component is an English verb that takes the semantic function and the second component is a Hindi verb that carries out the grammatical function. The second group includes English phrasal verbs combined with a Hindi verb, e.g. *pick up karna.*

Table 2.

Explicator compound verb constructions in Hinglish

Explicator compound verbs (number of contexts)		
"verb + verb" (2849 c.) e.g., **compare karna**	"phrasal verb+verb" (31 c.) e.g., **pick up karna**	"noun + verb" (144 c.) e.g., **argument karna**

Among the explicator compound verbs, structures with the first English verb component and the second Hindi verb component are the most numerous, for example, *compare karna, wait karna, disturb karna, check karna*, etc., found in 2,849 contexts. As for other combinations, they are much less frequent - 31 contexts of "phrasal verb + verb" combinations, and 144 contexts of "noun + verb" combinations. These constructions are used in informal situations, for example, in

a conversation with a family, e.g., *agar koi problem hai toh, please, humse* ***share karo*** (imperative mood of the verb "karna" for "you") – *if there is a problem, then please share with us*. They may also be observed in business and professional communication, e.g., *join karna, use karna*, *diagnose karna*.

2) Particle "ji" to express respect

Respect is one of the key values of the Indian culture. It is common to show respect verbally to people who are older than the speaker or senior in position. Hindi has special lexical means that serve this cultural purpose, namely particle "ji". The latter is used as a honorific, i.e. special words or particles expressing respect [Caldwell Smith, Weightman, 1994: 385]. It has no direct translation into Russian or English and has no counterparts. This particle is added to the words which are used to address, greet and thank people. In Hinglish, this particle is added to an English word that is the semantic core, for example, *auntieji, uncleji*, etc. This particle can be attached to the words of gratitude or greetings and performs the emphatic function, e.g., *thank you ji, hello ji.* This feature is significantly more common in the speech of young characters than the older generation.

Table 3.

Particle "ji" in Hinglish

Addressing words + particle «ji»	Gratitude words + particle «ji»	Greeting + particle «ji»
Uncleji	Thank you ji	Hello ji

3) Suffix "wala" to indicate affiliation or relation

In Hinglish, suffix "wala" is added to English words thus modifying their meaning. Its function is to emphasise the relation to something, e.g., *policewala* (a policeman). It has 4 different forms: "-wala" – male, singular; "-wali" – female, singular; "-wale" – male, plural; "-waliyan" – female, plural.

In India, due to the hot climate, it is common to offer your guests some cold drinks such as water, juice, lemonade or soda. One of the characters, attending an event, calls the person who offers drinks to guests a "*juicewala*" (the one who has and gives juice). In another episode the son of the main characters, little boy Ayush, calls one of his aunts "*strictwali auntie*" which means "a strict aunt". In the opening episode, delegations from London come to the main character for the negotiations, and the secretary uses the word "*londonwale*" as a descriptive word (from London) to remind her boss about the meeting.

4) Reduplication

One of the distinctive features of Hindi is reduplication, i.e. repetition of a certain lexeme, e,g., *zaroor-zaroor – of course-of course*. It has two main functions in Hindi:

• emphatic, i.e. emphasizing certain details in a statement or emotional colouring of the speech;

• reduplication can change the meaning of the word, for example: *kabhi* means "ever", and *kabhi-kabh*i means "sometimes" [Koul, 2008: 73-176].

In Hinglish, however, reduplication keeps only the emphatic function, making a statement more emotional, e.g., *sure-sure*. Reduplication is used by characters of different social status, age and gender.

Following grammatical patterns of Hindi, reduplication in Hinglish can be simple, when the repeated word remains unchanged: *sure-sure, of course-of course, ek second-ek second*. Or there might be a change of the first letter (or the first letters) and the sound (or sounds) in the repeated word: *dinner-**v**inner; coffee-**sh**offee*. Note that this feature can be traced only in informal contexts.

Table 4.

Reduplication

Simple reduplication	Modified reduplication
e.g., sure-sure, ek second-ek second	e.g., dinner-**v**inner, date-**v**ate, cooking-**sh**ooking, coffee-**sh**offee

Conclusion

The results of this study show that the linguistic contact of Hindi and English generates a unique hybrid structure called "Hinglish" which has its own specific features. The distinctive features of Hinglish include explicator compound verbs comprised of an English and a Hindi element, particle "ji" to express respect, suffix "wala" to indicate relation, and emphatic reduplication.

To conclude, Hinglish linguacultural characteristics are shaped by India's multilingual environment and reflect the centuries-old ethnocultural heritage of its people. Hinglish plays a significant role in daily life of Indians, being used for communication at home, at schools and at work. Hindi, Hinglish, and English coexist peacefully in the minds of Indians and are used in different linguistic contexts. English in this diverse language landscape undergoes transformation in accordance with the Indian cultural and linguistic traditions.

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INTERNET MEMES AS CREOLIZED TEXTS: LINGUISTIC FEATURES OF TEXT COMPONENT

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Abstract. *The paper discusses the textual component of English-language Internet memes. Internet memes as creolized texts are an integral part of the present-day information society, which carry cultural information. However, most researchers focus primarily on the communicative or semiotic features of memes, while the linguistic component remains insufficiently studied. All this determines the relevance of the study. The aim of the paper is to examine the spelling, lexical and syntactic features of English-language Internet memes relying on the structural criterion in the meme typology as polymodal creolized texts. The research views the text component as one of the constituent elements of binary type memes, taking into account cultural and situational context. The authors highlight the role of linguistic means in creating a language-game and implementing the creative function of the language. The research methodology includes the inductive method and its specific procedures, such as direct observation, comparison and analysis, the descriptive method and the componential analysis.*

Keywords: *Internet meme, creolized text, linguistic features, linguistic creativity, language-game, communication.*

Memes have become an integral part of Internet communication in the 21st century. This phenomenon attracts close attention of scientists, however, the linguistic features of Internet memes remain insufficiently studied, which determines the relevance of the current study.

The research focuses on binary-type memes (according to the classification of Tatiana V. Marchenko and Larisa L. Zelenskaya), which are made up by two codes

– text and visual image [6]. The linguistic characteristics of the textual component of Internet memes are directly related to their structure. Researchers distinguish the following major types of Internet memes in accordance with their structure: 1) two-part memes; 2) comparative memes; 3) metamemes. Examples of memes are provided below to illustrate the linguistic features of the text component of the three types of Internet memes mentioned above.

Two-part memes are the most common type. It is a two-part statement (inception + punchline – an unexpected witty conclusion), which enters a complex semantic relationship with the accompanying visual material.

Figure 1.

Figure 2.

The punchline in the meme in Fig. 1 *'He's back!'* is a direct reference to Cornelius Fudge's famous line from the "Harry Potter and the Order of the Phoenix" film, supported by corresponding visuals.

Comparative memes built on the contrast or comparison of several images, objects, or points of view on a situation are also extremely popular. The comic effect is often based on the discrepancy between the ideal and the real; where meme elements are juxtaposed to highlight the imperfection of the world [5] (see Fig. 2).

Metamemes are memes that perform a referential function. Their identification and interpretation requires significant effort from the addressee. The author's presuppositions can only be deciphered if the meme generates the same cultural associations in the addressee's mind. Metamemes interplay with other existing structural types of memes.

The peculiarity of the Internet meme as a creolized text is the combination of signs belonging to different semiotic systems. When perceiving a creolized text, double decoding of the information contained in it occurs.

First, the addressee perceives the image, that is, the non-verbal component, and then the verbal part of the information, decoding the meanings implied by the author [1]. Considering the textual component of creolized Internet memes, it is necessary to stress the point that the most important property of memes is linguistic creativity. According to Mariya S. Tikhomirova, "linguistic creative thinking is a special type of thinking that ensures the functioning of verbalization

and deverbalization skills with a dual focus" [4, p. 149]. Linguistic creativity helps to realize the humorous and creative functions of language [2, p. 34]. A typical way of manifesting linguistic creativity in Internet memes is a language game at various levels of the language system, associated with the emergence of ambiguity and violation of language norms.

One of the most common ways to create a language game at the lexical and phraseological levels involves homonyms and paronyms. In this case, two levels of perception come into conflict due to the contrast in the meanings of homonyms, one of which is presented in text form, and the other in visual form (for example, see *'loaf'* and *'seal'* in Figures 3 and 4).

Figure 3.

Figure 4.

A play on words based on homonyms can only be present in the text component, whereas the non-verbal component serves to attract attention and performs "representative and attractive functions" [3].

Figure 5.

Figure 6.

In the two-part meme in Figure 6 the key to the pun with the homonyms '*step'* as a component of the complex words *'stepfather'*, *'stepmother'* and *'step'* as a component of *'step ladder'* is the punchline *'I never knew my real ladder'*, which comes into logical contradiction with the plot supported by the non-verbal component.

Another mechanism for creating a language game at this level is the destruction of language clichés, or 'cliché twist', and the actualization of the direct meaning of a phraseological unit or its part through a non-verbal image (see Fig. 7 and 8).

Figure 7.

Figure 8.

The creation of occasionalisms through punning word formation is another manifestation of the linguistic creativity of meme authors. The most productive ways of forming occasionalisms in Internet memes are contamination and substitution or formation by analogy with a common word (see Fig. 10). In the occasionalism *'gentlehobbit',* the stem '*hobbit'* replaces the *'stem man.'*

Figure 9.

An Internet meme always claims to be original, often built on anomaly and deliberate violation of spelling and grammatical rules. From the point of view of spelling, one can find simplified spelling of words, replacement of letter combinations with a letter representing a particular sound, etc.

A classic example is a popular three-part comparative meme, replicated in dozens of *Panik – Kalm* metamemes, where the letter ***c*** is replaced by the letter ***k*** ***(***see Fig. 10, 11). Different parts of speech are grammatically opposed – a noun and an adjective.

Intentional grammatical errors are another characteristic feature of Internet memes (see Fig. 12). The word *'unpossible'* violating the rules of the English language remains comprehensible and serves to attract the Internet users' attention by its paradoxical nature.

Figure 10.

Figure 11.

At the syntactic level, the analysis resulted in revealing such features of memes as elliptical constructions, rhetorical questions, inversion, and parallel constructions. Many of the features mentioned above are associated with entire series of memes with recurring characters. Moreover, many of the grammatical structures reflect the speech peculiarities of the memetic characters. Thus, we often find rhetorical questions in memes about a philosophizing raptor, while sentences with inverted word order are characteristic of Master Yoda, a small green long-eared creature, Master of the Jedi Order from the *'Star Wars'* saga.

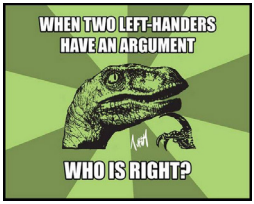

Figure 12.

Figure 13.

Thus, the analysis of the linguistic characteristics of the textual component of two-code Internet memes, allows the authors to draw the following conclusions. First, linguistic creativity plays a huge role in the construction of memes, which is reflected in the mechanisms of language play at all levels of language. Second, the main functions of a language game are to create a comic effect and give expressiveness, whereas an equally important function is to draw the readers' / Internet users' attention to current phenomena of reality. Finally, in a two-code Internet meme, the game with the addressee involves both verbal and non-verbal components, which either complement or contrast with each other, updating hidden meanings. Further study of the interaction of semiotic systems of memes seems promising for studying the features of Internet communication in the 21st century.

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Images

1. *Figure 1. https://cheezburger.com/37539845/the-funniest-harry-potter-memes-of-the-week-october-30-2024*
2. *Figure 2. https://wave.video/video-templates/comparison-meme?aspects=square*
3. *Figure 3. https://punpedia.org/tag/meme/*
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5. *Figure 5. https://punpedia.org/tag/meme/*
6. *Figure 6. https://memebase.cheezburger.com/tag/the-hobbit*
7. *Figure 7. https://punpedia.org/tag/meme/*
8. *Figure 8. https://cheezburger.com/20653829/20-perfectly-balanced-memes-about-thanos*
9. *Figure 9. https://memebase.cheezburger.com/tag/the-hobbit*
10. *Figure 10. https://knowyourmeme.com/memes/panik-kalm*
11. *Figure 11. https://www.reddit.com/r/memes/comments/xi9hi8/unpossible/*
12. *Figure 12. https://memebase.cheezburger.com/tag/Raptor*
13. *Figure 13. https://memebase.cheezburger.com/tag/yoda*

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NARRATIVE CONSTRUCTION OF POSTFEMINIST SPACE IN *THE HERD* BY ANDREA BARTZ

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Abstract. *The article is aimed at studying narrative construction of postfeminist space in Andrea Bartz´ detective novel The Herd (2020). The main theoretical approach is feminist literary analysis. The work explores an attempt in The Herd to construct challenging space for female professionals, which is empowering and confining at the same time. The analysis shows that the construction of space in the narrative comes to represent inherent controversies of postfeminist society. While redefining the role of contemporary women as freed from the patriarchy, this society exposes them to new social, racial, and gender pressures and anxieties.*

Keywords: *Andrea Bartz, The Herd, postfeminism, narrative construction, postfeminist space.*

Andrea Bartz is one of the bestselling contemporary American authors of detective fiction. The main themes of her novel *The Herd* (2020) are femininity and self-realization in the postfeminist society. The novel features two sisters, Katie and Hana Bradley, who turn into amateur detectives to solve the murder of their colleague and friend Eleanor. The figure of a female detective has already become a literary convention. However, *The Herd* sheds a new light on the subject, as it radically departs from describing "the female detective's status as a victim of 'patriarchy'" (Tomc 1995: 58). Indeed, in a great number of detective novels female protagonists often find themselves trapped and outpowered; they can only exercise autonomy and agency by deviating from or outright sabotaging the guidelines given to them by male supervisors. In Andrea Bartz´ *The Herd* the opposition of a rebellious woman and her tyrannical male adversary is non-existent; in fact, males participate very little in the action of the novel, mainly as secondary characters. This dramatic change in the female protagonist´s narrative stance is very typical for the condition defined by theorists as postfeminist. The aim of this article is to explore literary construction of postfeminist space as the crucial element of the narrative.

There is no clearcut and unanimously acknowledged definition of postfeminism. Due to the enormous pluralism of feminist tenets, "defining the term is necessarily problematic" (Godsland 2002: 85). Ann Brooks argues that the notion of postfeminism was introduced to disrupt the outdated second-wave feminist paradigm, relying heavily on the concepts of masculine oppression and female victimisation, and to bring the discussion of the women´s condition to the next level: "Postfeminism as in the case of post-colonialism and postmodernism is often used to signal a complete break in a previous range of usually 'oppressive' relations. 'Post' as used in these instances often implies that these relations have been overcome and replaced and in this context the emphasis is on a new range of temporal, political and cultural relations" (1997: 1). The most pronounced features of this condition are "the emphasis upon self-surveillance, monitoring and discipline; a focus upon individualism, choice and empowerment; the dominance of a makeover paradigm" and "an emphasis upon consumerism and the commodification of difference" (Gill 2007: 149). Postfeminist fiction focuses on portraying strong female leaders, using authoritarian and intimidating techniques to secure their position on top. They have no fear of patriarchal oppression because they have incorporated patriarchy by way of internalising abusive masculine attitudes, previously considered external and adversarial, and making them the core part of their identity. As a result, the notions of femininity and masculinity become blurred and dissolved, related more to the position in the power structure than to biological sex.

The best-known examples of how postfeminist sensibilities are represented in mass culture include both written narratives, such as Candace Bushnell´s *Sex and the City* (1997) and Lauren Weisberger´s *The Devil Wears Prada* (2003), and their screen adaptations. In the detective genre, postfeminist attitudes started to appear in the works of well-known twentieth century authors and have become even more pronounced in contemporary novels. In general, authors of crime fiction in the USA are much more concerned with the controversies and anxieties brought about by the new patterns of societal gender arrangements than their European counterparts. It can be partially connected with the fact that women´s alliances, intimacies, and conflicts have always been one of the central themes for American female authors of mystery and crime novels. In Hilda Lawrence´s *Death of a Doll*, written as early as 1947, the idea of female interaction is foregrounded; it also plays a major part in Sara Paretsky's V.I. Warshawski series and Janet Evanovich´s novels featuring Stephanie Plum. So, a typical American female detective is very often an amateur or a loner working outside the established system of law enforcement: "Although independent, and often without visible home or family, most contemporary female heroes operate within a distinctive "family" of characters, most notably among their female friends" (Robinson 2012: 68).

The Herd by Andrea Bartz also explores the subject of female leadership and female bonds in postfeminist society. The narrative is centred around the Herd, female-only coworking space and social club, and the figure of its charismatic and formidable leader Eleanor Walsh, whose murder is investigated by the Bradley sisters. The assassination of a self-pronounced feminist leader by another woman is highly metaphoric. It can be seen as an utmost expression of the erasure of the woman from many discussions on contemporary feminism, the paradox that Tania Modleski, the author of *Feminism Without Women*, calls "gynocidal feminism" (2014: 4). Alternatively, it can signify the falsehood of treating feminism as a commodity that is monopolised by some representatives of the moneyed classes and sold on restrictive conditions to the rest of the world. Also, in the postmodern ironic manner it plays with the idea of a female victim as a cliché for many generations of feminist thinkers and a fetish of detective fiction. The last but not the least, the crime described in the novel questions the ontological roots of monstrosity and revisits Gothic representations of haunted spaces and feminine monsters. On the whole, *The Herd* ushers in serious reflection on the nature of many faces of up-to-date feminism through looking at femininity as a spatialised concept. Spatial configuration of femininity reveals itself not only in making the closed space of the Herd, likened to "Athena's vagina" (Bartz 2020: 11), the narrative centre of the novel, but also in the way the four main female characters´ relationship is represented as a quasi-symmetric quadrilateral figure.

The Herd is a name given by Eleanor Walsh to both the coworking space, designed for exclusive female use, and the company that owns it. Eleanor´s ambition to create a place in the world, a homelike sanctuary, and a centre where "passionate women and marginalized genders come together" (Bartz 2020: 22) turned into a successful business. Ostensibly, its purpose has been to provide women with safe territory free from the fear of marginalization and exclusion, and with the atmosphere opposite to the traditional office culture based on sexist attitudes and the "let the fittest survive" law of the jungle. Eleanor describes the Heard as a peaceful environment, set up "to make our members' lives more balanced, beautiful, and connected" (Bartz 2020: 22). Apart from hosting working women and taking care of their comfort and "work-life balance" (Bartz 2020: 60), the space has political goals to attain, becoming a "flash point for debates over feminism and power" (Bartz 2020: 69). Thus, the Herd can be viewed as "feminist utopia" (Bartz 2020: 276). Even its name with "emphasis on the H-E-R" (Bartz 2020: 24) favours female self-expression and sensitivities.

As was noticed by *The Herd´*s reviewers, fictional the Herd is modelled on "sparse details and features lifted from the Wing" (Tiven 2020: www.latimes.com), a real female coworking space that was founded in 2016 in New York by political activist Audrey Gelman and supported by a big number of influential wom-

en. The company, whose aim was to promote female-centred effort of women from different backgrounds, quickly grew and opened subsidiaries in the major cities in the USA and overseas. However, while the initiative was met with enthusiasm by the privileged segment of the working women´s community, the media reported tensions related to the inconsistencies of the Wing´s egalitarian policy not covering "underserved women" (North and Lieber 2019: www.vox.com). In 2022 the Wing closed, officially because of the downturn caused by Covid, but also unable to recover reputational damages following the company´s being accused of classism and "mistreating many of its workers, particularly employees of color" (González-Ramírez 2022: www.thecut.com). Not an exact portrait of the Wing, the Herd nevertheless accumulates many of its real-life predecessor´s controversies.

One of them is the mismatch between the Herd´s constant talk about "how inclusive and supportive and wonderful it really is" (Bartz 2020: 78) and its easily detectable aura of clannishness and placing value primarily on "A-list clients" (Bartz 2020: 32). Related to this spatial discourse of exclusiveness is the Herd´s strong accent on representation of femininity not as an inherent property but as a commodity, a disguise that can be purchased, upgraded and recast to meet the local sleek canon of "girly chicness" (Bartz 2020: 11) – someone with "high cheekbones" (Bartz 2020: 13), who is "perfectly coiffed and clad in stylish, breezy outfits" (Bartz 2020: 12) and has conventional sex appeal. Millennial postfeminist aesthetics – "a brilliant combination of feminism and antifeminism" (Mizejewski 2004: 60) – reinforces sexualised body of "Entrepreneur Barbie" (Bartz 2020: 17) as a material attribute of success, a premium-class product that speaks of its owner´s status. As an extension and a metaphor of the female body, the space of the Herd is also penetrated with symbolism pertaining to sexualisation. Reading the space as a visual narrative, an observer can notice its seductive vibes, revealing themselves in "a pattern of illustrated red lips smirking and smiling and sticking out their tongues" (Bartz 2020: 13), "vintage-looking bulbs ringing six oval mirrors" (Bartz 2020: 15), and a lesbian phantasy of "an open shower" and "exposed boobs" of the women, waiting for their turn to use it (Bartz 2020: 60).

The Herd represents female body that is defined not only by class but also by race. The narrative does not provide direct explanation of the Herd´s racial politics, but through subtextual indicators of the local culture creates faint undercurrent, guiding the reader toward certain conclusions. Quite important is the fact that no Black person is ever mentioned in the context of the Herd. However, the company and Eleanor as its CEO have decided that women of colour should be represented in recognition of the values of multiculturalism and diversity and have chosen Hana Bradley as the Herd´s official non-white face. Being "a mélange of Middle Eastern, Eastern European, and South Asian" backgrounds (Bartz 2020: 35), Hana nevertheless thinks of herself as a person "barely in touch with your

own brown-ness" (Bartz 2020: 130). Her life trajectory of coming from the traditionalist well-reputed Midwest family, graduating from Harvard University, and becoming a professional belonging to the high-income group is not very typical for an average woman of mixed race and does not, for example, reflect the dilemmas, anxieties, and life choices facing women from the inner-city Asian or Hispanic communities. So, the Herd promotes femininity that is predominantly white, elitist, and strongly associated with wealth and celebrity.

Another controversy is linked to the Herd´s involvement with the gendered politics of looking. According to the official statement of philosophy, "it's one place where you're free from the male gaze" (Bartz 2020: 37). However, far from being at ease, the members are compelled to keep up appearances and obey "the Herd's tacit rules" (Bartz 2020: 72). For instance, all members of the club are supposed by default to wear high heels. Katie Bradey committed a serious faux pas, when on her first day she arrived in the boots with traces of salt from the street. Even more outrageous requirement is for members to have their armpits "smooth and hairless" (Bartz 2020: 58). Mikki, the author of original conception of coworking space for women, resents the hypocrisy of the Herd´s covert adhering to patriarchal ways of judging by appearances: "You have to slit your wrists if you smear your lipstick" (Bartz 2020: 297). It turns out that inside all-female community the ferociousness of looking is even more pronounced than in mixed gender environments. Women, especially those in the position of power, examine, evaluate, and censor the performance of other women who, in turn, are feeling "under a microscope" (Bartz 2020: 36).

As a newcomer to the Herd, Katie is especially sensitive to being scrutinized by other members, and constantly registers "the Herders stealing glances at us" (Bartz 2020: 14), "feigning disinterest in us, too subtle to gaze at Hana head-on" (Bartz 2020: 13); "a quivering intensity" in their eyes (Bartz 2020: 13), "all-seeing eye of the front desk (basically Sauron)" (Bartz 2020: 161); she tries to conduct research "somewhere I knew no Herder would see me" (Bartz 2020: 86). Exposure to the lecherous male gaze is replaced by new disciplinary policy of austere female surveillance. Characteristically, on the day of her disappearance Eleanor was expected to give an interview to *The Gaze* magazine, targeting female audience. Thus, the gaze of the media is feminized; it is female surveillance that performs regulatory function and prompts women to polish themselves in order to be admitted to the media space. Following the same principles as the body aesthetics, design of the coworking space is aimed not at providing maximum comfort for its users, but at creating an attractive media image: "a chic café counter" (Bartz 2020: 14), "a seating area with soft white chairs and gold shelving units" (Bartz 2020: 20), "the communal tables" that "were too high, the individual workstations too low, more fun than functional" (Bartz 2020: 60). Preoccupation with how "it looks

on Instagram" (Bartz 2020: 20) is obviously placed above the considerations of practicality and user-friendliness.

The politics of the critical female gaze has economic implications. Branding their products as feminist, female bosses of manufacturing companies impose them on the customers who genuinely wish to contribute to the triumph of feminism. Merging feminist appeal with the artificially created need to satisfy the scrutinizing gaze of the media, the Herd makes money by diversifying into products and services, unrelated to its main activity, and imposing them on its members. The typical examples are elaborated and expensive bites of food, such as "an artichoke hummus platter" (Bartz 2020: 146), offered in the Herd´s café as a company for free coffee, or weekly Monday Mocktails, prepared and served by specially invited star baristas. Moreover, the Herd´s facilities are used as a polygon for testing and aggressive advertising of cosmetics issued by Eleanor´s second company, evocatively branded the Gleam. The Gleam products invade "every square inch" of the Herd (Bartz 2020: 296), its iconography and even language: the bathroom for the Herders is called The Gleam Room. Strong emphasis on interconnection between feminism and beautification, the necessity "to dress up and put on makeup" (Bartz 2020: 297) is a clear marker of postfeminist "makeover paradigm" (Gill 2007:156). Basically, it is a conviction that a woman can improve life circumstances and achieve her desired targets by simply redressing her appearance and upgrading consumption habits. Among the four main characters of the novel, Eleanor is a firm believer in the power of makeover; "she practiced what she preached" (Bartz 2020: 130). Katie is humorously sceptical about the Gleam cult. Hana, although in favour of self-cultivation and putting on an air of success, notices racialised implications of the Gleam´s marketing. Promoted by the Herd cosmetic products "didn't work especially well on darker skin" (Bartz 2020: 130). Mikki, the Herd´s sharpest critic, finds the need to embody a lifestyle of luxury and ease a serious economic burden.

One of the Herd´s most striking features is that, although its hermetically sealed world is a symbolic representation of a womb, from which a new empowered woman is reborn, it has the hallmarks of assumptions, which turn it into a perverted anti-womb space and reject femininity, constructed around "an absolute and alive centre of condensed intimate space" (Shands 1998: 24). In fact, eradication of femininity in its primal, biological sense is very indicative of contemporary debates on postfeminism, and "for many "women" the very term arouses a visceral, even phobic reaction" (Modleski 2014: 16). Some representatives of postfeminist society oversee the biological essence of femininity, viewing it only as a socially constructed identity that can be easily reconciled with autonomy and independence. Such views are shared by Eleanor, who hates associating womanhood with "the C-word" and fights against the focus upon the physiological "with

unprecedented vehemence" (Bartz 2020: 50). Conversely, Eleanor´s antagonist Mikki spray-paints "Ugly Cunts" on the Gleam Room´s wall out of obvious desire to disturb Eleanor but also to bring home message about the primary and most distinctive characteristic of a female. Katie, who is also committed to feminism, is more amused than shocked, and reasonably remarks that "cunts are awesome—they birth tiny humans" (Bartz 2020: 35).

The names, given by Mikki to her business project and by Eleanor to the real company, clearly reflect the differences in the two women´s life philosophies. Mikki´s *The In* emphasizes both the interior space of the female body and the inside of the woman´s psychic world. Ironically, it also foreshadows the character´s narrative development, as the expression "to be in" in colloquial speech can stand for serving a term in prison. Mikki´s vision of the culture inside the female coworking space is based on mutual support and mitigating pressures from the outside world. According to her, "the thing about these ugly cunts" is that "when you fall, we'll catch you" (Bartz 2020: 60). She clearly identifies with "ugly cunts", using the word not to insult, but to establish a community of equals belonging to "the in-crowd" (Bartz 2020: 286), the shared space of metaphoric vagina.

Eleanor, on the contrary, looks at the members of the Herd as a dumb bunch of cattle that can be led in any direction by a superior personality. She subverts expectations and takes on masculine leadership style, rigorous and authoritarian, gaining power from gender masquerade employed "to stomp on other women's backs" (Bartz 2020: 297). Due to recurrent mentioning of "a small knife with a carved handle" (Bartz 2020: 20) in Eleanor´s office, her identity can be metonymized as "the terrifying *vagina dentata*" (Creed 1993: 248), the embodiment of Medusa, mythological female monster and would-be castrator. An abundance of mirrors and red lips in the Herd´s visual aesthetics reinforces the Medusa symbolism. The mirrors evoke the story of Perseus, watching the monster´s reflection in his shield. Intense red colour of the painted lips serves as a warning against castrating teeth. "The snake plants" (Bartz 2020: 60) as an element of the Herd´s design symbolise snakes on Medusa´s head and "may suggest a multiplication of the woman's imaginary phallus" (Creed 1993: 408). Thinking of Eleanor´s unknown side, Hana is haunted by the vision of "smelly hags with snakes in their hair" (Bartz 2020: 177). In this context, Eleanor´s abhorrence of the female genitalia is clear – decapitated Medusa does not have a vagina in the common sense, she is merely a severed head, and Eleanor´s position of the head of the company stresses the importance of this body part as a metonymy of her personality. On the other hand, the combination of the red mouth and the snakes implies bisexuality, which also applies to Eleanor as a female leader practicing masculine approach and as a woman, having a heterosexual marriage but flirting with other women.

Eleanor obviously displays features of nefarious Medusa. Promoted by her corporate culture of the intense and critical female gaze can be associated with

the incapacitating gaze of Medusa. She not only dominates the lives of her female friends and paralyzes their careers, as if turning them to stone, but also metaphorically emasculates male partners. Indeed, her ex-boyfriend Cameron has not been able to cope with deep psychological crisis for many years after their breakup, and her husband Daniel is so vulnerable and submissive that becomes a caricature of masculinity. Eleanor forces him to sign "the polyamory contract" (Bartz 2020: 96) against his desire to keep the marriage monogamous. Even her manner of gesticulation reminds of "juggling invisible knives" (Bartz 2020: 32). At the end, Eleanor´s decorative knife as an instrument of castration is mirrored by Mikki´s "X-Acto knife" (Bartz 2020: 60), the murder weapon, previously used to make photo collages. X in X-Acto can be understood as a reference to female set of chromosomes – XX, and to Mikki´s intention to defend femininity, which, however, ends in a collapse. Thus, the womb-like space of the Herd, instead of giving birth to more female talent, contributes to eruption into the world of another monster.

The Herd´s Gothic tropes of claustrophobic settings and alter ego characters echoes the dense atmosphere of horror, depicted in Hilda Lawrence´s *Death of a Doll*. Both Lawrence´s Hope House and Bartz´ the Herd are designated for female use only, and their narrative construction explores representation of femininity as gender masquerade. In both narratives locations of femininity turn from protective and empowering places of refuge into a trap. Their action is set in New York at Christmas time and involves the plot motif of the past crime and redemption. Finally, the idea of climbing to the top in both novels is linked to female leadership: the victim falls from the seventh floor in one narrative and is stabbed to death on the roof in the other.

However, *The Herd* offers a significant shift in attitude. First, there is a reverse of the roles in the detective plot. In *Death of a Doll* female leader is a murderer, and in *The Herd* she is a victim. Also, and more importantly, the consistency of Eleanor´s adopted masculinity is not treated as an unequivocally vicious posture. Her vigour, determination, and strong will deserve respect and even admiration. So, Eleanor is depicted as a dualistic, ambiguous figure. Spatialisation of the scene of Eleanor´s body being discovered by Hana pinpoints her liminality. Hana´s climbing to the roof of the Herd is paralleled by a procession of "a troupe of drummers, their marching-band uniforms decorated to look like nutcrackers" (Bartz 2020:167), occupying the street right outside the building. According to Hélène Cixous, a military parade with the soldiers marching to a drum is a perfect expression of masculinity: "The masculine is governed by a rule that keeps time with two beats, three beats, four beats, with pipe and drum" (1981: 42). Eleanor´s body is found on the roof, which is a crossover space between the feminine confined environment of the Herd and the masculine continuum of the drummers, marching along the street and out of sight. Apart from it, "a frantic crescendo" of

the corps (Bartz 2020: 168) can be interpreted as a farewell military salute to a strong and fearless woman.

Thus, the image of postfeminist space in *The Herd* interweaves postfeminist paradigm with the female Gothic mode of writing and detective novel´s tradition of concentrating on closed settings. While endorsing female ability, the narrative pictures a highly controversial space and examines the premises, on which it is constructed. The labyrinthine depths of this space hide such discouraging attitudes as strong focus on the income, race, and social class; scrutinizing "look of a woman upon a woman" (Modleski 2014: 11); commercialisation of feminism as ideology; mandatory involvement in never-ending cycle of consumption; and being locked inside a toxic relationship with a ruthless and intimidating leader.

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Annotation. *53 types of micromycetes have been identified from the leather bindings of 500 documents from various libraries. Almost all but three fungi (Oospora lutea, Rhinocladium sporotrichoides, and Akanthomyces lecanii) are conditionally pathogenic and belong to pathogenicity group IV. Only three species of fungi of the genus Aspergillus, isolated from leather bindings, belong to group III: Aspergillus flavus, A. fumigatus and A. terreus. The highest frequency of occurrence was in four fungi: A. ustus (FO = 9.16), A. niger (FO = 8.43) Penicillium aurantiogriseum (FO = 6.02) and Alternaria alternate (FO = 4.34). A. niger and P. aurantiogriseum are the most commonly found species in libraries, while A. ustus and A. alternate are characteristic of the leather bindings of books.*

Keywords: *conditionally pathogenic micromycetes, library documents, leather binding.*

The library collections contain a large number of documents with bindings containing leather elements. These can be leather spines, inserts in the binding, or entirely leather bindings. The main function of bindings is to protect the book block from negative environmental influences. Accordingly, leather bindings are influenced by environmental factors much more than a book block: dust settles on them, which is a source of nutrition for microorganisms, bindings suffer more from sudden changes in humidity. In the vast majority of cases, the moisture content in the binding is higher than in the book block. With a relative humidity of 70 %, the moisture content of the leather reaches 20%, while the moisture content of the paper is only 6-9 %. When the relative humidity in the book storages in-

creases, the bindings are the first to absorb moisture from the air, and it penetrates into the inner parts of the book later, so the probability of spore germination on the binding is very high. In practice, when the relative humidity in the depositiries reaches 60–70 %, there is still no mold on the paper, but light growth of fungi colonies are already appearing on the bindings [1].

53 micromycetes were identified from the leather bindings of 500 documents from various libraries.

The distribution of micromycetes by frequency of occurrence on leather bindings is shown in Fig. 1. The majority (23 species) are, apparently, contaminated fungi, and only four species: *Aspergillus ustus*, *A. niger*, *Penicillium aurantiogriseum*, and *Alternaria alternate* had a high frequency of occurrence, with *A. ustus, A. niger* being dominant.

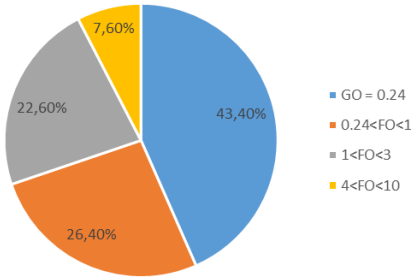

Figure 1. *Distribution of micromycete species isolated from leather book bindings by FO*

Opportunistic (conditionally pathogenic) fungi are a group of organisms that, on the one hand, can persist and develop in the external environment for a long time, and on the other, cause human mycoses [2]. Conditionally pathogenic organisms are natural inhabitants of various biotopes of the human body, they are usually not pathogenic to healthy people, but they can cause disease with a sharp decrease in general or local immunity [3].

The IV group of pathogenicity includes conditionally pathogenic organisms — causative agents of superficial mycoses (dermatophytes) [4]. Micromycetes of this group often are in book depositories in the air and on the surface of documents [5, 6]. In most cases, there are no effective medical measures against these fungi.

Pathogenicity group III includes microorganisms that cause opportunistic mycoses (systemic mycoses) caused in humans with a decrease in immune status [4]. There are effective therapeutic and preventive procedures for them. Fungi of this group include, for example, *Aspergillus flavus*, *A. fumigatus*, *A. terreus*, *Candida albicans*, *C. glabrata*, *C. crusei*, *C. tropicalis*, *Penicillum marneffei* = *Talaromyces marneffei*, which are also often found in archives [7], libraries, museums [8].

Almost all the fungi isolated from the leather bindings of books are conditionally pathogenic (opportunistic), mainly belong to the IV group of pathogenicity — these are fungi with mycelial thallus, causing hyphomycosis, as well as *Botrytis cinerea* (FO = 0.24), which is the cause of botryomycosis (BM), and *Mucor plumbeus* (FO = 1.44), causing zygomycosis (ZM).

Three accidental micromycete contaminants: *Oospora lutea*, *Rhinocladium sporotrichoides* and *Verticillium lecanii (Lecanicillium lecanii) = Akanthomyces lecanii* do not belong to any of the pathogenicity groups.

Hyphomycosis is divided into two groups: hyalohyphomycosis and pheohyphomycosis.

Hyalohyphomycosis (HHM) is a group of infections caused by mycelial fungi, the mycelium and spores of which are colorless or brightly colored. Fungi of 28 species belonging to seven genera that may cause hyalohyphomycosis were found on the leather book bindings from 53 isolated micromycetes: *Acremonium charticola*, *Paecilomyces variotii* and *Trichoderma viride*, two species of the genus *Fusarium*: *F. macroceras* and *F. sporotrichioides*, two species of the genus *Talaromyces*: *T. purpureogenus* and *T. variabilis*.

A particular type of hyalohyphomycosis is penicillosis (HHMP), caused by fungi of the genus *Penicillium* (21 species isolated from leather bindings of books), and aspergillosis (HHMA), caused by fungi of the genus *Aspergillus*, 12 species of which are isolated from leather bindings. *Aspergillus ustus* is a producer of proteinases [9] that explains its highest frequency (9.16) on leather bindings among the isolated micromycetes. Only three species belong to the III group of pathogenicity: *Aspergillus flavus* (FO = 0.72), *A. fumigatus* (FO = 1.2) и *A. terreus* (FO = 0.24).

Pheohyphomycosis (PHM) is a group of infections caused by demacytic or meristematic ascomycete fungi, whose morphological characteristics in tissues include hyphae, yeast-like cells, or a combination thereof [10, 11]. Pheohyphomycosis can be associated with a number of melanistic filamentous fungi, including the species *Alternaria*, *Exophiala jeanselmei*, and *Rhinocladiella mackenziei*.

Five species of fungi belonging to six genera that can cause pheohyphomycosis have been identified on the leather bindings: *Alternaria alternate*, *A. tenuissima*, *Aureobasidium pullulans*, *Phoma herbarum*, *Ulocladium consortiale = Alternaria consortialis, Chaetomium globosum*, *Cladosporium cladosporioides*.

Fungi of the genus *Rhizopus*, which cause phycomycosis, were not found on the bindings, although they are found in the air of the storages [4, 5].

For unknown reasons, *Stachybotrys* was not included in the classification of pathogenic microorganisms [4]. *Stachybotrys chartarum*, found in libraries [12, 13], causes stachybotriotoxicosis (SBT) in humans and animals. Its mycotoxins have neurotoxic and cytotoxic effects on the human body, mycotoxin poi-

soning can occur during prolonged exposure to rooms infected with these fungi and through skin and respiratory contact with *S. chartarum* spores [14]. Some *S. chartarum* strains are capable of producing trichothecene mycotoxins and atranones. Trichothecene mycotoxins have cytotoxic and neurotoxic effects. The toxic effects of atranones are known to cause irritation of the mucous membranes of the respiratory tract, eyes, bronchi, and other painful symptoms [15, 16, 17].

The distribution of micromycetes isolated from the leather bindings of documents by the diseases they cause is shown in Fig. 2. Groups of fungi causing penicillosis (HHMP), which account for 69.8 %, and aspergillosis (HHMA), which account for 18.9 % of the total number of isolated micromycetes, are separately identified (Fig. 3).

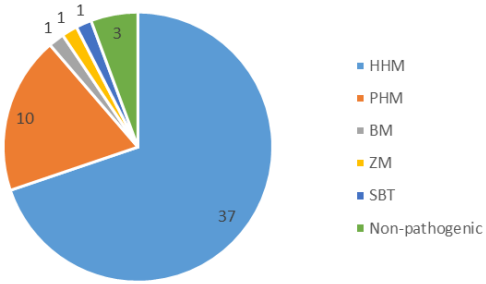

Figure 2. *The distribution of micromycetes isolated from the leather bindings of documents according to the diseases they cause: HHM — hyalohyphomycosis; PHM — pheohyphomycosis; BM — botryomycosis; ZM —zygomycosis; SBT — stachyobothriotokicosis*

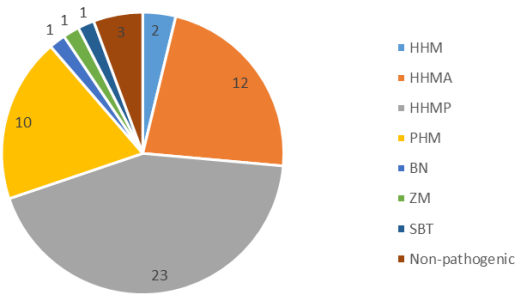

Figure 4. *The distribution of micromycetes isolated from the leather bindings of documents by the diseases they cause: HHM — hyalohyphomycosis; HHMA — aspergillosis; HHMP — penicillosis; PHM — pheohyphomycosis; BM — botryomycosis; ZM —zygomycosis; SBT — stachyobothriotokicosis*

Conclusions

Almost all fungi isolated from the leather binding of books appear conditionally pathogenic (opportunistic), mainly belonging to group IV pathogenicity, causing hyphomycosis, *Botrytis cinerea*, causing infection with botryomycosis, and *Mucor plumbeus*, causing zygomycosis, as well as three accidental micromycete contaminants. Only three species of fungi belong to the III group of pathogenicity: *Aspergillus flavus*, *A. fumigatus* and *A. terreus*. The highest proportion of occurrence was in four fungi: *A. ustus* (FO = 9.16), *A. niger* (FO = 8.43), *Penicillium aurantiogriseum* (FO = 6.02) and *Alternaria alternate* (FO = 4.34). *A. niger* and *P. aurantiogriseum* are the most commonly found species in libraries, while *A. ustus* and *A. alternate* are typical for the leather of book bindings [24].

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OUR EXPERIENCE IN COMBINED SURGICAL TREATMENT OF HEMORRHOIDS BY LIGATION OF HEMORRHOIDAL ARTERIES WITH MUCOPEXY AND RECTOCELE CORRECTION DUE TO OBSTRUCTIVE DEFECATED SYNDROME

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Abstract. *One of the causes of the development and progression of hemorrhoids is obstructed defecation syndrome, which often develops in patients with rectocele.*

The aim: *to enhance the outcomes of hemorrhoid surgery in patients experienced rectocele with obstructed defecated syndrome.*

Material and methods. *This research paper examines the outcomes of a combined surgical procedure performed on 25 women diagnosed with isolated middle grade 3 rectocele and grade 3–4 hemorrhoids. The procedure involved posterior colporaphy with anterior levatoroplasty, along with ligation of hemorrhoidal arteries and mucopexy. Clinical methods, ultrasound, magnetic resonance imaging and defecography were used as methods of monitoring the course of the postoperative period and long-term results.*

Results. *In the immediate postoperative period, we did not notice rectal bleeding and urinary retention. The pain syndrome was expressed moderately on*

the first day of 3.7 ± 1.1 points and 2.3 ± 0.5 points on the 2nd day on a 10-point analog scale. Self-defecation occurred on the 1st–2nd day. The pain syndrome after the first defecation was 3.5 ± 0.9 points and was generally relieved by 3–4 days. The discharge of a small amount of blood in 10 (45%) patients stopped by the 9th–10th day. The wound process in the vagina proceeded favorably in all patients. Successful rectocele correction was confirmed by MRI in all patients on day 4. After 6 months, no complications were recorded. The number of points in the assessment of obstructed defecation syndrome decreased from 22.6 ± 3.7 to 4.7 ± 0.7 (p < 0.001) according to the Altomare questionnaire. Defecography showed a decrease in the size of the rectocele from 4.9 ± 0.8 cm to 1.6 ± 0.8 cm (p < 0.01); an increase in the rate of barium evacuation from 3.4 ± 0.9 g/sec to 5.4 ± 0.8 g/sec (p < 0.01); a decrease in the residual volume of barium after emptying from 40.2 ± 6.5% to 17.9 ± 5.4 % (P < 0.005). After 2 years, these figures have not changed. However, 5 (20%) patients were diagnosed with recurrent hemorrhoids.

Conclusion. *We have noted good results when performing a combined operation, which consists in correcting the rectocele with vaginal access and ligating hemorrhoidal arteries with mucopexy. Normalization of defecation was achieved in all patients. However, hemorrhoid recurrence, noted in 5 (20%) patients, required hemorrhoidectomy.*

Keywords: *hemorrhoids, rectocele, obstructive defecated syndrome, combined surgical treatment.*

Introduction. According to modern concepts, hemorrhoidal disease begins with a weakening of the supporting structures, as a result of which the hemorrhoidal tissue loses its physiological fixation to the anal canal and subsequently goes down [1]. This mechanism is closely related to other forms of pelvic floor prolapse in women, in particular with prolapse in the posterior segment of the pelvis [2]. Clinically, this is manifested by obstructed defecation syndrome (ODS), which, in turn, leads to the progression of hemorrhoids [3]. The most common cause of ODS is rectocele [4]. Some authors are of the opinion that this implies the need for simultaneous correction of rectocele and hemorrhoids [5]. Minimally invasive methods of surgical treatment of hemorrhoids developed recently expand these possibilities [6]. In this study, we present our first experience of combined surgery involving rectocele correction and ligation of hemorrhoidal arteries with mucopexy (HAL–RAR). The choice of the latter is based on the fact that rectocele is often accompanied by prolapse of the rectal mucosa, which further exacerbates the symptoms of obstructed defecation [7].

The aim: to enhance the outcomes of hemorrhoid surgery in patients experienced rectocele with obstructed defecated syndrome.

Materials and methods. The criteria for inclusion in the study were the presence of an average grade III rectocele and grade 3-4 hemorrhoidal disease. The

study group included 25 patients aged 45 to 55 years, with an average age of 52.4 ± 5.2 years. The average body mass index was 29.5 ± 2.7 kg/m2; 5 (20%) patients were menopausal; the number of births was 2.4 ± 0.7; 6 (24%) had chronic obstructive pulmonary disease; 4 (16%) had diabetes mellitus. At the same time, concomitant diseases were compensated. Of these, grade 3 hemorrhoids were diagnosed in 16 (64%) patients, grade 4 hemorrhoids in 9 (26%) patients. Hemorrhoids were diagnosed based on clinical data and anoscopy. Rectocele was diagnosed clinically and confirmed by ultrasound and defecography. Magnetic resonance imaging was used to monitor the effectiveness of its correction in the early postoperative period, due to the non-invasiveness of the method. A questionnaire specially developed by D.F.Altomare et al. was used to assess the severity of ODS (2008) with a maximum possible score of 31, corresponding to the highest severity of the disease [8]. The pain syndrome in the postoperative period was assessed on a 10-point analog scale.

Rectocele correction was performed at the 1st stage of the operation and consisted of posterior colporaphy and anterior levatoroplasty by vaginal access. At the 2nd stage, the HAL–RAR technique was performed. Using a special anoscope with an ultrasound Doppler sensor, the localization of the terminal branches of the superior rectal artery was determined. They were ligated through the anoscope window by applying a Z-shaped suture 2–4 cm above the anorectal line. Usually, 3–6 arteries were ligated. Then, a continuous suture was applied from the desarterization zone to a level 5–10 mm above the anorectal line, which was tightened by pulling the mucosa upward. All interventions were performed under epidural anesthesia.

On the eve of the operation, the bladder was catheterized with a Foley catheter. Preoperative preparation consisted in cleansing the rectum of its contents using microclysters, which included sorbitol, sodium citrate, and sodium lauryl sulfoacetate. Following surgical intervention, all patients received topical antimicrobial treatment. A cylindrical hemostatic sponge impregnated with furacilin and boric acid as antiseptic agents was placed within the anal canal. Concurrently, a gauze swab saturated with Levomekol ointment on a water-soluble base, containing antibiotic levomecithin, was inserted into the vagina. Systemic antibiotic prophylaxis was not performed. Following surgery, a standardized anesthetic regimen was implemented. This involved the regular administration of oral paracetamol (500 mg every six hours) and intravenous parecoxib sodium (40 mg twice daily). This protocol proved effective in managing postoperative pain for the majority of patients.

The hemostatic sponge was removed the next day, followed by the introduction of rectal suppositories containing 500 mg methyluracil into the rectum 2 times a day. The vagina was treated twice a day with an aerosol containing sea buckthorn oil, chloramphenicol, boric acid, benzocaine and having analgesic, antimicrobial and wound healing effects.

Results. An assessment of the immediate postoperative period was performed. After removal of the urethral catheter a day after surgery, all patients had free, painless urination. No significant bleeding was observed in the postoperative period. Rectal bleeding was observed in half of the patients (45%), with minimal blood loss occurring during defecation. This symptom resolved spontaneously within nine to ten days in all affected individuals. On the first day after surgery, the patients reported moderate pain, the intensity of which averaged 3.7 ± 1.1 points. On the 2nd day, the pain was less pronounced, amounting to 2.3 ± 0.5 points. Self-defecation occurred a day later in 6 (24%) patients, and in the rest – after 2 days. The severity of the pain syndrome after the first defecation was 3.5 ± 0.9 points. In general, the pain syndrome was relieved by 3–4 days. Septic complications were not observed in any of the patients. There was also no tissues edema of the perianal region. Successful rectocele correction was confirmed in all patients on the 4th day after surgery by MRI data. There were no complications from vaginal wounds. All the patients were discharged from the hospital 5–6 days after the operation.

In the long-term follow-up, after 6 months, no complications were recorded. There was a decrease in symptoms of ODS, the severity of which was 4.7 ± 0.7 points according to the D.F. Altomare questionnaire, compared with preoperative indicators of 22.6 ± 3.7 points ($p < 0.001$). Defecography revealed a decrease in the size of the rectocele from 4.9 ± 0.8 cm to 1.6 ± 0.8 cm ($p < 0.01$), which corresponded to stage 0–I. The rate of barium evacuation during emptying increased from 3.4 ± 0.9 g/sec to 5.4 ± 0.8 g/sec ($p < 0.01$) at normal values of 5.6±0.9 g/sec. The residual volume of barium after emptying also decreased by 40.2 ± 6.5% to 17.9 ± 5.4 ($P < 0.005$) at normal values of 16.5±5.3%. All the patients were satisfied with the results of the operation.

In the long-term follow-up, after 2 years, the Altomare questionnaire and defecography data did not significantly change. However, there were recurrences of hemorrhoidal disease, consisting in hemorrhoidal prolapse in 5 (20%) patients. 2 of them also had itching and 3 had blood excretion during defecation. They underwent repeated surgical treatment of hemorrhoids – Milligan–Morgan open hemorrhoidectomy with good immediate and long-term results after 2 years.

Conclusion. When we performed a combined operation, which consists in correcting the rectocele with transvaginal access and the HAL–RAR technique aimed at treating hemorrhoidal disease, good results were obtained. ODS was cured in all patients. Despite the increased volume of surgery, the immediate postoperative period was favorable for all patients. However, the recurrence of hemorrhoidal disease in the long-term postoperative period in 20% of patients required repeated surgical treatment of hemorrhoids by resection. Thus, the approach described by us may be the method of choice for the treatment of hemorrhoidal disease in combination with obstructive bowel movement syndrome.

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PROBLEMS OF COMMUNICATION BETWEEN DOCTOR AND PATIENT IN THE PROVISION OF SPECIALIZED MEDICAL CARE: PROFILE "PSYCHIATRY"

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Absract. *Problems of medical communication are currently widely discussed, as they are a frequent cause of diagnostic and therapeutic failures, low patient satisfaction and high level of emotional burnout of medical personnel. Identification of communication problems and development of an effective model adapted to the specifics of providing medical care in the profile of "psychiatry" is an urgent task that will improve the quality of medical care for patients and satisfaction with the work of medical personnel. The authors of this study conducted a survey using a personally developed questionnaire model assessing the general and specialized communication skills of doctors and nurses in order to identify the most problematic elements of medical communication in the provision of medical care in outpatient settings in a state-owned medical organization. The article describes the most frequently occurring problems of communicative interaction between medical personnel and patients, according to the employees*

of the medical organization, and also provides additional barriers that affect the establishment of interaction with the patient.

Keywords: *communication, psychiatry, doctor-patient interaction, emotional burnout, compliance.*

In scientific literature, the issue of existing differences in specialized communication has been discussed since the 1950s. Due to the significant prevalence of these nosologies, their significant maladaptive influence and the peculiarities of the clinical course that change the personality of the patient, the focus is on mental illnesses [1]. Interaction between a doctor of any specialty and a patient is important for increasing the involvement of the latter in managing their disease, which allows achieving compliance and influencing the course of the pathological condition, its prognosis and outcome; in psychiatry, communication becomes a key tool, allowing not only to correctly interact with the patient, but also acting as a diagnostic or therapeutic method. In addition, with mental illnesses, the psycho-emotional sphere is significantly disrupted, in connection with which correctly built communication also becomes a basic ethical obligation of a psychiatrist, allowing him to relieve the patient from additional mental suffering. Finally, it is in psychiatry that the paternalistic model of medical relations is in the most vulnerable position, which is due to the frequent inability of the patient to engage in the treatment of his illness on equal terms with the medical worker due to the peculiarities of his current condition. Finally, the stigmatization of patients characteristic of psychiatry also brings a major problem [2].

The authors of this study set the task: to identify the main difficulties arising in the implementation of the communicative act between medical personnel with higher or secondary medical education, when providing medical care to patients with mental illnesses. The study was conducted in the format of a survey (filling out a questionnaire developed by the authors of this study personally) in writing by means of a continuous sample, employees of a state-owned medical organization providing medical care in the profile of “psychiatry” in outpatient settings were invited. The questionnaire forms did not contain questions that allowed identifying the respondent. To participate in the study, it was required: higher or secondary medical education, at least 3 years of work experience in the specialty, consent to participate in the study (was obtained orally). 80 people (29 doctors and 51 nurses) took part in the survey.

The questionnaire form proposed for completion included 15 questions divided into blocks of basic and specialized communication competencies. The first included skills of interaction with the patient, collecting anamnesis, managing emotions, and the second - the ability to adapt interaction and achieve compliance within the framework of psychiatric practice. All questions were formulated as

statements, the assessment of each of them was proposed on a Likert scale from 1 - "completely disagree" to 5 - completely agree." After completion, all questionnaires were analyzed in order to identify the lowest scores in the blocks of general and specialized competencies. In our study, no data were obtained on a significant influence of the respondent's gender on his answers, and therefore, the respondent's gender was not taken into account in the final data processing.

The following statements received the lowest scores in the "general competencies" block: "I talk to the patient, avoiding complex terms and concepts" (2 points [1;4]); "I easily understand the patient's emotion and adjust our conversation to it" (2 points [1;3]); "I conduct a dialogue with the patient based on his cultural and ethnic background, religious beliefs" (2 points [1;4]); "I accurately distribute the time of the appointment, I have time to complete the dialogue" (1 point [1;3]). When assessing in the specialized competencies block, the following statements received the lowest scores: "I treat any patient without prejudice" (2 points [1;4]); "I am able to build trusting relationships with any patient" (1 point [1;3]); "I easily control my emotions and express them correctly" (2 points [1;3]); "I easily demonstrate verbal signals myself and correctly interpret them in the patient (2 points [1;4]).

In addition to the questionnaire, the authors of the study managed to ask doctors and nurses short questions about their opinions on the most problematic aspects of communication in providing medical care to patients with mental illnesses, in addition to those presented in the questionnaire. Most often, health workers mentioned difficulties in communicating with the patient's family, guardians, or loved ones. In the field of psychiatry, these people are an important support for both the patient and the doctor, becoming intermediaries facilitating the establishment of contact, achieving trusting relationships, and motivating the patient to continue treatment in outpatient settings [2].

Thus, the authors of this study were able to identify the existence of significant difficulties in the implementation of communicative interaction between medical personnel with higher and secondary medical education and patients with mental illnesses.

The low results obtained in questions from the general communication competencies block are consistent with the results of another study conducted by the authors several years ago [3]. It can be said that the basic difficulties of medical communication are similar when interacting with patients with somatic and mental illnesses.

The results obtained in the block of specialized communication skills coincide with the studies of colleagues [4; 5]. Walther S et al. (2015) described the difference in non-verbal communication in patients with schizophrenia. The peculiarity of this disease, according to the results of the study, not only distorts the patient's

non-verbal signals, but also prevents him from correctly interpreting them from the doctor [4]. Howe AJ. (2023) suggests that modern psychiatry underestimates body movements and stereotypes in conditions such as catatonia. According to the author of the study, health care workers should pay attention to such seemingly insignificant signals, as they can help in diagnosis and finding a therapeutic approach to the patient [5].

Overcoming the identified barriers and improving the professionalism of communicative interaction for doctors and nurses has long been implemented with the involvement of simulated patients. However, in psychiatry, such a practice is still rarely used. Ditton-Phare P. et al. (2022) in a recent study show significant success in training psychiatrists using this model and recommend including communication training with a simulated patient in the training of students and in the advanced training of current medical workers to improve their skills in specialized communication in the profile of "psychiatry" [6].

The low awareness of health workers about cultural and language barriers when interacting with patients is a concern, although studies have shown the high significance of these factors. Arpin-Gemme K et al. (2023) report that changing the organization of health care to provide optimal psychiatric care to patients with cultural and language barriers is essential; in addition, additional educational activities are needed for health workers to ensure human rights and patient safety [7]. This is especially relevant at the present time, when global migration flows are very intense [8].

Conclusion. The main problems in the implementation of communicative interaction between doctors/nurses and patients when providing specialized medical care in the profile of "psychiatry" in a state medical organization were: excessive use of medical terminology; correct emotional response; taking into account the cultural and linguistic characteristics of the patient; compliance with the regulations of the reception time; overcoming stigmatization; achieving trusting relationships taking into account the characteristics of the patient's mental state; use and interpretation of non-verbal signals. In addition, health workers reported communication barriers with relatives and guardians of their patients. The creation of an adapted medical communication model for health workers working with patients with mental illnesses is an important direction in the implementation of the current direction of improving the quality of medical communication.

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ECOLOGICAL - HYGIENIC CONSEQUENCES AND POSSIBLE RISKS OF THE HEALTH OF THE POPULATION OF THE EMERGENCY HIT OF FUEL OIL IN THE BLACK SEA. REVIEW OF LITERATURE AND CHRONOLOGY OF EVENTS

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Abstract. *The article provides data on the chronology of the emergency situation (ES) that occurred in December last year in the Black Sea near the Kerch Strait and measures to eliminate the consequences of this emergency. During a storm, the tankers Volgoneft-239 and Volgoneft-212, which were transporting 9.2 thousand tons of fuel oil, were wrecked. As a result, the tankers fell apart and, according to preliminary estimates, at least 2.4 thousand tons of fuel oil spilled into the sea. The actual volumes may be several times larger and depend on the time of eliminating the consequences of the accident by pumping the remaining fuel oil and diesel fuel from the engines of the tankers. Despite the complex work carried out since December 17, the scale of the emergency in the past months since the accident is only gaining momentum. The area of the fuel oil slick in some places is tens or more square kilometers. During all this time, hundreds of thousands of tons of sand/soil mixed with fuel oil, oil products and other waste have been collected and removed from the beaches of the Krasnodar Territory, Crimea, Sevastopol and elsewhere.*

In connection with the goals and objectives of this article and the above-mentioned circumstances of the emergency, the authors of the article responsibly declare that the Federal Budgetary Scientific Institution "Ufa Research Institute of Occupational Medicine and Human Ecology" has many years of experience and data from a large number of studies on the sanitary and hygienic assessment

of the state of water, water and other environmental objects, health risks for workers and the population in areas with a developed oil-producing industry on the continent and on the sea shelf of the country, including during emergency or emergency situations. This article also presents the results of studies carried out within the framework of the Rospotrebnadzor industry program "Hygienic scientific justification for minimizing health risks to the population of Russia" in 2016-2020. (p.p.2.16). The main parameters, sources and mechanisms of pollution of sea waters are defined. The sanitary and hygienic characteristics of the quality of sea water, the ways and mechanisms of control over the state of sea waters, which can be used in the liquidation of emergency situations in the Black Sea are given [1].

Keywords: *Black Sea; tanker accident; ecological crisis zone; ecological control; health risks and consequences.*

On December 15, 2024, in the Black Sea near the Kerch Strait, during a 7-point storm, the tankers Volgoneft-239 (carrying 4.3 thousand tons) and Volgoneft-212 (carrying 4.9 thousand tons) sank. They were carrying a total of about 9.2 thousand tons of M-100 fuel oil, which is a residual product after separating gasoline, kerosene, gas oil and other light fractions from oil. As a result of the wreck, the tankers fell apart and, according to preliminary calculations by the Federal State Budgetary Institution "Marine Rescue Service" of the Federal Agency for Maritime and River Fleet of the Ministry of Transport of the Russian Federation, 3.7 thousand tons or about 40% of the transported fuel oil could have ended up in the sea. According to the latest updated data from the Ministry of Transport of the Russian Federation, at least 2.4 thousand tons of fuel oil ended up in the sea. The actual volumes can be specified after the complete liquidation of the accident (hereinafter referred to as the emergency) and depend on the duration of the elimination of the consequences of the accident by pumping out the remaining fuel oil, diesel fuel in the tanker engines and other petroleum products. The sunken parts of the stern of tanker-212 are located 11 km from the coastline. Parts of the hull sank to a depth of 20 m. Divers regularly descend to the vessel to monitor its condition, and also take water and soil samples for analysis. The plan for their prompt lifting and disposal of the damaged tankers for February-March is the most important and complex task, outlined in early January by the President and the Chairman of the Government of the Russian Federation. To coordinate the work of all interested ministries and departments to eliminate the consequences of the emergency, the Government of the Russian Federation created a commission headed by Deputy Prime Minister Vitaly Savelyev [2, 3].

The entire situation around the tankers is monitored by aviation and monitoring is carried out from satellites on the spread of stains in the places of the

shipwrecks. In the areas of the accident, labor-intensive and complex operations are underway to eliminate and reduce the spillage of oil products into the sea. The tanker Volgoneft-239 off the coast of Krasnodar Krai was surrounded by an earthen rampart in early January. To prepare for and pump out the remaining fuel oil from the tanker's tanks, more than two kilometers of "boom" barriers were installed around it, and sorbents are poured around it every day. According to the head of the Ministry of Emergency Situations A. Kurenkov, a technical (temporary) road of more than 600 m in length was built to the tanker Volgoneft-239 in a few days. Thus, the stern of the tanker was surrounded by a road and an earthen rampart to protect the hull from storms, organize access for equipment for heating, further pumping and removal of the remaining oil products to land. On January 25, the Marine Rescue Service completed pumping out the fuel oil from the stern of the tanker. From January 19 to January 25, a total of 1,488 tons of fuel oil were pumped out and taken ashore by bitumen tankers. Now the development and implementation of the project for the disposal of the sunken stern of the vessel is underway. This work should also be completed by March 31. Due to repeated storms, some of these oil products are washed up on the Black Sea coast - on the coastal zone and beaches from Taman to Anapa in the Krasnodar Territory, Crimea, Sevastopol and the Zaporozhye Region. Today, a federal emergency situation is in effect in Anapa, the Krasnodar Krai, Crimea and other regions. The entry of the above-mentioned part of the fuel oil transported by sunken tankers into the Black Sea means the onset of one of the largest catastrophes in the history of our country in the 21st century. The consequences of such a catastrophe may not only lead to a spill of hydrocarbons over vast areas, right up to the Black Sea shores of neighboring countries (Turkey, Romania, Bulgaria, Georgia, Abkhazia and Ukraine), but will also cause damage and significant losses to all those who live inside the sea: from zooplankton, invertebrates and birds, and may also damage the health and health conditions of the population of a number of regions of the Russian Federation. In general, a difficult situation is developing in the ports of the entire Azov-Black Sea basin.

In the first days of the organized collection of fuel oil, i.e. from December 17, 2024, many volunteers, volunteers of the regional detachment "Kuban - Spas", the Ministry of Emergency Situations and other rescuers worked in fabric gloves, without special clothing and suits, protective masks, respirators and other personal protective equipment for the skin, eyes and respiratory organs when working with oil products. After such work, many complained of headaches, nausea, vomiting, sore eyes and other symptoms of irritation. Thus, even among the volunteers working at the fuel oil collection sites on the beaches of Anapa from December 18 to January 7, more than 146 people sought medical help, three of whom were hospitalized. As of January 16, 2025, i.e. exactly 1 month after the emergency,

more than 165 thousand tons of contaminated sand, soil and more than 25 tons of oil-containing water and liquid were collected and disposed of. In the Kerch Strait area, 2220 sq. km of water area were surveyed, of which 43 thousand sq. km were treated with 4464 kg of sorbent [4, 5]. Earlier, in our country in 2007, such an emergency already occurred in the Black Sea and then the tanker Volgoneft-139 sank in the Kerch Strait with 1.9 thousand tons of oil products that got into the sea water. Then it took almost five years to restore the ecological balance. Despite this negative "experience", unfortunately, it was not possible to prevent the emergency of the end of 2024. In Spain in November 2002, off the coast of the Galicia Islands (Atlantic Ocean) there was also a serious incident with the wreck of the tanker "Prestige" and the spill of about 90 thousand cubic meters of fuel oil, which was mainly removed using mechanical collection, both manually and with the help of equipment. The possibilities of microbial decomposition there were also very limited, both because of the narrow range of conditions and the duration of such a process.

Today, a large number of rescue specialists from the Russian Marine Rescue Service, employees of Rospotrebnadzor, environmental agencies, the Ministry of Emergency Situations, more than 32 thousand volunteers from all over the country, etc. have been working since mid-December on the Black Sea coast to clean the shores and save hundreds and thousands of mammals found, including endangered dolphins (Azovka, bottlenose dolphin, common dolphin, etc.), various birds, fish, etc. affected by oil products. According to data published on January 8, 2025 by the local publication RBC "Kuban", more than 2.5 thousand waterfowl (grebes) have already been transferred to the rehabilitation centers of the Stavropol Territory and Kuban for their mechanical cleaning by absorption with starch powder, restoration and further rehabilitation. According to the latest data, as of January 20, at least 5.6 thousand birds have already suffered, which were found, they are trying to wash and rehabilitate. The corpses of more than 60 dolphins have also been found, most often these are Azovkas. According to preliminary forecasts, more than fifty species of birds and other representatives of flora and fauna listed in the Red Book of the Russian Federation may suffer from the fuel oil spill in the Black Sea basin [6]. On January 8, a new unified Bird Rescue Center was opened on the basis of the existing boarding house in Anapa, where volunteers are mainly involved. It is necessary to open state stations with professional veterinarians in the near future.

Experts from the Ministry of Natural Resources and Environment of the Russian Federation calculated that the volume of soil to be disposed of at the initial stage of emergency response in January-March of this year could amount to more than 200 thousand tons. As of mid-January, 139 thousand tons have already been removed. In Sevastopol, a federal emergency regime was introduced on January 24 alone.

Conclusion. In total, 39 emergencies occurred in the Russian Federation in 2007-2024, which were immediately or subsequently given a federal character. Of all these emergencies, only one of the above-mentioned cases was the wreck of a tanker in 2007 with an oil spill. The largest number of federal emergencies occurred in 2024 and there were exactly eight of them, including the one in December. In 2016 and 2018, there were five such emergencies due to floods and fires.

Today, in the Russian Federation, all territories involved in the accident and their regulatory authorities are examining not only samples of sea water, air, and coastal soil, but also all living and known creatures of the Black Sea environment.

Thus, from the first days of the disaster, the Sevastopol Institute of Biology of the Southern Seas (FSBI FRC InBYuM named after A.O. Kovalevsky of the Russian Academy of Sciences) joined the work on studying the impact of harmful emissions from emergencies. Over the century and a half of its existence, the FSBSI FRC InBYuM named after A.O. The Sevastopol Institute of the Kovalevsky Institute of the Russian Academy of Sciences (hereinafter referred to as the Sevastopol Institute) carries out its tasks in the field of research in the field of biology and ecology of the seas and freshwater bodies. The Sevastopol Institute, despite the November "storm of the century" of 2023, is active and competent in its field, opening up data for the knowledge of nature, including the Black Sea flora and fauna in the Russian Federation [4]. In connection with the direction of scientific research at sea, especially in the initial stages of work on emergency response, the institute should be the coordinator and organizer of the solution of further problems related to the protection of the marine environment, as well as an in-depth study of the ecosystem in the Black Sea and the coastal zone. At present, all the sanitary-chemical and microbiological indicators carried out in the named environments, organisms of the inhabitants of the marine environment and the Black Sea coast allow the institute to receive relevant data at the initial stage of large-scale and long-term work on the elimination of this emergency for at least 2-3 weeks. In connection with the goals, objectives of this article and the above circumstances of the emergency, the authors of the article responsibly declare that the Federal Budgetary Scientific Institution "Ufa Research Institute of Occupational Medicine and Human Ecology" (Institute) has many years of experience (more than 69 years) and data from a large number of studies on the sanitary and hygienic assessment of the state of water in water bodies in areas with a developed oil-producing industry on the continent and on the sea shelf of the country, incl. In recent years, the Institute has completed (there are scientific reports, monographs, articles and other regulatory and methodological documents at the regional and federal level, which can be used by the Rospotrebnadzor bodies at the local level when solving individual issues [7 - 9].

Mazut contains a significant amount of carcinogenic substances that have a negative and dangerous effect not only on environmental objects, but also on all

living beings, including the population of contaminated areas. In warm periods of the year, when the air and water temperature rises to tens of positive values, mazut and other petroleum products begin to rise from the bottom of the sea, actively melt, evaporate and this situation can be repeated cyclically for many more years.

Vice President and Academician of the Russian Academy of Sciences, Doctor of Chemical Sciences Stepan Kalmykov has not yet named the exact time frame for eliminating the emergency in the Kerch Strait. If nothing is done, then the process of independent cleaning of the Black Sea, according to him, will take quite a long time - many years. He called for the creation of large associations of scientists in connection with the emergency, rather than organizing separate scientific groups. According to some experts, it may take up to ten years to clean up the water area. The situation is still critical, fuel oil is periodically washed ashore, and volunteer headquarters receive more than a thousand birds and other inhabitants of the Black Sea daily, contaminated with oil products.

According to the data announced today by the Ministry of Natural Resources and Environment of the Russian Federation, it is necessary to restore more than 280 hectares of territory contaminated as a result of this incident. According to preliminary estimates, more than 840-850 thousand cubic meters of quartz sand from three deposits located in the Anapa area are needed just to reconstruct the beaches with a layer of clean sand at least 20 cm thick.

The use and especially the consumption of water contaminated with oil products and of unsatisfactory quality can contribute to the development of various diseases among the population and vacationers. The results of the risk assessment associated with the use of drinking water indicate that for the population of territories gravitating towards oil production zones, there is a risk of developing pathologies in the cardiovascular and skeletal systems, digestive organs, blood system, as well as the formation of various neoplasms. Thus, according to our calculations, in territories with intensive and long-term oil production, the total individual carcinogenic risk is justified at levels from 3.5E - 0.5 to 1.6 E - 0.4, which actually characterizes them as zones from the maximum permissible to unacceptable risk for the population. Non-carcinogenic risks associated with the use of drinking water are very high (HI - hazard index over 5.7) for the blood and cardiovascular systems. In such contaminated territories, a high level of organoleptic risk was revealed in terms of not only total hardness, but also the content of chlorides and sulfates.

Thus, today all the problems of ensuring the safety of drinking and domestic water supply in the areas of intensive onshore oil production are most relevant and significant for the territories of: Yamalo-Nenets and Khanty-Mansiysk Autonomous Okrugs; Tyumen, Saratov and Samara Regions; the republics of Udmurtia, Komi, Tatarstan and Bashkortostan; as well as Perm Krai. In connection with the

above circumstances, it should be noted that a special role in the self-purification of waters from pollution belongs to methane-oxidizing, sulfate-reducing and oil-oxidizing bacteria. Their numbers increase in coastal areas of the sea with the appearance of large masses of nitrogen, phosphorus and oil products. The latter is utilized by interacting with yeast microorganisms - oil-eaters. In general, in order to preserve the ecological integrity of the sea, it is necessary to prepare and implement in the coming years an interstate agreement of the countries of this region on further prevention of pollution of the Black, Caspian and other seas [9 - 13]. The current sanitary rules and regulations 2.1.5.2582-10 “Sanitary and epidemiological requirements for the protection of coastal waters of the seas from pollution in places of water use by the population” indicate areas where the discharge of all types of oil-containing, as well as untreated and undisinfected wastewater generated at offshore oil and gas facilities (O&GF) during drilling wells for oil and gas production is prohibited. The organization of sanitary and epidemiological supervision over the prevention of pollution of the aquatic environment from O&GF should include an assessment of: wastewater treatment and disinfection facilities, shale water separators, waste disposal facilities, the presence and required volume of wastewater storage tanks and waste containers. During the operation of the MNGS, the efficiency of the wastewater treatment and disinfection units is assessed (by conducting laboratory testing of the treated wastewater). The performance of the waste incineration unit is checked, as well as the method of collecting and transporting waste to this unit. In order to prevent unauthorized discharge overboard of untreated wastewater and oil-containing water, the shut-off equipment on the discharge pipes and those leading overboard is checked.

Regulatory requirements for the discharge of pollutants from ships are also regulated by the international convention Marpol-73/78. The Convention stipulates the condition for the discharge from ships of not only oil, but also other harmful substances, wastewater and garbage that are generated during the life of the crew, as well as the operation of systems and mechanisms.

All information on the results of industrial control over the composition and properties of sea water is provided by companies (water users) and at the request of bodies authorized to carry out state sanitary and epidemiological supervision. State sanitary and epidemiological supervision and laboratory control is carried out jointly with other regulatory authorities selectively to prevent or eliminate accidents, emergency situations, as well as when carrying out control measures for epidemiological indications and as part of social and hygienic monitoring.

Companies are required to provide information to the authorities authorized to carry out state sanitary and epidemiological supervision and the population about emergency situations of sea water pollution in protected areas and the predicted deterioration in the quality of sea water, as well as about the decision taken to prohibit or restrict water use and the measures taken.

The conducted comprehensive study will improve the existing environmental quality management system, increase the scientific reliability of methodological approaches to the further development of the methodology for assessing the risk to public health, scientifically substantiate and develop ecological and hygienic measures to prevent environmental pollution and reduce the impact of negative environmental factors on the health of the population of ecologically unfavorable territories.

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THE POSSIBILITIES OF BALLOON-ASSISTED ENTEROSCOPY IN THE PATHOLOGY OF THE SMALL INTESTINE. THE CLINIC'S EXPERIENCE

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Annotation. *This article presents the results of examination and treatment of 88 patients hospitalizedfrom 2018 to 2024 in the State Budgetary Healthcare Institution "Regional Clinical Hospital No. 2" of the city of Krasnodar with suspected pathology of the small intestine. Patients underwent both standard examination methods: esophagogastroduodenoscopy and colonoscopy; and methods for examining the small intestine: the first stage was video capsule endoscopy and the second was balloon-assisted enteroscopy. Depending on the identified pathology and level (jejunum or ileum), an access for balloon-assisted enteroscopy (oral, transanal or combined) and a therapeutic approach were selected.*

Keywords: *enteroscopy, video capsule endoscopy, small intestine pathology.*

Relevance. Endoscopic diagnosis of small intestinal diseases and subsequent use of endoscopic therapeutic interventions without surgical access have been used since the advent of video capsule (VCE), double balloon (DBE), and in 2007 balloon-assisted enteroscopy (BAE) by Olympus Medical Systems (Tokyo, Japan). The introduction of a single-balloon enteroscope into clinical practice reduced the time of the examination [1,2]. Despite the high diagnostic value of capsule endoscopy, its disadvantages are associated with its non-invasiveness, which limits its use as an independent visualization method [3,4]. Thus, balloon enteroscopy and capsule endoscopy are complementary methods of examining the small intestine, BAE is an important method only after VCE, which allows identifying pathological foci of the small intestinal mucosa and determining the access (oral, transanal or combined), as well as further management tactics [5,6].

Purpose of the study. To evaluate the effectiveness of therapeutic interventions in balloon-assisted enteroscopy in a multidisciplinary clinic.

Materials and methods. We analyzed the results of diagnosis and treatment of 88 patients with small intestinal pathology who were hospitalized from 2018 to 2024 in the State Budgetary Healthcare Institution "Regional Clinical Hospital No. 2" of Krasnodar, Russia. Of the 88 patients, 49 patients underwent balloon-assisted enteroscopy and 39 patients underwent video capsule endoscopy. A total of 65 BAEs were performed, including 49 diagnostic and 16 therapeutic. Of the 49 patients who underwent BAE, 32 were men and 17 were women. The average age of the patients was 48±7.45 years. 38 studies were performed via oral access, 15 via transanal access, and 11 via combined access. 1 study was performed via enterotomic access.

Results and discussion.

Upon admission, all patients underwent routine examination methods: esophagogastroduodenoscopy within 1 hour from the moment of hospitalization and, after appropriate preparation of the large intestine, colonoscopy was performed. In patients admitted with suspected small intestinal bleeding, the next step was video capsule examination to determine the tactics of further treatment and choice of access (oral, transanal or combined). In this group of patients, the following pathology of the small intestine was detected: angioectasis of the jejunum in 17 patients, ulcers of the jejunum and ileum - in 5 patients, polyps of the small intestine in 13 patients, tumors of the jejunum - in 8 patients, varicose veins of the jejunum - in 3 and inflammatory compensated stricture of the jejunum in 1 patient. Therapeutic interventions performed in this group of patients are presented in Table 1. In two patients, pathology was not detected.

Table 1.

Endoscopic therapeutic interventions performed during balloon-assisted enteroscopy.

Findings	Tactics
Angioectasias	Mechanical hemostasis (clipping), argon plasma coagulation
Ulcers	Biopsy, mechanical hemostasis
Polyps	Biopsy, endoscopic polypectomy
Tumors	Biopsy
Varicose veins	Surgical intervention (resection of the affected area)
Inflammatory compensated stricture of the jejunum with the formation of a phytobezoar	Destruction of phytobezoar with a loop, hardware bougienage of stricture, dynamic observation

Endoscopic hemostasis was effective in patients with jejunal angioectasias and jejunal ulcers when appropriate conservative therapy was administered. Surgical

treatment was used in cases of small intestinal tumor detection (8 cases). No remote recurrences of bleeding were observed in cases of small intestinal angioectasias and ulcers, and there were no fatal outcomes.

Conclusions: The main advantages of the combined use of VKE+BAE for diagnosing small intestinal diseases are noninvasive total examination of the entire small intestinal mucosa with the possibility of performing biopsy and using therapeutic endoscopic interventions with a minimal degree of complications. Also, with the introduction of these methods into clinical practice, the number of surgical interventions by laparotomy access has decreased, which has reduced the risk of postoperative complications, thereby improving the quality of life of patients.

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ASSOCIATION OF MILD ANEMIA WITH HOSPITALIZATION AND MORTALITY IN THE ELDERLY: A POPULATION-BASED STUDY

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Abstract. *Anemia is one of the most common geriatric syndromes. Mild anemia is a frequent laboratory finding in the elderly, usually ignored in everyday practice as an innocent indicator. The aim of this population-based study was to prospectively examine the association of mild anemia with hospitalization and mortality. This population-based observational study was conducted among residents aged 65 to 84 years for 2 years. The study involved 2251 people. The results obtained during the study show that mild anemia is associated with an increased risk of clinically significant outcomes such as hospitalization and mortality.*

Keywords: *anemia in the elderly, mild anemia, old age, mortality, hospitalization.*

Introduction. Every year the average age of the population increases, and this leads to an increase in problems associated with old-age diseases. There are currently nearly 500 million (7%) adults aged 65 years and older worldwide, but the elderly population is expected to double to 1 billion (12%) by 2030. [1] The prevalence of elderly population is more common in developed countries as birth and death rates have fallen dramatically. Anemia is one such problem that is becoming increasingly important among older adults, with a significantly higher proportion of older adults suffering from anemia. Anemia is one of the most common geriat-

ric syndromes that often occur in older adults, with its prevalence being ~17% in the over-65 cohort and increasing with age to over 20% in those aged 85+. [2] The condition is characterized by a lack of blood, or the body's inability to produce enough red blood cells, resulting in low hemoglobin levels in the blood. Despite a large number of population-based studies, reliably assessing normal hemoglobin levels in older adults remains challenging due to the difficulty in recruiting truly healthy older adults. [3] However, most studies show that screening older adults without serious chronic diseases does not reveal any significant decrease in hemoglobin levels. [4] The development of anemia in older adults can have serious consequences for their health and overall well-being. Decreased hemoglobin levels can lead to fatigue, weakness, increased susceptibility to infections, and cardiovascular disease. Older adults with anemia often report poor quality of life and complain of fatigue and weakness. Low hemoglobin levels are a risk factor for cardiovascular disease, [5] cognitive impairment, insomnia, mood disorders, depression, [6] and decreased quality of life. Moreover, anemia is associated with decreased executive function and physical performance. Low hemoglobin levels are associated with an increased risk of falls and fractures. [7]

With the rapid and steady aging of the population, the number of elderly people suffering from anemia in Russia will increase sharply in the near future. As a result, anemia can have a significant impact on healthcare requirements and significantly increase healthcare costs. Therefore, this topic occupies a rather important place for study.

Objective. Mild anemia is a common laboratory finding in the elderly, usually ignored in everyday physician practice. The aim of this population-based study was to prospectively study the relationship between mild anemia and hospitalization and mortality

Materials and methods. This population-based observational study was conducted among residents aged 65 to 84 years in Belgorod.

The study involved 2251 people. The participants' blood pressure (third measurement), heart rate and respiratory rate, weight and height were measured, and blood samples were taken. A questionnaire was then administered to determine habits, current and past illnesses, hospitalizations, and interventions during the previous 5 years.

Anemia is defined by the World Health Organization (WHO) criteria as a hemoglobin concentration below 12 g/dL in women and 13 g/dL in men. According to most classification systems [8], mild anemia is defined as a hemoglobin concentration of 10 to 11.9 g/dL in women and 10 to 12.9 g/dL in men.

The observation period during which death from any cause could be established (data from the Civil Registry Office and local health authority) ranged from 1 day to 2.0 years after blood collection.

Subgroup analyses were also conducted to examine potential mortality risks associated with different types of anemia.

Participants' health information was primarily self-reported. However, previous studies have shown that collecting health records from older adults in population-based studies provides an accurate and complete clinical picture in terms of the accuracy of responses to health-related questions. The current study found evidence that the risk of death within 2 years was almost twice as high among subjects with mild anemia as among peers without anemia.

Results. Among 2251 participants, 25 had moderate-severe anemia, with a total of 215 participants with mild anemia and 2011 without anemia.

Mild anemia was also associated with a higher rate of comorbid conditions in participants (84%). During the 2-year follow-up period, 16 of 25 participants with moderate-severe anemia, 84 of 215 participants with mild anemia (39.1%), and 565 of 2011 participants without anemia (28.1%) were hospitalized. The risk of hospitalization was significantly higher in both women and men with mild anemia. The risk of hospitalization within 2 years after blood collection was significantly higher in participants with mild anemia than in participants without anemia.

During the 2-year follow-up that began 30 days after blood collection, 11 people with moderate or severe anemia (44.0%), 58 with mild anemia (27%), and 198 people without anemia (9.8%) died. As a result of this study, we found that the risk of mortality was significantly higher among people with mild and moderate-severe anemia compared with people without anemia. Within the group of patients with mild anemia, an analysis was also performed by anemia type to further examine the association between mild anemia and mortality at 2 years. The results for all types of anemia confirmed the findings for the entire group of patients with mild anemia to varying degrees. However, the numbers of events or deaths were too small to obtain reliable results for iron deficiency, renal failure, and anemia due to folate or vitamin B12 deficiency, while the risk of mortality was significantly higher in patients with mild anemia combined with a comorbid condition. Discussion. This is a population-based study specifically designed to thoroughly examine the impact of mild anemia in older adults. Blood samples were collected for study purposes from an unselected population. The risks of mortality and hospitalization were significantly higher among older adults with mild anemia compared with participants without anemia. The hazard ratios for mortality at 1 and 2 years of follow-up were significantly increased and very similar. Mortality risk has been found to be associated with mild anemia and comorbidity.

Several retrospective and prospective studies have reported an increased risk of hospitalization among older adults with all degrees of anemia, and in the Established Populations for Epidemiological Studies in the Elderly (EPESE) study, a significant trend toward increased risk of hospitalization with decreasing hemo-

globin concentrations was observed [9]. In the current study, we show a higher rate of hospitalization within 2 years after blood collection, independent of many potential factors, also among older adults with mild anemia.

A possible higher mortality in older women with low hematocrit has already been observed several decades ago [10]. This association has also been further explored. In the EPESE and Leiden 85-plus studies, an increased risk of mortality at 4 and 10 years, respectively, was associated with decreasing hemoglobin concentrations [9, 11]. In the Women's Health and Aging Study, older women with disabilities with moderately low hemoglobin concentrations had a higher risk of mortality within 5 years.[12]

In the Health, Aging, and Body Composition Study, an increased risk of mortality over 6 years was found in well-functioning older men and women with hemoglobin concentrations below 12 g/dL compared with similar subjects with hemoglobin concentrations between 12 and 12.9 g/dL [13].

The current study found evidence that the risk of death at 2 years was higher among subjects with mild anemia than among their peers without anemia. Estimates of the risk of mortality over longer periods are planned.

However, as striking and promising as the results are, given the observational nature of the study, it cannot be concluded from the results that restoration of hemoglobin concentrations to normal will necessarily reduce the observed risks associated with mild anemia.

Conclusion. The results obtained in the study indicate that mild anemia is associated with an increased risk of clinically important outcomes such as hospitalization and mortality. Observational studies cannot provide evidence of cause and effect, but the reasonable suspicion that mild anemia in older people may be more than just an innocent bystander calls for controlled clinical trials to test whether raising hemoglobin concentrations can effectively reduce the risks associated with this condition.

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PSYCHOLOGICAL HEALTH ASSESSMENT IN THE ELDERLY PATIENTS AS ONE OF THE IMPORTANT INDICATORS OF VIABILITY

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Abstract. *More than half of the people who seek medical and social care services are elderly and senile people. Elderly people require a different approach to health assessment, monitoring and treatment due to changes in the body that develop during physiological aging. Aging is associated not only with an increase in the number of diseases, polypharmacy, but also with the development of a number of geriatric syndromes that reflect the morphofunctional age-related evolution in various organs and systems of the aging organism. Geriatric syndromes are multifactorial conditions that develop in response to a decrease in the functioning of many organs and systems. They determine individual viability, functional activity and the degree of dependence on outside help in everyday life. Geriatric syndromes are characterized by some clinical features. Firstly, each geriatric syndrome has many risk factors for development as a result of age-related changes in systems and organs.[1] Secondly, diagnostic approaches aimed at identifying the cause underlying a particular geriatric syndrome are often ineffective, burdensome, dangerous and costly.*

And finally, it is necessary and appropriate to treat the clinical manifestations of geriatric syndromes, even in the absence of a definitive diagnosis or the cause underlying its formation.

Geriatric syndromes are divided into somatic, mental, and social. Comprehensive geriatric assessment helps explain the relationship between a number of protective factors and processes that contribute to individual and interpersonal resilience, including cognitive health, psychological health, physical health, and self-assessment of successful aging.

It is important to note that this is a brief assessment system that allows for an individualized approach to elderly patients and increased effectiveness of therapy.

Keywords: *geriatrics, elderly patient, psychological health, cognitive abilities, comorbidity.*

Objective. To assess the level of psychological well-being in elderly patients aged 65+ and to identify the relationship between comorbidities and the risk of increased psychological maladjustment. To personalize the approach to managing patients of the older age group, taking into account the comorbidity of diseases and polypharmacy. Materials and methods. The study included 280 male and female patients (67.5±6.2 years) hospitalized in the geriatric department. Screening was conducted using the General Psychological Well-Being Index Rating Scale. [Dupuy H., 1984] The rating scale was filled out during the initial examination at the initial stage of hospitalization. A repeated assessment was carried out when a high risk of psychological instability was detected (less than 60 points) and when taking medications that increase the risk of psychological maladjustment (sedatives, neuroleptics, antidepressants), the presence of more than 2 concomitant diseases that significantly reduce the quality of life (most often, diseases of the musculoskeletal system were diagnosed, such as osteoarthritis and osteoporosis). As a rule, 1 or 2 repeated assessments were sufficient. [1,2] The General Psychological Well-Being Index is a self-questionnaire designed to measure affective or emotional disorders that arise in connection with a disease and reduce self-assessment of well-being. It includes 22 items that can be divided into 6 subscales characterizing the following states: anxiety, depression, self-control, general health, emotional well-being and vital energy. For each item, 6 possible answers are given, one of which is chosen by the subject when filling out the questionnaire. The most negative answer is estimated at 0 points, the most positive at 5 points. The total score varies from 0 to 110 points. It is also possible to calculate the total scores for individual subscales of the questionnaire. The average value of the Psychological Well-Being Index in healthy people is approximately 105.

The level of psychological well-being in elderly patients, as one of the important indicators of vitality, was also assessed using the Philadelphia geriatric morale scale questionnaire, which allows one to determine moral state.

The scale includes 17 items that assess the state of an elderly patient during the year (sleep, anxiety, state of moral balance, self-perception and the ability to adapt to life as age increases). The items of the questionnaire were assessed using a five-point system, with a higher score corresponding to a worse moral state.[3,4]

The level of psychological well-being was assessed using both scales. Patients with a total score of 80 or more on the General Psychological Well-Being Index Rating Scale (n=80, 30.7%) had no concomitant diseases and received only nutri-

tional support. With a total score of less than 80, a comprehensive geriatric assessment was performed, after which 2 more groups were identified: with preasthenia (n=115, 41.07%) and frail asthenia (n=85, 30.35%). The closer the assessment score approached 0 points, the more pronounced were the symptoms of frail asthenia (FA). The development of frail asthenia syndrome is facilitated by: the consequences of long-term chronic diseases, a sedentary lifestyle with a significant limitation of the level of physical activity; apathy and depression, chronic stress; side effects of medications, which in old age

can cause such conditions as loss of appetite, sedation, falls. It has now been established that more than 65 age-related geriatric syndromes can lead to the development of frailty, the main ones being musculoskeletal diseases, diabetes mellitus and chronic heart failure. [5,6]

All patients in the second group had concomitant musculoskeletal diseases (mainly type II osteoporosis and knee osteoarthritis) and were taking more than 3 medications at the same time

Results. The level of psychological well-being in elderly patients was assessed and a relationship was found between concomitant diseases and the risk of increased psychological maladaptation. The severity of mental geriatric syndromes increases in proportion to the comorbidity of diseases and the number of medications taken. During a comprehensive geriatric assessment, preasthenia phenomena were detected in 41.07% of patients. Asthenia syndrome was detected in 30.35% of elderly patients in group 2. Patients with a total score of 85 or more (n=80, 30.7%) had no concomitant diseases and received only nutritional support. A personalized approach to the management of older patients, taking into account the comorbidity of diseases and polypharmacy, is extremely important for improving the quality of life of elderly patients and their adaptation to society.

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MEDICAL, ECONOMIC AND SOCIAL PROBLEMS IN THE RUSSIAN FEDERATION RELATED TO EXTREMELY LOW BIRTH WEIGHT PREMATURE INFANTS (ANALYTICAL REVIEW OF RUSSIAN LITERATURE)

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Abstract. *Due to the increase in the number of premature babies born with extremely low body weight in Russia over the past fifteen years, associated with the development of technologies for nursing premature babies, artificial insemination, advanced training of medical personnel, WHO recommendations and treatment protocols, medical, economic, and social problems of rehabilitation of such children are becoming increasingly acute, and the long-term consequences of this growth are visible, especially in terms of reproductive health.*

Keywords: *extremely low body weight, ELBW, premature babies, children, premature.*

According to the order of the Ministry of Health of the Russian Federation dated 12/27/2021, the criteria for a live birth are the moment of separation of the fetus from the mother's body through childbirth at a gestational age of 22 weeks and more than 500 grams or more (or less than 500 grams in multilayer births). In accordance with the legislation of our country, all such children are nursed in medical institutions. The law does not provide for parents' refusal to nurse a live-born child.

Premature birth as a cause of birth of children with extremely low birth weight: current trends in Russia

According to the clinical recommendations of the Ministry of Health, Premature birth (PB) is a birth that occurs during pregnancy from 22 weeks to 36 weeks and 6 days, while the establishment of the pregnancy period is determined on the basis of data on the 1st day of the last menstruation (with a regular menstrual cycle) and an ultrasound of the fetus performed in the 1st trimester.

Premature birth is one of the leading medical and social problems that leads to high perinatal morbidity, infant mortality, child disability, mortality, negatively affecting the psychoemotional health of not only the family, but also the health of the nation as a whole [1]. Children born with a body weight of up to 1000 grams have a high perinatal morbidity rate, among surviving infants only one in ten does not have neurological disorders [1].

This cohort of patients is characterized by the development of a number of severe disabling diseases that cause health problems in old age. The structure of morbidity in premature babies has its own characteristics, almost 100% of premature babies have pathology of the nervous system, these patients are susceptible to diseases of the respiratory system, and pathology of the sense organs is more common. Large financial costs are required for the care and rehabilitation of this cohort of children [2].

Many factors are known that can cause premature birth. A complicated obstetric and gynecological history makes a significant contribution to the development of premature birth: repeated premature births, miscarriages, intrauterine manipulations with dilation of the cervical canal, chronic endometritis, etc. Risk factors include high parity (more than 3 births). There is evidence of a genetic predisposition to the development of premature birth [1].

The age of the pregnant woman under 18 years and over 35 years is associated with an increased incidence of premature birth. An unfavorable factor is the presence of severe extragenital diseases in the woman [1].

The incidence of premature birth ranges from 5 to 18%, while in most countries with developed perinatal care, including the Russian Federation (RF), due to the introduction of high-tech diagnostic and treatment methods in recent decades, there has been an increase in the survival of premature babies with very low birth weight (VLBW, born with a body weight of 1000 - 1500 g) and extremely low birth weight (ELBW, born with a body weight of 500 - 1000 g) at birth. [2]

The incidence of premature births in the Russian Federation has remained stable over the past 10 years and in 2020 amounted to 59.9 thousand people out of the total number of births (1,220.8 thousand people). [12]

That is, the incidence of premature births in the Russian Federation in the past 10 years is at the level of 5% of the total number of births.

Among those born at 24^0–24^6 weeks, 55% of newborns survive, but only 32% do not have neurological deficits at the age of 18–22 months [7].

This cohort of patients is characterized by the development of a number of severe disabling diseases (for example, bronchopulmonary dysplasia, retinopathy of prematurity, intraventricular hemorrhage, sensorineural hearing loss, etc.). Such diseases cause health problems in premature babies at an older age and require large financial costs for treatment and rehabilitation.

Newborns with extremely low birth weight (ELBW) had significant health problems: 78.0% were diagnosed with hypoxic brain injury (HBI), with 32.0% having severe injury; 55.0% of cases were diagnosed with intrauterine infection (IUI) with damage to the central nervous system (CNS, meningoencephalitis), and 33.0% had anemia. Developmental defects were diagnosed in 58.0% of newborns, with cardiovascular defects being the most common, occurring in 66.0% of cases. Intrauterine hydrocephalus was detected in 10.0% of those examined, and 5% of newborns had retinopathy [8]. In our country, since 2011, there has been an increase in the prevalence of childhood disabilities caused by diseases of the nervous system, which some researchers associate with an increase in the proportion of premature infants with a birth weight of <1500 g after the introduction of new live birth criteria. According to various sources, 17 to 40% of children with ELBW at birth have a disability at the age of up to 1 year [2].

Frequency and duration of hospitalization of premature infants

It should be noted that, regardless of the presence of disabling diseases and congenital malformations, premature infants in early childhood have an increased need for hospitalization, both for treatment and for examination for a wide range of diseases. [2]

The duration of inpatient treatment is 2 times higher in children with ELBW at birth: 92 ± 6.4 vs. 48.8 ± 2 bed/patient days [5].

In a retrospective study by Slimings et al. (*n* = 721,702, 2014) determined the frequency of hospitalizations in preterm infants who did not have congenital malformations and healthy full-term infants over 18 years. Data were obtained on a higher risk of rehospitalizations in preterm infants (odds ratio (OR) 130.2/1000 person-years; 95% confidence interval (CI) 129.1–131.4) compared with the group of full-term infants (OR 109.1/1000 person-years; 95% CI 108.5–109.7), especially in early childhood. Similar results were obtained in a population-based cohort study of VLBW and ELBW infants at birth conducted by Klitkou et al. in Norway (*n* = 9,309, 2017). The researchers assessed the frequency and duration of hospitalizations, as well as the number of outpatient visits at the age of 1–9 years in children with a birth weight <1500 g and compared the obtained data with the results in the general population: it was found that preterm infants were 3.2 times more likely to require outpatient visits (odds ratio (OR) 3.2; 95% CI 3.0–3.3), and the duration of hospitalization was 2.3 times longer (OR 2.3; 95% CI 2.2–2.4) than in the comparison group [2].

A number of studies have proven an inverse correlation between gestational age and the frequency of hospitalizations. Thus, according to Borresen et al. (n = 211, 2020), 56% of children born at 26–36 weeks of gestation had at least one hospitalization before the age of 2 years, while extremely premature children under 6 months had a higher risk of rehospitalization than late premature infants (78

vs. 53, p = 0.01). According to Miller et al. (n = 719,311, 2016), the frequency of hospital admissions increased by 12% for each week of decrease in gestational age (OR 1.12; 95% CI 1.12–1.13) and by 19% for each 500 g decrease in birth weight (OR 1.19; 95% CI 1.18–1.21). It should be noted that the correlation between gestational age and the need for hospitalization weakened with increasing age of the child [2].

Respiratory diseases

One of the reasons for the greater susceptibility of premature infants to respiratory diseases and their severe course is the presence of concomitant pathology - bronchopulmonary dysplasia (BPD) [2]. In the work of M.P. Yakovenko et al., which included 61 premature infants with a birth weight of <1500 g and a gestational age of less than 32 weeks, it was found that respiratory diseases were 2 times more common in the group of children with BPD compared to children who did not have this diagnosis [2]. A significant etiological factor in the development of infectious diseases of the respiratory system in premature infants is the respiratory syncytial (RS) virus. In a retrospective study by Greenberg et al. (n = 3322, 2020), the incidence of RS virus bronchiolitis was studied in hospitalized children born at 33–36 weeks of gestation, compared with full-term infants under 1 year of age. It was found that premature infants more often required hospital care for the development of RS-virus bronchiolitis than children from the comparison group, the average annual frequency of hospitalizations was 35.8 ± 13.0 and 19.6 ± 4.1 per 1000 children, respectively (p = 0.009); premature infants also required a longer hospitalization: 4.8 ± 7.0 days compared to 3.9 ± 4.9 days (p = 0.003). I.V. Krsheminskaya et al., having studied the data of the case histories of 40 premature infants under 7 months of age who had RS-bronchiolitis, found that in 50% of cases, assistance was required in the intensive care unit, in 80%, oxygen therapy was administered, and in 25%, mechanical ventilation was required [2]. Diseases of the nervous system

As the results of studies show, children born with ELBW are characterized by a high frequency of severe neurological disorders: the frequency of cerebral palsy exceeds the population by 8.6 times, epilepsy - by 11 times [9].

A special problem in the health of premature children in early childhood and preschool age is the consequences of damage to the central nervous system (CNS): from delayed speech development to severe forms of cerebral palsy (CP). It is diseases of the nervous system that are in first place in the structure of disabilities of children with ELBW and VLBW at birth. According to the results of the study by A.I. Safina et al., including 97 extremely premature infants, all 100% of children with ELBW at birth in the 1st year of life had damage to the central nervous system of varying severity. Yu.V. Chernenkov et al. also determined the pathology of the central nervous system among premature infants at the stage of follow-up

observation up to 98.9%, a total of 157 children with VLBW and ELBW at birth were examined from 2013 to 2017, while the frequency of detection of this group of diseases did not have significant differences among premature infants, regardless of the year of observation [2].

A severe consequence of perinatal CNS damage leading to disability is, in most cases, cerebral palsy. According to M.G. Devyaltovskaya et al. (n = 200, 2019), this disease was diagnosed in 23.0% of children with a birth weight of <1500 g by the age of one year.

According to various researchers, from 16 to 57% of premature infants had deviations in neuropsychic development [2].

According to A.I. Safina et al. (n = 97, 2000), a frequent disorder in extremely premature infants was delayed speech development (39.3%) [2].

Another disease that receives special attention from both neurologists and psychiatrists is autism spectrum disorders (ASD). A number of studies have shown that the risk of developing ASD is higher in children born prematurely [2].

Allen et al. (n = 416, 2020) identified an inverse correlation between gestational age and the risk of developing autism. An accurate diagnosis of ASD was made in 10.3% of the studied premature infants aged 2 to 14 years, while in children with a gestational age of 25 weeks, the diagnosis was made in 22.6% of cases, and with a gestational age of 31 weeks - in 6% ($p < 0.05$) [2].

Diseases of the organ of vision

Pathology of the organ of vision occupies a special place in the structure of morbidity and causes of disability in premature infants. The most studied and leading in frequency ophthalmological nosological unit is retinopathy of prematurity (ROP), which occurs exclusively in infants born prematurely [2].

According to E.A. Matveeva et al. (n = 411, 2018), 46.7% of children with ELBW and 12.1% of children with VLBW at birth have ROP ($p = 0.0001$) [2]. It should be noted that premature infants without developed ROP in the neonatal period also require more careful and frequent monitoring by ophthalmologists due to the development of other pathologies of the organ of vision. According to Tian et al. (n = 2190, 2015), the incidence of myopia and astigmatism is higher in premature infants (9.1 and 35.4%, respectively) compared to the control group (4.4 and 18.9%, respectively, at the age of up to 6 years, a progressive decrease in visual acuity and the development of astigmatism in premature infants without ROP is also observed at an older age [2].

Many researchers call strabismus another common pathology.

Another study conducted an ophthalmological examination of children under 10 years of age, it was found that strabismus was found in 12% of premature infants with a gestational age of 29–32 weeks without ROP, 22% of premature infants with a gestational age of less than 28 weeks without ROP, and 26% of

premature infants with ROP compared to 2% of full-term infants, the authors determined a reliable inverse correlation between the risk of developing strabismus and gestational age (OR = 0.84 for each week, p = 0.001) [2].

A number of studies have found that intraocular pressure (IOP) in VLBW newborns is significantly higher than in full-term infants, which may also affect the development of glaucoma at an older age. According to Acar D.E. et al. (n = 470, 2015), the average IOP in children born before 32 weeks of pregnancy was 16.86 ± 2.93 mm Hg, the shorter the gestational age, the higher the values of this indicator (p < 0.001). In the work of Grover et al. (n = 45, 2016), which included children born before the 30th week of pregnancy, the average IOP in this cohort of children was 29.0 ± 9.0 mm Hg. The authors also determined a negative correlation between IOP and gestational age [2]. Diseases of the organ of hearing

Another severe damage to the sensory organ in premature infants is sensorineural hearing loss, the consequences of which can be both delayed speech development and cognitive impairment [2].

According to E.A. Matveeva et al. (*n* = 411, 2018), 2.1% of children with ELBW and 1.1% of children with VLBW at birth were diagnosed with persistent hearing loss (p < 0.02). Risk factors for the development of sensorineural hearing loss include not only prematurity, but also a long stay in intensive care units. According to Frezza et al. (n = 239, 2019), children with hearing pathology were in the intensive care unit for 132 ± 67 days, newborns without hearing loss - 59 ± 7 days (p = 0.0002). Other risk factors for the development of sensorineural hearing loss, according to various sources, were: mechanical ventilation (45%), sepsis (54.6%), hyperbilirubinemia (up to 50%) [2].

All researchers agree that the short gestation period itself is a predisposing factor for the development of hearing impairment [2].

Disability

In St. Petersburg, in the structure of early primary childhood disability, children born with very low and extremely low body weight make up about 9.5% and their number tends to increase. This trend is observed in all weight groups, but most clearly in the group of children with a birth weight of ≤500 g [3].

In the structure of children born with extremely low body weight, referred for the first time for medical and social examination, 95.05% are recognized as disabled (and among those born with a body weight of ≤500 g - 100%), which exceeds the indicators of children born with a body weight of ≥1501 g (89.62%). At the same time, statistical indicators of primary disability of children born with a body weight from 1001 to 1500 g do not differ significantly from the indicators of full-term children [3].

Persistent impairment of body functions in children born with very low and extremely low body weight lead to restrictions in the main categories of life ac-

tivities, forming a structure of childhood disability, often more rigid to the implementation of rehabilitation and / or habilitation measures in comparison with children born full-term [3]. Currently, a sufficient amount of scientific data has been accumulated confirming that children born prematurely are more susceptible to various respiratory diseases, hypertension, the development of type 2 diabetes and a number of other chronic diseases [4].

A.N. Gubanova et al. presented their own data on the remote results of treatment and rehabilitation of 87 children born with extremely low body weight. The follow-up data were studied over a 12-year period. According to the assessment of the children's health status, conducted after 1 year of life, it was established: delayed physical development in 71% of cases, pathology of the central nervous system - in 100%; congenital malformations - 67.5%; pathology of hearing and vision - 28.8%. The authors managed to track the remote results in 59 children. It was noted that by the age of 12, 23.7% of children were disabled from childhood, 62.7% had chronic somatic diseases and only 1 child was practically healthy. Seven children died at the age of 1.5 months to 1 year 9 months [11].

The burden of care and rehabilitation. Long-term prospects

Provision of medical care to children born with very low birth weight (VLBW) and extremely low birth weight (ELBW) is classified as high-tech medical care (HTMC) [5]. Financial support for such care is provided mainly by the federal budget (in accordance with the RF Government Resolution of December 21, 2021, No. 1065).

Foreign and domestic studies show that the costs of nursing and rehabilitation of premature infants with VLBW and ELBW are significant and vary depending on the degree of damage and duration of treatment. According to the World Health Organization report, the annual cost of treating premature infants worldwide is more than $26 billion. The assessment of the socio-economic burden of nursing and rehabilitation of premature infants with VLBW and ELBW includes the costs of medical equipment, medications, food, ward services, personnel and additional procedures. An important factor in cost assessment is the duration of treatment, which increases the cost of medical equipment and personnel [6].

Nursing newborns with extremely low birth weight is associated not only with the difficulties of nursing, but also with subsequent problems for families raising these children [11].

Thanks to the development of perinatal care in the Russian Federation, each perinatal center has a follow-up monitoring unit in its structure, created for dynamic monitoring of the condition of children from high-risk groups, including premature infants. The observation period depends on a specific medical institution, but is most often 1 year, however, the presented data indicate the need for

longer active management of patients with ELBW and VLBW at birth [2], which increases the socio-economic burden on families and the healthcare system [6].

Such a wide range of complications would not be complete if we did not mention the effect of extremely low birth weight on the future reproductive function of these children, the decrease in which is directly dependent on gestational age. Only 25% of girls born with extremely low birth weight (gestational period of 22-27 weeks) showed a positive reproductive history when examined in adulthood, compared to girls born at term. Similar results and trends were found in boys: a positive reproductive history was registered in only 13.9% [11].

Thus, the gestational age and birth weight largely determine the state of health not only in the neonatal period, but also in early childhood and preschool age [2], as well as in adulthood, placing a colossal socio-economic burden on the state and families.

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STRAINS OF SARS-COV-2 INFECTION IN THE PEDIATRIC POPULATION OF PENZA CITY

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Abstract. *The issue of the incidence of coronavirus infection in children remains relevant. In this regard, the goal of this study was to investigate the etiological variants of SARS-CoV-2 in children in the Penza region during periods of epidemiological upsurge in morbidity (January 1, 2021 – March 31, 2023). An analysis was conducted on 3,279 PCR tests to study the epidemiological variants of SARS-CoV-2 circulating among children in the Penza region during periods of increased morbidity. A predominance of COVID-19 cases in children was observed in 2022, with the "Omicron" strain being the most frequently encountered variant in the studied pediatric population.*

Keywords: *children, COVID-19, strains.*

Introduction: The pandemic caused by the SARS-CoV-2 virus was first mentioned in late December 2019 in the People's Republic of China (PRC), with the epicenter in the city of Wuhan (Hubei Province). The first cases in the Russian Federation were registered in late January 2020. In 2021, a new surge in COV-

ID-19 morbidity was noted, possibly linked to the emergence of mutant strains of the SARS-CoV-2 coronavirus (Delta). Currently, new mutations of the SARS-CoV-2 strain are regularly being identified, which can alter its virulence. The Delta and Omicron variants carry mutations in their genome that enhance the virus's contagiousness and reduce the detection of viral antigens by post-infection and post-vaccination antibodies. According to the All-Russian Health Organization, as of November 24, 2024, there have been 181 million reported cases of COVID-19 worldwide, with 101 million cases recorded in the Russian Federation. In the Penza region, over 248,000 cases of coronavirus infection were registered by November 2024. According to Rospotrebnadzor of the Penza region, 90% of the population tested positive for the "Omicron" strain in 2022. The Delta strain also circulates in the environment, but its proportion is significantly lower. In January 2023, the first case of infection with the "Kraken" subvariant (a subvariant of "Omicron") was registered in the Penza region. According to Rospotrebnadzor of the Penza region, as of November 2024, 4,913 people have died from COVID-19. Thus, timely diagnosis of the disease in children and identification of the SARS-CoV-2 strain is essential for timely determination of treatment strategies and reduction of mortality rates.

The aim of the study is to investigate the etiological variants of SARS-CoV-2 in children in the Penza region during periods of epidemiological upsurge in morbidity (January 1, 2021 – March 31, 2023).

Materials and methods: This study conducted an interdisciplinary, exploratory, retrospective investigation analyzing the results of PCR tests through sequencing obtained from 3,279 pediatric patients in the Penza region at the N.F. Filatov Penza Regional Children's Clinical Hospital between January 1, 2021, and March 31, 2023.

The biological material was collected from the nasopharynx and oropharynx of children who presented for examination to rule out a coronavirus infection. A dry sterile swab was inserted gently along the outer wall of the nasal cavity. Rotational movements were performed for five seconds. The tip of the swab was then placed in a test tube, tightly sealed with a cap, and the tip of the swab was snapped off using a rotational motion. The procedure was then repeated for the oropharynx. A dry sterile swab was inserted into the oral cavity, and rotational movements were used to collect biological material from the surfaces of the palatine arches, tonsils, and posterior pharyngeal wall, avoiding contact with the surface of the tongue and the mucosa of the cheeks. The tip of this swab was also placed in a test tube, tightly sealed, and snapped off using rotational movements. The tube was then securely closed. After all swabs were collected, the tube with a barcode was placed in a zip-lock bag along with a referral form containing information about the pediatric patients suspected of having a coronavirus infection.

Results: A total of 3,279 nasopharyngeal swabs were analyzed using PCR methodology in patients aged 0-18 years in the city of Penza from January 1, 2021, to March 31, 2023, who were suspected of having a coronavirus infection. It was found that in 2021, 727 swabs (22%) were examined; in 2022, 2,367 swabs (72%); and in the first three months of 2023, 185 swabs (6%).

In 2021, among the 727 swabs from children suspected of SARS-CoV-2 infection, 181 (25%) were confirmed as positive cases of SARS-CoV-2, while 546 (75%) did not present evidence of the virus. In 2022, 2,367 swabs were analyzed in pediatric patients, out of which 952 PCR tests (40%) confirmed the presence of SARS-CoV-2. No SARS-CoV-2 infection was found in 1,415 (60%) of the tested children. During the first three months of 2023, 26 (14%) out of 185 nasopharyngeal swabs from pediatric patients were positive for SARS-CoV-2, while the virus was not detected in the remaining 159 cases (86%).

The investigation conducted in the Penza region revealed the circulation of the following SARS-CoV-2 strains: in 2021, among the 181 identified cases of coronavirus infection, the Delta variant was found in 177 swabs, and the British variant in 4 swabs; in 2022, the Omicron variant was identified in 952 children and in 26 nasopharyngeal swabs collected within the first three months of 2023.

Taking into account the global epidemiological situation, particularly in Russia at the beginning of 2023, related to the mutation of the Omicron strain of SARS-CoV-2, subvariants such as Kraken, Cerberus, Kentavr, Eris, and Pilora began to emerge. Our study examined the presence of these subvariants in the Penza region. From January 1, 2023, to March 31, 2023, three subvariants of the Omicron strain were identified within the N.F. Filatov Clinical Hospital: Kentavr, Kraken, and Cerberus. Among the 26 nasopharyngeal swabs collected from pediatric patients with SARS-CoV-2, 6 cases of the Kentavr subvariant were detected, accounting for 23% of the total number of SARS-CoV-2-positive swabs collected during the first three months of 2023; 17 cases (65%) were identified as the Kraken subvariant, and 3 cases (12%) as the Cerberus subvariant.

Discussion: According to the Moscow State Medical University named after I.M. Sechenov, a higher proportion of acute respiratory viral infections was recorded among pediatric patients in April 2022 compared to previous years. Our study similarly observed a 3.2-fold increase in the incidence of acute respiratory viral infections in children in 2022 as compared to 2021.

As reported by authors from the Smolensk State Medical Institute, the peak of new coronavirus infection incidence among pediatric patients occurred in 2022, which aligns with our findings of a 5.2-fold increase in COVID-19 cases among children in that year compared to 2021.

With the emergence of the new SARS-CoV-2 “Omicron” variant in 2022, a new surge in COVID-19 cases among children was noted across the Russian Fed-

eration. In some regions of the RF, the incidence of the Omicron variant in the pediatric population rose by 3.4 times compared to 2021. Our research indicates that the new SARS-CoV-2 "Omicron" variant was first registered in the Penza region in 2022, correlating with a 5.2-fold increase in new coronavirus infections among children as compared to 2021.

Considering the information from the global scientific medical community regarding the mutations of the SARS-CoV-2 "Omicron" variant in 2023, we analyzed its subvariants circulating within the pediatric population of the Penza region during this timeframe. It was recorded that the Kraken subvariant predominated over the Kentavr subvariant by a factor of 2.8 and over the Cerberus subvariant by a factor of 5.4.

Conclusions: The peak incidence of acute respiratory infections among the pediatric population of the Penza region was recorded in 2022, which corresponded with the prevailing epidemiological situation in the Russian Federation. This included a 5.2-fold increase in the incidence of new coronavirus infections among children, attributed to the onset of the circulation of the new SARS-CoV-2 "Omicron" variant in the environment

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WASTE-FREE TECHNOLOGY FOR OBTAINING NITROGEN FERTILIZER BASED ON THE PROCESSING OF POLLUTING COMPONENTS OF FLUE GASES FROM THERMAL POWER PLANTS

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Abstract. *The article presents information on ammonia-sulphate desulphurization developed by "VTI" JSC; general information on the use of ammonium sulphate as a fertilizer and information on the technology itself. The results of experimental data on the absorption of nitrogen oxides by solutions of ammonium sulphite-bisulphite-sulphate used in ammonia-sulphate technology are presented. It was found that an increase in the degree of NO absorption from 30-35% to 70-80% is achieved using divalent copper ions.*

Keywords: *fertilizers, ammonium sulfate, ammonia-sulfate desulfurization, ammonium sulfite, ammonium bisulfite, nitrogen oxides.*

Mineral fertilizers can be called substances on which human life depends without exaggeration, since without them the yield of agricultural crops will drop sharply. Of the various types of nitrogen, phosphorus, potassium, complex NPK and microfertilizers, the leading role in increasing yields belongs to nitrogen fertilizers. One of the important nitrogen fertilizers containing 21% by weight of nitrogen, as well as sulfur, is ammonium sulfate $(NH_4)2SO_4$, which belongs to fertilizers with the ammonium form of nitrogen [1].

Despite the fact that ammonium sulfate is inferior to urea and ammonium nitrate in nitrogen content, it has a wide range of applications in agriculture. The combined use of nitrogen and sulfur works effectively: sulfur improves the transport of crop nutrients through the root system, and nitrogen helps to increase the green mass of leaves, improves photosynthesis and gives the leaves a dark green color.

Ammonia nitrogen is easily and quickly absorbed by plants, and when it enters plants, it is immediately and directly used to synthesize amino acids, while nitrate nitrogen must still undergo the process of reduction to ammonia, thereby consuming a certain amount of energy. From this point of view, ammonium nitrogen is more economical than nitrate nitrogen. The disadvantage of ammonium sulfate - acidification of soils due to greater consumption of NH_4^+ cation by plants than SO_4^{2-} anion, on buffer chernozem soils has not a negative, but a positive value, since the mobilization of a significant amount of soil nutrients is enhanced [1]. Ammonium sulfate is advisable to use for the following crops:

- having a special need for sulfur - rape and buckwheat, corn, different types of cabbage, wheat and sunflower;
- preferring nitrogen in ammonium form instead of nitrate - sugar beet and potatoes, various forage crops. For potatoes - this is the best form of nitrogen fertilizer, since much less nitrates accumulate in the tubers compared to other forms of nitrogen fertilizers;
- showing high productivity on slightly acidic soils - for flax, tea, tomatoes, carrots and squash, radishes and pumpkin, parsley and sorrel, radishes and turnips, as well as raspberries and gooseberries.

Particularly noteworthy is the use of ammonium sulfate in rice growing, since, given the peculiarities of growing this crop, nitrogen in nitrate form is easily lost [1].

Ammonium sulfate is usually obtained by removing ammonia from coke gas with sulfuric acid, and also as a waste product of caprolactam production. Another way to obtain ammonium sulfate is to clean flue gases from various industries (desulphurization technology) containing sulfur dioxide, in particular thermal power plants burning solid fuel. As a result, the ammonia-sulfate technology using ammonia is a waste-free and cost-effective technology, since the ammonium sulfate product has a market value higher than the cost of the reagent. The reagent used - ammonia or 25% ammonia water binds sulfur oxides with subsequent oxidation of the resulting reaction products to stable ammonium sulfate. During absorption, reactions (1) and (2) occur with the formation of ammonium sulfite and bisulfite.

$$\mathbf{SO_2 + H_2O + 2\ NH_3 \rightarrow (NH_4)_2SO_3} \quad (1)$$

$$\mathbf{(NH_4)_2SO_3 + SO_2 \rightarrow 2\ NH_4HSO_3} \quad (2)$$

Due to the additional supply of air into the absorption solution, ammonium sulfite and bisulfite are oxidized by oxygen to ammonium sulfate according to reactions (3, 4).

$$(NH_4)_2SO_3 + ½\ O_2 \rightarrow (NH_4)_2SO_4 \quad (3)$$

$$NH_4HSO_3 + ½\ O_2 \rightarrow NH_4HSO_4 \quad (4)$$

Absorption of sulfur dioxide from flue gases is carried out by a solution containing sulfite, bisulfite and ammonium sulfate with a certain content of total sulfur dioxide and effective ammonia in the solution. The ratio of these values is designated as S/C (the ratio of the molar content of total SO_2 in the solution to the effective ammonia in the solution), with sulfite being the absorbent, and the resulting ammonium bisulfite is neutralized by reaction (5), and the bisulfate is neutralized by reaction (6):

$$NH_4HSO_3 + NH_3 \rightarrow (NH_4)_2SO_3 \quad (5)$$

$$NH_4HSO_4 + NH_3 \rightarrow (NH_4)_2SO_4 \quad (6)$$

The pH value of the irrigating and effluent solutions (pH>5) is directly related to the ratio of sulfite and bisulfite in the solution (S/C) by dependence (7). The working pH values for ammonium sulfite/bisulfite solutions are from 5.2 to 6.2.

$$pH = 9{,}2 - 4{,}62*(S/C) \quad (7)$$

Because ammonia is volatile, there is a partial pressure of sulfur dioxide and ammonia above ammonium sulfite-bisulfite-sulfate solutions. The equilibrium concentrations of SO2 and NH_3 above these solutions, expressed in mm Hg, $P_{равн.SO2.Hg}$, and $P_{равн.NH3.Hg}$ are determined by empirical formulas (8, 9) [2]:

$$P_{равн.SO2.Hg} = \theta * 10^{9{,}096*\log(S/C) - \frac{2443}{T} + 7{,}079 + 1{,}139*\log C_{NH3эф}} \quad (8)$$

$$P_{равн.NH3.Hg} = \theta * N * C_{NH3эф}\left(\frac{1-S/C}{2S/C-1}\right) \quad (9),$$

where; S/C is the ratio of the molar content of total dissolved SO_2 and effective NH_3 in the solution; T is the absolute temperature of the solution, K; $CNH_3эф$ is the concentration of effective ammonia in the solution, mol/100 mol of water; θ is the increasing coefficient of increasing the partial pressure of the component over the solution due to the presence of ammonium sulfate in the latter, determined by formula (10):

$$\theta = \frac{C_{(NH4)2SO4} + C_{NH3эф}}{C_{NH3эф}} \quad (10),$$

where: $C_{(NH4)2SO4}$ - concentration of ammonium sulfate in solution, mol/100 mol of water. N is the temperature coefficient determined by the empirical formula (11):

$$N = 10^{13{,}68 - \frac{4987}{T}} \quad (11)$$

Conversion of values $P_{равн.SO2.Hg}$, and $P_{равн.NH3.Hg}$ expressed in mm Hg, into the commonly used value mg/m^3 at normal conditions (temperature 273 K and pressure 101 325 Pa) is carried out according to formulas (12, 13):

$$P_{равн.SO2} = \frac{64 * P_{равн.SO2.Hg}}{21{,}9 * P} * 10^6 \quad (12)$$

$$P_{равн.NH3} = \frac{17 * P_{равн.NH3.Hg}}{22{,}4 * P} * 10^6 \quad (13),$$

where: $P_{равн.SO2}$ and $P_{равн.NH3}$ - equilibrium concentrations of SO_2 and NH_3 over the ammonium sulfite-bisulfite-sulfate solution, expressed in mg/m3 at normal conditions; P is the total pressure over the ammonium sulfite-bisulfite-sulfate solution, mm Hg; 64 and 17 are the molar masses of SO_2 and NH_3, g/mol; 21.9 and 22.4 are the molar volumes of SO_2 and NH_3 at normal conditions, l/mol.

The desulfurization process is carried out so that a certain driving force exists between the output working and equilibrium concentrations of SO_2 and NH_3, respectively. The ammonia-sulphate technology has the lowest specific capital costs among the "wet" cleaning technologies, and also uses the same reagent as for the technologies for cleaning flue gases from nitrogen oxides (SCW and SNCR), which allows for additional savings in capital costs with the combined use of sulfur and nitrogen cleaning at thermal power plants. A simplified view of the ammonia-sulphate technology is shown in Figure 1.

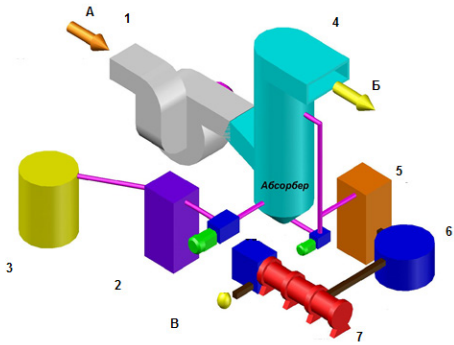

Figure 1. *Simplified view of ammonia-sulphate desulphurization technology*
A – dust-free gases for purification; B – purified gas outlet;
C – ammonium sulphate.
1 – blower; 2 – reagent preparation unit; 3 – ammonia warehouse;
4 – absorber; 5 – evaporator; 6 – centrifuge; 7 – dryer.

The purified flue gases are discharged into the atmosphere through a chimney, and the resulting solution is converted into final fertilizer using the known stages of evaporation, crystallization, centrifugation and drying.

VTI JSC has successful experience in implementing a pilot plant for ammonia-sulphate desulphurization in the Russian Federation at the Dorogobuzhskaya TPP with a capacity of 250-500 thousand m3/hour at normal conditions for flue gases. High-sulfur coal from the Moscow region was used as fuel, giving a SO_2 content in flue gases of up to 8-10 g / nm^3 at normal conditions (dust content after the electrostatic precipitator is no more than 200 mg / Nm^3 at normal conditions); the degree of purification from SO_2 was 95-98%. The initial temperature of the flue gas was 120 ° C, purified - 49 ° C. The main device - the absorber - was a column apparatus of square cross-section (7000 x 7000 mm) and a total height of 45450 mm. Inside the absorber, there is a packing made of perforated corrugated metal in three tiers (sections). Contact between gas and liquid is carried out in all three sections, each of which has its own closed irrigation cycle. The resulting commercial ammonium sulfate had the required hygienic certificate of conformity with the requirements of TU 113-03-625-90 “Ammonium sulfate - by-product” [3].

During absorption, ash is additionally captured from flue gases; when burning ordinary coals, the resulting fertilizer is enriched with microelements that improve the quality of the fertilizer. According to TU-113-03-625-90 (Table 1), the following microelements may be present in the ammonium sulfate product:

Table 1

Content of microelements in ammonium sulfate according to TU 113-03-625-90.

Component	**Mass fraction,**	**$MAC_{рз}$ mg/m^3**	**Hazard class**
mercury	no more than 2.0 mg/kg	0,01/0,005	1
cadmium	no more than 0.5 mg/kg	0,05/0,01	1
cobalt	no more than 5.0 mg/kg	0,05/0,01	1
arsenic	no more than 2.0 mg/kg	0,04/0,01	1
nickel	no more than 4.0 mg/kg	0,05	1
lead	no more than 32 mg/kg	0,01/0,005	1
copper	no more than 33 mg/kg	1/0,5	2
zinc	no more than 55 mg/kg	Not set	
chromium	no more than 2 mg/kg	Not set	
manganese	no more than 1500 mg/kg	Not set	

According to GOST 10873-73 for purified ammonium sulfate, the mass fraction of heavy metals of the hydrogen sulfide group in dry ammonium sulfate should not exceed 5 mg/kg.

At present, “VTI” JSC is adjusting its own ammonia-sulfate technology for cleaning flue gases from sulfur dioxide during combustion of petroleum coke. A feature of this fuel is the presence of a significant amount of unburned carbon in

the fly ash, as well as heavy metals such as nickel and vanadium. In this regard, the flue gas before the cleaning devices is pre-cleaned from solid particles to 20 mg/m3 at normal conditions, and the concentrated ammonium sulfate solution obtained in the evaporative cooling device, which is the first in the flue gas flow, is carefully filtered. The indicators of ammonia-sulphate desulphurization technology as applied to thermal power plants operating on sulphur and high-sulphur fuel, depending on the flow rate, composition, temperature of the purified gas and other parameters are given in Table 2.

Table 2

Technical and economic indicators of ammonia-sulphate desulphurization technology for thermal power plants

Desulphurization degree	Possible up to 99.5%
Share of consumed energy of the power unit	1.00-1.50%
Total area occupied by the desulphurization unit	12-22 m^2/MW
Specific capital costs	4000-8000 rub./kW (depending on the sulfur content in the fuel and the characteristics of the final product (ammonium sulfate solution/crystalline ammonium sulfate))

An additional positive factor of the ammonia-sulphate technology is the capture of nitrogen oxides by a solution of ammonium sulphite/bisulphite. During operation of the unit at the Dorogobuzhskaya TPP, a decrease in the initial concentration of nitrogen oxides in flue gases by approximately 30-35% was detected. Laboratory studies conducted at VTI JSC , carried out on solutions as close as possible in composition to the working ones (ammonium sulphate content - 0.3-0.68 mol/l (40-90 g/l); total concentration of sulphur dioxide, represented as the sum of sulphite and bisulphite ions - 0.1; 0.5 mol/l; initial pH of the solution - 5.2-6.2) confirmed the data obtained during the studies at the Dorogobuzhskaya TPP (a series of data is presented in Figures 2-4) [4]. The process temperature was 48-58 °C.

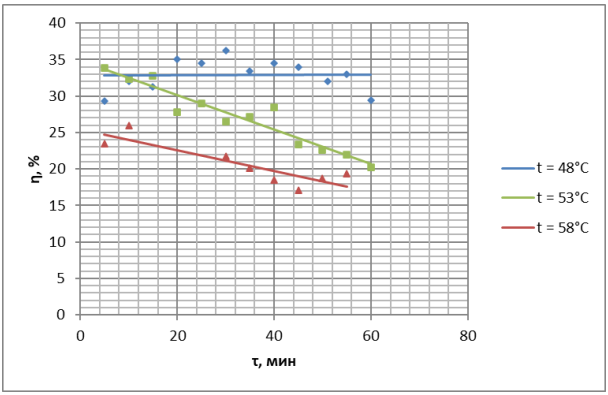

Figure 2. *Dependences of the degree of nitrogen monoxide absorption η by ammonium sulfite-bisulfite-sulfate solutions on time τ at different temperatures. Conditions:* C_{SO2} *= 0,5 M;* $C_{(NH4)2SO4}$ *= 40 g/l;* $pH_{нач}$ *= 6,2.*

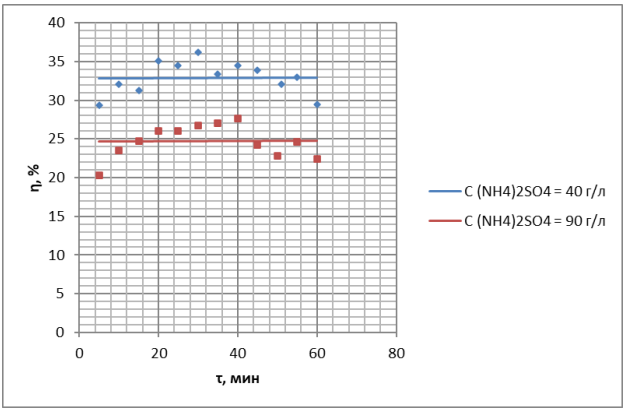

Figure 3. *Dependences of the degree of nitrogen monoxide absorption η by ammonium sulfite-bisulfite-sulfate solutions on time τ at different concentrations of ammonium sulfate. Conditions:* $t = 48°C$; C_{SO2} *= 0,5 M;* $pH_{нач}$ *= 6,2.*

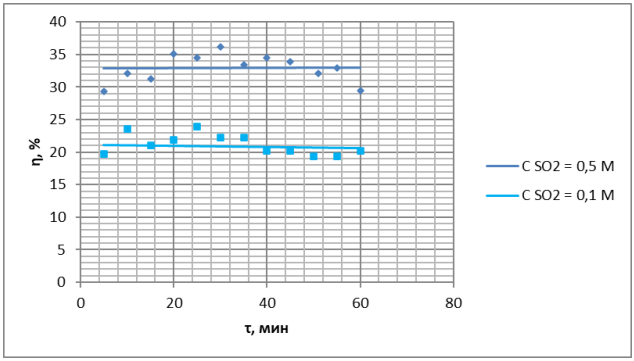

Figure 4. *Dependences of the degree of nitrogen monoxide absorption η on time τ at different concentrations of active SO_2. Conditions: t = 48°C; $C_{(NH4)2SO4}$ = 40 g/l; $pH_{нач}$ = 6,2.*

The experiments showed that the degree of nitrogen monoxide absorption by ammonium salt solutions increases with decreasing temperature, decreasing ammonium sulfate concentration, and increasing total sulfur dioxide concentration. The effect of pH in the range of 5.2-6.2 is insignificant, but with decreasing pH, a slight increase in the degree of nitrogen monoxide absorption is observed.

To increase the degree of nitrogen oxide absorption by sulfite solutions, additives of transition metal ions are often used. Studies conducted with additives of iron, cobalt, and manganese compounds did not yield a noticeable effect, but the use of divalent copper compounds yielded a significant effect (70-80%). The corresponding graph is shown in Figure 5.

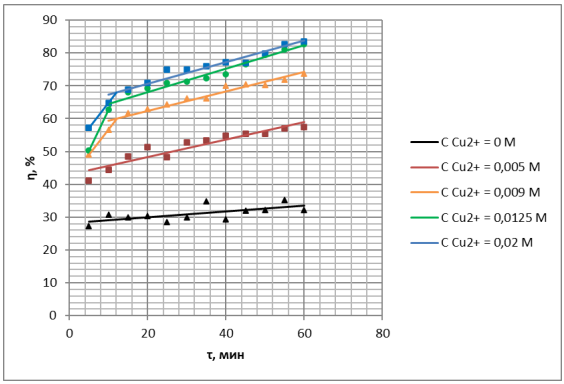

Figure 5. *Dependences of the degree of absorption of nitrogen monoxide η by solutions of ammonium sulfite-bisulfite-sulfate on time τ on the concentration of ions Cu^{2+}. Conditions: t = 48°C; C_{SO2} = 0,5 M; $C_{(NH4)2SO4}$ = 40 g/l; $pH_{нач}$ = 5,7.*

It is evident from the data in Figure 5 that with increasing concentration of Cu^{2+}, the degree of NO capture by the ammonium sulfite-bisulfite-sulfate solution increases, while the optimal value of the Cu^{2+} concentration (the degree of absorption exceeds 70%) is 0.0125 mol/l.

Conclusions

1. The need for intensive development of agriculture dictates the need for the production and use of mineral fertilizers, the largest share of fertilizers in their total balance is occupied by nitrogen fertilizers. Ammonium sulfate is one of the widely used nitrogen fertilizers; it contains ammonium nitrogen and sulfur, while being the most preferable for many agricultural crops, including potatoes and rice.
2. One of the methods for obtaining ammonium sulfate is the purification of flue gases of various industries, including coal-fired thermal power plants, from sulfur dioxide using the ammonia method. In this case, two problems are solved simultaneously - environmental protection and obtaining a commercial product used in agriculture. As a result, the ammonia-sulphate desulphurization technology is waste-free and, due to the sale of fertilizer, also pays for itself.
3. The ammonia-sulphate technology is suitable for both thermal power plants that burn coal and petroleum coke, the ash of which contains unburned carbon and heavy metals. In the first case, gas desulphurization is carried out after preliminary ash removal in an electrostatic precipitator in the usual way, and the resulting fertilizer is enriched with microelements. In the second case, the flue gas is very carefully cleaned of ash (up to 20 mg/m3 at normal conditions) and highly efficient filtration of the ammonium sulfate solution is organized.
4. Considering the volatility of ammonium sulphite/bisulphite used as reagents, it is necessary to clearly select the required concentrations and pH of the reagents, and also to organize gas desulphurization on at least two tiers.
5. “VTI” JSC has significant experience in calculating, basic designing and implementing ammonia-sulphate technology units in the Russian Federation. One of the units was implemented in the 90s of the twentieth century, and the second is being implemented at the present time.
6. In addition to flue gas desulphurization, ammonia-sulphate technology also allows for flue gas nitrogen purification. Without the use of a catalyst, the capture rate is low and amounts to 30-35%, and with the use of copper compounds as a catalyst, it reaches 70-80%.

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THE NEW ALTAI OPTICAL-LASER OBSERVATORY TELESCOPE

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Annotation. *The article presents a new telescope of the G. S. Titov optical-laser observatory, in the village of Savvushka, Zmeinogorsky district, on the top of Bolshaya Mountain at an altitude of 640 meters, one kilometer from the lower platform of the first line telescope. The main mirror has a diameter of 3.12 meters and a weight of 70 tons. The device will surpass the existing ones at times. This will be the first such telecast in Russia and only the second in the world. A concrete structure with a height comparable to a 12-storey building, 45 meters high from the base to the ceiling, was built for him. With the help of a unique telescope, it will be possible to observe objects remote from Earth at a distance of up to 400 thousand km, obtain high-resolution images of space objects, track the movement of space debris and thus prevent collisions with them by operating spacecraft, including the ISS.*

Keywords: *telescope, Altai optical-laser Observatory, optical-laser technology, space debris, adaptive optics.*

Introduction

Just as heat waves reduce the visibility of hot areas of the Earth's surface, temperature changes in the atmosphere affect the quality of images of distant objects obtained with telescopes. Atmospheric turbulence affects image formation. Isaac Newton noted this back in 1704, atmospheric turbulence affects image formation. Therefore, the light entering the telescope reaches different points of the entrance aperture, following different trajectories. There are statistical characteristics that determine the size and quality of the image, for example, the coherence length (r0) is a numerical value usually equal to 100 mm under normal conditions. Thus, even under good conditions, the resolving power of a large telescope (with a diameter of 4 or 8 meters) is comparable to the resolving power of a telescope with an aperture of 100 mm, and the image itself will be as clear as the atmosphere allows. The air layer necessary for the existence of life on Earth causes problems for as-

tronomers. It is good for breathing, but when studying dim extraterrestrial bodies, its effect on image quality is noticeable. Therefore, optical-laser technology will reduce the influence of the air layer for studying deep space.

The phenomenon of atmospheric turbulence creates a situation in which a large telescope aperture is represented by many small apertures of size r0, each of which experiences independent vibration, which makes combining individual image points almost impossible. The degree of this vibration is determined by the time parameter of coherence, which is usually about 1 millisecond. As a result, the image becomes blurred due to trembling, similar to hand trembling, but with a frequency of up to a thousand hertz.

Laser adaptive optics is a relatively new method for obtaining high-quality images using ground-based telescopes. Telescopes such as the Keck telescope in Hawaii and the ESO VLT large telescope in Chile are already using laser adaptive optics to take image quality to a new level. Despite the fact that telescopes operating in space provide unique images for research, their maintenance is expensive [4 - 7, 11 - 16].

Space debris. Experts could not imagine that just a few decades after the start of the space program, space flights and the performance of various tasks in orbit would become risky due to the possible collisions of functioning satellites and other devices with space debris [2].

According to experts, the fact that debris of space origin actively populates areas of near-Earth space where spacecraft operate is of concern. These objects, moving along working orbits at high speed, pose a real threat of collision with operating spacecraft. Even a small fragment can disable them. Risks arise for manned flights.

We do not realize that every week a space object enters the Earth's atmosphere, which to one degree or another poses a danger to the population of the planet. The problem of space debris in near-Earth orbit is becoming increasingly important. Objects that have completed their mission accumulate in orbits and pose a threat to new and existing spacecraft. Despite the fact that space exploration has been going on for over half a century, the number of used satellites continues to grow. Collisions with them are inevitable, and the destruction that follows them is a serious problem. [8, 17 - 19] In order to solve the above-mentioned problems, an advanced OEK (optical-electronic complex) was developed near the village of Savvushka, which consists of four types of telescopes for various purposes, capable of detecting elements of space debris larger than a quarter of a meter [10].

The giant telescope with a primary mirror 3.12 meters in diameter and weighing 70 tons is at the final stage. The construction of the second line of the optical-laser center is being completed in the village of Savvushka in the Zmeinogorsk district on the top of Mount Bolshaya. The height of the facility is 640 meters,

and the distance from the lower platform to the telescope installation site is about one kilometer, the model of the optical-laser center is shown in Figure 1. This telescope will be the first such facility in Russia and the second in the world. A concrete structure comparable in height to a 12-story building has already been erected for it - 45 meters from the base to the ceiling [2].

Figure 1. *Model of the optical-laser center*

The manufacturer of the main mirror with a diameter of 3 meters 12 centimeters for the largest telescope of the Altai optical-laser center named after G. S. Titov was the Shvabe Holding (the G. S. Titov center is part of the Scientific and Production Corporation "Precision Instrument-Making Systems" of Roscosmos).

To avoid image distortion in the optical system, the mirror manufactured at the Lytkarensky Plant (LOGP) and transferred to the Altai optical-laser center named after G. S. Titov belongs to the category of mirrors that change shape during operation. Optics created at the Rostec enterprise are widely used in telescopes around the world, including several large telescopes with Russian mirrors up to 4 meters in diameter, operating in the world's leading research centers. During the manufacture of the mirror, as with any production of optical components, the surface was checked with the necessary retouching and processing operations to achieve the focal length and resolution of the mirror [9].

With the help of this unique telescope, it will be possible to observe extraterrestrial (space objects) located at a distance of up to 400 thousand kilometers from the Earth, obtain high-quality images of these objects and track the movement of space debris. Thus, it will be possible to prevent collisions of operating devices, including the International Space Station (ISS), with space debris.

Tasks set for the new optical-laser telescope:

1 observation system for spacecraft (SC), space objects, as well as abnormally functioning (all military devices). That is, a tracking system for both space objects and military objects. in orbits with an altitude range from 150 to 36,000 km;

2 Determining the range of spacecraft in low orbit using laser ranging based on reflected radiation from their scattering surface;

3 Detecting, tracking and photometry of spacecraft in the infrared range during the day, as well as spacecraft in the shadow at night;

4 Detecting and determining the parameters of space debris located close to controlled spacecraft in order to improve the safety of their operation;

5 Obtaining detailed images of low-orbit spacecraft using reflected solar radiation with an angular resolution close to the diffraction one for a telescope with a primary mirror of 3.12 m in diameter for identification, refinement and assessment of the condition of structural elements of emergency spacecraft;

6 Recording detailed images of low-orbit tracked spacecraft, partially illuminated and unilluminated by the Sun, using laser illumination [1, 3].

Conclusion

In the course of studying this topic, it can be noted that the telescopes of the first and second lines have the same range of tasks. To perform such serious tasks, a telescope with impressive optical characteristics is required, which is why an optical-laser telescope is being created at the Titov Observatory.

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ZONING BASED ON XAI AND KNOWLEDGE BASES: A THEORETICAL AND APPLIED APPROACH TO MANAGED SPATIAL SYSTEMS

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Abstract. *Zoning has long been used as a tool for spatial planning and resource management. However, the escalating complexity of modern urban and environmental systems calls for more adaptive, non-linear methods. In this article, we propose a hybrid zoning paradigm that integrates expert knowledge (via ontologies and rules) and advanced AI—encompassing neuro-fuzzy models and explainable interfaces. We emphasize the importance of a bioinspired explanatory layer, which tailors its outputs to both analytical (left-brain) and visual-metaphorical (right-brain) modes of understanding. This facilitates trust and transparency among a broad spectrum of stakeholders, including domain experts, municipal officials, and local communities. Moreover, we highlight how two-way integration with a knowledge base ensures continual updates, enabling the system to refine itself in response to changing environmental or socioeconomic conditions. The result is a novel approach that marries data-driven algorithms and expert-driven insights, thereby offering a robust, transparent, and collaborative framework for next-generation zoning practices.*

Keywords: *Explainable AI, XAI, Neuro-Fuzzy Models, ANFIS, Knowledge Base Integration, Bioinspired Interface, Intelligent Decision Support Systems (IDSS).*

Introduction

Historically, zoning has been viewed as a spatial planning tool for organizing land use, managing urbanization, and monitoring environmental conditions.

These classical approaches to zoning involve designating functional areas (industrial, residential, recreational, etc.), demarcating administrative boundaries, and defining zones of influence (buffer zones, protected areas). However, in the face of rising complexity in modern urban and environmental systems, simple linear methods increasingly prove insufficient, failing to account for emergent properties that arise in large-scale systems.

According to research [1-3], cities are complex adaptive systems characterized by self-organization and nonlinear behavior. Notably, research on urban growth has revealed the existence of so-called power laws, $\boldsymbol{Y \sim N^{\beta}}$ (где $\boldsymbol{\beta > 1}$), indicating superlinear increases in social, economic, and ecological risks as population size expands. This type of behavior renders traditional "rigid" zoning algorithms—for instance, clustering based on population density without considering cross-sectoral interrelationships—inadequate for strategic decision-making.

Emergent properties refer to characteristics that develop at the system level but cannot be predicted simply by summing the properties of individual components. In urban contexts, emergence manifests when local changes—such as opening a new road or constructing a large commercial facility—trigger cascading effects: shifts in migration flows, increases in real estate prices, and even changes in ecological parameters (for example, soil and air pollution).

Traditional geostatistical methods (e.g., Kriging interpolation, linear regression, simple spatial distribution models) often fail to capture these non-linear effects [4]. Complex systems require new models capable of describing the interactions among multiple agents (people, infrastructure, ecosystems) and the dynamics of their behavior. Furthermore, it is necessary to integrate not only quantitative data (e.g., satellite imagery, population statistics) but also qualitative expert knowledge, which frequently contains vital heuristics and constraints.

Against this backdrop, the scientific community has increasingly turned to hybrid systems that combine machine learning techniques (neural networks, decision trees) with formal knowledge structures (ontologies, production rules). Such systems not only model complex processes but also present results in a form understandable to experts [5].

The principal goal of this study is to develop and justify a theoretical and applied approach to next-generation zoning, which integrates methods of explainable artificial intelligence (XAI), knowledge bases (ontologies, production rules), and adaptive self-learning mechanisms. Within this overarching goal, the following objectives are pursued: (1) analyze existing issues with traditional "rigid" zoning methods and identify critical factors that hinder strategic decision-making; (2) substantiate the feasibility of implementing hybrid AI systems that combine formalized expert knowledge and machine learning, including neuro-fuzzy models; (3) explore the potential of a bioinspired explainable interface to increase

stakeholder trust in IDSS recommendations and improve cross-disciplinary collaboration; (4) propose a concept for two-way data exchange with a knowledge base, enabling the system not only to leverage accumulated expertise but also to enrich it with newly identified information through ongoing analysis; and (5) formulate principles for constructing governed spatial systems that can adapt to evolving socio-ecological conditions and ensure transparency in decision-making for diverse interested parties.

Zoning as a Complex System

Contemporary zoning involves analyzing a complex system composed of numerous interacting agents: residents, infrastructure, and natural elements (water resources, soil systems, forested areas, etc.). Three key features characterize such complex systems:

1. Nonlinearity: minor changes in one part of the system can lead to disproportionate effects elsewhere.
2. Emergence: properties arise at the system level that are not inherent in any individual element.
3. Adaptability: systems can reorganize themselves in response to external disturbances [6].

In urban or regional planning contexts, an example of adaptive behavior might be shifts in population migration prompted by changes in economic conditions, the opening of new transport routes, or the construction of large industrial facilities.

One way to model the dynamic behavior of regions is through a system of differential equations, for instance:

$$\frac{dS_i}{dt} = \alpha \sum_{j=1}^{n} A_{ij} S_j - \beta S_i + \gamma E_k + \varepsilon_i(t),$$

where:

- $\boldsymbol{S_i}$ — is the state of the $\boldsymbol{i}$ -th system element (e.g., pollution level, population density, economic activity),
- $\boldsymbol{A_{ij}}$ — is the interaction matrix describing how one element influences another (for instance, the impact of emissions in one district on neighboring territories),
- $\boldsymbol{E_k}$ — denotes expert assessments normalized from 0 to 1, reflecting qualitative aspects such as “flood risks” or “landscape value,”
- $\boldsymbol{\varepsilon_i(t)}$ — represents stochastic noise accounting for unpredictable factors (for example, economic shocks or natural disasters).

The parameters $\boldsymbol{\alpha}$, $\boldsymbol{\beta}$, and $\boldsymbol{\gamma}$ are calibrated based on empirical data and/or expert surveys. In the study [7-8], ignoring the $\boldsymbol{\gamma E_k}$ term was shown to produce significant forecast errors—reaching 30–40% in certain urban planning scenarios.

For a clearer demonstration of emergent effects, cellular automata (CA) are frequently employed. In the classical formulation [9], the new state of cell ($\boldsymbol{i}$) at the next step is given by the function:

$$S_i^{t+1} = f(S_{i-1}^t, S_i^t, S_{i+1}^t).$$

Even when local update rules are relatively simple, complex structures and spatial patterns can emerge at the macro level—ranging from orderly to chaotic. In the context of zoning, such emergent behavior may be seen in the spontaneous formation of "ecological corridors," microclusters of economic activity, or uneven distributions of pollutants.

Effective regional planning systems require synthesizing insights from multiple fields:

- *Geography and Ecology:* spatial distribution of soils, water resources, and vegetation.
- *Sociology:* migration processes and population behavior.
- *Economics:* investment dynamics, land values, and forecasting for key industries.
- *Computer Science:* machine learning methods, knowledge-base construction, and automation of data analysis processes.

The resulting model must integrate all these perspectives, fostering interdisciplinary dialogue. In this dialogue, experts from different domains play a pivotal role by contributing their specialized knowledge and experience to refine and enhance the formal model.

Integration of expert knowledge

Expert knowledge in the field of zoning often takes the form of informal rules, such as "there is a high risk of flooding in valleys during spring," "additional drainage measures are necessary when building on marshy land," or "population migration to industrial areas may surge following the creation of new jobs," and so on. Such rules are frequently hard to translate into quantitative models.

Moreover, experts themselves may disagree. One expert might assert that an industrial zone needs a buffer of at least three kilometers from residential areas, while another believes two kilometers is sufficient. These differences require mechanisms for conflict resolution and consensus-building.

One tool for the semi-automated extraction of knowledge from expert interviews and documents is topic modeling—specifically, Latent Dirichlet Allocation (LDA) [10]. Suppose we have a set of interview transcripts. For each document $\boldsymbol{d}$ (either transcribed interviews or written responses) and for each word $\boldsymbol{w}$, we can compute the probabilitv:

$$P(w \mid d) = \sum_{t=1}^{T} P(w \mid t) P(t \mid d)$$

where:

- $\boldsymbol{t}$ — is a latent "topic" (for instance, "water supply issues" or "social conflicts"),
- $\boldsymbol{P(t \mid d)}$ — is the posterior probability that topic t is represented in document $\boldsymbol{d}$,
- $\boldsymbol{P(w \mid t)}$ — is the probability that word $\boldsymbol{w}$ appears under topic $\boldsymbol{t}$.

By identifying these topics and their associated terms, we can organize expert knowledge along "narrative lines" (water, pollution, transportation, etc.). The next step involves converting the identified topics and relationships into formal structures (ontologies or knowledge bases). An ontology can be represented as a directed graph $\boldsymbol{G = (V, E)}$, where:

- $\boldsymbol{V}$ — is the set of concepts (e.g., "soil," "load-bearing capacity," "building height"),
- $\boldsymbol{E}$ — is the set of relationships (e.g., "soil influences load-bearing capacity," "building height depends on load-bearing capacity," etc.).

In the study [11], a method is described that partially automates this process through semantic text analysis. The resulting ontology can be integrated into an expert system where production rules formalize dependencies of the type: "IF (soil = low load-bearing) THEN (building_height ≤ 5).

Formalizing knowledge in this way makes it possible to combine these insights with remote sensing data (e.g., satellite imagery), statistics, and geodata (such as digital elevation models) to create a unified hybrid AI system. One can conceptualize this scheme using the formula:

$$K_{total} = K_{data} \oplus K_{expert}$$

where:

- $Kdata$ — represents data-derived knowledge (e.g., pollution markers extracted from satellite images, NDVI vegetation indices, etc.),
- $Kexpert$ — corresponds to ontologies and production rules.

Research [3] shows that such an approach increases risk forecast accuracy and improves decision-making recommendations in zoning tasks.

Despite the efficacy of hybrid methods, several limitations remain:

- High complexity of ontology construction, requiring trained specialists and a significant time investment;
- Risk of knowledge obsolescence, as expert systems must be continually updated when legal frameworks or technological conditions change;
- Likelihood of conflicts among diverse knowledge sources, making robust conflict-resolution and rule-consensus mechanisms essential.

Nevertheless, integrating formal knowledge bases with data paves the way from traditional "rigid" zoning toward a more flexible, adaptive model capable of capturing diverse factors and their mutual interactions.

The Need for Intelligent Decision Support Systems (IDSS)

Conditions to socioeconomic and cultural dimensions. Previous sections have examined mathematical and ontology-based methods for partially formalizing the intricate interplays found in urban systems. Yet, in practice, zoning decisions typically consider both quantitative data and expert opinions, which may conflict or add new nuances to each other.

Under these conditions, traditional decision-support methods—expert systems with rigid rule sets, or classical GIS tools using basic clustering algorithms—often struggle to cope with escalating complexity. Enter intelligent decision support systems (IDSS), which:

- **Integrate heterogeneous data** (satellite images, thematic maps, statistics, surveys) and ontologies that encode expert knowledge;
- **Analyze links and dependencies** using AI algorithms, including neural networks, decision trees, and production rules;
- **Provide explainability** (Explainable AI, XAI), thus offering transparent, interpretable justifications for recommendations, enabling users (public officials, consultants, researchers) to discover and correct any errors;
- **Account for uncertainty** in expert opinions (neuro-fuzzy models), flexibly handling terms like "moderate pollution" or "acceptable population density."

One of the key elements in building IDSS for zoning may be neuro-fuzzy models, which combine the advantages of artificial neural networks with fuzzy logic. Fuzzy logic makes it possible to formalize qualitative expert notions (e.g., "significant flood risk," "moderate landslide likelihood," "high population density") by translating them into linguistic variables and membership functions. The neural component (commonly an Adaptive Neuro-Fuzzy Inference System, ANFIS) automates the calibration and training of these membership functions using real-world data.

As noted in earlier sections, the success of hybrid systems heavily depends on a robust, formalized knowledge base that encompasses ontologies, fuzzy rules, and collected facts about specific areas. A one-way approach, in which the IDSS only uses the base without feeding new data back into it, quickly grows outdated, since emerging data (e.g., recent violations or newly detected pollution hotspots) might not be incorporated into the system in a timely manner.

For this reason, two-way data and knowledge flows have become increasingly critical in modern IDSS design:

1. *From the KB into the IDSS:* ontological concepts, rules, constraints, and historical precedents feed into modules for neuro-fuzzy logic, interpretability, and decision making.

2. *From the IDSS back to the KB:* if analyses or optimizations reveal new insights (e.g., a newly discovered high-risk zone or a recalibrated threshold for "moderate" vs. "high" flood risk), these updates are added to the KB. This creates a self-learning and self-updating mechanism that gradually builds expertise and accuracy.

In regions subject to rapid changes—such as intensive urban development or evolving climate factors—this continual feedback loop preserves the currency and relevancy of rules and recommendations, lending long-term resilience to decision making.

A Bioinspired, XAI Concept with Two-Way KB Integration for IDSS in Zoning

In the multidisciplinary realm of zoning—where ecologists, economists, sociologists, architects, and municipal officials collaborate—an AI-based IDSS must, above all, ensure:

1. Explainability (XAI) to illuminate the "black box";
2. A bioinspired interface that makes complex computational processes more comprehensible;
3. Two-way knowledge-base integration, so that the AI not only leverages existing expertise but also enriches it with newly derived insights.

Complex machine-learning algorithms—deep neural networks, evolutionary methods, hybrid neuro-fuzzy models—can indeed confer significant benefits in spatial planning tasks. However, if the system only generates final outputs (e.g., recommended district boundaries or development scenarios) without clearly explaining why these particular solutions were chosen or which factors took precedence, users tend to distrust its conclusions. Consequently, the computational effort may be dismissed, and interdisciplinary collaboration stalls.

To forestall such issues, an explainable AI (XAI) layer is necessary—tools and methods that unveil the logic of internal algorithms to diverse audiences. In this context, bioinspiration holds special promise, not as a direct imitation of evolutionary or swarm processes, but rather as a collection of intuitive metaphors that help professionals "decode" the model's functioning. For instance, analogies to an "immune system" illustrate why certain areas are flagged as "pathogenic hotspots" (zones with elevated pollution or social tension) and which "protective measures" may mitigate them. Similarly, a "genetic selection" analogy clarifies how different zoning scenarios evolve via "mutations" and "crossovers," fostering the identification of the most "viable" solutions.

Such a bioinspired explanatory model resonates with both left-brain (analytical) and right-brain (visual-imaginative) modes of comprehension. The former requires formal metrics and variables (cost functions, equations, fitness functions), while the latter responds to illustrations, metaphors of "struggle" or "evolution"

in a given space. When both types of understanding converge, experts from various disciplines gain a holistic perspective: economists discern which parameters influenced boundary shifts, ecologists grasp why the model "targets" certain zones as hotspots, and sociologists appreciate how social conflict risks are factored in.

This dual adaptation is critical because zoning is a multidisciplinary process involving a wide variety of stakeholders. Technical specialists and researchers seek computational precision, validated forecasts, and clear decision criteria. Meanwhile, policymakers, investors, and the public require accessible insights and transparent reasoning to align zoning initiatives with socioeconomic priorities. Hence, an IDSS that simply outputs numerical results without explanation will likely fail to gain broad acceptance. Conversely, a bioinspired "explanatory" interface breaks down comprehension barriers and delivers what each participant needs: analytics and reliable metrics for left-brain thinkers, visual and emotional cues for right-brain thinkers, along with a shared metaphorical language that helps reconcile different viewpoints.

Finally, to prevent AI-generated zoning decisions from "freezing" into rigid rules, two-way knowledge-base integration becomes imperative. The system must not only use existing expert rules, ontologies, and factual data but also incorporate newly discovered information from ongoing analyses. For instance, if modeling reveals that the real flood-risk threshold deviates from prior assumptions, the IDSS adjusts this figure in the KB. Consequently, a self-learning, self-correcting system emerges, ensuring that each new round of zoning is richer than the last.

Conclusion

This study has demonstrated that traditional, linearly oriented zoning methods—historically entrenched in spatial planning—are increasingly inadequate for capturing the dynamic and emergent properties of modern urban and ecological systems. By examining the interaction between expert knowledge (formalized via ontologies and rules) and cutting-edge AI methodologies—particularly neuro-fuzzy models and explainable interfaces—it becomes clear that a more adaptive, knowledge-based, and transparent structure is necessary. A bioinspired explanatory layer, which integrates both formal-analytical and visual modes of cognition, bolsters stakeholder trust and encourages interdisciplinary dialogue. Moreover, two-way integration with a knowledge base not only draws upon established expertise but also continually refines system parameters in response to changing conditions. Taken together, these components establish a theoretical foundation for an intelligent decision-support paradigm in zoning—one that unites analytical data with nuanced insights from domain experts and relevant societal participants.

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