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МЕДИЦИНА И ОРГАНИЗАЦИЯ ЗДРАВООХРАНЕНИЯ

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LENINGRAD PEDIATRIC MEDICAL INSTITUTE IN 1943–1944. ON THE 80th ANNIVERSARY OF THE COMPLETE LIBERATION OF LENINGRAD FROM THE FASCIST BLOCKADE

© Dmitry O. Ivanov, Galina L. Mikirtichan, Irina A. Savina

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ABSTRACT. The article is dedicated to the event of enormous historical significance — the 80th anniversary of the complete liberation of Leningrad from the fascist blockade. The employees of the Leningrad Pediatric Medical Institute (LPMI, now St. Petersburg State Pediatric Medical University) contributed to the overall victory of the Leningraders, who remained in the city throughout the days of the Great Patriotic War and the siege, fought to save the lives of children, trained medical personnel, and were engaged in scientific work. During these years, the scientific research of LPMI employees was focused on the most vital problems: war trauma, nutritional dystrophy and vitamin deficiencies; nutrition and search for milk substitutes; anemia; treatment and care of newborns and premature babies; childhood infectious diseases; tuberculosis and a number of other diseases; dynamics and specificity of morbidity, indicators of physical development, infant mortality, as well as numerous organizational problems of treatment and preventive care for children during different periods of the blockade. Since May 1942, the Scientific Society of Children’s Doctors resumed its work, meetings were held monthly, reports were heard on the results of the research, joint conferences of pediatricians with obstetricians, therapists, and phthisiatricians were held on topical issues of obstetrics and pediatrics, collections of scientific papers were published, monographs, articles were published, training manuals. All this contributed to the rapid implementation of scientific research into practice. Having survived the incredible difficulties of the blockade years, the Institute’s staff continued to fight for the lives of children, eliminate the consequences of severe blockade pathology, strive to maintain sanitary and epidemiological well-being and prevent the development of epidemics of childhood infectious diseases. The article provides a qualitative and quantitative analysis of the main performance indicators of the LPMI during the war and blockade.

KEYWORDS: Great Patriotic War, siege of Leningrad, Leningrad Pediatric Medical Institute, training of doctors, scientific problems, scientific society of children’s doctors of Leningrad, children

ЛЕНИНГРАДСКИЙ ПЕДИАТРИЧЕСКИЙ МЕДИЦИНСКИЙ ИНСТИТУТ В 1943–1944 гг. К 80-ЛЕТИЮ ПОЛНОГО ОСВОБОЖДЕНИЯ ЛЕНИНГРАДА ОТ ФАШИСТСКОЙ БЛОКАДЫ

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РЕЗЮМЕ. Статья приурочена к событию огромной исторической значимости — 80-летию полного освобождения Ленинграда от фашистской блокады. В общую победу ленинградцев внесли вклад сотрудники Ленинградского педиатрического медицинского института (ЛПМИ, ныне СПбГПМУ), которые все дни Великой Отечественной войны и блокады оставались в городе, боролись за спасение жизней детей, готовили врачебные кадры, занимались научной работой. В эти годы научные изыскания сотрудников ЛПМИ были сосредоточены на самых насущных проблемах: военная травма; алиментарная дистрофия и авитаминозы; питание и поиски заменителей молока; анемии; лечение и выхаживание новорожденных и недоношенных детей; детские инфекционные заболевания; туберкулез и ряд других заболеваний; динамика и специфика заболеваемости, показатели физического развития, детской смертности, а также многочисленные организационные проблемы лечебно-профилактической помощи детям в разные периоды блокады. С мая 1942 г. возобновило работу Научное общество детских врачей, заседания проводились ежемесячно, заслушивались доклады по результатам исследований, проводились совместные конференции педиатров с акушерами, терапевтами, фтизиатрами по актуальным вопросам акушерства и педиатрии, выпускались сборники научных трудов, печатались монографии, статьи, учебные руководства. Все это способствовало быстрому внедрению научных изысканий в практику. Пережив неимоверные трудности блокадных лет, сотрудники Института продолжали и в дальнейшем бороться за жизни детей, ликвидировать последствия тяжелой блокадной патологии, стремились поддерживать санитарно-эпидемиологическое благополучие и не допустить развития эпидемий детских инфекционных заболеваний. В статье приводится качественный и количественный анализ основных показателей работы ЛПМИ в годы войны и блокады.

КЛЮЧЕВЫЕ СЛОВА: Великая Отечественная война, блокада Ленинграда, Ленинградский педиатрический медицинский институт, подготовка врачей, научные проблемы, научное общество детских врачей Ленинграда, дети

Comes again in January
Our Leningrad Victory Day!
A. Molchanov

There has been written a lot about the war and the blockade. But the unparalleled feat of Leningrad citizens both adults and children, displays of heroism and courage, fortitude and willpower — never stop surprising us, making us revisit these days again and again to try to understand how people lived, created and gave the warmth of their hearts to other people in those incredible conditions. Among them were the staff of our Leningrad Paediatric Medical Institute (LPMI), who, thanks to their profession, adherence to their duty and conscience, stood guard over children's health. And this mission during the Great Patriotic War was especially responsible and difficult.

In connection with the great date of the complete lifting of the siege of Leningrad, which took

place on the 27th of January 1944, this article focuses on the work of the LPMI staff in the fateful years of 1943–1944, when the city, and with it its citizens, gradually began to recover from the experience of 1941–1942.

On the 27th of January 1944 the jubilation of Leningrad residents was unprecedented. Together with all the citizens, the staff and students of LPMI were rejoicing. Here is how the teacher of the Department of General Chemistry Y.N. Berg wrote about this day: "In January 1944 we heard an intense cannonade. It was our troops launched a vigorous offensive against the Germans. It was both joyful and anxious, especially for those who had any of their relatives on the Leningrad front. Finally, the Germans were driven far away from Leningrad, and in January 1944, for the first time during the war we had a celebratory salute in Leningrad. Joyful, we all left the building, admiring the victory salutes..."[1]. Professor N.I. Lopatina, a student of LPMI in 1944, remembered: "On 27th January at 8 p.m., my mother and I, like all Leningraders, went out into the street, on the International (Mezdunarodniy) Avenue, to watch the salute in honour of the lifting of the blockade. It was an unforgettable hour — for the first time in 2 years and 7 months, the streets of Leningrad became bright with celebratory rockets. The ground was covered with white snow, multicoloured lights sparkled in the sky, and the houses were dark and severe, because the light cloak had not been removed yet. There were not a lot of people on International (Mezdunarodniy) Avenue, for the Moskovsky district was a front-line neighbourhood, and the majority were women. Almost everyone was crying, shouting "Hooray", softly singing songs. This is how that unforgettable day remained in my memory"[2]. Professor A.B. Volovik, head of the Department of Propaedeutics of Paediatric Diseases of LPMI, wrote: "Leningrad citizens took a full breath" [4].

The terrible days and nights of artillery bombardment (up to 8–12 per day) were left behind, as LPMI was listed on the German shelling map as object No. 708, subject to special destruction. Even after the partial breakthrough of the blockade on 18 January 1943, Leningrad continued to be a front-line city, and its population was subjected to fierce shelling, sometimes bombing, there were also attacks on the Institute's buildings. But none of the Institute's staff, students or children were harmed by the shelling. Behind were cold, hunger, lack of basic living conditions, long stay in bomb shelters. The autumn and winter of 1941–1942 were especially difficult. Transport did not run, there was not enough food, people died of cold and hunger, the overwhelming number of Leningraders had manifestations of alimentary dystrophy and avitaminosis. LPMI clinics were overcrowded with sick children who needed qualified help. Due to lack of electricity, water supply, fuel we had to work in limited premises, in bomb shelters, heated by temporary shelters. There was no firewood, we collected and carried it on our shoulders, there was no water — we went to the Neva for water and brought it in tubs, cans, buckets, on sledges or pumped it with a pump through a long rubber hose directly from the river. In the wards children were bathed once in 10 days, and in the neighbouring wards they washed by hand, dried and ironed linen... In the spring of 1942 the whole staff and students eliminated the consequences of the first blockade winter, dismantled the rubble, improved the premises, broke the ice, cleared the territory from snow, procured fuel, made elementary repairs of the premises, adjusted electric lighting, restored the water supply, performed everyday feats.

A great achievement of the LPMI administration, its director Professor Y.A. Mendeleva and the head doctor of the clinic D.S. Tumarkin (Fig. 1) was the preservation in those difficult conditions of our unique university — the only paediatric institute in the world, which continued to train personnel, treat children, conduct scientific and organisational work during all the years of war and blockade. This would have been impossible if the administration had not taken measures to preserve the lives of staff and students, who were allowed to live on the territory of the Institute in the buildings that had not been damaged by bombing. They were provided with therapeutic food, food oil extracted from natural olive oil and vitamin C from pine needles, obtained at the Department of Inorganic Chemistry by the head of the local industrial defence chemical laboratory, docent M.M. Koton, as well as fruits and vegetables.

LPMI did not stop educating doctors. During the war there were 7 planned and early gradua-

[1] Berg Y.N. Memories. Manuscript. Stored in the Museum of History of SPbSMU.

[2] Lopatina N.I. Memories. Manuscript. Stored in the Museum of History of SPbSMU.

Fig. 1. Director of LPMI Professor Yu.A. Mendeleva and chief physician of the clinic D.S. Tumarkin

Рис. 1. Директор ЛПМИ профессор Ю.А. Менделева и главный врач клиники Д.С. Тумаркин

tions, 947 doctors were educated for the front, health care institutions of Leningrad, Leningrad Region, and other territories of the RSFSR. Amazingly, from the end of June 1941 until the blockade was broken in 1944, 904 doctors were educated. The seventh graduation of 43 doctors took place in July 1944. Accordingly, the enrolment of students did not stop. In 1941–1943 there were 5 admission campaigns, 1200 students were enrolled, and in October 1944 during the sixth military admission 400 people were enrolled in the 1st course, i.e. 1600 people were enrolled in total during the war years.

The fact that in these hardest years the administration of LPMI took into account the needs of the time and promptly solved the most acute problems of training of wartime doctors is evidenced by the organisation of new departments: the department of hospital surgery in 1942 and the department of hospital therapy in 1944. The staff of these departments carried out a lot of practical and advisory work in military and civilian hospitals, where they also had classes with students.

In 1944 the question of improving the education of medical personnel became acute. Until that time, according to the resolution of the Council of People's Commissars (CPC) of the USSR of 02.07.1941 and the order of the Administration of Medical Universities of the RSFSR of 05.08.1941, the five-year period of training of medical students was reduced to three and a half years, which caused early training and graduation of doctors.

But time demanded more thoroughly trained doctors. On 19 June 1942, the All-Union Committee for Higher Education under the USSR Council of People's Commissars decided to restore the five-year term of study in the country's medical institutes (Decree No. 113/m) [26]. And on the 1st of December 1944, the resolution of the CPC of the USSR "On measures to improve the training of doctors" was issued, and the gradual transition of medical institutes to a 6-year term of study began [11]. The new curriculum was based on the following principles: strict consistency in the study of theoretical and clinical disciplines; increasing the number of hours in the main disciplines; strengthening practical training, establishing the correct ratio between lecture and practical courses. Our Institute was commissioned to develop a teaching programme for paediatric faculties for a 6-year period of study.

In addition to students' education in LPMI, since 1943 the work on improvement of all ranks of medical personnel has been intensified. Only in 1943 were upgraded:

1. Wartime nurses — 500 people.
2. By May 1, 1943, 157 doctors were prepared for the work of a "single paediatrician" on one-month courses.

3. Courses for doctors of neonatal departments in November-December 1943 — 6 people.
4. Courses on dietetics of healthy and sick children — 263 persons.
5. Training in nutrition:
   a) courses for cooks of nurseries and other institutions — 65 persons;
   b) Courses for doctors in nutrition and dietary school canteens — 35 doctors;
   c) courses for managers and cooks in children's establishments in the Vyborg district RONO — 30 persons.
6. Professional development courses for state inspectors and their assistants — 25 persons.

In 1944 the following courses were organised:

1. Short-term courses for district paediatricians of the Regional Healthcare: from 17.02 to 04.03 — 5 persons, from 18.03 to 11.04 — 9 persons.
2. Courses on dietetics of healthy and sick child from 02.03 to 22.04 — 31 persons.
3. Courses on infectious diseases from 03.03 to 19.04 — 31 persons.
4. Courses on blood transfusion — 85 specialists were trained.
5. Advanced training courses for school doctors from 07.03 to 23.05 — 35 people.

A total of 111 people took the courses [22].

In addition, twice a month the clinics of the LPMI held rounds of professors and associate professors for the city's paediatricians, with a review and demonstration of patients.

Bombing and shelling caused enormous damage to the buildings of the Institute. After the blockade was lifted, it was necessary to start rebuilding the damaged buildings. Building materials, glass, labour force, etc. were needed. The Institute's employees themselves had to get involved in this work. For example, the premises of the Department of Physiology, the roof of which was particularly damaged, were restored by the efforts of teachers and other staff members.

By May 1, 1944 the following restoration works were done: 2500 m^2 of windows were glazed; plywood was laid on the floor, walls and other surfaces with the area of 4500 m^2; the central heating network of 97 662 cubic metres was restored. The roof was repaired over an area of 2,700 m^2; cosmetic repairs were carried out on 4,950 m^2 of premises. This made it possible to hold classes with students and doctors, to hospitalise children in more or less acceptable conditions.

As of 1 July 1944, the main clinical building and the food block were restored, and some other buildings were repaired on a small scale. In 1944 all 20 theoretical departments worked in their old premises, located in four buildings with a total of 182 rooms. There were a number of laboratories for student classes, 7 classrooms, 2 libraries, 2 prosectories and a vivarium. In addition, there was an experimental workshop, whose tasks included the manufacture of precision instruments for the departments of the Institute, meeting the current technical needs, glass blowing, improvement of equipment, etc.

But the Institute itself was not able to repair all the buildings. In the autumn of 1943, the question of reconstruction works was put before the People's Commissariat of Health of the USSR. The plan and scope of works were approved, and all the documentation was handed over to Lengorispolkom for implementation. The works were started at the end of 1944.

The issue of student dormitory was especially acute. Before the war, the Institute did not have its own dormitory and when admitting students it focused exclusively on Leningrad youth. After the blockade was broken, a course was taken to admit students from other territories, and the construction of a dormitory became one of the priority tasks of the administration. It was planned to build a 5-storey building for 500 student places and 100 places for doctors of advanced training courses. The construction of the dormitory was finished after the war.

All the years of war LPMI did not stop its clinical and scientific activities. In the clinics of LPMI there were wounded and sick children, with various pathologies, as well as children in physiological departments, whose parents died or were at the front (Fig. 2). From November 1941 until April 1942, all the work of the clinics took place in bomb shelters.

During the most difficult period, from 01.07.1941 to 01.10.1942, the scientific work in its volume was certainly not as intensive as in peacetime, but it did not stop, was relevant and responded to the needs of the time. Unique data were collected, which were then generalised, conclusions were drawn, and new approaches to treatment were developed. The main topics concerned the development of special wartime issues were: the war trauma (N.E. Berg, N.E. Surin, etc.); alimentary dystrophy and avitaminosis (A.F. Tur, A.B. Volovik, S.A. Gavrilov, E.I. Friedman,

Fig. 2. Wounded children at the LPMI clinics

Рис. 2. Раненые дети в клинике ЛПМИ

R.M. Muravina, G.A. Nikolaev, M. V. Miller-Shabanova, etc.); anaemias (A.F. Tur, A.N. Antonov, Y.A. Kotikov, etc.); treatment and nursing of newborns and premature infants (A.F. Tur, M.A. Singer, A.N. Antonov, I.I. Bogorov, etc.); childhood infectious diseases (A.B. Volovik, M.B. Danilevich, V.G. Danilevich, V.I. Bogorov, etc.); tuberculosis (A.E. Pevzner, S.B. Adelberg, C.L. Bibikova, etc.) and a number of other diseases; the dynamics of morbidity, child mortality, and physical development indicators (Y.A. Mendeleva, S.A. Novoselsky, A.N. Antonov, A.F. Tur, A.B. Volovik, A.N. Tipolt, R.P. Levitina, etc.); numerous organisational problems of therapeutic and preventive care for children under blockade (Y.A. Mendeleva, D.S. Tumarkin, S.I. Volchok, N.G. Sinyavskaya, etc.).

One of the most urgent was the problem of nutrition: the search for milk substitutes, the development of recipes for the nutrition of healthy and sick children of different ages in conditions of food shortages and the mass absence of breast milk. Much merit in this belongs to Professors A.F. Tur and M.N. Nebytova-Lukyanchikova, employees of the food station and dairy kitchen S.I. Polyakova, N.V. Balinskaya, V.B. Kisileva and others [24]. The Institute undertook the development of children's diet, the introduction of new dishes from various substitutes and substances not previously used for the purposes of mass, especially children's, nutrition. To coordinate issues related to the rational nutrition of children, in June 1942, under the chairmanship of Y.A. Mendeleva and the head of the Department of Hospital Paediatrics, Professor A.F. Tur, the Children's Nutrition Council began to operate under the City Health Department.

From the spring of 1943 the research work was intensified despite the ongoing blockade and increased artillery bombardment. The work of the laboratories of the Institute resumed, which made it possible to study various special issues of treatment and nutrition in greater depth. The scientific subject matter expanded with the study of hypertension. As Y.A. Mendeleva wrote, "nothing broke the research thought and creative initiative of the Institute's scientific workers. Despite their employment in the educational process, in the work of helping the wounded, in the defence and reconstruction work, in the absence of journal literature, the team worked with enthusiasm and great productivity" [15]. All departments of the Institute were included in research work.

Undoubtedly, paramount importance was given to a comprehensive study of alimentary dystrophy, its external manifestations, lesions of various organs, individual course of the disease, layering of other diseases (pneumonia, tuber-

culosis, dysentery, scarlatina, measles, chronic infections, etc.), significantly complicating the course and treatment of dystrophy and avitaminosis. Cases of alimentary dystrophy began to be registered already in November 1941 due to a sharp lack of protein in the food, and in December this disease became so widespread that all other diseases receded into the background (Fig. 3). In the winter of 1941/42, hospitals were overcrowded with such patients in the most serious condition, some of whom died within the first day or even in the first hours of admission.

According to data from the LPMI hospital for dystrophy patients, 64.5% of all patients were between 9 and 15 years of age. Children of this age found themselves in particularly unfavourable conditions during the hungriest months of the blockade (from November 1941 to March 1942). The dependent food rations they received were insufficient; most of them were not covered by public meals, many children experienced great physical strain, helping the family, working, participating at night in extinguishing incendiary bombs, etc. [7]. About 25–30% of dystrophy patients had clinically diagnosable oedema. Innovative were the developments of pathogenetic treatment of dystrophy and its complications proposed by our paediatricians A.F. Tur, A.B. Volovik, E.I. Fridman and others. Depending on the indications, a complex of measures was applied: the diet therapy, enzyme therapy, vitamin therapy, blood transfusion, physiotherapy, physical therapy, therapeutic exercise, antibacterial therapy, as well as "the correct construction of the daily regime and education of the child in relation to unusual living conditions", strict consideration of the individual characteristics of each child, and most importantly "it is impeccably devoted, conscientious and loving attitude to the work of all the staff" [29]. Hospitalism was actively controlled (Fig. 4).

Fig. 3. A child with nutritional dystrophy in the LPMI clinic. 1942

Рис. 3. Ребенок с алиментарной дистрофией в клинике ЛПМИ. 1942 г.

Table 1

Distribution of sick children by disease diagnoses (as a percentage of the total) as of January 1, 1941–1944 in the clinics of the Leningrad State Pediatric Medical Institute (according to the report of the chief physician D.S. Tumarkin) [7]

Таблица 1

Распределение больных детей по диагнозам болезней (в % к итогу) по состоянию на 1 января 1941–1944 гг. в клиниках Ленинградского государственного педиатрического медицинского института (по данным отчета главного врача Д.С. Тумаркина) [7]

Заболевания / Diseases	На 01.01.1941 г. (за 1940 г.) / On 01.01.1941 (for 1940)	На 01.01.1942 г. (за 1941 г.) / On 01.01.1942 (for 1941)	На 01.01.1943 г. (за 1942 г.) / On 01.01.1943 (for 1942)	На 01.01.1944 г. (за 1943 г.) / On 01.01.1944 (for 1943)
Инфекции острые и хронические / Infections acute and chronic	34,6	20,6	9,7	19,1
Болезни органов дыхания / Respiratory diseases	22,0	10,8	5,1	16,4
Болезни органов пищеварения / Digestive diseases	8,4	6,4	3,4	13,9
Травмы бытовые / Domestic injuries	4,5	2,2	0,5	3,7
Болезни нервной системы / Diseases of the nervous system	3,9	3,1	4,3	6,4
Авитаминозы / Vitamin deficiencies	0,4	1.1	4,1	3,2
Прочие болезни / Other diseases	20,2	20,6	20,0	19,4
Военные ранения / War wounds	–	7,4	1,4	–
Дистрофии алиментарные / Nutritional dystrophies	–	27,8	45,6	17,9
	100%	100%	100%	100%

Fig. 4. At the LPMI clinic

Рис. 4. В клинике ЛПМИ

Table 1 gives information on the structure of patients in the LPMI clinic, depending on the diagnosis.

As can be seen from Table 1, in 1942 there was a sharp rise in diseases of dystrophies and avitaminosis; this group of children accounted for almost 50% of all patients in our clinics. Since 1943, with the improvement of material and living conditions of the inhabitants of Leningrad, there was a decrease in the incidence of dystrophies. Thus, according to the materials of our hospital, the number of patients with dystrophies in 1943 decreased to 17.9% (almost 3 times), and the number of patients with avitaminosis — to 3.2%. In 1944 single cases of dystrophy in children were observed, if we do not count chronic forms such as atrepsia and hypotrepsia [22]. The efforts of doctors in 1944 were aimed at complete elimination of specific blockade pathology.

Fig. 5. Professor A.N. Antonov

Рис. 5. Профессор А.Н. Антонов

A.F. Tur was an active member of the Committee for the study of alimentary dystrophy and avitaminosis, established at the State Health Department of Leningrad Region on 21 April 1943, headed by the famous therapist Professor M.V. Chernorutsky. Along with the organisational, methodological and clinical study of symptomatology, pathogenesis and pathogenetic treatment of alimentary dystrophy, in 1944–1945 the Committee had the task to focus on the symptoms, pathogenesis and pathogenetic treatment of alimentary dystrophy. The Committee set a task to focus on complications and consequences of dystrophies, pellagra and

neuropsychiatric disorders in them. It was found that the LPMI staff prepared the largest number of papers on this subject — a total of 85 [12].

Throughout the war and blockade years, the LPMI operated an obstetric clinic and a department for newborns and premature babies. In the winter of 1941–1942, the total mortality rate of newborns increased, reaching 35–37%. A detailed clinical and statistical characteristic of newborns during the blockade of Leningrad was given by Professor A.N. Antonov of the Department of Hospital Paediatrics (Fig. 5). He wrote: "During the period of particularly deep starvation (the 1st half of 1942), the number of stillbirths more than doubled against the usual (up to 5.6%), the number of children born prematurely reached unprecedentedly high figures (41.2%). The number of high birth weight babies born prematurely fell sharply and, conversely, the number of low birth weight babies rose sharply. Physiological weight loss lasted longer than usual and the average weight loss was higher than usual. The morbidity of newborn infants during this period was unusually high (32.3%), which must be partly attributed to their low vitality. Among the diseases, scleredema and scleraemia and pneumonia ranked first" [1].

All this was due to the severe degree of quantitative and qualitative starvation experienced by Leningrad women during the blockade, which affected the course and outcome of pregnancy and the condition of newborns.

According to A.F. Tur, in pre-war times the number of premature babies in Leningrad did not exceed 9–10% of all live newborns, in January 1942 the number of premature babies reached 40.8%; in March — 62%; in the fourth quarter of 1942 — 20.0%; in December 1943 — 17.0%, in the first half of 1944 — 11.8% [28].

I.I. Bogorov, head of the LPMI Department of Obstetrics, noted: "We were losing more than one third of the babies born; this, of course, was very sensitive given the extremely limited number of children born at that time" [2]. The high rate was explained mainly by the high percentage of premature babies. At the same time, all groups of newborns had a higher mortality rate compared to peacetime. Thus, up to 50% of premature babies died (before the war this figure was no more than 22–26%), and 12% of full-term babies died (before the war this figure was no more than 1.5–2%).

A.F. Tur already at that time paid special attention to the cause of death of such children, which was not yet recognised by all: "We take the liberty to state categorically that although these were premature babies, although they were born to mothers who were severely malnourished, often with severe manifestations of scurvy and sometimes even died soon after birth, the main cause of death of such children was not their congenital inferiority, but those defects of service, which, unfortunately, took place in individual cases, in particular, improper nutrition and severe cooling of the nevborn... This is confirmed by the fact that we have been able to preserve the lives of the great majority of such defective children from the same sick and weak mothers, if they were not subjected to significant cooling in maternity institutions, if at the time of admission to the clinic they did not have extensive and sharp manifestations of scleraedema, and their rectal temperature was not lower than 36.0–36.5 °C" [29].

According to the city maternity hospitals, gradually, beginning in the second half of 1943, the negative impact of the blockade on women's reproductive health began to recede, and this can be clearly seen in the birth rates both in the city and in the maternity hospital at LPMI. The birth rate in Leningrad in 1940 was 25.1 per 1000 population, in 1941 — 25.0‰, in 1942 — 6.4‰, in 1943 — 12.6‰, in 1944 — 30.5‰, in 1945 — 38.0‰ [10]. Accordingly, the number of births decreased compared to 1940: in 1942 — 7.9 times, and in 1943 — 10.4 times. The real growth of the birth rate begins in 1944.

And here are the data for the LPMI maternity hospital on the number of births that were delivered by quarters 1941–1944:

- 1941: III quarter — 651, IV quarter — 418.
- 1942: I quarter — 450, II quarter — 176, III quarter — 65, IV quarter — 20.
- 1943: I quarter — 88, II quarter — 135, III quarter — 118, IV quarter — 280.
- 1944: I quarter — 338.
- Number of children born by half-years 1941–1944:
- 1941 2nd half-year — 1049;
- 1942 1st half-year — 409, 2nd half-year — 84;
- 1943 1st half-year — 217; 2nd half-year — 387;
- 1944 1st half-year — 636 [22].

With the improvement of nutritional and daily living conditions of pregnant women, there was a gradual recovery of the physical condition of newborns and their reactions to various pathogenic factors approaching to the norm.

The study of physical development indicators of children, including newborns, in LPMI was conducted at the Department of Health Care Organisation under the guidance of Y.A. Mendeleva and S.A. Novoselsky [20]. The materials included case histories of the obstetric clinic of LPMI and other maternity hospitals, as well as reporting data from 18 nurseries in Leningrad. The war and the blockade had an extremely unfavourable effect on the physical development of Leningrad newborns: according to the data of the LPMI obstetric clinic, in 1942 their average body weight decreased, compared to 1940, on average by more than 600 g, height — by 2 cm, head and chest circumference — by almost 1.5 cm [17]. The scientists of our Institute developed recommendations providing for a significant strengthening of measures to protect the health of pregnant women and children, especially with regard to their proper nutrition (proteins, fats, vitamins). The restoration of the physical development of newborns in Leningrad to the pre-war level was facilitated by careful measures for antenatal prophylaxis.

Anthropometric examination of creche kids also showed some lag in weight and height of these children from average norms, and it was more pronounced for weight than for height. The lag in height of creche children (by 4–5%) was observed at all ages from the first month of life to 3 years of age [20].

A sharply reduced nutrition was observed in 1942 among children of preschool age. 50–60% of children in kindergartens had signs of dystrophy of II–III degree. According to medical examinations, in some schools 96 % of children suffered from dystrophy and rickets. These children were taken under careful observation and were given appropriate therapy. Surveys of preschool and school-age children in kindergartens and schools in Leningrad at the end of 1943 also revealed a lag in their physical development. The average height lagged behind in all age groups within 1.5–5.5 cm. There was no lag in average weight at the age of 3–5 years, while children aged 6–14 years had a lag of 1–3 kg, more pronounced in the groups of 13–14 years [20]. Improvement of physical development indicators began in 1944. According to the data of polyclinics, in 1945, 83–93% of children had normal physical development.

The pathology of children changed significantly during different periods of the blockade, and paediatricians carefully monitored these changes. Thus, in 1941–1942, during the most severe period, a number of diseases became very rare, for example, children were almost free of croup pneumonia, rheumatism, sore throats, scarlatina, acute nephritis, bronchial asthma, i.e. diseases in the pathogenesis of which the increased reactivity of the organism plays a decisive role. In addition, paediatricians noted significant changes in the course of some diseases: while some diseases took a more benign character (the same scarlatina), others were very severe. Tuberculosis took one of the first places among the diseases that were characterised by a particularly severe course during this period. The nature of dysentery changed: the acute toxic forms disappeared — prolonged forms with scanty clinical manifestations began to dominate, which, however, adversely affected the course and outcome of alimentary dystrophy.

In 1943, according to the memoirs of A.B. Volovik: “Living conditions in the autumn-winter period of 1942–1943 became more favourable. This had a positive impact on the work of children’s institutions. Alimentary dystrophy, avitaminosis became less frequent. The state of health of women in labour improved, lactation of mothers increased, and milk donation points at children’s consultations began to work again. Nutrition of children in crèches and kindergartens, school canteens approached the pre-war norms in caloric content. The therapeutic capabilities of children’s hospitals improved; paediatricians began to use haemotransfusions, sulphonamides, vitamins more widely. This led to a further reduction in hospital lethality. At the end of 1942 it was 5%, by the summer of 1943 it decreased to 0.94%, i.e. almost 5½ times” [4].

In 1943 there was a sharp decline in the incidence of dystrophies and avitaminosis. At the same time, a number of other diseases, such as tuberculosis, diphtheria, bronchopneumonia, acquired a more favourable course. Chicken pox, mumps, and pneumonia also had more typical clinical picture, which was then regarded as an increase in resistance, immunity, and general reactivity of the children’s organism compared to 1942 [5]. In 1943 bronchial asthma, diffuse nephritis, rheumatism, and croup pneumonia were not widespread. However, in the first half of 1943, according to A.F. Tur, the number of children with severe rickets, mainly children aged 3–4 years, increased sharply [28]. The number of children with neuropsychiatric diseases increased.

Fig. 6. Professor A.F. Tour — the first chief pediatrician of Leningrad

Рис. 6. Профессор А.Ф. Тур — первый главный педиатр Ленинграда

In 1944, along with the almost complete elimination of alimentary dystrophy and avitaminosis, the incidence of croup pneumonia increased, characterised by a severe course and a rather high mortality rate, which was explained by the refusal of hospitalisation and the predominant treatment at home [3]. Bronchial asthma, rheumatism and acute nephritis appeared again.

Exceptional attention was paid to the epidemiological situation in Leningrad. In the first months of the war, due to the rapid advance of the Nazis, a mass of refugees arrived in the city, which created conditions for the outbreak of infectious diseases. This was aggravated by the fact that during air raids the population took refuge in bomb shelters. Children's institutions often completely switched to living in bomb shelters. Particular attention was paid to preventing the introduction of infections. There was no reduction in the requirements for strict isolation of groups of children, and contacts with outsiders and adults were restricted. The special situation in Leningrad during the siege period created conditions that had an inhibiting effect on the development of infections: the decline in the birth rate, the reduction and cessation of population migration, the transfer of children almost entirely to boarding school life, the fragmentation of children's contingents and limited meetings between them. Later, in 1944, A.F. Tur wrote that it was not quite possible to prevent intra-institutional infection of children [29]. This was explained by the fact that, for example, the bomb shelter of our Institute, where the children lived, at first had contact with adjacent compartments where outsiders took shelter and children living on the territory of the Institute slept. Measles and chickenpox spread from here; the source of diphtheria was unknown. There was a small outbreak of colitis-like intestinal diseases during the period of greatest difficulty with water and food supply. There was also a relatively large number of catarrhal conjunctivitis associated with the use of "smokestacks" for lighting, dust from concrete floors and poorly whitewashed walls.

An important scientific fact was the first inoculation of young children against typhoid fever, which was due to the fact that in February 1942, cases of typhoid fever appeared in the children's home on Zagorodny Prospect. A special inoculation commission headed by A.F. Tur was promptly set up, the tasks of which included control over the vaccination of children from the age of 2, which was the first in the country. This shows how responsive the Institute was to changes in the situation in the city and developed the measures required at that time.

Let us name two more examples of important organisational innovations in 1942–1943. Of great importance was the introduction of the

Fig. 7. Professor A.B. Volovik

Рис. 7. Профессор А.Б. Воловик

Fig. 8. Professor E.I. Friedman

Рис. 8. Профессор Э.И. Фридман

posts of children's doctor of the city, due to the Decree of the CPC of the USSR No. 1739 and the Order of the People's Commissariat of Health of the USSR of 3 November 1942 No. 531, which approved the Regulations on the children's doctor of the city, urban district, working settlement [30]. The children's or head doctor of the city was appointed in each city to ensure the organisation of proper medical and preventive care for the child population, he was responsible for the medical care of children of all ages and for the quality of work of children's institutions. In Leningrad at the end of 1942, the position of the first chief paediatrician was held by A.F. Tur, and district paediatricians by A.B. Volovik, E.I. Fridman and others (Figures 6–8). The introduction of these posts contributed to a more effective coordination of the paediatric service of the city.

During the war, the number of paediatric institutions decreased due to their location in the dangerous zone of the city and shelling, and the number of medical personnel also decreased. Thus, by 1942 there were only 28 children's consultations and 17 children's polyclinics [18]. The living conditions of besieged Leningrad forced to restructure the system of polyclinic care for children. At the end of 1942, the Department of Health Care Organisation (Head of the Department Y.A. Mendeleva) of the LPMI together with the management of Children's Consultation No. 16 and Children's Polyclinic No. 21 of the Sverdlovsk District (N.G. Sinyavskaya) developed a methodology for the work of a united institution: a children's consultation providing therapeutic and preventive care for children from 0 to 3 years old and a children's polyclinic providing therapeutic and preventive care for children from 4 to 16 years old [25]. In 1943 the unification of these institutions began in the city; the organised united consultation-polyclinic (35 in 1943 and 36 in 1944) worked on the principle of a single paediatrician and provided care to children from birth to 16 years of age. The main method of work was patronage of children of all ages. The transition to the new system in 1943–1944 had a positive effect on the health of children, allowed timely hospitalisation of the weakened and sick. At the All-Union meeting on children's health care, convened by the People's Commissariat for Public Health of the USSR, held in Moscow on 9–11 March 1943, with great interest and excitement was heard the speech of Professor Y.A. Mendeleva, Director of the LPMI, who told about the heroic everyday life of children's health care workers in Leningrad during the harsh days of the blockade. A.F. Tur told the participants of the meeting about the organisation of nutrition in blockaded Leningrad. Deputy People's Commissar of Health M.D. Kovrigina positively evaluated the new experience of polyclinic work in our city and proposed to spread this experience to other territories of the country [8].

The reorganisation of polyclinic care contributed to a more careful monitoring of children's morbidity, especially infectious diseases, and to the mandatory implementation of general and special anti-epidemic measures, including

vaccinations: compulsory smallpox vaccination, BCG vaccination and revaccination when, anti-diphtheria immunisation, and phagination of children as a measure to combat gastrointestinal diseases. In 1943, Leningrad was still a closed city, and there was no importation of infection from outside. However, wariness about the possible spread of epidemics among the child population contributed to the issuance of the Order of the Commissioner of the State Defence Committee for anti-epidemic measures of the People's Commissar of Health of the USSR No. 28 of the 22nd of July 1943 "On preventing the spread of acute infections among children" [23]. Clear instructions were given on measures to combat diphtheria, measles, whooping cough, as well as on smallpox vaccination.

In connection with the complete breakthrough of the blockade in the spring of 1944, the gradual return of Leningrad residents from evacuation to their native places, including the staff and students of LPMI, began. Reevacuation to Leningrad was carried out in accordance with the Decree of the USSR State Defence Committee of the 29nd March 1944 [9]. Unfortunately, among the staff there were those who died at the front, died during the blockade and in the evacuation. In LPMI, and now in SPbSMU, remember and honour their unparalleled feat and courage. In July-August 1944 the teaching staff of LPMI began active preparation for the new academic year in liberated Leningrad.

Gradually, the population in the city, including children, increased. In 1944 the re-evacuation was still in very small numbers, but there was an outbreak of diphtheria and a measles epidemic in Leningrad. Thanks to the widespread use of anti-mumps serum, measles was quite easy to get. Employees of the Institute closely monitored the disease pattern, took all necessary measures to break the chain of infection. Immediately special classes were organised for paediatricians at the LPMI, where recommendations were given on the necessity of thorough patronage of arriving children, on methods of early diagnosis, treatment and prevention of measles. In 1944, the Leningrad State Health Department developed the "Instruction on the procedure for monitoring children arriving in Leningrad". Control over the necessary measures was entrusted to the Anti-Epidemic Department of the Leningrad Health Department, where information on arrivals was concentrated.

In the same year, there was an increase in the number of pyoderma and scabies, Leiner's desquamative erythroderma and eczema. Therefore, in 1944, the number of patients increased in the skin department of the LPMI, which had 35 beds.

Peculiarities and dynamics of morbidity dictated the profiling of beds in children's hospitals, and in 1944 the number of beds for infectious patients increased. Here are the data on the Clinical Hospital of LPMI. If in some months of 1941–1942 the number of beds was reduced to 500–600, then for 1943 and 1944 the USSR People's Commissariat for Health was determined by the USSR Ministry of Health to increase the number of beds for infectious patients. People's Commissariat of Health of the USSR determined 800 full-time beds. By 1944 the bed fund of the Clinical Hospital was distributed by specialities as follows:

- somatic paediatric beds — 225;
- tuberculosis beds — 50;
- surgical — 50;
- obstetric-gynaecological — 110;
- infectious — 130;
- dermatological — 35;
- beds for premature babies — 45;
- beds for adult therapeutic patients — 50;
- paediatric physiological beds — 35;
- beds for nervous patients — 15;
- for newborns — 55 [22].

The mass re-evacuation of Leningrad residents was already taking place in 1945. Children with their parents and children's groups were returning from various parts of the Soviet Union. Children fell ill while travelling and arrived in Leningrad at the full extent of the disease. For example, malaria, intestinal infections, etc. were brought in.

The indicators of infant mortality, which in those years was called child mortality, were studied by S.A. Novoselsky and his colleagues throughout all the years of the war and blockade (Fig. 9). The most unfavourable year for infant mortality was 1942, when, as a result of the deprivation of the blockade, the rate reached a huge 74.8% [19]. In 1943, the mortality rate began to decline sharply, and in 1944 it almost reached the pre-war level — 17.8%. Among the causes of mortality in the first year of life in Leningrad in 1944 the leading place was occupied by pneumonia — 75.3% (3.7% in 1939). The second place was occupied by acute gastro-

intestinal diseases — 47.3% (50.4 % in 1939). In 1944 mortality from prematurity and congenital weakness decreased — 9.8 and 0.5% respectively (14.1 and 2.8% in 1939). There were no cases of deaths from dystrophy and avitaminosis in the group of children aged 0 to 1 year in 1944.

Thus, the experience of the war period and the experience gained by LPMI doctors during the war and the blockade in the treatment and prevention of somatic and infectious pathology in children, in the study of the dynamics of their physical and psychomotor development, in the analysis of morbidity and mortality, and in the organisation of therapeutic and preventive care for children, made it possible to create a whole body of information and ideas concerning the physiology and pathology of children, including newborns and premature babies, and to develop a set of recommendations for treatment, nursing and rehabilitation. Many health indicators by the end of the war had reached pre-war levels, and the infant mortality rate in 1945 was even lower than in 1940.

The quantitative results of the scientific work of the LPMI staff are also impressive. In 1942, 26 papers were drawn up and monographs and textbooks were prepared for printing. In 1943 several monographs and textbooks, dozens of journal articles were prepared, 1 doctoral and 7 candidate dissertations were defended. In the first quarter of 1944 10 journal articles were finished, one doctoral dissertation and two candidate dissertations were defended, and for the whole 1944 130 works were completed. In total, during the war 6 doctoral and 23 candidate dissertations were defended, 165 journal articles were presented, 6 collections of works were published, which reflected the collective experience of our scientists [16].

The works of Leningrad paediatricians made up the entire fourth issue of the journal "Paediatrics" for 1944. The editorial article of the journal stressed: "Let this issue of «Paediatrics» remain a historical monument to the selfless work of paediatricians of Leningrad for the benefit of the children of that long-suffering city, the desire of paediatricians to scientific work, which could not be hindered by any external conditions. Honour and glory to the heroic paediatricians of the city of Lenin!". [21]. In addition, this issue contains a bibliography compiled by A.F. Tur, including 127 works of Leningrad paediatricians, performed in 1941–1944.

Fig. 9. A. Novoselsky is one of the founders of sanitary and demographic statistics

Рис. 9. Профессор С.А. Новосельский — один из основателей санитарной и демографической статистики

Since 1943, the Institute was again able to train postgraduate students, in 1944, 6 postgraduate students were trained in the spring, and since autumn 1944, according to the deployment of the People's Commissariat of Agriculture of the USSR, their number was increased to 11.

Students were also involved in the scientific work of the departmental staff. The first student scientific circles in LPMI were organised as early as 1934, they were established at the departments of hospital and faculty paediatrics, hospital surgery, inorganic chemistry, physics, psychiatry. The student scientific society at the Department of Therapy under the leadership of Professor V.A. Waldman was very active. Students were involved in the scientific work of the department, helped doctors in studying the outbreak of hypertension in Leningrad. V.A. Waldman organised a student scientific conference, which was a great success, at which 10 reports were presented by students of all courses.

The work of the Scientific Society of Paediatric Physicians of Leningrad, which resumed its work in May 1942, also contributed to the intensification of scientific work and the rapid introduction of new achievements into practice. Before the war, Professor M.S. Maslov, Head of the Department of Paediatrics at the LPMI, was the Chairman of the Society. Since he also

headed the Department of Paediatric Diseases at the Military Medical Academy, he was in Samarkand with the beginning of the war. The duties of chairman during these years were entrusted to Y.A. Mendeleva and A.F. Tur, who had been vice-chairmen of the Society before the war. The secretary of the Society, as in the pre-war years, was O.P. Timofeeva, an assistant professor of the Faculty Department of Paediatrics. Y.A. Mendeleva recalled: "During the difficult period of the blockade the Society played a great positive role; in those days its meetings were especially crowded and the most burning issues requiring urgent solution were solved. Reports were made on dystrophy, scorbuta, nutrition, preventive and therapeutic services for children, etc. The accumulated experience was shared with the doctors who remained in Leningrad, who in large numbers, despite the danger of the moment, flocked to these meetings, showing us the keenest interest. I should note that the main workers of our Institute were always active members of the Society and brought to its discussion all their scientific and practical achievements. The work of scientific thought did not weaken. All of us fought to save children's lives, fought hard, while accumulating great experience" [15]. The meetings were held on the LPMI campus in the 3rd auditorium. There was so much interest from paediatricians that the auditorium was always full [6].

The meetings were organised quite often: in 1942, 18 meetings were held, attended by 1900 people and 20 reports were heard [27]. The most urgent topics were discussed: the organisation of care for children in war and blockade conditions, dystrophies and avitaminosis, their influence on the course of other diseases, the fight against gastrointestinal and infectious diseases, including typhoid and typhus in children, and others.

In the same year several joint meetings were held with the Society of General Practitioners, phthisiatrists and obstetricians and gynaecologists, at which common topics were discussed, including pneumonias, specific anti-tuberculosis prophylaxis, organisation of care for premature babies, etc. On 26–27 December 1942 at the joint conference of therapists and paediatricians on alimentary dystrophy, hypo- and avitaminosis in adults and children, organised by the Leningrad State Health Department, 6 reports were presented by the Society of Children's Physicians, among the authors were professors A.F. Tur, E.I. Fridman, A.B. Volovik, docent E.I. Rautenstein.

In 1943 at 17 meetings of the Society, which gathered 1672 people, 33 reports were heard. On 21.07.1943 a solemn meeting dedicated to the 25th anniversary of the People's Commissariat of Health of the RSFSR was held, at which Professor Y.A. Mendeleva made a report "25 Years of Health Protection in the Soviet Union and the tasks of the Society of Children's Doctors". Professor S.S. Mnukhin made a report "On mental disorders in the case of alimentary dystrophy". Two special meetings in 1943 aroused great interest: at one of them N.G. Sinyavskaya made a report "Experience of the work of a single paediatrician", and as a result of the discussion a number of practical conclusions of an organisational nature were drawn. At the second session, held jointly with representatives of the city health department, measures were proposed to prevent and combat summer diarrhoea in children, which is the main cause of death in children, especially in the early years. At this session, reports were made by Associate Professor S.I. Volchok and P.M. Budrevich. In the same year, 5 combined sessions were given. Two of them jointly with therapists: 24.03 — on blood transfusion and 21.09 — on infectious jaundice. Two meetings of paediatricians and phthisiologists discussed specific prophylaxis of tuberculosis. A joint meeting of paediatricians and obstetricians was devoted to the management of the neonatal ward and the development and nursing of premature babies (speakers — Professors A.F. Tur and M.S. Frangulova.

In 1944 at the meetings of the Society were heard the reports acquainting doctors with new clinical observations and wartime experience: the report of Professor A.B. Volovik "On the peculiarities of the course of pneumonia in dystrophics", Associate Professor V.N. Ofitserov "Clinical observations on the course of dysentery in Leningrad in 1943" Kazakova and Cherna "Coprological Characteristics of Dysentery", Shumyatskaya "Saliva Secretion in Dystrophic Children", Professor E.I. Friedman "Pathogenesis of Some Forms of Anaemia", K.P. Glukhova "Capillaroscopy and Venous Pressure in Dystrophies and Scorbuta in Children" and others. Just as in the previous two years, several joint meetings with topical agenda were held.

In 1944, the Soviet government issued several decrees on maternal and child welfare aimed at strengthening assistance to mothers, pregnant women and children. The most important of them was the Decree of the Presidium of the Supreme Soviet of the USSR dated the 8th of July 1944 "On increasing state aid to pregnant women, mothers with many children and single mothers, on strengthening the protection of motherhood and childhood, on establishing the honorary title «The heroine mother» and on establishing the Order «The mother's glory» and the medal «The medal of motherhood»". According to this Decree, the maternity period for mothers was increased from 63 to 77 days, from the 4th month of pregnancy women were exempted from overtime work, and nursing mothers were exempted from night duty. The decree was issued shortly after the lifting of the siege of Leningrad and coincided with the moment of mass return of the population to Leningrad and an increase in the birth rate. The implementation of the decree was carried out simultaneously with the restoration and expansion of the network of paediatric and obstetric institutions [14]. Leningrad paediatricians and obstetricians, including LPMI specialists, were actively involved in the work to improve medical and preventive care for women and children. Already in 1946, 9 children's polyclinics, 4 children's homes, 16 nurseries, 9 milk kitchens were opened in Leningrad, specialised care for mothers and children was developed, and the health indicators of Leningrad children improved.

For its work during the Great Patriotic War, the LPMI received many commendations and diplomas from the People's Commissariat of Health of the USSR, Leningrad City Council and Vyborg District Council. The Motherland highly appreciated the heroic work of the LPMI staff: over 200 employees of the Institute were personally awarded with certificates of the District Council and the Leningrad City Council, 50 people were awarded with the badge "An excellent healthcare worker", 42 were awarded with orders and medals of the USSR, 1420 were awarded with the medal "For the defence of Leningrad".

Let the lines of the poet Vera Inber, who lived in Leningrad during these years, was well acquainted with Y.A. Mendeleva, visited the Institute and wrote about its work, be a dedication to all employees who worked during the war and blockade in LPMI [13].

Glory to you, who in battles
Defended the banks of the Neva.
Leningrad, which never knew defeat,
You shone a new light on Leningrad.
Glory to you too, great city,
which united front and rear.
In unprecedented hardships
Did stand firmly. Did fight. Did win the fight.

ADDITIONAL INFORMATION

Author contribution. Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

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ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

Вклад авторов. Все авторы внесли существенный вклад в разработку концепции, проведение исследования и подготовку статьи, прочли и одобрили финальную версию перед публикацией.

Конфликт интересов. Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

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COMPARATIVE ANALYSIS OF THE STRUCTURE OF URGENT HOSPITALIZATION OF CHILDREN DURING THE COVID-19 PANDEMIC

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ABSTRACT. The analysis of the structure of emergency hospitalization cases in a multidisciplinary children's hospital for children aged 0 to 17 years during the COVID-19 pandemic (2020, 2021, 2022) revealed significant differences compared to the period before (2019). During the pandemic children under the age of 3 most often needed emergency hospitalization due to acute respiratory pathology, which indicates a high vulnerability in susceptibility to infectious factors, despite restrictive measures. During pandemic , there was a decrease in cases of emergency hospitalization of children with acute digestive pathology in the age group under 3 years and in the group of children from 4 to 7 years of age from all cases of hospitalization per year, compared with the period before the pandemic. In the group of elder children, aged 8 years and older, on the contrary, an increase in the number of hospitalized with digestive diseases patients was revealed compared with the period before the pandemic. These features may be related to the restriction of nutrition of children of early and preschool age outside home, greater alertness of parents to children's complaints and earlier seeking for medical help. In school-age children, a certain increase of acute pathology of the digestive organs is presumably due to the possessing chronic pathology, periods of exacerbation, influence of lower dietary control by adult members. The main causes of emergency hospitalization in the group of adolescents aged 12–17 years during the pandemic were associated with injuries and infectious diseases, which is probably due to children's behavior and violation of self-isolation. In the period after the end of restrictions in the time of pandemic, an increase in the number of emergency hospitalizations in children with acute appendicitis was revealed, which may be the result of expanding children's access to food in public catering establishments, and presumably by a consequence of the influence of a new coronavirus infection, which requires further study.

KEYWORDS: children 0–17 years old, structure of emergency hospitalization, new coronavirus infection

СРАВНИТЕЛЬНЫЙ АНАЛИЗ СТРУКТУРЫ УРГЕНТНОЙ ГОСПИТАЛИЗАЦИИ ДЕТЕЙ В ПЕРИОД ПАНДЕМИИ COVID-19

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РЕЗЮМЕ. Анализ структуры случаев экстренной госпитализации в многопрофильном детском стационаре детей в возрасте от 0 до 17 лет в период пандемии COVID-19 (2020, 2021, 2022 гг.) выявил значительные отличия по сравнению с периодом до пандемии (2019 г.). В период пандемии наиболее часто нуждались в экстренной госпитализации дети в возрасте до 3 лет по причине острой патологии органов дыхания, что свидетельствует о высокой уязвимости по восприимчивости к инфекционным факторам, несмотря на ограничительные меры. Во время пандемии отмечено снижение случаев экстренной госпитализации детей с острой патологией органов пищеварения в возрастной группе до 3 лет и в группе детей от 4 до 7 лет из всех случаев госпитализации за год, по сравнению с периодом до пандемии. В группе детей более старшего возраста, от 8 лет и старше, напротив, выявлен рост числа госпитализированных с болезнями органов пищеварения по сравнению с периодом до пандемии. Возможно, данные особенности связаны с ограничением питания детей раннего и дошкольного возраста вне дома, большей настороженностью родителей к жалобам детей и более ранним обращением за медицинской помощью. У детей школьного возраста рост острой патологии органов пищеварения предположительно обусловлен имеющейся хронической патологией, с периодами обострения, влиянием более низкого контроля за питанием со стороны взрослых. Основными причинами экстренной госпитализации в группе подростков 12–17 лет в период пандемии явились травмы и инфекционные заболевания, что, вероятно, обусловлено поведением детей и нарушением самоизоляции. После окончания ограничений в пандемию выявлен рост количества экстренной госпитализации у детей с острым аппендицитом, что, вероятно, является результатом расширения возможностей доступности детей к заведениям общественного питания и, предположительно, последствием влияния новой коронавирусной инфекции, что требует дальнейшего изучения.

КЛЮЧЕВЫЕ СЛОВА: дети 0–17 лет, структура экстренной госпитализации, новая коронавирусная инфекция

INTRODUCTION

The COVID-19 pandemic and associated stringent anti-epidemic measures had a significant impact on all aspects of public life. Strict isolation, banning the movement of people and restricting the operation of businesses were forced and necessary measures to prevent the spread of infection. The COVID-19 pandemic was a serious test for the entire Russian health care system and made significant adjustments in the work of medical organisations [2, 8, 11]. All efforts were directed to the identification and treatment of COVID-19 patients. At the same time, the diseases that children face in normal life have not lost their relevance during the pandemic [5, 7, 10]. The limitation of outpatient appointments, planned hospitalisation, and social activity could affect the prevalence, diagnosis and treatment of various diseases; therefore, the assessment of the structure of emergency hospitalisation of children during the pandemic in a metropolitan multidisciplinary children's hospital is a relevant topic for research.

AIM

To assess the impact of restrictions in routine and preventive medical care and social restriction for minors during the COVID-19 pandemic on the age and nosological structure of acute pathology in children who required emergency hospitalisation.

MATERIALS AND METHODS

The medical histories of children from 0 to 17 years old admitted to the emergency department of the St. Petersburg State Pediatric Medical University (SPbSPMU) clinic in emergency, delivered by ambulance and emergency brigades in 2019, 2020, 2021, and 2022 were studied retrospectively.

All cases of emergency hospitalisation were divided into groups: the main group — emergency admissions to hospital in 2020 (n=7107) and 2021 (n=6397) — during the period of anti-epidemic restrictions during the COVID-19 pandemic, the 1st control group in 2019 — the period before the COVID-19 pandemic (n=8255), the 2nd control group in 2022 — the period after the existing restrictions during the COVID-19 pandemic were lifted (n=6353). All children in the main and control groups were free of COVID-19 infection at the time of hospitalisation according to laboratory test results. Restrictions of varying duration included: periods of isolation of organised children and their transfer to distance learning, prohibition of cultural and social activities, prohibition of preventive examinations and routine vaccination of children, and prohibition of routine hospitalisation in hospitals.

All children hospitalised on an emergency were divided into subgroups by age: 0 to 3 years, 4 to 7 years, 8 to 11 years, and 12 to 17 years.

By nosology, all patients were also divided into groups according to ICD-10 classification: I Certain infectious and parasitic diseases. II Neoplasms. IV Diseases of the endocrine system and nutritional and metabolic disorders. IX Diseases of the circulatory system. X Diseases of respiratory system. XI Diseases of the digestive system. XII Diseases of the skin and subcutaneous tissue. XIII Diseases of the musculoskeletal system and connective tissue. XIV Diseases of the genitourinary system. XIX Injuries, poisoning and certain other consequences of external causes.

RESULTS

We analysed the cases of emergency hospitalisation of children in the emergency department of the SPbSMU clinic during the period of anti-epidemic restrictions during the COVID-19 pandemic in 2020 and 2021, as well as for the period before the pandemic in 2019 and after the cancellation of some existing restrictions during the pandemic in 2022 by the nosological structure (Table 1).

In 2020 and 2021, emergency hospitalisation was the most frequent requirement for children in the age group 12 to 17 years, at 31.6% and 30.0%, respectively, among all hospitalisations for the year. Whereas in 2019, children in the age group of 4 to 7 years were the most frequently requiring emergency hospitalisation, in 29.5% among all cases for the period, and in 2022, children in the age group of 12 to 17 years, in 31.0% among all cases for the period (Fig. 1).

Table 1

Comparative characteristic of the nosological structure of cases of emergency hospitalization in the clinic of St. Petersburg State Medical University of children under 17 for 2019, 2021, 2021, 2022

Таблица 1

Сравнительная характеристика нозологической структуры случаев экстренной госпитализации детей в возрасте до 17 лет за 2019, 2020, 2021, 2022 гг. в клинику СПбГПМУ

Нозологические единицы / Nosological units	Количество случаев, n / Number of cases, n			
	2019	2020	2021	2022
I. Инфекционные заболевания / Infectious diseases	1639	1336	1653	1274
II. Новообразования / Neoplastic diseases	81	83	80	19
IV. Болезни эндокринной системы / Endocrine diseases	238	336	167	209
IX. Болезни системы кровообращения / Diseases of the circulatory system	22	48	56	27
X. Болезни органов дыхания / Respiratory diseases	1921	1042	1104	1106
XI. Болезни органов пищеварения / Digestive diseases	1410	957	929	1362
XII. Болезни кожи и подкожной клетчатки / Diseases of the skin and subcutaneous tissue	477	426	326	245
XIII. Болезни костно-мышечной системы / Diseases of the musculoskeletal system	59	28	29	14
XIV. Болезни мочеполовой системы / Genitourinary diseases	196	179	139	169
XIX. Травмы / Injuries	2212	2692	1914	1928
Всего случаев, n / Total of cases, n	8255	7107	6397	6353

It was found that the number of hospitalised children in 2020 in the under 3 years age group had a minimum value of 12.2%, while in 2019 it was 18.1% of cases. In the group of 4 to 7 years, among all emergency hospitalisations, the number was 26.6% in 2020, 25.6% in 2021, whereas in 2019 it was 29.5% of cases ($p \leq 0.05$). In the 12 to 17 years old group, the number of hospitalisations in 2020 was 31.6% among all emergency hospitalisations in a year, in 2021 it was 30.1%, whereas in 2019 it was only 27.5% of cases ($p \leq 0.05$) (Fig. 1).

In 2020 and 2021, 7107 and 6397 children were admitted to the emergency department of the clinic respectively. The predominant pathologies among all those requiring hospitalisation during the period of social restrictions were: in 2020 — injuries — 37.6% of cases, in 2021 — 29.9% of cases. Infectious diseases in 2020 accounted for 18.9%, in 2021 — 25.8%. Respiratory diseases in 2020 accounted for 14.7%, in 2021 — 17.3% of cases (Fig. 2).

In 2019, 8255 children were hospitalised as emergencies in the clinic of SPbSMU. The predominant reason for emergency hospitalisation in 2019 was: injuries — in 26.8%, respiratory diseases — in 23.3%, infectious diseases — in 19.9% of cases (Table 1, Fig. 2).

In 2022, 6353 patients were hospitalised as emergencies in the clinic of St. Petersburg State Medical University. The predominant reason for emergency hospitalisation was trauma — in 30.3% of cases, digestive diseases — in 21.4%, infectious diseases (excluding coronavirus infection) — in 20.0% of cases (Table 1, Fig. 2).

The number of hospitalisations of children with injuries in 2021 was 29.9% of cases, compared to 26.8% of all hospitalisations in 2019 ($p \leq 0.05$).

Infectious diseases accounted for 14.7% of all emergency hospitalisations in 2020, excluding coronavirus infection, in 2020 and 25.8% of all emergency hospitalisations in 2021, whereas infectious diseases accounted for 19.9% in 2019 and 20.0% in 2022 ($p \leq 0.05$). In 2019, respiratory diseases led to emergency hospitalisation significantly more often in 23.3% ($p \leq 0.05$) compared to 2020 — 18.9% and 2021 — in 17.3% of cases, respectively.

Analysis of the age groups of children admitted to emergency hospitalisation with trauma in 2020 and 2021 was dominated by children aged 12 to 17 years, n=1015 and n=767 respectively. In this age group, fractures were the most common injury with 62.3% of cases in 2020 and 55.7% of cases in 2021 (Fig. 3).

In the 12 to 17 year old group, injuries were the cause of hospitalisation in 38.0% and 40.4% of cases in 2020 and 2021 respectively, compared to 37.1% in 2019 ($p \leq 0.05$) (Fig. 3).

Among hospital admissions with injuries in 2019 (n=2212), fractures were more common (43.1%) (n=953), contusions were less common (18.3%) (n=404), and wounds were 18.2% (n=403). The highest number of injuries was observed in the age group from 12 to 17 years — in 37.1% of cases (Fig. 3).

When comparing the cases of injuries in the structure of emergency hospitalisation in 2020 and 2021, their significant increase in the group of children from 12 to 17 years old was revealed — in 43.8 and 40.4% of cases, respectively, compared to 2019, when their number was 37.1% of all emergency cases ($p \leq 0.05$).

Among hospitalised patients with injuries in 2022 (n=1928), fractures predominated in 49.2% (n=948) of cases, wounds in 20.0% (n=385), and contusions in 15.7% (n=302) of cases. Injuries were more frequent in the age group of children from 12 to 17 years old — 42.4% of cases among all those hospitalised with injuries.

A comparative characterisation of the number of cases of digestive diseases (Fig. 4) as a cause of emergency hospitalisation in 2019, 2020, 2021, 2022 revealed a significant increase in the number of hospitalisations in 2022 compared to the pre-pandemic period and during the period of anti-epidemic restrictions in the pandemic. It was found that the relative number of digestive diseases that were the cause of emergency hospitalisation increased in 2022 and accounted for 21.4% of all emergency hospitalisations in this time period, compared to only 13.4% in 2020, 14.5% in 2021, and 17.0% of cases in 2019 ($p \leq 0.05$) (Fig. 4).

Analysis by age group showed that in 2020 and 2021, a decrease in emergency hospitalisations of children with digestive diseases in the age group under 3 years was found in 2020 and 2021 — 7.3% and 8.4%, respectively, and 29.3% in 2019 ($p \leq 0.05$), of all hospitalisations for the year. The same trend in the decrease in the relative number of children with GI diseases was observed in the age group of 4 to 7 years — 21.8% in 2020 and 21.9% in 2021, compared to 29.3% of cases in 2019 ($p \leq 0.05$). In contrast, in the group of chil-

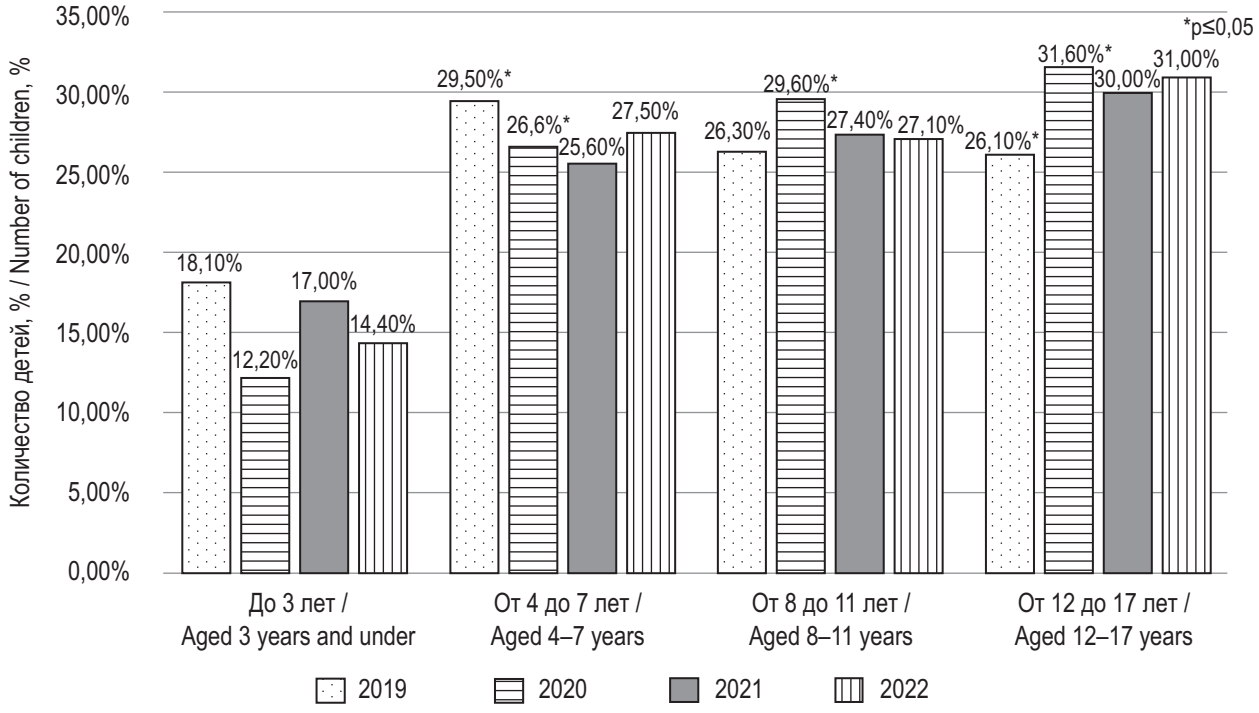

Fig. 1. Age structure of cases of emergency hospitalization in the clinic of St. Petersburg State Pediatric Medical University for 2019–2022

Рис. 1. Возрастная структура случаев экстренной госпитализации в клинику СПбГПМУ за 2019–2022 гг.

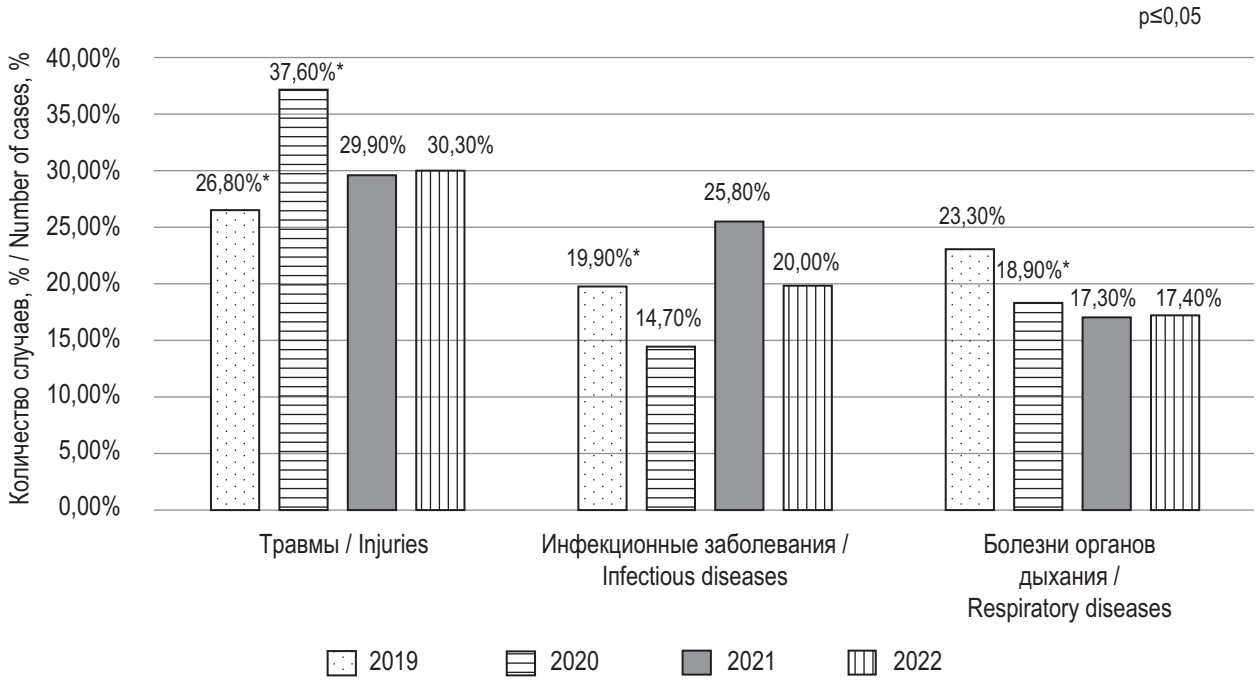

Fig. 2. The most common causes of emergency hospitalization of children during the study period (2019–2022)

Рис. 2. Наиболее частые причины экстренной госпитализации детей за исследуемый период (2019–2022)

dren 8 to 11 years old, an increase in the relative number of children hospitalised with diseases of the digestive organs was found in 2020 and 2021 compared with 2019: in 2020 — 39.8%, in 2021 — 39.3% and in 2019 — 36.5% of cases, while in 2022 this figure was 37.7% of cases

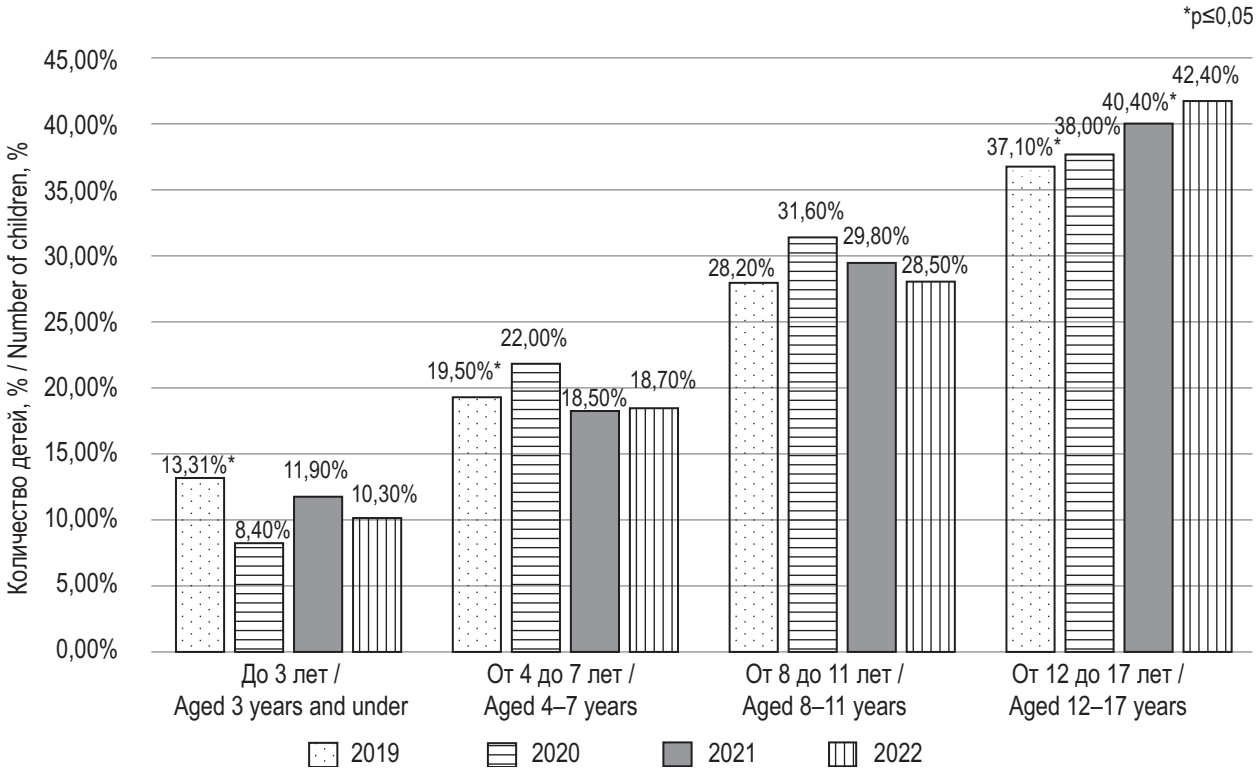

Fig. 3. Injuries as causes of emergency hospitalization in children during the study period (2019–2022)

Рис. 3. Травмы как причины экстренной госпитализации у детей за исследуемый период (2019–2022)

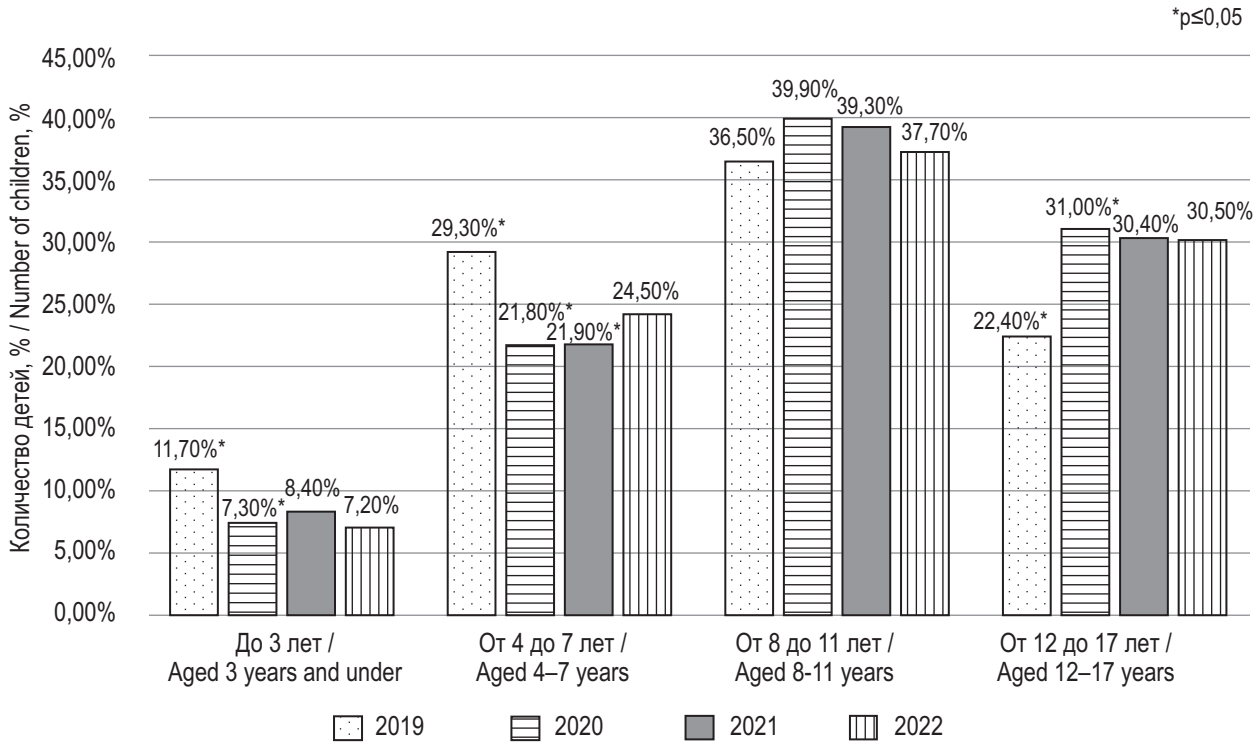

Fig. 4. Dynamics of the number of cases of emergency hospitalization caused by digestive diseases during the study periods (2019–2022)

Рис. 4. Динамика количества случаев экстренной госпитализации болезней органов пищеварения за исследуемые периоды (2019–2022)

(p >0.05). An increase in the number of hospitalisations with digestive diseases was found in the group of children between 12 and 17 years of age: in 2020 — 31.0% of cases, in 2021 — 30.4% of cases, and in 2022 — 30.5% of cases compared to 2019 — 22.4% of cases (p ≤0.05). Among the total number of emergency hospitalisations with digestive diseases, children with bowel diseases were 40.1% in 2020 and 38.3% in 2021, up significantly from 31.0% in 2022 (p ≤0.05). The number of cases of acute appendicitis had a minimum value of 16.0% in 2019, increasing to 30.2% in 2020, 27.8% in 2021 and 48.3% in 2022 (p ≤0.05) (Fig. 4).

An analysis of the age composition of cases of emergency hospitalisation with infectious diseases for 2019–2022 revealed an increase in the incidence in the group of children from 12 to 17 years of age: in 2020. — 22.7% and in 2021 — 22.5%, compared to 2019 (16.2%) and 2022 (16.7%), p ≤0.05. At the same time, in the age group of children between 4 and 7 years, there was a decrease in the number of emergency hospitalisations for infectious pathology compared to the number of cases in 2019 — 38.1% and in 2022 — 40.9% of cases (p ≤0.05) (Fig. 5).

Infectious diseases as a cause of emergency hospitalisation in 2022 (n=1274) were represented by: acute respiratory viral infections (ARVI) in 41.3% (n=527) of cases, infectious mononucleosis in 40.4% (n=515) of cases, and acute intestinal infections in 11.3% (n=144) of cases.

Among infectious pathologies (excluding coronavirus infection) in children hospitalised in 2020 (n=1336) and 2021 (n=1653) as emergencies, the most frequent were: acute respiratory viral infections in 53.3% and 55.5% of cases respectively, infectious mononucleosis in 31.1% in 2020 and 27.1% in 2021, and acute intestinal infections in 15.5% in 2020 and 13.2% in 2021.

In the age group of children from 4 to 7 years old, the incidence of infectious pathology was 37.2% in 2020, decreased to 32.7% of all emergency hospitalisations in 2021, while in 2019 it was 38.1% of cases (p ≤0.05).

In the group of children 12 to 17 years old infectious pathology led to emergency hospitalisation in 22.7% of cases in 2020, 22.5% of cases in 2021, compared to 16.2% of cases in 2019 (p ≤0.05).

Among respiratory diseases, acute tonsillopharyngitis was diagnosed more frequently in emergency hospitalisations in 2020 and 2021, in 67.3% (n=702) and 79.8% (n=881) of cases respectively, acute out-of-hospital pneumonia was much less frequent, in 2020 9.9% (n=104) and 6.8% (n=75) of cases in 2021, and bronchitis — in 2020. 8.2% (n=86), and 6.0% (n=67) of cases in 2021. Acute tonsillopharyngitis was predominant in the age group of 4 to 7 years in 2020 in 74.1% (n=255) of cases, in 2021 — in 82.7% (n=304).

The causes of an emergency hospitalisation in children with respiratory diseases in 2019 (n=1921) were: acute tonsillopharyngitis in 67.6% (n=1299), acute out-of-hospital pneumonia in 10.7% (n=206), bronchial asthma in 5.7% (n=109) of cases. Acute tonsillopharyngitis was predominant in the age group of 4 to 7 years in 73.0% (n=479) and in the group of children under 3 years in 74.4% (n=384) of cases. Acute out-of-hospital pneumonia prevailed in the age group of children from 4 to 7 years in 9.5% (n=64) and in the group of children under 3 years in 10.3% (n=53) of cases.

Among infectious pathology in children hospitalised in 2019 (n=1639) as an emergency, the most frequent causes were: infectious mononucleosis — in 38.6% (n=633), acute respiratory viral infections — in 36.4% (n=596), acute intestinal infections — in 20.8% (n=341) of cases. Infectious pathology requiring emergency hospitalisation was most frequently detected in the group of children aged 4 to 7 years — in 38.1% (n=625) and in the group aged 8 to 11 years — in 23.7% (n=388) of cases (Fig. 5).

When analysing the dynamics of the number of cases of emergency hospitalisation for respiratory diseases in children during the COVID-19 pandemic before the removal of anti-epidemic restrictions, a significant increase in the number of cases in 2021 was found in the group of children under 3 years of age — 29.9% of cases, whereas in 2020 they were 24.0%, in 2019 — 26.8%, and in 2022 — 25.5% of cases (p ≤0.05).

In the group of children 4 to 7 years and 8 to 11 years, the number of emergency hospitalisations for respiratory diseases in 2021 had a slight decrease of 33.3% and 15.3%, respectively, compared to 34.1% and 18.2% of cases, respectively, before the pandemic in 2019 (p >0.05).

DISCUSSION

The most common causes of emergency hospitalisation in 2020 and 2021 were: injuries

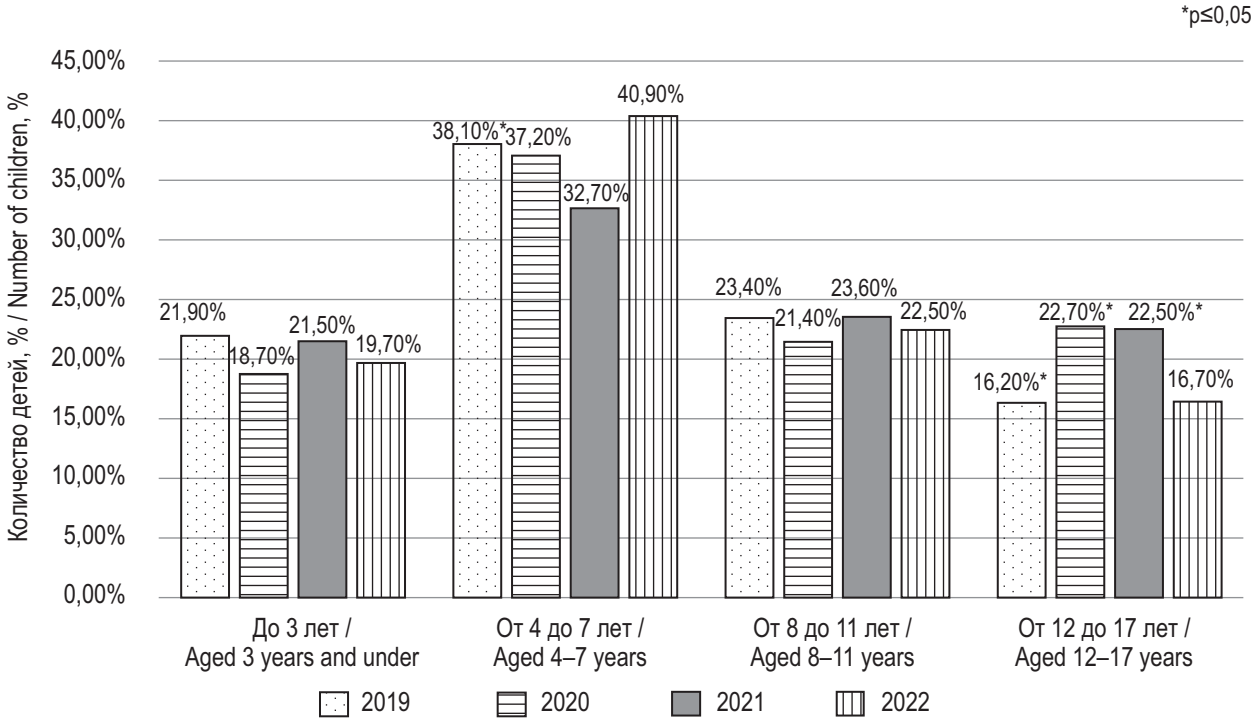

Fig. 5. Dynamics of the number of cases of emergency hospitalization caused by infectious diseases during the study periods (2019–2022)

Рис. 5. Динамика количества случаев экстренной госпитализации инфекционных заболеваний за исследуемые периоды (2019–2022)

(34.1% of cases), infectious diseases (22.1%) and respiratory diseases (15.9% of cases). And while the number of children with injuries and infectious diseases was significantly higher during the pandemic period, the number of children with respiratory diseases was significantly lower compared to 2019.

During the COVID-19 pandemic restriction period in 2020 and 2021, children aged 12 to 17 years were the most likely to require emergency hospitalisation. It was this age period that accounted for the highest number of injuries as a cause of emergency hospitalisation. The proportion of adolescents with injuries was 39.8% of all emergency hospitalisations for 2020–2021, compared to 37.1% in 2019. According to the international Health behaviour in school-aged children (HBSC) study, the highest rate of injuries occurs during adolescence [6]. It is possible that the increase in injury rates among adolescents during the pandemic is related to the impact of restrictive measures on access to public places and increased physical activity in environments not suited for this type of activity [9].

The structure of hospitalisations due to infectious pathology (except for coronavirus infection) during the period of anti-epidemic restrictions during the pandemic also had age-specific characteristics. In the group of children under 3 years old, as well as from 4 to 7 years old, the number of cases of infectious diseases as a cause of emergency hospitalisation significantly decreased, while in the group of children from 12 to 17 years old this indicator in 2020 was significantly higher compared to 2019 and 2022. The analysis of literature data showed that in St. Petersburg, as well as worldwide, during the COVID-19 pandemic, the incidence of seasonal acute respiratory and intestinal infections in children decreased against the background of anti-epidemic measures [1, 12–14], changes in the age composition were noted only in acute respiratory infections — most of the sick belonged to the group of children 7–14 years old [12]. In our opinion, the increase in the number of hospital admissions with infectious diseases among adolescents is due to active behaviour and increased social activity of children of this age during the period of relaxation of restrictive measures in 2020 and 2021. In addition, adolescents do not always present active complaints and parents may underestimate their condition, which contributes to the higher inci-

dence of deterioration requiring hospitalisation in this group of children.

The decrease in the number of hospitalisations of children with infectious diseases in the age group up to 3 years and in the group from 4 to 7 years in 2020 and 2021 is obviously associated with restrictive measures on the attendance of pre-school institutions and public places. It should be noted that the proportion of all hospitalised children of this age in 2020 and 2021 was significantly lower compared to 2019 and 2022.

During the COVID-19 pandemic, during the period of anti-epidemic restrictions, a significant increase in the number of respiratory diseases as causes that required emergency hospitalisation was found in children under 3 years of age — in 28.4% of all hospitalisations for the year, while in 2019 the number of emergency hospitalisations with respiratory diseases was 26.9% and in 2022 — 25.5% of cases.

The increase in the number of hospitalisations in 2020 and 2021 among children under 3 years of age is mainly due to the incidence of tonsillopharyngitis and acute out-of-hospital pneumonia among all hospitalised patients with respiratory diseases in this age group. This trend is probably due to the reduced functional capacity of anti-infective immunity in young children due to immaturity of lymphoid tissue of the pharyngeal ring and reduced protective immune function of the tracheobronchial mucosa in conditions of increased viral load [3, 4].

Of particular interest are the data on the detected increase in digestive diseases manifested by urgent conditions requiring emergency hospitalisation. In 2022, the number of hospitalisations of patients with this pathology increased, accounting for 21.4% of all emergency hospitalisations compared to 2021 and 2019, the increase being due to an increase in the number of cases of acute appendicitis.

CONCLUSION

1. The most vulnerable age groups requiring more frequent hospitalisation due to the development of urgent conditions were adolescents from 12 to 17 years of age due to the increase in infectious diseases and injuries caused by increased social activity in this age group.

2. The COVID-19 pandemic influenced the growth of respiratory diseases in the age group of children up to 3 years old, which is caused by anatomo-physiological peculiarities — immaturity of the immune system with low protective properties, as well as possibly related to the reduction of measures of non-specific (limitation of walks) and specific prophylaxis (vaccination) of respiratory infections, which once again proves the need for strict compliance with the National Calendar of preventive vaccinations, strict adherence to age-specific movement regimes, as well as the role of unconditional prevention of respiratory infections.

3. An increase in the number of cases of acute appendicitis in the period after the COVID-19 pandemic was revealed, which suggests the possible influence of viral infection with the subsequent development of inflammatory processes in the appendix and requires further research on this fact.

4. In the context of anti-epidemic measures in the pandemic of coronavirus infection, a decrease in the incidence of injuries and acute illnesses was expected. However, the main causes of emergency hospitalisation in the group of adolescents 12–17 years old during the pandemic were injuries and infectious diseases, which is probably due to children's behaviour and violation of self-isolation and lack of organised classes in educational institutions of secondary and additional education. Doctors and psychologists of the medical and social service of children's polyclinic departments and the department of medical care for children and adolescents in educational institutions should pay attention to health education and psycho-pedagogical work with parents and adolescents to involve schoolchildren in groups of additional education, including for the prevention of adolescent traumatism.

ADDITIONAL INFORMATION

Author contribution. Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

Competing interests. The authors declare that they have no competing interests.

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Вклад авторов. Все авторы внесли существенный вклад в разработку концепции, проведение исследования и подготовку статьи, прочли и одобрили финальную версию перед публикацией.

Конфликт интересов. Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

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ACTUAL ASPECTS OF PROVIDING ANTI-TUBERCULOSIS CARE TO CHILDREN WITH DISABILITIES

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ABSTRACT. Diagnosis and treatment of tuberculosis in childhood are especially difficult. The development and course of the tuberculosis process is significantly influenced by preventive and other available measures to prevent the disease. The most vulnerable are patients with severe comorbidities, such as children with disabilities. We conducted a cohort retrospective-prospective study in primary health care institutions and TB services in the city of St. Petersburg in 2019–2022. The assessment included the incidence of tuberculosis in disabled children, their tolerance to treatment, the frequency and effectiveness of preventive and preventive special anti-tuberculosis measures. It has been noted that among children with disabilities there is a high incidence of adverse events during treatment, parental refusal of preventive therapy, and irregular screening for tuberculosis. The combination of many risk factors for the development of the disease among children with disabilities determines the separation of this group of patients into a separate category, which will help optimize anti-tuberculosis measures in this group of patients.

KEYWORDS: children, tuberculosis, disability, risk factors, vaccination

АКТУАЛЬНЫЕ АСПЕКТЫ ОКАЗАНИЯ ПРОТИВОТУБЕРКУЛЕЗНОЙ ПОМОЩИ ДЕТЯМ С ИНВАЛИДНОСТЬЮ

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РЕЗЮМЕ. Диагностика и лечение туберкулеза в детском возрасте особенно сложны. На развитие и течение туберкулезного процесса существенно влияют профилактические и иные мероприятия по предупреждению заболевания. Наиболее уязвимы пациенты с выраженной сопутствующей патологией, такие как дети с инвалидностью. Нами проведено когортное ретроспективно-проспективное исследование в учреждениях первичной медико-санитарной помощи и фтизиатрической службы города Санкт-Петербурга в 2019–2022 гг. Оценке подлежали заболеваемость детей-инвалидов туберкулезом, переносимость ими лечения, кратность и эффективность профилактических и превентивных противотуберкулезных мероприятий. Отмечено, что среди детей с инвалидностью высока частота развития нежелательных явлений на фоне лечения, отказов родителей от превентивной терапии, нерегулярность скрининга на туберкулез. Сочетание множества факторов риска развития заболевания среди детей с инвалидностью обусловливает выделение данной группы пациентов в отдельную категорию, что будет способствовать оптимизации противотуберкулезных мероприятий среди таких больных.

КЛЮЧЕВЫЕ СЛОВА: дети, туберкулез, инвалидность, факторы риска, вакцинопрофилактика

INTRODUCTION

Currently, the problem of tuberculosis (TB) continues to be a pressing issue worldwide. According to the World Health Organisation (WHO), by 2021 tuberculosis remains in the list of the 10 most common causes of death from infectious diseases worldwide. For 2021, about 10.6 million people worldwide became ill, among them 1.2 million children, and 1.6 million patients died from tuberculosis [15, 16]. Diagnosing and treating TB in children is particularly difficult, and the disease at this age often goes unrecognised by health care workers [6, 7, 16]. In 2021, Russia was removed from the list of countries with a high burden of tuberculosis, but remains on the list of countries with a significant prevalence of drug-resistant and HIV-associated tuberculosis [15]. According to official data, in 2022, the incidence of tuberculosis among children and adolescents in St. Petersburg was 4.3 and 3.3 per 100,000 population, respectively [10]. The percentage of children among all TB cases in St. Petersburg in 2022 was 3.5%.

The most susceptible to tuberculosis are persons from groups of medical, biological, social, and epidemiological risk [6, 9, 11]. Children with disabilities, as a rule, have a combination of aggravating factors, including lack of vaccination, severe congenital and acquired pathology, social risks (staying in closed institutions, social and economic disadvantage of the family, etc.) [5]. However, special approaches to preventing and detecting TB in children with disabilities have not been developed; official recommendations do not designate this group as a target group for preventive TB interventions; therefore, late diagnosis of the disease and its severe course can be expected [11, 14].

In the Russian Federation, the primary childhood disability rate in 2021 was 24.3 per 10,000 of the population of the corresponding age [4]. This indicator reflects the most important social aspects: accessibility of medical care, quality of its provision, effectiveness of chronic disease prevention, etc. [3, 12]. According to the Federal Register of Disabled People, by January 2023, the number of children with disabilities in St. Petersburg was 23,256 people, of whom 9,026 (39%) were girls and 14,230 (61%) were boys. Children with disabilities account for 4.4% of the total number of disabled children, with a large proportion of children with disabilities aged 8–14 years — 11,588 people [13].

According to the structure of primary and recurrent childhood disability by main classes of diseases, three leading groups are distinguished [4]:

- mental disorders and behavioural disorders;
- diseases of the nervous system;
- congenital anomalies (malformations), deformations and chromosomal disorders.

AIM

To develop a set of measures to optimise TB care for children with disabilities at the level of primary health care and specialised TB services.

MATERIALS AND METHODS

A cohort (2019–2022), retrospective prospective study was conducted and included 619 children with disabilities (Fig. 1), of which: Group 1

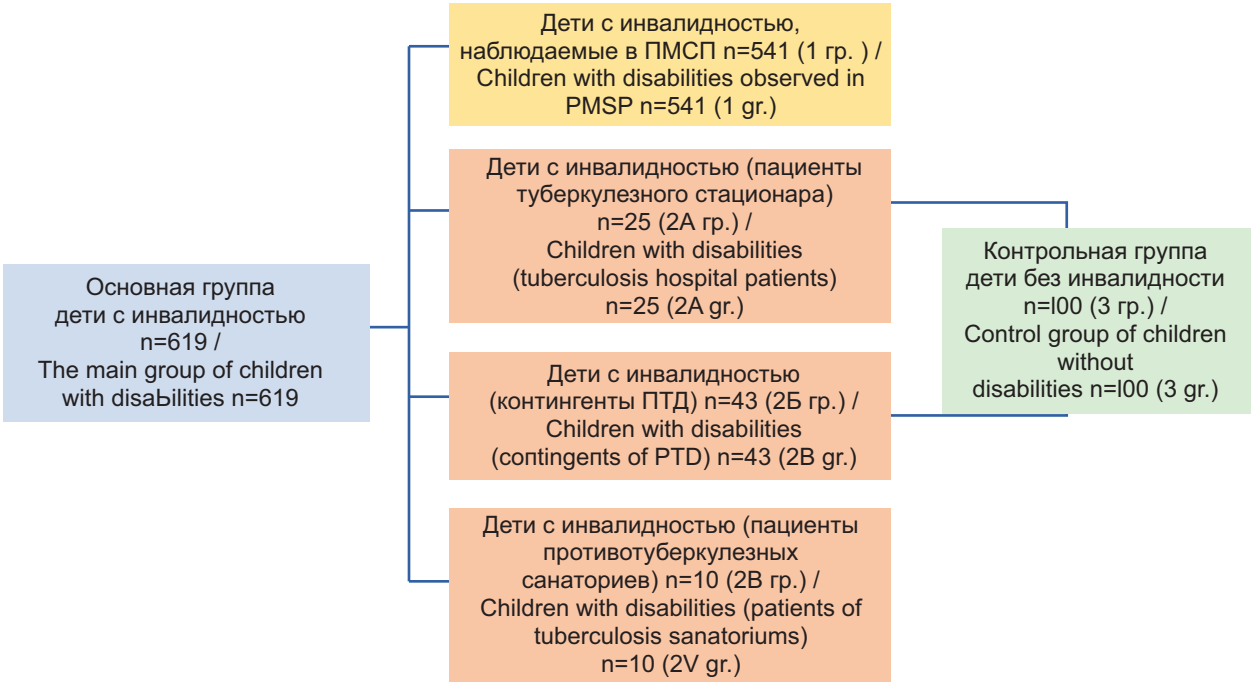

Fig. 1. Structure of the examined children by groups

Рис. 1. Состав обследованных детей по группам

(541) were children with disabilities observed in primary health care (PHC) facilities; Group 2 (78) were children with disabilities observed in specialised phthisiatric care facilities. Among the children of the 2nd group are distinguished: 2A subgroup — 25 children, patients of a tuberculosis hospital, including 10 patients with active forms of tuberculosis, 2B subgroup — 43 children, patients of an anti-tuberculosis dispensary (ATD), 2B subgroup — patients of tuberculosis sanatoria — 10 people. Inclusion criteria: age from 0 to 17 years; presence of established disability on any nosology; exclusion criteria: no disability; children with disabilities among those receiving palliative care. As a control group, group 3 was created by the case-control method — 100 children without disability, with tuberculosis and infected with *Mycobacterium tuberculosis* (MBT), corresponding in age, sex, nature of tuberculosis infection and treatment to children from group 2.

The research methods in the group of children with disabilities observed in PHC institutions (children's polyclinics) consisted of analysing medical records: child development histories (form No. 112/u), preventive vaccination cards (form No. 63/u), and vaccination certificates.

Research methods in groups of disabled and non-disabled children observed in TB dispensaries, inpatient clinics and sanatoria included analyses of children's case histories (Form No. 003/u), TB dispensary observation cards (Form No. 025/u).

Children with disabilities have been additionally studied:

- Causes of disability (including psychoneurological, somatic, infectious diseases), structure of pathology, ranking by frequency.
- Availability and timing of BCG vaccination, nature of contraindications.
- Availability, regularity, informativeness of mass immunodiagnostic tests (Mantoux test, test with recombinant tuberculosis allergen). Rationale for the use of in vitro tests.
- The frequency of latent tuberculosis infection (LTI) and tuberculosis has been determined among children with disabilities.
- Risk factors for tuberculosis in children with disabilities were assessed: social, medical and epidemiological.

The significance of differences between groups was assessed using Student's t-test. Differences between relative values were determined using the Pearson χ^2 criterion in the STATISTICA 6.1 programme. The 95% confidence level ($p < 0.05$) was considered to be generally accepted.

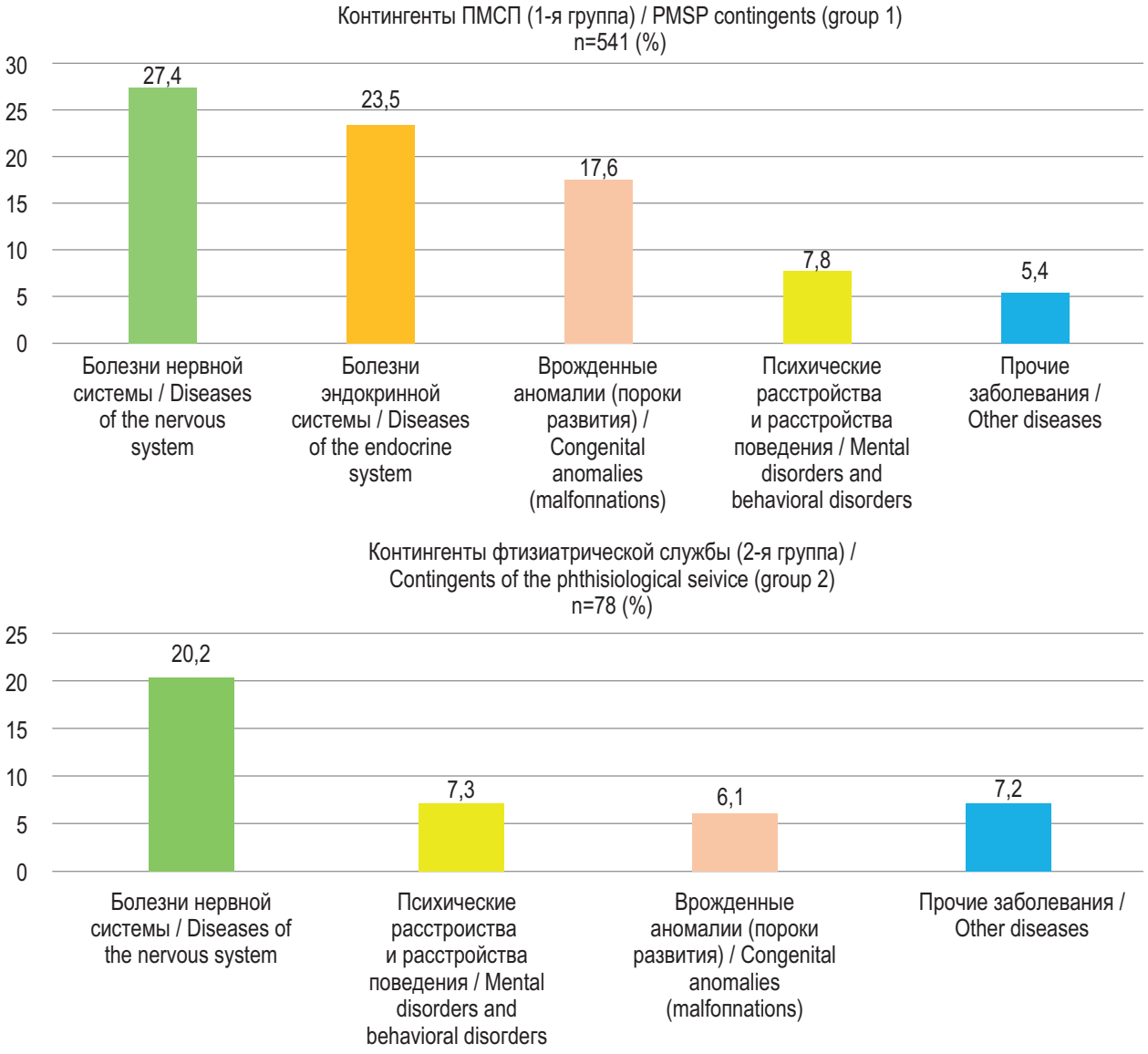

Fig. 2. Causes of disability among children, TB services and primary health care populations

Рис. 2. Причины инвалидности среди детей, контингентов фтизиатрической службы и ПМСП

RESULTS

In the structure of disability by main classes of diseases among children who were patients of the phthisiatric service (group 2), the first place was occupied by diseases of the nervous system — 20.2%, which is consistent with the structure of disability among contingents of only children's polyclinics (group 1) — 27.4%. Mental disorders and behavioural disorders (7.3%), congenital anomalies and malformations (6.1% vs 17.6% in group 1 ($p < 0.05$), and other diseases (diseases of the circulatory system, digestive organs, genitourinary system, etc.) (7.2%) were less common among group 2 children. It should be noted that among those observed in PHC facilities (group 1), the proportion of children with endocrine system diseases accounted for 23.5% of all disabled children and ranked second among the main causes of disability, whereas such children were virtually absent among group 2 patients ($p < 0.05$) (Fig. 2).

The following clinical forms of tuberculosis disease (10 patients) were observed among disabled children from the 2A subgroup of patients: intrathoracic lymph node tuberculosis (ITNT) — 5, primary tuberculosis complex (PTC) — 4, infiltrative pulmonary tuberculosis (IPT) — 1. Bacterial excretion was absent in all children. The following causes of disability

were noted in this group of TB patients: Noonan syndrome — 1; cerebral palsy — 2; congenital malformations — 2; autism — 1; mental retardation with speech disorders — 1; III degree sensorineural hearing loss — 1; organic lesions of the central nervous system (CNS) — 2.

Six children out of 10 had established household tuberculosis contact (kin, family): 3 had contact with a patient with multidrug-resistant tuberculosis (MDR-TB), and 3 had tuberculosis contact with patients with preserved drug susceptibility of Mycobacterium tuberculosis (MBT).

It was found that among children who received basic treatment for tuberculosis (10 patients), 3 children were treated with IV chemotherapy regimen (IV CTR — chemotherapy regimen for treatment of multidrug-resistant tuberculosis) and 7 with III CTR (drug-sensitive tuberculosis). It was observed that good treatment tolerability among patients with disability (2A subgroup) was in 30% of cases and among patients without disability (group 3) in 80% ($p < 0.05$). Adverse events (AEs) on the background of treatment were noted in patients of 2A subgroup in 70%, and in children without disability (group 3) — in 20% ($p < 0.05$). Adverse reactions to antituberculosis drugs (ATDs) from the gastrointestinal tract (GIT) prevailed among AEs in both groups (groups 2A, 3): 47.1% of cases in children of subgroup 2A and 52.4% in children of group 3. Allergic reactions were almost equally reported (10.8% vs 13.4%, respectively); however, subgroup 2A children had worse tolerance to ATDs, including the development of central nervous system (CNS) (26.5%) and hyperuricaemia (37.5%), which was not observed in the control group ($p < 0.05$).

Also among group 2 patients, 22 patients had latent tuberculosis infection (LTI), 36 were infected with allergen negative tuberculosis recombinant (ATR) MBT, among which 6 patients were from established tuberculosis contact (5 — tuberculosis contact with patients with drug sensitive TB), 1 — tuberculosis contact with drug resistant TB. Among children of both groups (group 2, 3), 27 patients required preventive treatment, among whom 18 with disability (2A, 2B subgroups) (66.7%) and 6 from control group (22.2%) refused treatment ($p < 0.05$) ($p < 0.05$). Among group 2 patients (2A, 2B subgroups), 9 (33.3%) received preventive therapy and 21 (77.8%) in the control group. Gastrointestinal AEs prevailed in group 2 patients — 70.9% vs. 14.3% in the control group ($p < 0.05$). Allergic reactions to ATDs were observed in both groups in almost equal proportion; CNS AEs were also observed in Group 2 patients — 3.6%, which was not observed in the control group.

The risk factors for tuberculosis development were analysed in the 1st group of patients (541 children with disabilities who were observed only by the polyclinic). It was noted that 39.7% of children had medical and biological risk factors (such as prematurity, home birth, immunosuppressive therapy, concomitant pathology in parents and child, etc.), 19.3% had unfavourable social factors (single-parent families, home births, immunosuppressive therapy, concomitant pathology in parents and child, etc.), 14.1% had epidemiological factors (tuberculosis contact), and 12.4% of patients with disabilities were migrants.

Specific vaccine prophylaxis plays an important role in the prevention of tuberculosis in children. However, not all newborns can be vaccinated in a timely manner due to medical disqualifications, such as intrauterine infection, severe lesions of the nervous system with pronounced neurological symptoms, generalised skin lesions, primary immunodeficiency states, HIV infection, etc. [1, 8]. In this regard, the combination of severe pathology, which in some cases leads to disability of the child [2], and lack of vaccination increases the risk of tuberculosis development in children from these categories. Among children with disabilities (in children's polyclinic), 328 (60.6%) were vaccinated with BCG-M before the 7th day of life, 159 (29.4%) were vaccinated before 1 year of age, and 54 children (9.1%) remained unvaccinated.

When assessing the regularity of screening for tuberculosis infection by means of Mantoux skin tests with 2 TU and with recombinant tuberculosis allergen (ATR, Dia-Skintest) among children with disabilities from polyclinic contingents, it was noted that in 59.5% of cases immunodiagnosis was performed irregularly, in 1.4% it was not performed, and in 38.1% of patients the regularity of screening was observed. The main reasons for irregular immunodiagnostics were refusals — 32.8%, medical cancellations accounted for 22.3%, and difficulties in attracting patients to screening (such as low mobility and lack of necessary means for transporting pa-

tients) were the reasons for omitting immunodiagnostics in 5.8% of children.

Children's tuberculosis sanatoria play an important role in the treatment and rehabilitation of patients with tuberculosis infection [9]. In the period 2020–2021, 10 children from 3 to 17 years of age with disabilities due to comorbidities were treated in tuberculosis sanatoria in St. Petersburg (2B subgroup). The causes of disability were as follows: infantile cerebral palsy, diplegia — 3; hearing loss III st. — 2; consequences of burns, contractures — 2; congenital synostosis — 1; cognitive disorders, mental retardation — 2.

In all cases the treatment was successful: it promoted socialisation, adaptation, and improved the quality of life of the patients.

CONCLUSION

Children with disabilities represent a risk group for TB due to a combination of risk factors, including lack of vaccination (9.1%), irregular immunodiagnosis (38.1%), and refusal of preventive treatment (66.7%). Treatment of disabled children with TB is difficult due to poor tolerance of TB drugs. Children with disabilities should have access to prevention and early detection of tuberculosis infection in children's polyclinics and dispensaries, including: transport, assistance in travelling around the institution, home care (examination by a specialist, taking tests), inpatient care at home, and supervised therapy using telemedicine. Hospitalisation of a child in an inpatient facility must include the possibility of a relative staying with him or her or additional care staff. Rehabilitation of children with disabilities in the presence of tuberculosis contact, tuberculosis infection, active tuberculosis in the phase of continuing chemotherapy is advisable to be carried out in children's tuberculosis sanatoria. TB dispensaries should have medical and social assistance rooms: children with disabilities and their parents need individual health education and psychological support.

ADDITIONAL INFORMATION

Author contribution. Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

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ACTIVITIES FOR THE CARE OF PALLIATIVE PATIENTS: GOVERNMENT STANDARD OR CLINICAL EXPERIENCE?

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ABSTRACT. Existing national guidelines on nursing care manipulations are the primary source of information for hospice nurses. A major role in the technique of performing procedures is played by the equipment of a medical institution, medical products, and consumables available. Local recommendations of specialists with extensive clinical experience in palliative care are also important. Hospice nurses are guided by various sources to obtain information about the technique of performing medical manipulations, as a result of which the delivery of medical services, even within the same organization, is carried out differently. The inclusion of some of the duties of caring for patients in the job responsibilities of other professionals can lead to inconsistency in the actions of medical personnel. The standard operating procedure (SOP), as a documented local instruction, has not been developed in every institution providing palliative care. To standardize patients' care, it is advisable to develop and use SOPs that take into account both the equipment and clinical experience of hospice specialists.

KEYWORDS: palliative care, gastrostomy, tracheostomy, bedsores, hospice, standard operating procedure

МЕРОПРИЯТИЯ ПО УХОДУ ЗА ПАЛЛИАТИВНЫМИ БОЛЬНЫМИ: ГОСТ ИЛИ КЛИНИЧЕСКИЙ ОПЫТ?

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РЕЗЮМЕ. Существующие национальные рекомендации по манипуляциям сестринского ухода являются основным источником информации для среднего медицинского персонала хосписа. Большую роль в технике выполнения процедур играет оснащенность медицинского учрежде-

ния оборудованием, изделиями медицинского назначения, расходными материалами. Имеют также значение локальные рекомендации специалистов, имеющих большой клинический опыт в паллиативной помощи. Медицинские сестры хосписа руководствуются различными источниками для получения информации о технике выполнения медицинских манипуляций, в результате чего выполнение медицинских услуг даже внутри одной организации выполняется по-разному. Включение некоторых обязанностей по уходу за больными в должностные обязанности других специалистов может приводить к несогласованности действий медицинского персонала. Стандартная операционная процедура (СОП) как документально оформленная локальная инструкция разработана не в каждом учреждении, оказывающем паллиативную помощь. Для стандартизации способов ухода за больными целесообразно разработать и использовать СОПы, которые учитывают как оснащенность, так и клинический опыт специалистов хосписа.

КЛЮЧЕВЫЕ СЛОВА: паллиативная помощь, гастростома, трахеостома, пролежни, хоспис, стандартная операционная процедура

INTRODUCTION

ПPalliative care has been declared one of the priorities in the work of the Ministry of Health of the Russian Federation. The number of institutions for inpatient palliative care in the regions of the Russian Federation has increased more than 3-fold over the last 5 years: the number of hospices has increased from 23 to 73, including paediatric hospices from 5 to 14 [5, 13].

Medical manipulations performed by nurses in hospices are quite diverse and require clear knowledge of the algorithms of their performance [3, 10]. There are national standards of the Russian Federation on the prevention of bedsores [11], on technologies for the performance of simple medical services, nursing manipulations [14], which reflect the sequence of actions of nursing staff for their qualitative performance. If necessary, the algorithm can be supplemented in each medical organisation by a local act. At the present stage, this may be an approved standard operating procedure (SOP) [1]. In the proposals (practical recommendations) on the organisation of internal control of quality and safety of medical activity in a medical organisation (hospital) of the Federal Service for Supervision of Health Care the definition of SOP is given — documented (local) instructions for the performance of working procedures or formalised algorithms for the performance of actions, fulfilment of the requirements of the standards of medical care. In other words, SOPs are the main document regulating the performance of work in the field as part of the process.

At the same time, in the practice of paramedical staff there is often an opinion that it is necessary to perform medical manipulations in accordance with the algorithms that specialists were trained earlier (in medical school, by their colleagues) without taking into account the emergence of new equipment, modern ways of patient care [15, 16], achievements of evidence-based medicine methods [17, 18].

AIM

To assess the degree of standardisation of approaches to palliative care; to identify sources of information on algorithms of the medical manipulation performed by nurses.

MATERIALS AND METHODS

The national standards of the Russian Federation on the prevention of bedsores (GOST R 56819-2015), on technologies for the performance of simple medical services (GOST R 52623.3-2015) were analysed, concerning algorithms for the performance of manipulations for gastrostomy care, tracheostomy care and actions of medical personnel in case of bedsores.

A questionnaire was developed, which included open-ended questions to characterise the algorithms for the performance of the above skills by nurses. Forty-six nurses from hospices of St. Petersburg and the Leningrad region took a part in the survey.

RESULTS

The age of the nurses ranged from 20 to 50 years, with an average of 35±9.09 years (Fig. 1). The length of service as a nurse ranged from 1 to 10 years, with an average of 5.5±3.03 years. The skills required for hospice work

were acquired by 32 nurses (69.6%) at medical school; 6 people (13.0%) trained while working at the hospice; and 8 staff (17.4%) trained elsewhere.

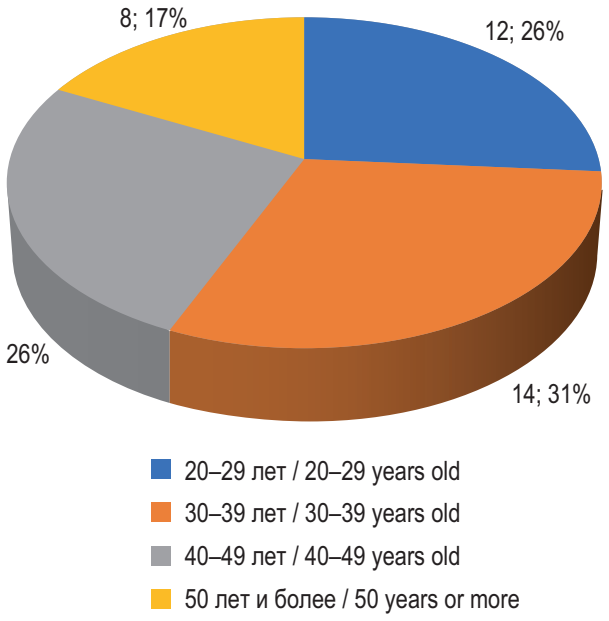

Fig. 1. Age of nursing staff working in a hospice

Рис. 1. Возраст среднего медицинского персонала, работающего в хосписе

The majority of respondents, 26 (56.5%), indicated that they were guided by the recommendations set out in the RF national standard. At the same time, 7 (15.2%) specialists used recommendations approved by hospice doctors. However, it is known that at the time of the survey, hospices did not yet have SOPs as documented local acts; therefore, more than half of the nurses were guided by verbal recommendations of hospice specialists. At the same time, the recommendations of the national standard of the Russian Federation and local recommendations of the hospice were used by 13 respondents (28.3%).

Completion of the bedsores management sheet, teaching the patient to self-care and determining the amount of food and protein intake is reflected in the recommendations of the national standard, but was not mandatory according to local requirements and was not performed by nurses in patients with stage I pressure sores (Table 1). The participants of the questionnaire noted that the maintenance of the decubitus sheet in their institution is performed by the attending physician, and nutritional assessment is the responsibility of the nutritionist. Regular change of body position (every

Table 1

Care after the patients with bedsores

Таблица 1

Уход за больными с пролежнями

Манипуляции / Manipulations	ГОСТ Р 56819–2015 / GOST R 56819–2015	Локальные рекомендации / Local recommenda-tions	Практика медсестры, % / Nursing staff's practice, %
Заполнение листа противопролежневых мероприятий / Filling out a list of anti-decubitus measures	+	–	0
Смена положения тела / Change of body position	+	+	87
Проведение гигиенических процедур / Carrying out of hygiene procedures	+	+	0
Обучение пациента самоуходу / Self-guided patient training	+	–	0
Обучение уходу лиц, ухаживающих за пациентом / Care training for carers	+	+	0
Определение количества съеденной пищи (количества белка) / Counting of the amount of food eaten (amount of protein)	+	–	7
Контроль количества употребляемой жидкости за сутки / Control of liquid amount per day	+	+	7
Использование противопролежневых приспособлений / Use of anti-decubitus devices	+	+	20
Массаж вокруг поврежденного участка / Massage around bedsore	+	+	7
Поддержание умеренной влажности кожи / Maintaining moderate skin moisture	+	+	80

2 hours) and maintenance of moderate skin moisture were the main manipulations of nursing staff (80–87%) for prevention and treatment of pressure sores. Despite the fact that hygiene procedures and caregiver training were mandatory according to both federal and local recommendations, these manipulations were not included in the algorithm in any case. Control of the amount of fluid intake per day and massage around the injured area were performed by 7% of nursing professionals. Anti-decubitus pillows, mattresses were used by 20% of the respondents.

According to the doctor's prescription, 37 (80%) nurses treated bedsores using "Bepanten", "Solcoseryl" and "Dexapanthenol" ointments. One respondent performed treatment with alcohol solutions, one person used herbal remedies (an aloe leaf) to treat pressure sores. In GOST R 56819-2915, solutions containing ethyl alcohol (40–96%) and herbal remedies of folk medicine are classified as negative technologies for prevention and treatment of pressure sores and are not recommended for use.

The algorithm of feeding a patient through the gastrostomy in both national and local recommendations started with the prevention of healthcare-associated infections, i.e. hand washing and wearing medical gloves (Table 2). In the course of the questionnaire survey, 33% of respondents included hand hygiene in the algorithm and 67% included wearing gloves in the algorithm. In accordance with the methodological recommendations, hygienic hand treatment before putting on gloves is a mandatory component [7].

Removing and applying a bandage to the gastrostomy was not performed by nurses, as frequent microtraumatisation during sticking and unsticking of the plaster has a negative effect on

Table 2

Gastrostomy care steps

Таблица 2

Действия при уходе за гастростомой

Манипуляции / Manipulations	ГОСТ Р 52623.3–2015 / GOST R 52623/3–2015	Локальные рекомендации / Local recommendations	Практика медсестры, % / Nursing practice, %
Обработка рук / Hand desinfection	+	+	33
Надевание нестерильных перчаток / Putting on non-sterile gloves	+	+	67
Снятие повязки с гастростомы / Removing the dressing from the gastrostomy tube	+	–	0
Обработка кожи вокруг гастростомы водой с мылом / Skin disinfection around gastrostomy tube with water and soap	+	+	20
Промывание гастростомы до кормления/ Gastrostomy tube cleaning before feeding	–	+	0
Введение питательной смеси / Introduction of enteral feeding	Шприцом Жане / Syringe of Zhane	С помощью систем капельного введения (энтеромат) / Dropper (enteromat)	Шприцом Жане 47% / Syringe of Zhane 47%
Промывание гастростомы после кормления / Gastrostomy tube cleaning after feeding	+	+	80
Поворот гастростомы на 360° / Gastrostomy tube rotation (360 degree)	–	+	0
Наложение мази, пасты, геля (по назначению врача) / Application of gel, paste, ointment (by doctor's prescription)	+	+	0
Наложение стерильной повязки, фиксация пластырем / Application of sterile dressing, adhesive fixation	+	–	0
Уход за баллоном (при низкопрофильной гастростоме) / Balloon care (at low profile gastrostomy tube)	–	+	0
Оценка глубины стояния трубки / Tube depth assessment	–	+	0

the condition of the skin [12]. Local guidelines do not suggest maintaining the gastrostomy under a dressing except in the immediate postoperative period.

Treatment of the skin around the gastrostomy before feeding is indicated in the algorithm by nurses in 20%, rinsing of the gastrostomy before feeding was not noted in any respondent.

According to the national standard, formula should be administered using a Janet syringe, and according to local recommendations — using an enteromate [2, 6]. At the same time, about half of the respondents did not indicate the enteromat as one of the possible options for feeding a patient with a gastrostomy. Rinsing the gastrostomy after feeding is one of the main nursing manipulations and it is performed by 80% of nurses.

360° rotation of the gastrostomy, balloon care (for low-profile gastrostomies) and assessment of tube depth are noted in local guidelines as necessary, but were not performed by any of the specialists.

The National Standard on Technology for Simple Health Care Services describes respiratory care activities in ventilator settings. For patients with tracheostomies who breathe independently, there are no clear algorithms for performing this manipulation in the federal standards [14]. Individual medical organisations have developed methodological recommendations and training manuals for the care of patients with permanent and temporary cannulation [4, 8, 9]. However, they are not widely known to the average medical personnel, because they are not implemented in the practice of the institution by means of a local normative act.

Hand treatment and tracheostomy cannula sanitation were mandatory according to national and local recommendations, performed by all nurses. Skin treatment with water-based antiseptics and changing the external dressing were required by local palliative care guidelines and were performed in 100% and 60% of cases, respectively. The use of sterile gloves during tracheostomy care was not included in the local requirements for hospice specialists, so this item was not included in the care algorithms in any case. At the same time, application of antibacterial ointment to the skin around the cannula was one of the local recommendations, but it was never mentioned by nurses in the algorithms of care for patients with tracheostomies.

DISCUSSION

Hospice nurses used different sources to obtain information about the technique of medical manipulation. Standard Operating Procedures (SOPs) as documented local instructions had not been developed at the time of the questionnaire survey, which resulted in different performance of medical services even within the same organisation. The inclusion of some patient care duties in the job descriptions of other specialists could lead to inconsistency in the actions of medical personnel. Despite the fact that some manipulations on bedsores care were mandatory according to both federal and local recommendations,

Table 3

Tracheostomy care steps

Таблица 3

Действия по уходу за трахеостомой

Манипуляции / Manipulations	ГОСТ Р 52623.3–2015 / GOST R 52623.3–2015	Локальные рекомендации / Local recommendations	Практика медицинских сестер, % / Nurse practice,%
Обработка рук / Hand desinfection	+	+	100
Наличие стерильных перчаток / The presence of sterile gloves	+	–	0
Санация трахеостомической канюли / Sanitation of the tracheostomy sunk	+	+	100
Обработка кожи антисептиками на водной основе / Skin cleaning with water-based antiseptics	–	+	100
Нанесение антибактериальной мази на кожу вокруг канюли / Use of antibacterial ointment on the skin around sunk	–	+	0
Смена наружной повязки / Change of outer dressing	–	+	60

they were rarely noted in the algorithm of the interviewees (from 9 to 20%). The State Standard describes some medical technologies in the treatment of bedsores, which may lead to negative consequences. It is necessary to pay special attention of medical personnel to such manipulations during professional development cycles. Not all specialists with secondary medical education performed hand treatment and gloves before manipulations. The development of new types of gastrostomy tubes and devices for the administration of nutrient mixtures led to significant differences between the national recommendations (from 2015) and the current clinical situation. No clear recommendations for the care of patients with tracheostomies on independent breathing are provided in the national standards. Nurses had the greatest difficulty in finding information on this issue.

CONCLUSION

In the modern world, medical technology is evolving rapidly. New ways of caring for patients are emerging, which makes it possible to improve the quality of life of patients. The use of the system of national standards is carried out on a voluntary basis is fundamental to ensuring the quality of medical care. A timely revision of the relevance of the GOSTs for the provision of medical services is required, taking into account modern scientific achievements. Based on the findings of this study, SOPs for the care of gastrostomies, tracheostomies and pressure sores in palliative care facilities were developed, which allowed taking into account the equipment of each organisation and ensuring greater dissemination and accessibility of information among health workers.

ADDITIONAL INFORMATION

Author contribution. Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

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USING MACHINE LEARNING ALGORITHMS TO PREVENT THE RISK OF MATERNAL COMPLICATIONS DURING PREGNANCY

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ABSTRACT. The publication presents the results of the drafting, analysis of the use of artificial intelligence technologies in the sphere of healthcare on the example of determining the risk of maternal complications during pregnancy, as well as the results of an online survey of women of reproductive age in the Republic of Uzbekistan for the use of the developed mobile application during pregnancy. Data processing methods were used using built-in Python libraries with automatic statistical data processing modules, and an online survey was conducted by means of Google Forms. The results showed high accuracy in predicting pregnancy complications. This research contributes to the digitalization of healthcare in general and helps to early identification of risks to maternal health. The analysis showed that blood glucose levels, age and blood pressure may significantly affect the health of pregnant women. Based on these data, a random forest model was built with an accuracy of 92.15%. In addition, digital medical products have been developed, and the survey demonstrated a willingness to use mobile applications to examine health status. The survey showed that 84.4% of women are ready to use a mobile app during pregnancy, and more than 60% of them even with a paid subscription. The developed digital software product in the form of a mobile application using machine learning algorithms is an alternative approach of preventing maternal complications during pregnancy in women.

KEYWORDS: machine learning, digitalization, maternal health, Random Forest, online survey

ИСПОЛЬЗОВАНИЕ АЛГОРИТМОВ МАШИННОГО ОБУЧЕНИЯ ДЛЯ ПРОФИЛАКТИКИ РИСКА МАТЕРИНСКИХ ОСЛОЖНЕНИЙ ПРИ БЕРЕМЕННОСТИ

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РЕЗЮМЕ. В публикации представлены результаты разработки, анализа использования технологий искусственного интеллекта в здравоохранении на примере определения риска материнских осложнений при беременности, а также результаты онлайн-опроса женщин репродуктивного возраста Республики Узбекистан на предмет использования разработанного мобильного приложения во время беременности. Были использованы методы обработки данных при помощи встроенных библиотек программного обеспечения Python с автоматическими модулями статистической обработки данных, а также проведен онлайн-опрос посредством Google Forms. Результаты показали высокую точность прогнозирования осложнений беременности. Это исследование вносит вклад в цифровизацию здравоохранения и помогает в раннем выявлении рисков для здоровья матерей. Анализ показал, что уровень глюкозы в крови, возраст и кровяное давление существенно влияют на здоровье беременных женщин. На основе этих данных была построена модель случайного леса с точностью 92,15%. Кроме того, были разработаны цифровые медицинские продукты, и опрос продемонстрировал готовность использовать мобильные приложения для отслеживания состояния здоровья. Опрос показал, что 84,4% женщин готовы пользоваться мобильным приложением во время беременности, и более 60% из них даже при условии платной подписки. Разработанный цифровой программный продукт в виде мобильного приложения с использованием алгоритмов машинного обучения является альтернативным способом профилактики материнских осложнений во время беременности у женщин.

КЛЮЧЕВЫЕ СЛОВА: машинное обучение, цифровизация, материнское здоровье, случайный лес, онлайн-опрос

INTRODUCTION

There are different approaches to monitoring the progress of digital health development in the world, one of the indicators of which, among others, is the presence of the “mobile healthcare” [4]. Digitalisation of healthcare is also intended to provide greater transparency and access to patient data, increase people’s knowledge and confidence, and enable them to become active partners in managing their health and wellbeing [6]. Those who do so are highly likely to adopt healthier lifestyles, leading to improved clinical outcomes and reduced hospitalisation rates [10].

Maternal mortality worldwide remains an acute issue, and the efforts made by all countries have seen some progress overall, but it still remains at high levels. For example, the global maternal mortality ratio (MMR) for 2020 is estimated at 223 maternal deaths per 100,000 live births (uncertainty interval (UI) 202–255), compared with 227 in 2015 (UI 211–246) and 339 in 2000 (UI 319–360): a decrease of one third (34.3%) over the full 20-year period. The average annual rate of decline (AAR) of global MMR was 2000–2020. 2.1% (IN 1.3–2.6%), meaning that from 2000 to 2020, on average, the global MMR declined by 2.1% annually, although progress during this period was uneven [11].

In Uzbekistan, various estimates of maternal mortality decreased from 41 per 100,000 live births in 2000 to 29 per 100,000 live births in 2017. However, this is more than twice the average for the WHO European Region (13 maternal deaths per 100,000 live births), and higher than the rates in Tajikistan and Kyrgyzstan [7].

According to the official statistics, maternal mortality in the Republic of Uzbekistan in 2021 and 2022 was 130 cases per year, compared to 2017–2020, when maternal mortality exceeded an average of 155 cases [5].

Providing more services outside of hospitals and closer to home through digital and innovative technologies, including mobile and social media, will make it easier for people to access health services when and how they want, tailored to local needs. Thus, the app we developed for patients and nurses to predict maternal health risk during pregnancy is one example of the processes of digitalisation of health care in Uzbekistan.

In Uzbekistan, due to the increase in the number of births and, consequently, the increased risk of maternal complications during pregnancy, the most pressing issue is the paradigm shift towards digitalisation of health care. Efforts are being made both at the national level and at the level of individual initiatives [3]. Certain difficulties in enhancing the effect of the

practical use of such initiatives in the field of digitalization and artificial intelligence include insufficient funding, immaturity of the regulatory framework, access to national electronic databases, and a lack of digital competencies among doctors and nurses [2].

MATERIALS AND METHODS

This study analysed open data bases [1] and conducted an anonymous online survey of 105 women of reproductive age in the Republic of Uzbekistan on the possible future use of digital software products and their monetisation. Methods of data processing were used with the help of built-in libraries of Python software: NumPy — used for processing multidimensional arrays; Pandas — for analysis and construction of summary tables of data; Scikit-learn contains classification and regression algorithms, allows clustering, validation and selection of machine learning models; SciPy used for scientific calculations with automatic modules of statistical data processing (analogue of STATISTICA 10.0), and an online survey was conducted through the open resource Google Forms from Google.

RESULTS AND DISCUSSION

We improved the accuracy and precision of an algorithm based on machine learning and artificial intelligence for predicting maternal health risk in pregnant women. Many maternal deaths are associated with pregnancy complications due to lack of awareness of maternal health measures during gestation and postpartum period. This is more common in rural areas and among low-income families in developing countries. Continuous monitoring of the health status of the pregnant woman during pregnancy is required to ensure normal foetal development and successful delivery.

The data were collected from various hospitals, clinics, maternal health services using Internet of Things (IoT) risk monitoring system, based on it a number of foreign researchers have conducted similar studies [8, 12]. Age, systolic blood pressure (BP), diastolic BP, blood glucose level and heart rate (HR) were used to determine the risk level. The predicted level of risk intensity during pregnancy took into account the data from each of these parameters [9]. Based on the analysis of these hyperparameters, machine learning algorithms were developed with varying accuracy in predicting maternal risk of pregnancy complications.

A total of 1014 pregnant women participated in the study, 272 (27%) of them were at the high risk of maternal complications, 406 (40%) at the low risk and 336 (33%) at the intermediate risk. The mean of the column by age was 30 years. The median value by age was 26 years. The minimum value by age was 10 years and the maximum value by age was 70 years. The range of the data frame was 10 to 70 years and the standard deviation was 13.5 years. In the age hyperparameter, the most frequent groups under 30 years were 23, 19, 17 and 15 years. The overall age data were grouped into categories: 54.3% adults, 40% youth, 5.3% children and 0.4% elderly. Hyperparameter correlation analyses were as follows: age/risk level — 55%, age/HR — 73%, systolic BP/body temperature — 92%, systolic BP/diastolic BP — 66%, diastolic BP/risk level — 79%, and diastolic BP/blood sugar — 58%.

After a number of experiments on training the data using machine learning and neural networks, we settled on the random forest algorithm, which gave the best result. A random forest contains a set of decision trees representing an individual instance of the input data classification. The random forest technique considers the instances individually, taking the one with the most votes as the selected prediction. Thus, random forest allows any classifiers with weak correlations to produce a strong classifier. We chose random forest because it is one of the most accurate training algorithms available, and it takes quite little time to train. In addition, random forest can work with a dataset that has feature values with different scales, so we do not need to perform normalisation or feature scaling.

By analysing an open data set, we can conclude that blood glucose levels are the most important variable in determining maternal risk levels. Pregnant women with high blood glucose levels tend to have a high health risk. More than 75% of pregnant women with a sugar reading of 8 or higher have a high health risk. Blood sugar also has a relatively strong positive correlation with age, systolic and diastolic BP, so older pregnant women with high systolic and diastolic BP should be vigilant. Age is also a fairly important variable, as the health risks for pregnant

women appear to begin to increase beginning at age 25 years. For systolic and diastolic BP, these two variables do have a strong relationship, as evidenced by the correlation coefficient value of 0.79. As for temperature, this variable does not give much information because more than 79% of the total value is 36.6 °C. But from this variable we know that pregnant women with a body temperature above 37 °C tend to have a higher health risk. And the last parameter, heart rate is the least significant variable to determine the health level of pregnant women. We built a classification model using random forest algorithm for this dataset. With the original dataset, we obtained a maximum accuracy of 86.7%. But after we performed cleaning of the data by removing outliers and unnecessary variable, the accuracy increased to 89.16%. This shows that the model gives better training results with the preprocessed dataset. We also performed index tuning to get the best result for the random forest algorithm. By using the best obtained results of indicator tuning, the model is able to provide higher accuracy which was 92.15% after a number of experiments.

After developing a machine learning-based model, we developed a number of digital software products (WEB application, Android and iOS mobile application, and a Telegram bot) for further use in practical health care. In order to explore further funding and monetisation of the developed digital products, we also investigated how much women are willing to pay for the right to use our digital products.

The questionnaire was developed based on Google Forms technology and contained a series of population, sociological, motivational and logistical questions. A total of 105 women participated in the study. The age structure of the sample was as follows: 54.3% of the female participants were aged 18–25 years, 23.8% were aged 26–35 years, 14.3% were aged 35–45 years and 7.6% were over 45 years. Of these, 82.6% lived in urban areas and 17.4 % lived in the countryside. In addition, 52.4% of the participants had no children, while 47.6% had one or more children.

Among the 105 respondents, 63.8% use mobile applications to monitor their health, while 36.2% do not use such applications. If such mobile applications are available, 91.4% are willing to use them, while 8.6% do not want to use them.

When assessing the positive aspects of such mobile applications, 56.2% of respondents noted their convenience, 27.6% — availability, 12.4% — quality, and 7.4% — speed. If we take the developed Homila AI app, 84.4% of the respondents will use it during pregnancy to assess maternal risk, while 15.2% of the participants will not.

Out of 105 respondents, 44.8% will use it every day, 34.3% will use it every week, 9.5% will use it every month and 11.4% will not use it. 64.8% of respondents believe that all 3 modules of Homila AI are equally useful, 28.6% believe that the module of artificial intelligence for assessing the risk of maternal complications is the most useful, 17.1% believe that the module of risks and complications (according to the regulatory document of the Ministry of Health of the Republic of Uzbekistan) is the most useful, and 12.4% believe that the module of addresses and geoposition of perinatal centres in the Republic of Uzbekistan is the most useful.

To increase the attractiveness of Homila AI mobile application, users suggest adding the following functionality (it was possible to choose several modules): module of monitoring for fetal development — 37.1%, module of remote online consultations — 34.3%, module for measuring weight gain during pregnancy — 30.5%, module for determining the date of birth of the future child — 25.7%, ovulation calendar and module on benefits for pregnant women — 21% each. Also 12.4% of respondents believe that three modules are enough in the original mobile application, while 41.9% prefer to have all the above-mentioned modules.

When assessing the design of a mobile application, 64.8% found it convenient, 30.5% found it attractive, 1.9% found it uncomfortable, and 2.9% found it unattractive. To assess the financial sustainability of the original mobile application, 44.8% of respondents expressed willingness to purchase a paid subscription, while 55.2% are not ready to do so. When new modules were added to existing modules, the willingness to purchase a paid subscription increased to 52.4%, while 47.6% remained unprepared to pay. Thus, adding new modules increased the percentage of respondents willing to purchase a paid subscription by 7.6%.

The following amount respondents are ready to spend on a subscription per year: 400 rubles — 44.8%, 800 rubles — 13.3%, not ready

to pay for a subscription — 38.1%, less than 400 rubles — 3.8%.

One of the survey questions was related to obtaining the respondents opinion on this mobile application development, we also found it necessary to cite the most interesting statements in our study. Respondents expressed their wishes and recommendations to the developers to improve the quality and attractiveness of using Homila AI m mobile application, some of them are given below.

Respondent 1: *It's a very interesting app, still really small functionality, but the app definitely has potential.*

Respondent 2: *The design is strict, I would like a more friendly design, maybe with pictures.*

Respondent 3: *About the subscription I can say the following. Suppose I got pregnant, bought the pro version, but it's for 1 year. But I don't need a year, 9 months is important to me. Either the application should be further developed so that a young mum could keep notes there, could also see what is normal for the baby, and what is clearly abnormal, or after pregnancy is over, the application should advise me to switch to another one from your company, where I can continue to receive help, now as a young mum.*

Respondent 4: *Subscription for the period of pregnancy. It is better to add more app for the development of children from 1 month to 1 year.*

Respondent 5: *There are a lot of free apps like this now, very attractive, convenient and informative. I am pregnant now and I am using one of them. What I would not like to see in such an app is a check of my risk level, because even without that there is cause for concern, and when the app gives an increased risk based on few data, it is even more worrying. Plus, I couldn't measure my blood sugar and blood pressure and I couldn't measure my heart rate if I didn't have a smartwatch. So you need some other means of getting information (tonometer, thermometer, etc) to use the app.*

Overall, more than 90% of survey responses were positive about the mobile app developed and more than 60% of respondents were willing to pay a paid annual subscription to use the mobile app during pregnancy.

CONCLUSION

Analysis of existing information and digital products in the Republic of Uzbekistan has shown a certain maturity of the health care system in terms of its digitalisation, nevertheless, a number of studied developments, especially using artificial intelligence technologies, remain unclaimed or do not work to the fullest extent, which requires further study and support from the state.

The developed software product using artificial intelligence technologies based on machine learning is an alternative way to prevent maternal complications during pregnancy and can be used both by nurses and directly by women of reproductive age as an independent diagnosis and vigilance towards their maternal health.

The survey showed readiness to use the mobile application during pregnancy, with more than 50% of them ready to pay a paid subscription in order to use it.

ADDITIONAL INFORMATION

Author contribution. Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

Competing interests. The authors declare that they have no competing interests.

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Consent for publication. Written consent was obtained from the survey participants for publication of relevant information within the manuscript.

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Вклад авторов. Все авторы внесли существенный вклад в разработку концепции, проведение исследования и подготовку статьи, прочли и одобрили финальную версию перед публикацией.

Конфликт интересов. Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

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CONTENTMENT OF STUDENTS OF THE FACULTY OF CLINICAL PSYCHOLOGY WITH THE LEARNING PROCESS

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ABSTRACT. Students' satisfaction with the learning process determines the effectiveness of the educational process. Assessment of the level of satisfaction with learning allows to establish full interaction of all participants of the educational process and improve the quality of education. The purpose of this study is: to examine various aspects of psychology students' satisfaction with the learning process, to identify the main components of satisfaction, to assess the contribution of individual parameters to the overall level of satisfaction. The sample consisted of 202 students of the Faculty of Clinical Psychology from the first to the fifth year of study. The study was conducted by means of anonymous questionnaires. Students evaluated on a 5-point Likert scale the main aspects of satisfaction with the educational process, highlighted during the literature review. The structural analysis identified three main components of students' satisfaction with the educational process: psychological, organizational, and social. The psychological component includes aspects related to the motivation to choose and study profession, as well as individual-psychological characteristics of students. Organizational component is related to learning conditions, content and form of material presentation. The social component reflects the nature of the student's relationships with the participants of the educational process. Multiple regression analysis showed that the greatest contribution to the overall level of satisfaction is made by the assessment of interaction with the faculty. However, the authors note that in order to increase the overall level of students' satisfaction with the learning process, it is important to take into account all aspects, including psychological, organizational and social. Regular monitoring of students' satisfaction with education received will help the administration of the educational institution to create optimal conditions for the implementation of the educational process and improve its quality.

KEYWORDS: clinical psychology, satisfaction with the learning process, professional self-determination, student motivation

УДОВЛЕТВОРЕННОСТЬ ОБУЧЕНИЕМ СТУДЕНТОВ ФАКУЛЬТЕТА КЛИНИЧЕСКОЙ ПСИХОЛОГИИ

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РЕЗЮМЕ. Удовлетворенность студентов обучением в вузе является одним из критериев эффективности образовательного процесса. Оценка уровня удовлетворенности студентов необходима для понимания факторов, влияющих на успешность обучения. Цель данного исследования — изучить различные аспекты удовлетворенности процессом обучения студентов факультета клинической психологии, и оценить вклад отдельных параметров в общий уровень удовлетворенности. Выборку составили 202 студента факультета клинической психологии с первого по пятый курс обучения. Исследование проводилось с помощью анонимного анкетирования. Студенты оценивали по 5-балльной шкале Лайкерта основные аспекты удовлетворенности образовательным процессом, выделенные в ходе анализа литературы. В рамках структурного анализа было выделено три основных компонента удовлетворенности студентов процессом обучения: психологический, организационный и социальный. Психологический компонент включает аспекты, связанные с мотивацией к выбору и обучению профессии, а также индивидуально-психологические особенности студентов. Организационный компонент связан с условиями обучения, содержанием и формой подачи материала. Социальный компонент отражает характер взаимоотношений студента с участниками образовательного процесса. Множественный регрессионный анализ показал, что наибольший вклад в общий уровень удовлетворенности вносит оценка взаимодействия с профессорско-преподавательским составом. Однако авторы отмечают, что для повышения общего уровня удовлетворенности студентов процессом обучения важно учитывать все аспекты, включая психологические, организационные и социальные. Проведение регулярного мониторинга удовлетворенности студентов обучением поможет администрации учебного заведения создать оптимальные условия для реализации образовательного процесса и повысить его качество.

КЛЮЧЕВЫЕ СЛОВА: клиническая психология, удовлетворенность процессом обучения, профессиональное самоопределение, мотивация студентов

INTRODUCTION

Student satisfaction with learning is one of the indicators of the quality of the educational process and, according to a number of authors, reflects the social effectiveness of higher education [10, 18]. This fact determines the relevance of research aimed at studying the factors of student satisfaction with learning and strategies for its improvement.

In the modern education the role of student's subjectivity is increasing, when he/she is considered not only as a "consumer of services" [6, 11], but also as a "producer of education", capable of influencing its final result through the motivation of choosing a profession, university, individual educational trajectory [5].

In connection with the development of this paradigm, monitoring of students' satisfaction with various aspects of the educational process becomes in demand. Many authors consider this screening as an important tool for improving the quality of education [20].

Analysis of students satisfaction with various aspects of educational training allows to identify current problems in the organisation of training and, if possible, to adapt the educational process to the needs of students, which undoubtedly increases student involvement in the educational process and positively affects the image of the university and its rating [8, 20].

With all the understanding of the necessity of monitoring student satisfaction with learning in the university, there is currently no single standard or approach to the definition of evaluation parameters.

A.S. Spassky describes satisfaction with studies as "a complex intertwining of expectations formed in the course of socialisation at all its stages regarding social status, profession, specialty, specific educational situation and assessment of the possibility of their implementation" [18]. The author identifies both general satisfaction from studying in higher education and private satisfaction, which is a reflection of specific aspects of learning.

It is certain aspects of learning that, as a rule, become the target in the studies devoted to the study of satisfaction with the educational process. The importance of students initial motiva-

tional attitudes to the choice of profession and mastering it is noted. In the framework of professional self-realisation, the independence of choice of educational trajectory correlates with satisfaction from education [12]. O.V. Gavrilova states that satisfaction with the chosen profession determines "a more stable and significant motivation for the implementation of professional training" [3]. At the same time, expressed learning and cognitive motivation forms satisfaction with learning activities [5, 14, 15].

In addition to motivation to obtain a profession, it is necessary to take into account the student's readiness or ability to study within the framework of higher education. Thus, underdeveloped skills of working with educational material, difficulties with self-organisation are considered to be the main reasons for students' failure and disappointment in learning [21]. Adaptation disorder leads to pronounced psychological distress, which correlates with low satisfaction with studies [18], while well-adapted students are more satisfied with their studies in higher education [22].

Many authors focus on the organisation and content of the educational process when assessing satisfaction with learning. Thus, T.N. Vazuvaeva states that "student satisfaction with the process of educational activity is largely determined by the content of this process: programme requirements and the direction of the university" [16]

V.A. Prokhoda's study showed that the priority for the main part of students is the quality of theoretical and practical training, while the living and material and technical conditions accompanying learning are of lower priority [15]. However, learning conditions are an important aspect in determining the quality of education [15]. And the activity of the university in creating a favourable educational environment directly affects the level of satisfaction with the educational process [1]. In addition, the formation of a positive attitude to learning activities is facilitated by the use of various forms and types of learning and the use of digital technologies [10, 21].

Some authors note the importance of social relationships within the framework of learning. According to A.S. Spassky, satisfaction with social status is "the highest structural component of satisfaction with educational and training activities in higher education" [19]. E.I. Sereda considers satisfaction with one's position in the group as a key component of satisfaction in students' educational and professional activity [17].

Some researchers consider the teaching staff to be the main factor determining the satisfaction with learning in higher education: teachers' qualification, their ability to create interest in the subject and science, supporting students in overcoming learning difficulties, encouraging their efforts and achievements — all this undoubtedly influences the level of students' satisfaction with the learning process [1, 9].

Extracurricular activities (creative and leisure) are also considered as a factor influencing the overall level of satisfaction with learning [2, 4]. According to I.A. Golubev, the organisation of students' leisure activities within the university can indirectly contribute to the improvement of educational potential, "the inclusion of students in the life of the university community and immersion in learning" [4].

Based on the analysis of scientific ideas about students' satisfaction with learning in higher education, we have identified three components of satisfaction to which we can refer to the aspects discussed above: psychological, organisational and social.

The psychological component includes aspects related to motivation (peculiarities of professional self-determination, satisfaction with the choice made and focus on mastering the speciality), as well as individual-psychological characteristics of students (level of self-esteem, learning strategies, formed skills of self-organisation and coping with stress). The organisational component is related to the learning environment, content and form of material presentation. The social component reflects the nature of the student's relationship with the participants of the educational process (teachers, colleagues, administration of the educational institution).

In our opinion, it is important to take into account all these components to create a more complete understanding of what factors influence the success of the learning process and how to improve the learning environment for students.

As part of the practical component of the study, it was important for us to assess the contribution of individual parameters to the overall level of student satisfaction with the learning process.

MATERIALS AND METHODS

To achieve this goal, an empirical study was organised and conducted (in April 2023) among students of the Faculty of Clinical Psychology of

the Federal State Budgetary Educational Institution of Higher Education SPbSPMU of the Ministry of Health of Russia. For the purposes of anonymity, data collection was conducted using an online survey service, and the invitation to participate was posted on the faculty's social networks.

A total of 202 people participated in the survey, among them female respondents were 90.1% (n=182) and male respondents were 9.9% (n=20). The average age was 20±2 years. The distribution by course was as follows: the 1st year — 36.1% (n=73), the 2nd year — 21.8% (n=44), the 3rd year — 16.3% (n=33), the 4th year — 12.4% (n=25), the 5th year — 13.4% (n=27). 48% (n=97) of the interviewed respondents are on the budgetary form of education, on the commercial form there are 52% of students (n=105). At the time of enrolment 48% (n=97) of students lived in St. Petersburg and Leningrad region, 50% (n=101) came from other regions of the Russian Federation, 2% (n=4) — from another country. At present, most students live separately from their parents: in rented accommodation — 35.6% (n=72), in their own flat — 19.8% (n=40), in a hostel — 15.3% (n=31). 29.2% (n=59) live with their parents, mostly these are 1st-2nd year students from St. Petersburg.

Thus, students of all courses are represented in the sample (with different course occupancy, more than 75% of students of each year of study took part in the study), most of them are girls, unmarried and living separately from their parents.

To assess satisfaction with the learning process, the author's questionnaire was developed, where 5 blocks of questions were included based on the analysis of research. The first block was devoted to analysing the respondents' motivation for choosing a profession, higher education institution and faculty of study. The second block concerned the assessment of various aspects of satisfaction with the learning process. The third block of questions made it possible to analyse the difficulties of the educational process faced by students. The fourth block was represented by scales of students' self-assessment of their communication, information handling, self-organisation and stress management skills. Finally, the fifth block contained questions revealing sociodemographic characteristics of the respondents.

Statistical analyses were conducted using StatTech software v. 4.0.6 (developer — StatTech LLC, Russia). Quantitative data were assessed for conformity to normal distribution using the Kolmogorov–Smirnov criterion. Categorical data were described with absolute values and percentages. Comparison of three or more groups on quantitative data was performed using the Kraskell–Wallis criterion. Pearson's χ^2 criterion was used to assess differences in the distribution of a categorical variable between two or more independent groups. Correlation analysis was performed using the Spearman criterion. The prognostic model was developed using the multiple linear regression method.

RESULTS AND DISCUSSION

In order to analyse the respondents' motivation, questions concerning the time of professional self-determination, independence of the choice made and the reasons for choosing a particular university for study were proposed. The data analysis showed that the majority of respondents decided on their profession in high school (67.8%, n=137), made this choice independently (93.1%, n=188) and further plan to work in their speciality (92.1%, n=186). The main reasons for choosing a higher education institution were the opportunity to get the desired profession (83.7%, n=169), high quality of education (45%, n=91), qualified teachers (44.1%, n=89), prestige of the higher education institution (40.1%, n=81) and interesting training (35.6%, n=72).

In our opinion, the analysis of repeated choice as a criterion of satisfaction with the professional educational trajectory is also important. The result of repeated choice of the studied sample is presented in Table 1.

The general satisfaction of students with the choice made revealed an increase in loyalty to the speciality, university and faculty as they studied: from junior to senior courses (χ^2=304.51, df=3, p=0.015). A similar tendency was noted in the framework of studying the motivational component of loyalty of psychology students [7].

To consider the readiness to study in higher education, the respondents were asked to assess the formation of the skills necessary for this. The majority of students noted that they have fairly well developed skills of working with information (72.3%, n=146), communication skills (59.4%, n=120), self-organisation (55.9%, n=113) and stress management (51%, n=103). No significant differences were found in the evaluation of their skills depending on the course of study. Despite the high assessment of the formed skills, stu-

dents are ready to develop them further within the framework of trainings and elective classes, if they are organised in the university.

When assessing the educational process (timetable, material and technical support, learning conditions), only 50.5% (n=102) of respondents noted that they were satisfied with its organisation. Among the main difficulties students noted the lack of places for adequate eating between classes (69.8%, n=141), uncomfortable conditions in classrooms (44.6%, n=90), lack of places for self-study on the territory of the university (43.1%, n=87), lack of modern educational literature (21.8%, n=44). No significant differences in the assessment of the organisation of the educational process depending on the course of study were revealed.

Assessing the content of the educational process (fundamentality, completeness and relevance of information) only 35.6% (n=72) answered that they were satisfied with this aspect of education, 50.5% (n=102) found it difficult to answer, 13.9% (n=28) noted that they were not satisfied with the quality of educational material. At the same time, students of higher courses are more dissatisfied with the content of taught disciplines (χ^2=341.33, df=3, p=0.007).

When assessing the practice within the educational process, 53.9% (n=109) of respondents noted that they were satisfied with its organisation. There are significant differences in satisfaction with the practice depending on the course of study, which, in our opinion, is associated with the specifics of institutions where students take practice, and the peculiarities of the organisation of interaction.

An important aspect of students involvement in the learning process, in our opinion, is participation in research activities. Among the surveyed students 63.8% (n=129) are members of the Student Scientific Society (SSS), 58.5% (n=118) are satisfied with its work. The main forms of scientific activity include presentations at conferences (8.4%), reports in the framework of SSS (5.9%), attendance of scientific-theoretical seminars (5.0%), publications in scientific journals (2.5%), student Olympiads (1%).

When evaluating extracurricular activities organised by the university (cultural, sports, leisure), 30.2% (n=60) were satisfied with their organisation, while many students noted that they were not aware of the activities — 36.7% (n=73). Such non-integration into extracurricular student activities of the university is due to the territorial remoteness of the faculty and low intersection of students with students from other areas.

The evaluation of interaction with the teaching staff showed that the overwhelming majority of students are satisfied with them (91%, n=183), with positive evaluation being maintained in all years of study, covering the entire teaching staff. Outlining the qualities important for teachers, the absolute majority of respondents put in the first three places: “the practical experience of a teacher” — 92.1% (n=186), “the ability to present information in an accessible way” — 92.6% (n=187) and “the passion for their discipline” — 94.6% (n=191). A significant proportion of students noted such qualities of the instructor as “the accessibility to communication” — 69.3% (n=140), “the interest in students” — 64.9% (n=131), “the oratorical skills” — 63.4% (n=128) and “the sense of humour” — 61.4% (n=124).

Relationships with classmates were satisfied with 87.6% of respondents (n=177). No significant differences were found in the assessment of this category depending on the course of study. Despite the course occupancy and the number of groups, relations with classmates fully satisfy the surveyed students.

The overall assessment of students’ satisfaction with studying at the University is presented in Table 2.

82.7% (n=167) of respondents are satisfied with their studies in higher education according to the obtained data. At the same time, there are

Table 1

Results of the reselection

Таблица 1

Результаты повторного выбора

Ответы / Answers	Специальность / Specialty	Вуз / University	Факультет / Faculty
Однозначно да / Скорее да // Definitely yes / More likely yes	89,6% (n=181)	70,4% (n=142)	90,6% (n=183)
Затрудняюсь ответить // Difficult to answer	9,9% (n=20)	19,3% (n=39)	5,0% (n=10)
Однозначно нет / Скорее нет // Definitely not/ More likely not	0,5% (n=1)	10,4% (n=21)	4,5% (n=9)

reliable differences in the maximum evaluation depending on the course of study (χ^2=401.01, df=3, p=0.001). Students of the first as well as the third year of study tend to evaluate their stay in higher education institution more positively. According to other studies, first-year students are characterised by higher grades [13], which, according to the authors, is explained by the satisfaction with the fact of entering and studying at the university. In the case of the third year, in our opinion, the increase in satisfaction can be explained by the change in the study load and the transition to the study of specialisation disciplines and practical training.

Correlation analysis allowed us to identify correlations between the general satisfaction with studying at the university and its individual aspects (private satisfaction). In this sample general satisfaction correlates with satisfaction with professional choice (Rs=0,354; p=0,000), learning conditions (Rs=0,276; p=0,015), learning content (Rs=0,421; p=0,001) and with the assessment of their relationships with teachers (Rs=0,654; p=0,000) and classmates (Rs=0,528; p=0,000).

The identified correlations were used to build a predictive model revealing the contribution of individual aspects of learning to overall satisfaction with the educational process. The results of multiple regression analysis are presented in Table 3.

The observed dependence of the indicator of overall satisfaction is described by a linear regression equation:

$$Y_{\text{Overall satisfaction with education}} = 1{,}164 + 0{,}191X1 + 0{,}202X2 + 0{,}402X3.$$

According to the obtained model, the greatest contribution to the students' overall satisfaction with their studies (Y) is made by the assessment of interaction with the teaching staff (X3) and the material (X2) taught by them, as well as the organisation of the whole educational process (X1).

The regression model obtained is characterised by a correlation coefficient of *rxy*=0.640, which corresponds to an appreciable closeness of relationship according to the Cheddock scale. The model is statistically significant (p <0.001) and explains 41.0% of the observed variance of the indicator of overall satisfaction with the educational process.

The obtained data are largely consistent with similar studies on similar samples [2, 10, 13],

Table 2

Students' satisfaction with studying at the University

Таблица 2

Удовлетворенность студентов обучением в Университете

Курс обучения / The course of study / Общая удовлетворенность / General satisfaction	1-й курс	2-й курс	3-й курс	4-й курс	5-й курс
Скорее недоволен / Rather dissatisfied, n (%)	1 (1,4%)	6 (13,6%)	5 (15,2%)	2 (8,0%)	2 (7,4%)
Затрудняюсь ответить / Difficult to answer, n (%)	3 (4,1%)	7 (15,9%)	1 (3,0%)	5 (20,0%)	3 (11,1%)
Скорее доволен / More like satisfied, n (%)	49 (67,1%)	29 (65,9%)	19 (57,6%)	15 (60,0%)	18 (66,7%)
Да, доволен полностью / Yes, I am completely satisfied, n (%)	20 (27,4%)	2 (4,5%)	8 (24,2%)	3 (12,0%)	4 (14,8%)

Table 3

Multiple regression analysis

Таблица 3

Множественный регрессионный анализ

Предикторы / Predictors	B	Стандартная ошибка / Standard error	t	p
Intercept	1,164	0,267	4,364	<0,001
Организация учебного процесса — X1 / Organization of educational process — X1	0,191	0,040	4,748	<0,001
Содержание учебного материала — X2 / Content of training material — X2	0,202	0,061	3,324	0,001
Взаимодействие с педагогами — X3 / Interaction with teachers — X3	**0,402**	0,066	6,064	<0,001

which may indicate the presence of general trends. However, it is important to take into account the specifics of the organisation of the educational process in a particular educational institution.

CONCLUSION

To sum up, it is important to note that ensuring student satisfaction with education in modern conditions is an important task for educational institutions. To increase the level of student satisfaction, it is necessary to actively interact with the student population, periodic monitoring of the quality of services provided with the analysis of the obtained data.

At the moment there is no unified methodological apparatus for conducting a comprehensive assessment of satisfaction. However, the analysis of available data and the conducted research show that there are certain components of satisfaction with training that require evaluation and analysis.

According to the authors, in addition to the organisational aspects of the educational process, it is necessary to pay considerable attention to the psychological component: the student's personality, his/her motivation to master the profession and readiness to cope with difficulties.

The authors see the development of this study in a more complete consideration of the psychological component, the study of the relationship between academic stress and overall satisfaction with learning in higher education, expanding the sample and identifying the specifics of certain aspects of satisfaction depending on the direction of study.

Speaking about increasing students' satisfaction with studying in higher education, we can identify separate recommendations depending on the level of organisation of the educational process.

Firstly, at the level of the administration of the educational institution it is justified to regularly monitor student satisfaction with the learning process with the analysis of the identified components and further optimisation of the educational process taking into account the obtained data, as well as the creation of comfortable conditions for learning, involving not only material and technical support of education, but also the distribution of teaching loads within the semester and weekly planning of classes, the organisation of opportunities for self-development of students: scientific ones.

Secondly, at the level of faculties it is necessary to work with the teaching staff: professional development and support for professional development, search for effective teaching methods, providing feedback between all participants of the educational process.

Thirdly, at the level of individual courses, it is important to develop a system of curatorship, conduct educational work, and organise extracurricular activities of students.

And, finally, at the level of a particular student, the work on increasing the level of satisfaction with learning can be implemented in the form of the introduction of individualisation of the educational route and the development of psychological support services for students.

Management of student satisfaction with the learning process is an important task for the management of educational institution, as it helps to provide a favourable educational environment, high quality education and increases the rating of the university.

ADDITIONAL INFORMATION

Author contribution. Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

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THE FIGHT AGAINST THE EPIDEMIC DESEASES IN TAURIDIAN PROVINCE IN 1860–1890S

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ABSTRACT. The paper characterizes the level of the development of medicine in the Russian Empire in 1860-th — 1890-th on the basis of information from the Tauridian Province, marks the main diseases that doctors and paramedics had to deal with, provides specific facts and statistic data. Its main task is to show by concrete examples that medical personnel often had to resist infections almost alone, endanger their lives and health on a diary basis, come into contact with the inertia and indifference of the majority of ordinary people. It making an attempt to identify the causes of high mortality of the population, to show particular measures, which had been taken by physicians for reducing of the catastrophic consequences of epidemics. The publication highlights the methods of combating various acute diseases, tells about numerous achievements that the Tauridian medical staff managed to succeed. Among the innovations that were widely implemented in practice at the end of the XIXth century were vaccination against smallpox, involvement of female medical personnel in inoculations and patient care, measures for isolation infected people in separate spaces, regular disinfection of individual houses and entire settlements, the appointment of special trustees to monitor the sanitary condition of streets and courtyards. The beginning of the 1890-th was marked by the creation of special coordinating institutions (the Tauridian Medical Council and the Sanitary Bureau) in Simferopol under the Tauridian Provincial Zemstvo Authority, which facilitated the collection and processing of statistical data, preparing annual reports and the implementation of measures to combat diseases throughout the region. The scientific value of the research is emphasized by the integration of rarely used materials from the documents of the Crimean Republic State Archive, being almost not introduced into the view point of researchers.

KEYWORDS: the Tauridian Province, the Provincial Medical Department, the Tauridian Provincial Zemstvo Authority, paramedic, inoculation, an epidemic disease, smallpox, diphtheritic, sanitary trustee, mercy sister, the Tauridian Medical Council, the Provincial Sanitary Bureau

БОРЬБА С ЭПИДЕМИЧЕСКИМИ ЗАБОЛЕВАНИЯМИ В ТАВРИЧЕСКОЙ ГУБЕРНИИ В 1860–1890-х ГОДАХ

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РЕЗЮМЕ. Статья характеризует уровень развития медицины в Российской Империи в 1860–1890-х годах на основе сведений Таврической губернии, отмечает основные заболевания, с которыми приходилось сталкиваться врачам и фельдшерам, приводит конкретные факты и статистические данные. Ее основная цель — подчеркнуть позитивные и негативные явления борьбы с различными болезнями; обратить особое внимание на передовые новшества, способствовавшие успешной борьбе с ними. Ее основная задача — показать на конкретных примерах, что медицинскому персоналу зачастую приходилось противостоять заражениям почти в одиночку, ежедневно подвергать опасности свои жизнь и здоровье, соприкасаться с инертностью и равнодушием масс обывателей. В работе предпринята попытка выявить причины возникновения высокой смертности населения, показать конкретные меры, предпринимаемые медиками для снижения катастрофических последствий эпидемий. Публикация делает более наглядными методы борьбы с различными острыми болезнями, рассказывает о многочисленных успехах, которых удалось достичь таврическому медицинскому персоналу. Среди новшеств, широко внедрявшихся на практике в конце XIX века, — вакцинация от оспы, привлечение к проведению прививок и уходу за больными женского медицинского персонала, меры по изоляции зараженных в отдельные помещения, регулярная дезинфекция отдельных домов и целых населенных пунктов, назначение особых попечителей для надзора за санитарным состоянием улиц и дворов. Начало 1890-х годов ознаменовалось созданием в Симферополе при Таврической губернской земской управе особых координирующих органов (Таврического врачебного совета и санитарного бюро), облегчивших сбор и обработку статистических данных, составление годовых отчетов, проведение мер по борьбе с болезнями в масштабах всей губернии. Научную ценность статьи подчеркивает использование документов Государственного архива Республики Крым, почти не внедренных в поле зрения исследователей.

КЛЮЧЕВЫЕ СЛОВА: Таврическая губерния, губернское врачебное отделение, Таврическая губернская земская управа, фельдшер, прививка, эпидемия, оспа, дифтерит, санитарный попечитель, сестра милосердия, Таврический врачебный совет, губернское санитарное бюро

INTRODUCTION

In recent years, the epidemiological situation around the world has become more acute. Thousands of people are sick and dying from tuberculosis, AIDS, monkeypox, pneumonia, coronavirus infection. This is happening despite the fact that in the XX century doctors have made tremendous progress in the fight against various diseases and have developed vaccines for many previously incurable diseases. It is difficult to imagine how medics of XVIII–XIX centuries counteracted epidemics, who did not yet have at their disposal such life-saving drugs that could fight previously incurable diseases. They had to face indifference of authorities, religious superstitions, misunderstanding of uneducated common people, lack of financial support at every step. The article attempts to highlight the development of health care in the Taurida Governorate in the 1860s–1890s. The publication represents a new approach to the events, their concretisation, disclosure of "white spots" which have not been studied yet. Undoubtedly, the activity of Russian doctors of that time can be regarded as a feat, self-sacrifice, an important step towards the enlightenment of the people, curbing devastating epidemics and preventing them in the future.

The aim of the work is to highlight the development of medicine and sanitary affairs in the cities and districts of Taurida Governorate in the 1860–1890s; to emphasise the positive and negative phenomena that doctors had to face; to pay special attention to the advanced innovations that contributed to the successful fight against diseases.

Its main goal is to show by concrete examples that doctors often had to confront dangerous contagious diseases almost alone, to put their lives and health in danger every day, to come into contact with the inertia and indifference of society.

When writing this article, we widely used information from the documents of the State Archive of the Republic of Crimea and minutes of the congresses of doctors of Taurida Governorate. These materials are poorly studied, not known to all researchers, practically not introduced into the scientific turnover. They allow to study the topic more deeply, accurately and concretely, to fill it with details and facts which were not known to a wide audience before. They allow us to show more vividly and imaginatively the struggle of Tauride doctors and paramedics against epidemics (such as smallpox, diphtheria, typhus, etc.), which annually covered towns and villages and resulted in dozens and hundreds of victims.

THE MAIN PART

At the end of the nineteenth century, the area of Taurida Governorate was 53,053.8 verst^2, or 60,375.2 km^2. It included five regions in the Crimea (Eupatoria, Perekop, Simferopol, Feodosia and Yalta) and three mainland regions (Berdyansk, Dneprovsk and Melitopol). The system of "public health" included the following stages. At the lowest level — free-practising doctors in towns and villages, which numbered 69, including 2 women doctors [2, 8][1]. Several volosts were part of a local medical district, where a doctor, a paramedic, a nurse, and a vaccinator performed simple medical procedures in the emergency room and supplied peasants with medicines through a pharmacy. The number of such stations could vary from county to county. The general supervision over the development of diseases in the county and its sanitary condition was carried out by the county doctor, who was responsible directly to the Medical Department of the Tauride Governorate Board and the medical inspector. Thus, the general assistance to the sick inhabitants of both towns and villages was provided by public service physicians. Zemstvo doctors, responsible to the district zemstvo boards, were mainly engaged in providing assistance to the rural population on small plots. The largest number of practising doctors (15) was in Melitopol district, and the smallest number (3) — in Simferopol district. The number of paramedics, which in the early 1890s worked in the entire province, 154, also varied by district — from 38 (in Berdyansk) to 8 (in Yalta) [2, 8]. One third of all medical personnel of the province conducted appointments in cities, and 2/3 — in the countryside.

The level of education of doctors and paramedics in the field varied. Among them there were both graduates of medical faculties of universities and medical and surgical academies, and random persons who had no idea about the methods of surgery, symptoms of certain diseases [8]. Not knowing the basic measures of sanitary prevention, many of them did not take any measures to prevent epidemics in advance, did not prepare peasants to fight diseases, were lost and waited for orders from "above" when urgent measures were needed to stop the development of disease. In such cases, it turned out that the initiative to carry out preventive measures in the field came from the governor or inspector, rather than from the doctor, whose position obliged him to directly deal with such measures[2]. District zemstvo doctors did not stay in one place for long, they could be transferred so often to different hospitals, districts and provinces that they did not have time to get acquainted with local residents, their languages and customs, and climatic conditions of the area[3].

Even with such medical personnel, the Tauride districts were not equally provided [2]. If in Berdyansk and Melitopol there were 10 medical sites, then in Dnieper and Perekopsk — 7, in Yalta and Feodosia — 5, in Simferopol — 3 and in Yevpatoria — only 2. Accordingly, depending on the district, their area fluctuated — from 2524 verst^2 (in Evpatoria district) to 311 verst^2 (in Yalta district). On the average for the province it was 1138,5 verst^2. If we take into account the population of medical sites, on average in the province it reached about 16 640 souls of both sexes (in Melitopol district — 27 277, Berdyansk — 24 455, Yevpatoria — 21 639, Simferopol — 12 175, Yalta — 7423). [2]. That is, there were about 6375 people per one paramedic: from 3804 in Yalta uyezd to 12 398 in Berdyansk uyezd. In Taurida Governorate there were 21 hospitals and 19 reception centres [2]. In Melitopol uyezd there were 7 hospitals, while in Simferopol uyezd there were none at

[1] State Archive of the Republic of Crimea (SACR). F. 27. O. 12. D. 130. L. 142–143, 247; SACR. F. 27. O. 12. D. 115. L. 249.

[2] SACR. F. 27. O. 12. D. 130. L. 551–552.

[3] Ibid. L. 551–552; SACR. F. 27. O. 12. D. 155. L. 125.

all, except for the provincial zemstvo hospital in the city itself. In total, medical centres had 954 beds, which was negligible in relation to the total population of the province, which reached just over 1 million 450 thousand souls. Hospital places were distributed among the districts in the following proportions [2]. In Dnieper district — 98 (one per 1501 people); in Melitopol — 95 (1:2871); in Berdyansk — 85 (1:2877); in Feodosiya — 48 (1:1188); in Yalta — 44 (1:843); in Yevpatoria — 30 (1:1442); in Perekopsk — 26 (1:2080) and in Simferopol — 18 (1:2065). On average, there were 104 verst[2] of territory and 1,671 local inhabitants per 1 hospital bed in the province. Specialised and infectious disease beds could be referred to only in large hospitals, which were located, as a rule, in district centres, railway stations and large villages. Smaller zemstvo stations rarely had them. In the 1890s, doctors themselves recognised the development of "public health" in Taurida Governorate as weak, insufficient and unsatisfactory, and the medical-police and sanitary parts were practically not adjusted at all [8][1].

There was no less disorder and ugliness in the reports and statements provided by doctors[2] [2, 3, 8]. There was no common form for filling out documents, which made it very difficult to compile annual summaries, keep current records of morbidity and the dynamics of epidemics. Each doctor and each district zemstvo kept documentation in their own way, as they considered necessary and correct. Many physicians sent annual reports to Simferopol untimely, the data were not checked, it was entered inaccurate and incomplete. Doctors did not process the data, allowed voids and errors. Even more confusion was caused by the subordination of doctors to different departments and reluctance of zemstvo physicians to send their data anywhere but the district zemstvo. Instead of their interaction with the district doctors, there was only intrigue and clarification of relations. Information about the progress of smallpox inoculation, spread of widespread diseases of people and livestock was often inaccurate and approximate. Under the created conditions it became almost unreal to get clear and accurate information about the number and organisation of medical institutions, boundaries of medical stations, spread of epidemics and measures for their prevention, dynamics of infections by months and years. As there was no central controlling and unifying organisation in Taurida Governorate for a long time. The compilation of annual medical reports and the planning of general medical and sanitary measures were incredibly difficult, costly and time-consuming problems. In 1879, the Medical Department submitted a report to the Tauride Governorate Board containing specific instructions to city, district and zemstvo doctors to prevent further confusion and misunderstandings. From that moment all medical personnel of the province were provided with special forms for the preparation of reports and were obliged to submit them completely and accurately filled in to the medical inspector by 15 December (zemstvo doctors — by 1st December) every year.

While each uezd acted on its own, on its own, and filled out documents as it wished, towns and villages were immersed in mountains of filth and rubbish. From year to year, city and district doctors, sanitary commissions of zemstvos and city councils reported about overcrowded and cramped dwellings, neglected market squares, rivers and sewers overflowing with filth, cesspits in courtyards that had not been cleaned for years, filthy slaughterhouses, shops and taverns. Only rare settlements had a relatively tolerable appearance. The Yevpatoria district doctor informed the Medical Department that the local market square was covered with a dense layer of rubbish and manure because of the submarines standing there during the whole market day [1][3]. In autumn this rubbish formed rotten stinking puddles, and in summer — dust mixed with organic decay products. In addition to numerous taverns, shops and inns, these bazaars also housed 'slaughterhouses' for slaughtering cattle. The buildings in the town were extremely cramped and had almost no courtyards, and the alleys were so narrow that they barely allowed carriages to pass. The locals tended to dump their filth directly into the street, forcing passers-by to move only with extreme caution to avoid the excrement. All these factors led to the air being tainted by an almost unceasing stench.

The situation in Yalta was more worse than in Yevpatoria[4]. The small and cramped market

[1] SACR. F. 27. O. 12. D. 130. L.551–552; SACR. F. 27. O. 12. D. 155. L. 125.

[2] SACR. F. 27. O. 12. D. 115. L. 1–2, 3.

[3] SACR. F. 27. O. 12. D. 101. L. 113; SACR. F. 27. O. 12. D. 121. L. 386.

[4] SACR. F. 26. O. 1. D. 26995. L.150–158.

square, filled to the brim with ugly and dirty stalls, which was cleaned only at the beginning of summer — on the eve of the arrival of the rich public and courtiers. The rest of the time it drowned in the dirt and manure. One of the narrow alleys — Vorontsovsky — was called by local witters "cosmetic" because of the stinking piles of manure and puddles of mud. Visitors who were not used to such "odours" had to "quicken their steps and pinch their noses". Only the location of the town on the slopes of the mountains and the stony soil prevented the formation of impenetrable mud and dirt from penetrating deep into the ground. The courtyards of the manors were characterised by cramped and small spaces, and some owners had none at all. The inhabitants drained the liquid mud through ditches and gutters into mountain rivers and the sea, and used the slops to water tobacco plantations, orchards and vineyards. The pit latrines in the courtyards were rarely cleaned and disinfected. They were usually used until they were full and then buried and made into a new latrine. The result was a system of rotten stale cloaks from many yards. Disposing of foul sewage in leaky, untreated barrels was considered expensive and difficult and was in a very primitive state. The cleaning of streets and yards was resorted to only occasionally, as a last resort. At one of the meetings in 1879 members of the city council complained that Yalta would not be able to be "Russian Nice" as before, if the residents did not observe elementary measures of sanitary cleaning and disinfection. The "city fathers" considered the sanitation of streets and yards as an urgent matter that did not require delay and waiting for the allocation of funds. The lower the sanitary and hygienic conditions of the city, the less sick people would come to it during the summer season and the less money would come into the city budget.

Dirt and unsanitary conditions were even more noticeable in Melitopol, the main city of one of the mainland counties[1] [8]. The situation here reached the point of paving the streets with dung, making bricks from a poorly dried mixture of earth with grass and straw, and using for drinking water from springs flowing from under the hill with the cemetery. The city's soils were deeply soaked with a perennial layer of sewage and various organic compounds that had accumulated over decades. The streets and the market square were filled to capacity every day, especially on trading days, with vagrants, carts and carts living in the open air. This was evidenced, for example, by the report of Melitopol town doctor in 1876: "Melitopol is probably the only city in Russia, in which squares and streets served as an inn on such a huge scale. The custom of staying with horses and feeding them in the streets has taken root here to such an extent that even rich people — German landowners and other landowners — coming on their business to the city, stay in the square near the shops all day long with a van and horses. Their whole family spends the whole day in the wagon; they have a bedroom and a dining room in it. The food remains are thrown out into the square, which, together with the dung left by the horses, makes a heap of rubbish, which is left to rot in the place"[2].

The inhabitants of Melitopol often moved into the new houses in the late autumn, before the heating, and did not even let the walls dry out properly[3]. The annual spring floods of the Molochnaya River led to swamping of the banks, formation of rotten puddles and cloaks, overflowing with mosquitoes and emitting a stench. The situation was further aggravated by the dry steppe air, high temperature and humidity. As a result of all these factors, dozens and hundreds of local inhabitants were exposed year after year to various acute diseases (malaria, bronchitis, fever, fever, typhus, measles, whooping cough, inflammation of tonsils and mucous membranes, rheumatism), which often had a malignant and fatal course. In a report of 1883, the Melitopol town doctor reported about the resolution of the town council to oblige the inhabitants of one of the streets to raise the level of low-lying land so that water would not stagnate there[4]. He doubted that the idea could be easily implemented, as the cost of levelling exceeded the price of all the property of the homeowners. Dirty and stinking puddles like those in Melitopol, he said, could be found in a backwater Asian town, not in a self-respecting county town[5]. The doctor doubted

[1] SACR. F. 27. O. 1. D. 84. L. 300–301; SACR. F. 27. O. 12. D. 104. L. 43–46; SACR. F. 27. O. 1. D. 110. L. 194 at 196; SACR. F. 27. O. 12. D. 115. L. 121 at 130; SACR. F. 27. O. 12. D. 121. L. 247–250; SACR. F. 27. O. 12. D. 131. L. 228–230; SACR. F. 27. O. 12. D. 155. L. 403–408.

[2] SACR. F. 27. O. 12. D. 108. L. 149.

[3] SACR. F. 27. O. 12. D. 84. L. 300 ob.

[4] SACR. F. 27. O. 12. D. 121. L. 249.

[5] Ibid. L. 249.

the belief that prevailed for many years that the main reason for the unsanitary condition of the city and the increase in the incidence of disease among its inhabitants was the swampy banks of the Molochnaya River and rightly emphasised the main factors: inactivity and inertness of the city authorities, the low level of culture of local residents. Numerous appeals of the medical officer to the city government and county zemstvo with various proposals to improve the sanitary condition of Melitopol remained unanswered or did not lead to the expected results.

It is no secret that with such a low level of sanitation of settlements and cultural level of the population, various contagious diseases spread in Taurida Governorate year by year. They deprived dozens and hundreds of people of their strength and health, and often their lives, spared neither old people nor children, neither rich nor poor. One of the most dangerous epidemics, especially in rural areas, was the smallpox. Rarely a year passed in Taurida without its devastating outbreaks with a high percentage of deaths among children and young people. For example, in 1883, 227 out of 881 people afflicted with this disease died, and during 1891–1892 911 out of 2631 people who fell ill died[1] [2, 8]. Where could such deplorable statistics come from, if it is known that inoculations against smallpox were made in Russia since the end of the XVIII century? Let us consider several aspects. At the end of the XIX century, "humanised lymph and calf detritus" were used as smallpox vaccines[2] [2, 4, 6, 8]. Due to the small number of specially trained smallpox vaccinators, inoculations were administered by local paramedics when travelling around the counties and volosts of their district. For each successfully implemented and adopted procedure, they received remuneration — 20 kopecks from the city and 30 kopecks from the zemstvo. Feldshers were not always conscientious in the performance of their duties due to different levels of training and workload associated with the provision of routine medical care to the villagers[3] [2, 8]. In many uezds they, like doctors, lived in the main town rather than in the district, and treated their work without due love, care and patience. The lower medical staff sometimes showed such uncharacteristic traits as uneducatedness, rudeness, haste, and slovenliness to patients from peasants. The first vaccinators in Berdyansk district in the 1860s were retired soldiers who had no medical skills and treated their duties with sloppiness. Sometimes there were even frivolous dandies among the paramedics, who were not after the quality of vaccination, but after the quantity and high figures in the report, demanding money from the villagers for free vaccination. As a result, children in villages and districts were often found to have vaccines that did not take root or were not vaccinated at all. Due to the different sizes of medical stations and infrequent travelling, doctors' control over smallpox vaccination was irregular and random. The district zemstvos did not provide the medical staff with fare money, and the post station keepers did not provide horses in time. Such delays missed the deadlines for withdrawal of lymph, as a result of which it lost its power. Preparations (and not always of high quality) were sent from St. Petersburg or central provinces. Due to constant transport from place to place and hot weather, lymph was often wasted[4] [2, 8]. These problems were aggravated by the creation by the Tauride Governorate Zemstvo of its own smallpox committee with a staff of paramedics, who transmitted information about the incidence of the disease and inoculation reports not to district doctors and the Medical Department, but only to the zemstvo authorities[5].

The habits and traditions of the local population, who were sceptical of any innovations, were closely intertwined with the low qualifications of medical staff and organisational shortcomings. The Tatar population continued to live in unsanitary conditions, rarely visited baths, and almost never changed their beds and dirty clothes[6]. There were cases when a sick child was specially placed with a healthy child so that they would get over the disease as soon as possible[7]. In southern coastal villages, hou-

[1] SACR. F. 27. O. 12. D. 121. L. 429.

[2] SACR. F. 27. O. 12. D. 104. L. 221; SACR. F. 27. O. 12. D. 113. L. 87, 277–278; SACR. F. 27. O. 12. D. 131. L. 584; SACR. F. 27. O. 12. D. 155. L. 676–678; SACR. F. 60. O. 1, D. 14. L. 14.

[3] SACR. F. 27. O. 12. D. 84. L. 154; SACR. F. 27. O. 12. D. 104. L. 221; SACR. F. 27. O. 12. D. 121. L. 7..

[4] SACR. F. 27. O. 12. D. 121. L. 7; SACR. F. 27. O. 12. D. 155. L. 584.

[5] SACR. F. 27. Op. 12. Д. 84. L. 116 ob, 360 ob, 490 ob.

[6] SACR. F. 27. O. 12. D. 113. L. 89, 90, 277, 278; SACR. F. 27. O. 12. D. 121. L. 172.

[7] SACR. F. 27. O. 12. D. 113. L. 278.

ses were built in the middle of uncleaned yards, with dirt floors, in extreme cramped conditions. Such buildings were seldom ventilated, and almost always emitted the odour of rot and dampness. In 1878, Gypsies travelling from village to village contributed to outbreaks of smallpox in several places in Yalta and Feodosia counties at the same time[1]. Only thanks to the timely actions of doctors and paramedics it was possible to avoid mass mortality of Tatar children (10 out of 85 who fell ill in the Baidar Valley died).

The reason for the emergence of the epidemic in 1883 in the mainland counties was the elementary lack of police supervision and quarantines[2]. Residents continued to move freely, visiting infected houses. In the village Kostogryzovka of Dnieper district, a local priest dared to marry a girl with smallpox, who died on the third day. During visits to smallpox-affected areas, county doctors and paramedics personally and through priests or imams approached peasants and talked to them about methods of saving children from the disease. They gave free vaccinations and medicines to the villagers and persuaded them to observe elementary protective measures (to take baths, wash clothes, remove dirt, air the rooms, whitewash the walls with lime, isolate the sick in a separate room and prevent their contact with other people, fumigate contaminated things with sulphur solution or burn them)[3] [2]. In case of particularly acute and persistent outbreaks of the disease, it was necessary to send police and soldiers to villages, to set up posts of tens of policemen near infected houses, to prohibit approaching the epidemic hotbeds under threat of liability, to organise sanitary quarantines and cordons on the roads[4] [2, 4, 6].

Every year the Taurida Governorate was affected by an even more terrible epidemic that devastated cities and counties and claimed dozens and hundreds of children's and young people's lives. It was diphtheria, and at the end of the nineteenth century people did not know how to fight with it[5] [8]. In 1873 in the Feodosia and uyezd 431 people (including 368 children) fell ill, 218 died. In 1877 in the same uyezd 65 out of 180 people died, and in Dneprovsky uyezd — 354 out of 826. The following year in Berdyansk — 1463 out of 2464 all possessed by the disease, in the Evpatoria — 17 out of 19. In 1879, 867 out of 1449 died in Berdyansk, 53 out of 59 in Melitopol, and 9 out of 12 in Yevpatoria. None of the 24 who fell ill in Melitopol survived. Even in 1895, 757 people out of 2249 of all those possessed by the contagion in the province could not be saved.

From year to year reports of city and district doctors placed tearful hopes such as "All possible methods of diphtheria treatment were unsuccessful"[6] [8]. The fight against the acute infectious disease was complicated by the fact that medical science of the second half of the nineteenth century had not yet fully identified the conditions of origin and development of the disease [8]. Doctors were puzzled how an insidious disease could subside and lurk to isolated cases, so that in a few months it could flare up with even greater force than before. This was evidenced, in particular, by the report of the Berdyansk district doctor of 1879: "This disease now, as in the previous year, in late spring and summer until August is so quiet that the majority of the population willingly believed that diphtheria with all its horrors has completely stopped. But with the onset of dampness and cold the illness intensified and the despondency increased too"[7].

The epidemic constantly kept Tauride cities and villages in fear and tension, was not eradicated completely, but gave only temporary, very shaky and deceptive relief, left and returned to the same villages and families[8]. During the warm spring-summer period, when field work was going on, people were on the open area and left open doors and windows in the houses, providing a constant inflow of fresh air, the incidence

[1] SACR. F. 27. O. 12. D. 113. L. 89 ob. 90, 277, 277 ob.

[2] SACR. F. 27. O. 12. D. 121. L. 380–381.

[3] SACR. F. 27 O. 12. L. 101. L. 363; SACR. F. 27. O. 12. D. 115. L. 277, 277 ob; SACR. F. 27. O. 12. D. 121. L. 271–272; SACR. F. 27. O. 12. D. 130. L. 247.

[4] SACR. F. 27. O. 12. D. 101. L. 363; SACR. F. 27. O. 12. D. 121. L. 271–272.

[5] SACR. F. 27. O. 12. D. 84. L. 69; SACR. F. 27. O. 12. D. 108. L. 67, 68, 75, 76; SACR. F. 27. O. 12. D. 110. L. 87, 205, 334; SACR. F. 27. O. 12. D. 113. L. 6, 90, 91, 286; SACR. F. 27. O. 12. D. 115. L. 79, 120, 184, 377, 378.

[6] SACR. F. 27. O. 12. D. 115. L. 129 ob, 378, 378 ob.

[7] SACR. F. 27. O. 12. D. 115. L. 184.

[8] SACR. F. 27. O. 12. D 113. L. 220; SACR. F. 27. O. 12. D. 121. L. 2 o, 19 o, 130 o, 184; SACR. F. 27. O. 12. D. 130. L. 438, 485; SACR. F. 27. O. 12. D. 131. L. 392.

of the disease decreased. It increased with the onset of autumn rains, slush and frost, forcing locals to isolate themselves inside cramped and dirty rooms as soon as possible[1]. The doctors had to write constantly about diphtheria, "which has taken deep roots and is unfortunately uprooting many young victims among the villagers"[2]. The only thing they were able to determine unmistakably was the direct dependence of the growth of the disease on the sanitary conditions of the area, the time of year and the cultural level of the population. It developed more strongly in places where cloistered and ignorant peasants were apathetic towards disinfection measures and isolation of sick children, lived in neglected and crowded villages. In a number of villages of Melitopol uyezd, adult villagers allowed their children to visit infected houses and wear the clothes of dead children, and priests exposed the bodies of the dead in churches in open coffins[3] [8]. The rural poor were indifferent and sometimes hostile to all the measures of doctors to prevent and counteract the disease. Timid attempts to educate the peasants, to persuade them to protect at least their children from the effects of the disease, were often met with the same answer: "If God does not want it, it will not die"[4]. Disinfection in the districts was most often carried out formally, haphazardly, on an incident-by-incident basis. Premises for isolation of the sick and means to compensate for burnt clothes and property were not prepared in advance. Such hastily conducted measures did more harm than good[5]. Cases of thoughtlessness and inaction on the part of the authorities were also found in the cities[6]. At the end of 1886, members of the sanitary commission of Berdyansk city government did not believe the words of the city doctor, refused to recognise the development of the diphtheria epidemic and to take timely preventive measures in the hotbeds of infection. They came to their senses only when time was lost and the incurable disease spread throughout the city and led to numerous deaths. Seeing the futility of all measures taken and the helplessness of doctors before the epidemic, peasants refused to seek medical help in time, as a result of which catarrhal inflammations of the mucous membranes of the mouth and pharynx could develop into gangrenous form and further into diphtheria[7] [8]. The disease continued to ravage the towns and villages of Taurida Governorate every year, killing and maiming the youngest and most vigorous, especially among the poor people, who were often left without the only breadwinner of the family or their beloved children.

Despite such terrible statistics of mortality from epidemic diseases, the situation in Taurida Governorate at the end of the 19th century was not quite so gloomy and unpromising. Just at this time, positive dynamics became noticeable in a number of cases. Although doctors could not yet develop a complete set of measures to eradicate diphtheria, the first guesses about measures to prevent and combat the disease, the first successful attempts to overcome it with the least losses were already observed. From the end of the 1870s, medical personnel began to propose as temporary measures the hiring of spacious houses in villages to isolate the sick in order to create shelters with exclusively female staff [8]. They also proposed the idea of dividing villages into small sanitary districts and electing trustees from among respected literate peasants[8] [2, 8]. These officials, endowed with broad authority and real power, were obliged to go immediately to infected areas at the first rumours of an epidemic or even suspicion of it, to take the most decisive measures in the fight against disease, and to bring the guilty to legal responsibility. The duties of the social guardians included: organising such urgent measures as disinfecting dwellings, burning the clothes and belongings of the sick or dead person, isolating healthy children in a spacious room, and preventing any contact of the infected person and his caregivers with healthy people. The destruction of personal linen was carried out at the discretion of a doctor, a paramedic, or a specially selected commissioner from the district zemstvo and town council, but not otherwise than after a preliminary assessment of the property and payment of prompt compensation to the villagers.

1 SACR. F. 27. O. 12. D. 115. L. 127; SACR. F. 27. O. 12. D. 130. L. 438.

2 SACR. F. 27. O. 12. D. 113. L. 85.

3 SACR. F. 27. O. 12. D. 113. L. 220.

4 SACR. F. 27. O. 12. D 130 L. 438.

5 Ibid.. L. 438, 438 ob.

6 SACR. F. 27. O. 12. D. 113. L. 484 485.

7 Ibid. L. 85; SACR. F. 27. O. 12. D. 121. L. 381.

8 SACR. F. 27, O. 12. D. 113. L 85–86; SACR. F. 27. O. 12. D. 131. L. 228 ob; SACR. F. 60. O. 1. D. 45. L. 26, 26 ob.

The fire had to be built in such a way that it did not damage neighbouring fields and buildings. An authorised representative of the zemstvo or a sanitary trustee had to be present at the burning, and a report signed by two witnesses had to be drawn up. The room where the sick person was kept was subjected to prolonged airing and drying, the walls were re-whitewashed and painted. Furniture and household utensils were disinfected with sulphuric acid vapour and carbolic solution. The house where healthy children were isolated for the duration of the spread of the disease had to be dry and spacious enough. It had to be out of a crowded area, belong to a widow or childless couple, and have proper ventilation and heating. The children were supervised by a reliable hired woman or sister of charity. All these preventive measures, as well as punitive measures against those who ignored and failed to comply with them, were carried out in close co-operation between three components: the sanitary and medical staff, district zemstvo or town councils, and the local police.

In the late 1880s — early 1890s small sanitary stations headed by wardens or trustees, covering several neighbourhoods or up to 20 yards, were available in the cities of Evpatoria, Feodosia and Kerch, in many villages of Berdyansk[1] [7, 8]. Public controllers of "public health" reported to doctors and paramedics about the slightest suspicion of the emergence of contagious diseases among the inhabitants, especially children, carried out activities on disinfection, cleaning of yards, houses and rubbish pits, medical and health education. Their resolute activity made it possible to take timely measures against epidemics, to prevent deaths from them in many cases, to improve sanitary conditions, and to persuade the population to seek medical help more often. Gradually, specific measures were developed to alleviate the incidence of diphtheria and reduce its mortality[2] [8]. In addition to isolation and disinfection measures, silver nitrate, cold compresses on the neck, quinine solution and excitatory drugs (wine, valerian) were used. The best results were obtained by persistent inhalation of hot water vapours from an early stage of the disease and disinfection of the body every 15 minutes by gargling or swallowing chlorine or sodium salts. Unfortunately, doctors recognised this method of treatment as very long, tedious for both the patient and the caregivers, expensive and therefore not always possible. Some of the zemstvo medical staff considered that providing peasants with more nutritious food rich in vitamins and raising the general cultural level of the village were important steps in the fight against the disease.

On the part of the Taurida Governorate and district zemstvo boards, measures against the spread of diphtheria consisted in allocating considerable sums of money to compensate the poor for destroyed property, organising burnings and disinfection, remuneration to commissioners, hiring isolation rooms and carers. It also took a lot of effort and money to send specially trained sanitary detachments to the infected areas. Only the participants of the Tauride provincial zemstvo meeting of 1880 allocated 5000 rubles for the organisation of burning of things and other measures to prevent the spread of diphtheria and another 10 000 rubles for general measures such as disinfection and isolation[3]. If the funds from the reserve treasury ran out and the epidemic persisted, the chairman of the provincial zemstvo had the right to call an Extraordinary Provincial Zemstvo Assembly. At joint meetings of the members of the provincial zemstvo and doctors, it was proposed to select one large and most populous place where the disease was developing as a testing ground and to send there a sanitary detachment consisting of a doctor, two paramedics and three sisters of mercy, who were not constrained by any instructions. To facilitate the registration of cases, special forms were introduced to record the name and age of the patient, time of onset, methods of treatment and outcome.

Not the least role in improving the sanitary condition of various institutions and places in Taurida Governorate was played personally by the provincial medical inspector, State Councillor Fyodor Fedorovich Bruns, who made annual inspection trips and checks (Fig. 1). In 1867 he inspected the "military half-hospital" in the district town of Perekop, "free pharmacies" in Perekop and Yalta[4]; in 1869 — pharmacies in

[1] SACR F. 27. O. 12. D. 131. L. 120, 121 SACR. F. 27. O 12. D. 155. L. 509–510, 555, 555 об, 675; SACR. F. 27. O. 12. D. 353. L. 84, 103; SACR. F. 27. O. 12. D. 393. L. 81, 87.

[2] SACR. F. 27. O. 12. D. 104. L. 75, 76; SACR. F. 27. O 12. D. 115. L. 184–185, 388 .ob.

[3] SACR. F 60. O. 1. D. 44. L 15.

[4] SACR. F 27. O. 12. D 84. L. 56 ob, 229 ob, 230.

Fig. 1. F.F. Bruns. 1860–1870-th photo. Simferopol, the Crimea. From Euler`s private collection

Рис. 1. Ф.Ф. Брунс. 1860–1870-е годы. Крым, г. Симферополь. Фото из частной коллекции семьи Эйлеров

Karasubazar and Berdyansk[1]; in 1874 — medical institutions of Melitopol[2]; the following year — them and Levitan's pharmacy in Yalta[3]. When the inspector examined the Kerch pharmacies in 1879, he found that they were in satisfactory condition and did not reveal any significant shortcomings[4]. He recorded many disturbances (disgusting condition of cesspits, garbage-filled yards, supplying water to the Jewish bathhouse from the sewage ditch, selling expired fish) when he inspected the town of Karasubazar (nowadays Belogorsk) by order of the governor[5]. Another inspection of the pharmacy of this city inspector conducted in 1883[6]. In the same year F.F. Bruns during his inspection of Yalta recorded a lot of sanitary violations in the city slaughterhouse, where a large number of cracks in the cemented floor stank of blood and manure, and excrement went down the chute into the sea[7]. The unbearable odour in the room could make bystanders cramp, vomit and feel dizzy. He immediately informed the members of the sanitary commission of the city government of these deficiencies and ordered them to be remedied without delay. The doctor also inspected the recently closed city hospital and was convinced that its premises were cramped and dilapidated, the floors were rotten, the roof leaked, the doors did not close tightly, and there was a shortage of medicines, linen and clothing. The medical inspector demanded from the city and district authorities to open a hospital in Yalta which would be worthy of the city's status as a resort town. On the instructions of the city government or the initiative of local doctors known in the province doctor repeatedly conducted audits and inspections of the bazaar, yards, streets and various establishments in Simferopol. He was one of the first to declare to the public about the need for the provincial city to develop its own set of sanitary regulations. Thus, F.F. Bruns personally contributed to improving the development of medicine and sanitary affairs in Taurida Governorate.

The long-standing idea of creating provincial coordinating bodies was realised in 1894, when the Taurida Governorate Zemstvo established the Taurida Medical Council and Sanitary Bureau[8] [2, 3]. The council consisted of the chairman of the provincial zemstvo, two representatives (a physician and a zemstvo member) from each district and a sanitary doctor — secretary. Sometimes the provincial inspector and the chief doctor of pious places could be admitted to the meetings. The main powers of this structure included: the comprehensive consideration of issues related to the medical system of the province; coordination of smallpox inoculation and epidemic control; compilation of a report on the state of the zemstvo medicine system once every three years. Its main tasks were proclaimed to be "generalisation of district medical organisations, assistance to them and proper development of zemstvo sanitary affairs in the province". The Medical Council met as cases

1 SACR. F. 27. O. 12. D. 87. L 133 ob, 339.

2 SACR F. 27. O. 12. D. 101. L 179.

3 SACR. F. 27. O. 12. D 104. L. 39 ob, 47, 47 ob.

4 SACR. F. 27. O. 12. D 115. L. 84.

5 SACR. F. 26. O. 1. D. 26995. L. 113 ob.

6 SACR. F. 27. O. 12. D. 121. L. 39 ob.

7 SACR F. 27. O. 12. D. 121. L.285–288.

8 SACR. F. 27. O. 12. D. 353. L. 100, 101, 103; SACR. F. 27. O 12. D. 393. L. 86–88.

accumulated, but at least three times a year. The Sanitary Bureau, which consisted of one doctor and three counters, printed "Journals of the meetings of the Tavrichesky Medical Council", distributed medical brochures on measures to combat diseases, prepared monthly summaries of the progress of contagious diseases, developed projects of proposed improvements and changes in the districts, was engaged in the compilation of annual provincial reports, processing of statistical data, weekly transmission of data on sanitary inspections of cities. Its monthly bulletins, in addition to current information and statistics, began to publish the works of local physicians of a scientific and practical nature. For the first time, reports on the current state of local zemstvo medicine were introduced into practice, debates on the most acute problems: smallpox vaccination, measures to combat diphtheria, syphilis and other dangerous diseases, the system of providing the rural population with permanent medical care, prescription of medicines from abroad. After the establishment in Simferopol all-Gubernskiy controlling bodies stopped the transfer of reports and reports made in dozens of ways. It became much easier to control the development of epidemics, to observe their dynamics by months and take timely preventive measures, to determine the number of doctors and paramedics, the size of medical plots, to conduct district and provincial sanitary measures. The powers of doctors and sanitarians became clearer and more defined, and sanitary-executive commissions were established in each uyezd and in a few cities.

CONCLUSION

To sum up the development of the medical system in Taurida Governorate in the late 1860s — early 1890s, it can be noted that it became more and more organised, systematic and orderly every year. The connection with modern science was more and more closely established, the latest ways and methods of disease control were introduced. Doctors began to pay more and more attention to sanitary business and the collection of current statistics, realised the need for one-person reporting and the creation of centralised coordinating bodies in Simferopol. Ordinary people in towns and villages developed more trust in medical personnel, especially specially trained paramedics and nurses. Taken together, this led to a significant reduction in mortality and marked a significant advance in the development of medical science and practice. Not the least role in this process was played by the multifaceted active work of the provincial medical inspector F.F. Bruns.

As a proof of the undoubted effectiveness of many years of work of Taurian doctors in the "public health" one of the reports of the Society of Simferopol doctors of 1895 can be cited [5, 8]. During the diphtheria epidemic raging that year, three vaccines were successfully tested on children and led to favourable results. Their developers were the St. Petersburg Imperial Institute of Experimental Medicine, the prominent French epidemiologist Louis Pasteur and the German physician Emil Adolf von Behring, who was awarded the first Nobel Prize in physiology and medicine in 1901. The use of these serums gave hope of defeating the dangerous epidemic in the near future and once again convinced the medical profession that all their efforts had not been in vain.

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REMEMBERING THE TEACHERS

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ABSTRACT. The article is dedicated to the memory of two outstanding Russian hygienists with complex destinies and features of characters, who had crossed life paths and were accompanied by radical scientific contradictions. First of them is Professor Grigory V. Khlopin (1863–1929), until 1917 — full state councilor, holder of the Order of St. Stanislav and two orders of St. Vladimir, in Soviet times — Honored Scientist of Russia, founder and head of several departments of higher learning in the country, author of many manuals, textbooks and monographs. Khlopin was the first in our country to develop a training program for sanitary doctors and introduced it at his educational department already in 1912. During the First World War, on behalf of the Artillery Directorate of the General Staff, he organized an Anti-Gas Laboratory at the department, which developed effective means of protection in case of chemical warfare. G.V. Khlopin completed his career at the Military Medical Academy, where he headed the department of hygiene. Another outstanding hygienist to whom this article is also dedicated is Professor Zakhary G. Frenkel (1869–1970), whose life also took place in two contrasting eras. Until 1917, he was a graduate of Dorpat University, an active figure in the area of zemstvo medicine — clinician, epidemiologist, demographer, deputy of the 1st State Duma, member of the Central Committee of the Constitutional Democrats Party. In Soviet times, Frenkel was the organizer of the Hygiene Department at the City Museum, the founder and head of two departments at the Institute for Advanced Medical Studies, Social and Communal Hygiene, an academician of the USSR Academy of Medical Sciences, and a long-term leader of the Leningrad Society of Hygienists and Sanitary Doctors. Z.G. Frenkel considered the main work of his hundred-year life to be the monograph “Life extension and Active Aging”, which is considered the “bible” of social gerontology. The article contains little-known facts from the biographies of these two outstanding scientists, presents the nature of their scientific disagreements, arising, among other things, from complicated characters, which adds non-standard colors to their portraits.

KEYWORDS: G.V. Khlopin, Z.G. Frenkel, outstanding hygienists, destinies in two epochs, scientific achievements and contradictions, character traits

ВСПОМИНАЯ УЧИТЕЛЕЙ

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РЕЗЮМЕ. Статья посвящена памяти двух выдающихся отечественных гигиенистов со сложными судьбами и характерами, жизненные пути которых пересекались и сопровождались при этом радикальными научными противоречиями. Первый из них — профессор Григорий Витальевич Хлопин (1863–1929), до 1917 года — действительный статский советник, кавалер ордена Св. Станислава и двух орденов Св. Владимира, в советское время — заслуженный деятель

науки России, основатель и заведующий несколькими кафедрами в стране, автор многих руководств, учебников и монографий. Хлопин впервые в стране разработал Программу подготовки санитарных врачей и внедрил ее на своей кафедре уже в 1912 году. В период Первой мировой войны по поручению Артиллерийского Управления Генерального штаба организовал на кафедре Противогазовую Лабораторию, которая разработала эффективные средства защиты на случай химической войны. Завершил свой жизненный путь Г.В. Хлопин в Военно-медицинской академии, где заведовал кафедрой гигиены. Другой выдающийся гигиенист, которому посвящена эта статья, — профессор Захарий Григорьевич Френкель (1869–1970), жизнь которого протекала также в двух контрастных эпохах. До 1917 года он, выпускник Дерптского университета, активный деятель земской медицины — клиницист, эпидемиолог, демограф, депутат Первой Государственной Думы, член Центрального Комитета партии Конституционных демократов. В советское время Френкель — организатор Гигиенического отдела в Музее Города, основатель и руководитель двух кафедр в Институте усовершенствования врачей, социальной и коммунальной гигиены, академик АМН СССР, многолетний руководитель Ленинградского Общества гигиенистов и санитарных врачей. Главным трудом своей столетней жизни З.Г. Френкель считал монографию «Удлинение жизни и активная старость», которая считается «библией» социальной геронтологии. Статья содержит малоизвестные факты биографий этих двух выдающихся ученых, представляет характер их научных разногласий, вытекающих, в том числе, из сложных характеров, что добавляет нестандартных красок в их портреты.

КЛЮЧЕВЫЕ СЛОВА: Г.В. Хлопин, З.Г. Френкель, выдающиеся гигиенисты, судьбы в двух эпохах, научные достижения и противоречия, свойства характеров

On 16th April 2024 ***Alexander Pavlovich Scherbo*** *— Doctor of Medical Sciences, Professor, Corresponding Member of the Russian Academy of Sciences, Honoured Worker of Higher Education of the Russian Federation, prominent Russian hygienist and teacher — is* ***80 years old****!*

Alexander Pavlovich is the author of more than 600 scientific publications, including about 50 books. He prepared 11 doctors and 16 candidates of sciences. He wrote the monographs "Grigory Vitalievich Khlopin. Leafing the pages of history" (2006) and "Zakhary Grigorievich Frenkel. A Century Long Life" and was awarded the N.A. Semashko Prize of the Russian Academy of Medical Sciences in 2012 .

We heartily congratulate Alexander Pavlovich, a member of the Editorial Board of our journal, on his jubilee, wish him good health and many years of fruitful work! The article published here about outstanding Russian hygienists partially reflects the life path of the jubilee.

I dedicate these notes to my teachers — of course, not only my teachers — and, unfortunately, to those who are gone. They are Professor Grigory Vitalievich Khlopin (1863–1929, 66 years old), Honoured Scientist of the RSFSR, and Professor Zakhary Grigorievich Frenkel (1869–1970, 100 years old), Academician of the Academy of Medical Sciences of the Soviet Union — also because they were my predecessors in the walls of the "Khlopin's" hygienic department at the building number 41 in Kirochnaya Street. Why so casually — "within the walls" — I will explain a little later, there is a small historical mishap here.

Usually such articles are written on the days of anniversaries and personally to the jubilarians. Here, outside the jubilee dates, I will try to remember two great scientists, whose lives took place in very contrasting eras and intersected, sometimes dramatically, in scientific, official and social terms. To remember, perhaps in a somewhat updated perspective, two outstanding people who had political problems both "before" and "after", managed to preserve themselves during the Soviet years, and, in addition, at the beginning of the last century worked under the same roof.

However, other dates are also contribute to these notes: last year 2023 marked the 160th anniversary of G.V. Khlopin's birth, and this December we can celebrate the 155th anniversary of Z.G. Frenkel. It is probably worth remembering the death of G.V. Khlopin on 30th of July 1929 — he will be 95 years old — which caught up with him suddenly, at his desk, while preparing documents for election to the Academy of Sciences of the USSR. Let me remind you that the Academy of Medical Sciences was not yet.

Alas, for an outstanding scientist this election (which he undoubtedly deserved) did not happen.

Fig. 1. Grigory V. Khlopin

Рис. 1. Григорий Витальевич Хлопин

However, two years earlier, the Council of People's Commissars awarded the scientist the honorary title of Honoured Scientist of the RSFSR, which in those years was very rare and had an exceptionally high public status. His biography was published, and among the congratulations, a solemn letter from the hygienists of Leningrad, signed by a group of specialists headed by Professor Zakhar Frenkel, *Chairman of the Society of Sanitary Workers and Epidemiologists*, stood out.

The achievements of Grigory Vitalievich in the field of scientific hygiene, training of specialists and sanitary practice do not need to be described here, they are widely covered in the literature, including the books of the author of this article. In this article I will bring only some bright facts of his biography. For example, Khlopin's intellect, pen and energy belonged to the first in Russia "*General programme of courses for training of sanitary doctors*", with the initiative of implementation in the practice of teaching which he came forward in 1912. It was implemented in his department starting from the spring semester of the same year.

Grigory Vitalievich Khlopin (Fig. 1) founded the Department of Hygiene with General Bacteriology at the Imperial Clinical Institute of the Grand Duchess Elena Pavlovna in 1906[1]. Subsequently, the chair became the progenitor of other educational units of the prophylactic vector. First courses, then full-fledged departments, which later developed into the Faculty of Sanitation and Hygiene; in the later St. Petersburg Medical Academy of Postgraduate Education (SPbMAPO) — the Faculty of Public Health, the dean of which I had the opportunity to serve for several years.

It is clear that I could not be a direct disciple of G.V. Khlopin, because the maestro of hygiene died before the war, and I was born only in the penultimate year of the war, and for another seven years, at least, I did not study sciences, especially medicine. At the same time I happened to be a follower of his departmental work and therefore partly a pupil for three decades. When from the end of the 70s of the last century and in the first decade of this century together with the team we continued to master the science of hygiene, including primary sources, the departmental library kept the manuals created by G.V. Khlopin, with edits and notes by his hand.

Let me note that Grigory Vitalievich for a relatively short period of creative life published scientific texts... 5736 (!) typographical pages, or about 560 printed sheets of fundamental scientific works alone. This is an incredible scale even for today's major figures of the scientific world. Such legacy of G.V. Khlopin are four volumes of "Methods of Sanitary Research", three volumes of "Fundamentals of Hygiene", textbook "Course of General Hygiene", manual "Military and Sanitary Fundamentals of Gas Masking" and a number of others. When at writing a monograph about him and compiling a list of his works I myself began to count, the volume of his works, without reprints, amounted to more than seven thousand pages [7]. Productivity due to diligence, erudition and organisation is fantastic.

I will notice, that Khlopin published his capital works without co-authors (which, probably, could be, and were, his employees) that speaks, on the one hand, about encyclopaedic own knowledge of the scientist, and on the other hand — about some properties of the character which we also will mention.

Let's pay attention to the fact that Grigory Vitalievich, being a professor of hygiene at the Odessa University, was elected there also the Chairman of the port sanitary trusteeship, and in this capacity he showed himself as a promising organiser and leader. And that is why in 1904 he was invited to St. Petersburg not at all to organise a chair in the Eleninsky Institute, but to the post of head of the

[1] On the website of the I.I. Mechnikov North-Western State Medical University (NWSMU) in the section "History of the Department of Communal Hygiene" the year 1806 is erroneously indicated.

medical and sanitary part of the educational institutions of the Ministry of National Education.

Among the thirteen ministries under the wing of Prime Minister S.Y. Witte there was no Ministry of Health, these functions were performed by various departments of the Ministry of Internal Affairs. There were chronic reorganisations of the sector of "public health", not quite successful and, probably because of this, in the Ministry of Public Education it was decided to create its own medical and sanitary part, to organise and head which was invited G.V. Khlopin. At the same time he began to teach as a professor of the hygiene department of the St. Petersburg Women's Medical Institute. Grigory Vitalievich remained an official of rather high rank until 1911.

In the same year, 1904, the Imperial Clinical Institute of the Grand Duchess Elena Pavlovna held a meeting of teachers, which decided to petition for the establishment of a department of hygiene with general bacteriology. In September of the same year, the highest permission to establish the department was received, and the new anatomical-hygienic building was laid, where the department existed on the first floor for 105 years [2], until it was disbanded in connection with the merger of the St. Petersburg Medical Academy of Postgraduate Education (SPbMAPO) and the I.I. Mechnikov State Medical Academy. I.I. Mechnikov State Medical Academy (GMA) in 2011. Professor G.V. Khlopin, already a well-known scientist and at the same time, as we know, a state official, was invited to head the department. The official milestone of the beginning of the department's activity is autumn 1906, when the course of chemical and bacteriological methods of sanitary research and practical classes began. Until 1912, the training at the department was conducted by clinicians; the training of sanitary physicians according to the programme developed by Khlopin, as indicated, began in 1912.

Grigory Vitalievich, awarded the Order of St. Stanislaus and two orders of St. Vladimir, was a significant figure in the capital, so it was not difficult for him to attract to teaching large and well-known experts and public figures, such as the deputy of the State Duma A. I. Shingarev[1] (basics of the State Duma). I. Shingarev (basics of public medicine), S.K. Dzerzhgovsky (questions of disinfection), D.K. Zabolotny (epidemiology), G.Y. Yavein (cholera, typhuses), G.D. Belonovsky (doctrine of immunity). Among them was the former deputy of the First State Duma, Z.G. Frenkel, who, being an experienced zemstvo worker, read the organisation of practical medicine. Thus, the work of the future academician began here in 1911.

It should be noted that the beginning of practical activity of G.V. Khlopin's eldest son — an outstanding Russian radiochemist, Hero of Socialist Labour, three times laureate of the Stalin Prize, Academician of the USSR Academy of Sciences, Professor Vitaly Grigorievich Khlopin (there is a street named after him, as well as the Radium Institute named after him, which he headed for many years, in modern St. Petersburg), who in the tenth years of the twentieth century, being a student of the University, worked as a lecturer at his father's department.

The First World War that broke out dictated its own imperatives: after the Germans used poisonous substances, a Chemical Committee was organised under the Main Artillery Directorate of the General Staff. The presence in the Clinical Institute of the Department of Hygiene, headed by G.V. Khlopin, who had a background in physics and mathematics at the Faculty of Physics and Mathematics of St. Petersburg University and the Faculty of Medicine of Moscow University, served as a basis for the Chemical Committee to appeal to the management of the Institute with a proposal to organise a gas mask laboratory at the department with the manufacture of protective equipment, for which the appropriate funds were allocated. The head of the Laboratory was G.V. Khlopin, who was then, among other positions, the Chairman of the Advisory Commission of the Chemical Committee; the executors were the future Academician of the USSR Academy of Sciences, Professor N.D. Zelinsky, engineer K. Kummant and a number of other specialists close to the subject of activity.

Directives on the development of one of the products — a new design of gas mask (mask, filtering elements, etc.), abound with the words "immediately", "in view of the urgency of the matter", "the matter is extremely urgent", "immediately", including orders to organise the so-called fumigation to test the reliability of gas masks. On this matter, for example, the directive was given, literally, on Sunday, for discussion on Monday and submission of proposals for the General Staff on Tuesday. The document bears an unsigned visa consisting of a single word — "Executed". The Khlopin's handwriting. The war. The tension is unbelievable.

[1] He was zemstvo doctor, public figure, participant in the revolutionary events of 1905-1907, specialist in public medicine, hygiene and sanitation. He was killed by sailors in 1918.

In the monograph on Khlopin in this place I allowed myself this paragraph in brackets and small italics: “Ironically, some fifty years after the First World War, the author of these lines, still far from being a doctor, after sergeant’s school in Osinovaya Roscha, served as a conscript in the Polar North (1963–1966) — as a chemist-instructor-dosimetrist — organised training of soldiers with gas masks, including the very fumigation — with chloropicrin — to test the effectiveness and readiness of gas masks for combat use”. Today I will complete this paragraph: the Zelensky-Khlopin gas mask, developed at that time in the Antigas Laboratory, was, as at its creation, effective and remained in service with the Soviet Army for more than fifty years (!). And I, being a soldier at that time, could not think that I would work for 33 years in the walls of the department where this most reliable gas mask was created, and that I would write articles and books about its creator.

In 2000 Khlopin’s department received a kind of greeting from the Antigas Laboratory of 1915–1916. The department in those days was partitioned along the boards covered with polythene: on one side classes were going on, on the other side, accompanied by various unnecessary sounds for the educational process — that day in the office of assistant professors was undergoing repairs.

Suddenly, I got a phone call in the rectorate, and one of the staff members, in a state of great excitement, reported: while knocking off numerous layers of old plaster, the workers discovered a large safe in the wall.

Remembering the history of the department, I smelled something wrong, forbade to touch the safe and said that in a minute I would be at the department — well, just run across the courtyard. When I burst into that office, I saw the picture shown on the photo. The staff didn’t touch the safe, but the workers were not subject to our prohibitions, even if they were vice-rectors: with crowbars they somehow twisted the rusty safe out of the wall (gold, diamonds!!!) and managed to open the door (Fig. 2). The jewellery was gone.

In the safe, which was still pristinely clean inside, we found several yellow wooden tripods with wide sockets, glued inside with soft felt. In the sockets were several half-litre vials with lapped corks and the inscription “Mustard gas”.

I do not remember whether I was cold or not: I must suppose that the brown, thick liquid in the vials was mustard gas. One vial was

Fig. 2. A safe from 1915, removed from the wall in 2000

Рис. 2. Сейф 1915 года, извлеченный из стены в 2000 году

empty and half broken, or perhaps it had burst sometime without mechanical intervention. But when? The thought of several premature deaths of relatively young employees in the 1950s–1960s flashed through my mind...

The find was handed over to the invited experts of the Ministry of Emergency Situations, and the staff of the department, as well as the workers who had opened the safe without authorisation, could only be glad that the vials had not been broken during this procedure...

* * *

...We are also grateful to Grigory Vitalievich Khlopin for two outstanding sons, Vitaly and Nikolay, the elder of whom, Vitaly, has already been mentioned. Out-of-town listeners often asked: “Is Khlopin Street named in honour of Grigory Vitalievich?”. I had to explain: “No, in honour of his son — Vitaly Grigorievich”, — and remind about this great scientist with a bright, relatively short life and dramatic fate.

There are many images of the outstanding radiochemist with many awards on his chest in the Internet, but I chose this one for publication (Fig. 3). A beautiful spiritualised face, reminis-

Fig. 3. Vitaly G. Khlopin

Рис. 3. Виталий Григорьевич Хлопин

cent of his father's portraits, but the features are more subtle, from his mother — a high forehead of a gifted man and a sad look through the glasses. It is as if he foresees his unique fate...

It should be noted that before the revolution Vitaly graduated from Göttingen and St. Petersburg universities, as a promising radiochemist was noticed by V.I. Vernadsky, became his assistant and follower, for the first time in 1922 received domestic radium, succeeded in works on radiochemistry of plutonium, which in the late forties was very relevant, for which he was repeatedly awarded. We will return to Vitaly Grigorievich, after a few words about his remarkable younger brother.

Nikolai Khlopin, like his father, acquired two similar higher educations: he graduated from the Faculty of Physics and Mathematics of the Petrograd University and the Military Medical Academy. Moreover, he studied in these universities at the same time! Nikolai Grigorievich's creative life was mainly connected with the Military Medical Academy (MMA), but he also worked at the Institute of Experimental Medicine (IEM), the Leningrad Sanitary and Hygienic Medical Institute (LSHMI), and the Institute of Oncology. As an outstanding morphologist, he worked alongside Academician A.A. Zavarzin of the USSR Academy of Sciences; co-operating and competing, they created two non-contradictory theories of tissue development, which to this day, integrated by modern scientists, serve as the basis for new research in this delicate field of biology. In 1945, being the Head of the Histology Department of the MMA, Nikolay Grigorievich was elected Academician of the Academy of Medical Sciences of the USSR, and in 1947 he was awarded the Stalin Prize of the first degree.

After being elected at the end of the eighties as head of the Khlopin's department of the State Institute for Advanced Medical Education, I began to actively dig into its history, delve into the archives, ask old men-hygienists about the descendants of Khlopin. In this environment somehow settled opinion that the outstanding sons of the "main" Khlopin children were not and, therefore, the family name dried up. Moreover, nobody knew where the elder Khlopin (!) was buried. Fortunately, one of the veterans (if I remembered who, I'd give a virtual earthly bow today) dropped then, is not the descendant of the famous family historian Khlopin, with whom he once crossed? That was already something!

Today you can type "Igor Nikolaevich Khlopin" in a search box and get a small article about him in Wikipedia. But then through my university friends I got the phone number of an unknown archaeologist Khlopin, called and introduced myself. Igor Nikolaevich at the other end of the line was not very nice at first; then I learnt that for some reason he did not like to talk about his father — there was some deep resentment for him connected with his work in the MMA.

I managed to ask for a visit. It was 1992, Igor Nikolayevich was only 62, but, unfortunately, he had only a couple of years to live. But then he was full of vigour, he introduced me to his wife Lyudmila Ivanovna, also an archaeologist, but who, unlike her husband, a doctor of historical sciences, had only defended her candidate's dissertation. Igor Nikolayevich was charming and witty, he asked about the department, which was founded by his grandfather. Finally, I learnt that "our" Khlopin was buried in the Smolensk Orthodox Cemetery.

To my surprise, Igor Nikolayevich gave me the original of this photograph of his father (Fig. 4) with a gift to him, which, I think, is published for the first time. In case the inscription is not discernible: "*To dear Igor with good hope from Dad. 9.IX.47*".

For the museum of the Leningrad State Institute for Advanced Medical Education, Igor Nikolaevich did not spare unique relics preserved from his grandfather: his doctor's badges on silver with eagles and snakes, an inkstand, an

Fig. 4. Nikolai G. Khlopin

Рис. 4. Николай Григорьевич Хлопин

honourary badge “To a Friend of Dobrokhim” and several welcoming addresses. I dared to ask if the orders of St. Vladimir and St Stanislaus, which were awarded to G.V. Khlopin in the Tsarist times, had been preserved.

Igor Nikolaevich regretfully replied that there were only the so-called “frachnye” rosettes to these orders (miniature copies of awards to wear instead of orders). And the orders themselves during the siege of Leningrad were exchanged for food for starving family members. And I thought then: it was a pity, of course, the original Khlopins orders (their copies were exhibited in our department until her “demise”), but this regret dissolved in the bright consciousness that the great hygienist and man, through the years, perhaps saved his descendants from starvation. I didn’t dare to ask for the rosettes at that time.

Igor Nikolaevich also explained that he has two sisters (!), i.e. daughters of Nikolai Grigorievich and granddaughters of the great hygienist. The elder one, Natalya Nikolaevna (she was born in 1928), is from the second marriage, and the younger one Tatiana Nikolaevna (she was born in 1931) is from the third marriage. I got the coordinates of Tatiana Nikolaevna.

Igor Nikolaevich also told me a lot of interesting things about his great uncle who was a radiochemist. There were no descendants at him, apparently, therefore it was considered, because of his popularity, that there is no continuation of a sort of Khlopins. The uncle, as we know, was engaged in defence research of radioactive substances; according to Igor Nikolaevich, in the twenties of the last century he even carried a test tube with radium in his breast pocket (!). The dangers of radium were not fully known at that time; it was even used in medicinal mixtures, and because it glowed, it was also applied to the numerals of wristwatches.

We know that two-time Nobel laureate Marie Curie discovered radium at the beginning of the century. She worked with it throughout her life, but died of radiation disease only in 1934. Only by this time the danger of radium to health became quite obvious; hence it is clear why the outstanding scientist in the 1920s so tolerant, if not to say frivolous, treated this relatively new element of the Mendeleev table.

Vitaly Grigorievich was an unusually modest and closed person, apparently because of the categorical secrecy of his existence. From conversations with Igor Nikolaevich it turned out that he knew nothing about his uncle’s first marriage and the fate of his wife. However, in that marriage there was a daughter who died at the age of eight, which the uncle-radiochemist experienced severely. He surmised that her death was related to the consequences of his work. After this drama, Vitaly Grigorievich categorically did not want to have children. And he did not have any.

His second marriage was no less dramatic. His wife, Maria Alexandrovna Pasvik, was his employee and life partner until the end of his days. Their marriage was complicated by Maria Alexandrovna’s large family — three sisters and brother, they were disadvantaged in terms of mental health. In particular, her brother posed himself as Nikolai II, which was not quite convenient in the 1930s-1940s, and the younger sister died in the 3rd Psychiatric Hospital, and the anti-soviet nature of her delusions caused V.G. Khlopin a great deal of troubles. It is necessary to believe that this extremely difficult family environment, together with dangerous work, took away a lot of health from the scientist. Nevertheless, he fully supported everyone, including payment for a rented flat for his wife’s relatives. In 1945 Vitaly Grigorievich suffered his first stroke, after which he did not fully recover; strikingly enough: being the director of the institute, out of modesty, he refused a personal car (!), which added drama to his last hours.

On the 10th of July 1950 he died in a tram on his way to work; as Igor Nikolaevich told me, the passengers decided that the man was drunk,

took him out of the tram and put him against a fence to have a rest...

Nobody knows when the ambulance arrived. Pathological diagnosis was massive haemorrhagic stroke. Chronic radiation disease. He was only 60 years old. He was buried in the tomb of the Alexander Nevsky Lavra.

...Talking about his older sister (on his father's side), Natalia Nikolaevna, Igor Nikolaevich did not say much about her; she was a pathologist, and he did not say what happened to her family[1]. As for his younger sister, Tatiana Nikolaevna, Igor Nikolaevich was not reassuring: she was old, lonely, unsociable, lived with an unmarried adult son who had something wrong with his head. Everything was later confirmed: Tatiana Nikolaevna spoke to me very sparingly on the phone and refused to meet me. But a decade and a half later I saw her...

...In 1995 SPbMAPO was headed by the future academician N.A. Belyakov (I got fewer votes at the rector's election) — an outstanding (in my opinion) scientist, leader and person. I became the first vice-rector, vice-rector for academic work. The 12 years of joint work with Nikolai Alekseevich in the rectorate at that difficult time for the country were the best years of my life.

The new rector was very reverent about the history of the Institute and infected his whole team with this enthusiasm. The house church was revived, several collective monographs about the Institute of the previous years were written and published, the main lobby was decorated with a gallery of picturesque portraits of major scientists, our predecessors (including G.V. Khlopin), and a large picture of the Grand Duchess Elena Pavlovna, the founder of the Imperial Clinical Institute.

By this time I had visited the grave of G.V. Khlopin in the Smolensk cemetery and found it in a deplorable condition: behind the light fence, a simple shell was visible, and the cross, which had fallen off, was leaning against the fence. I took some photographs to present them to the Rector. It was clear that the grave, unfortunately, was not visited by anyone.

Fig. 4. Monument to G.V. Khlopin at the Smolensk Cemetery

Рис. 4. Памятник Г.В. Хлопину на Смоленском кладбище

On our initiative, the burial place of G.V. Khlopin was taken under state protection, and we were assured that in the near future reconstruction of the cemetery Khlopin's grave would be moved to the Pantheon of burials of great people who found their resting place here. "A long tale is told...", but we managed to get the grave preserved in its original place. As we now know, no Pantheon was created.

In 2004, Nikolai Belyakov decided to create a monument on the grave (to replace the tombstone, which was almost destroyed by time). The monument was made of red granite with a bronze bas-relief of the deceased designed by Svetlana Sergeevna Platonova (1941–2018), a member of the Union of Artists of the Russian Federation, professor at the Stieglitz Academy. The monument was erected, opened and consecrated during the celebration of the 100th anniversary of the Department of Medical Ecology and Epidemiology named after G.V. Khlopin. G.V. Khlopin in September 2006 (Fig. 4).

In my opinion, while embodying the new monument, the sculptor used the motif of the tombstone of the hygienist's son, radiophysicist

[1] My close friend and colleague at the Russian Academy of Sciences Nikolai Milievich Anichkov did not clarify the situation today either, informing only that at the Department of Pathological Anatomy, which he headed for many years, Natalia Nikolaevna Khlopina really worked as a physician-projector in the 1980s. Nothing is known about her family status and possible descendants.

V.G. Khlopin in the Alexander Nevsky Lavra (the photo is available on the Net, everyone can compare it). This similarity cannot be regarded as a drawback, on the contrary, there is a symbolic continuity, albeit with a reverse "vector". Apart from hygienists of our city, the opening of the monument was attended by high guests from Moscow: Academicians N.F. Izmerov, N.V. Rusakov, Professors B.A. Revich, M.V. Fokin and other major hygienists.

The granddaughter of G.V. Khlopin Tatiana Nikolaevna, whom I had not been able to meet before, also responded to the invitation: the elderly woman laid flowers at the monument to her grandfather, but she avoided visiting the department of his name and generally avoided communication as before... Now her ashes rest here, as evidenced by the granite slab at the foot of the stele. On the photo we took on the day of the opening, there is no memorial slab yet.

For many years in a row, the department acted as the organiser of the annual scientific conference "Khlopin Readings" with the publication of a collection of publications on the subject of the next meeting. On this day, usually in June, we together with doctors visited the grave of our founder, said the appropriate words and laid flowers. "Khlopin Readings" were held until the merger of the two institutes in 2011; the last, XXXXIV conference was held that year. Probably, it would not be superfluous for the hygienic departments of I.I. Mechnikov North-Western State Medical University to revive this tradition in memory of our common teacher.

* * *

...I could still be a student of Academician Z.G. Frenkel (though, also rather conditionally). I remember the 24th of December 1969, the department of communal hygiene of Leningrad Sanitary-Hygienic Medical Institute under the leadership of a remarkable front-line soldier Professor Vladimir Afanasievich Rudeyko and myself, a six-year student, a member of the student scientific society at this department. Since, I was going to continue my education under the wing of Vladimir Afanasievich after receiving my diploma, I devoted my extracurricular time to work at the ancient laboratory of the department: that day I was doing some experiments on chlorine absorption of water.

My assistant Mira Nikolaevna Kuklina; my, not afraid of this word, charming curator, putting on a fur coat, asked me if I wanted to go together with the teachers to the Military Medical Museum to honour the 100-year-old academician Z.G. Frenkel. I had already heard something about long-lived Frenkel and his works from the course of social hygiene, from the examination of which Professor E.Y. Belitskaya had generously released me, but I did not attach due importance to the event and did not join the department. I would have known then that in 40 years I will have to write a monograph about the scientist of considerable thickness [8].

And then, in the Military Medical Museum, where after an abyss of years a remarkable servant of the history of military medicine Igor Petrovich Kozyrin helped me to collect materials about Frenkel, I could see how 100-year-old Zakhar Grigorievich, despite the fact that he was blind, went up to the third floor and within forty minutes read a witty and bright lecture. And everyone in the hall became his students, including the fifth-year student Rashid Bakhtiyarov, who devoted his whole life to preserving the memory of the outstanding scientist. And I could not become Frenkel's "student" at that time. But then I made up for lost time.

* * *

In 1918, Grigory Vitalievich Khlopin accepted the offer of the Military Medical Academy and in March became head of the Department of General and Military Hygiene there. He left other institutions where he worked, leaving behind him only the department at the Women's Medical Institute, where, as well as at the Military Medical Academy, he worked until the end of his days. G.V. Khlopin left the "Eleninsky Clinical Institute", and his successor took over the department already in the "Soviet Clinical Institute for Advanced Training of Doctors". This renaming by the decree of the Council of People's Commissars of the RSFSR happened on the 14th of June 1918 [3].

It was not Z.G. Frenkel, as it is sometimes written, but Professor Kazimir Vikentyevich Karaffa-Korbut, who emigrated four years later and was later known as an outstanding Polish hygienist, who took over the chair of hygiene with general bacteriology. After K.V. Karaffa-Korbut's departure, the Chlopin's department was headed by Konstantin Erastovich Dobrovolsky, and Z.G. Frenkel, already a well-known specialist in the field of public medicine, organised the department of social hygiene in 1923, which was


The Times
Русскій Номеръ

Fig. 5. The first page of the newspaper "The Times" on March 15 (28), 1913

Рис. 5. Первая страница газеты «The Times» 15 (28) марта 1913 года

transformed into the department of communal hygiene in 1931. The two departments worked together until 1952, when after Frenkel's dismissal his chair was merged with the Khlopinskaya one.

Back in pre-revolutionary times, in March 1913, the newspaper "The Times" published a large article by Z.G. Frenkel under the title "*Zemstvo. Recent Crisis — A Variety of Energetic Activity*" (Fig. 5). It was the "Russian Number" ("Русскій Номеръ") of the newspaper, in Russian, a copy of which I was lucky enough to receive as a gift in the early noughties from the academician's son Ilya Zakharovich (1919–2011) and granddaughter Tatiana Ilinichna (we wish her good health, we are still in touch). The article was first published in full in the Frenkelev Anniversary Collection in 2009 [1].

To appreciate its scale, as well as the range of knowledge of the already well-known public figure Zakhar Frenkel, it is enough to cite only the titles of the sections of the article: *"Zemstvo's statelessness", "The law on the limit of taxation", "The decentralisation of the zemstvo", "The school construction", "Medical and pharmaceutical aid — free of charge", "The water supply", "Zemstvo telephones", "Zemstvo cement factories", "Zemstvo small credit".*

Zakhar Grigorievich's article evokes a sincere feeling of pride for our country: it is full of optimism, imbued with true patriotism, including because it refers to the period of Russia's rise, successfully overcoming the social and military cataclysms of the early twentieth century.

In the twenties, Z.G. Frenkel was already an experienced and well-known specialist in the field of public medicine, as early as 1913 at the Psychoneurological Institute he read the course "Public Medicine and Sanitation". And in 1919, in the hardest years of devastation, Zakhar Grigorievich published a major work "Social Medicine and Social Hygiene, as a science and as a subject of teaching in higher education". In 1926, the work of Z.G. Frenkel was published as a separate book under the title "Social Medicine and Social Hygiene". It was the first textbook on the speciality, the basic provisions of which, despite the steep turns of social policy during the last century, formed the basis of practically all subsequent manuals.

It should be noted that Khlopin's and Frenkel's views on social hygiene, to put it mildly, did not coincide. Schematisied contradictions can be presented as follows: G.V. Khlopin denied social hygiene independence, fearing that the new specialty, as well as the new direction in science, would emasculate the social component from hygiene as such — general, communal, food, etc., as well as the social component of social hygiene. Maitre believed that elements of social hygiene should accompany the hygienic sciences in order to ensure their true humanitarian mission.

Characterising Z.G. Frenkel's position, in my book about him I cited the difficult questions that he, perhaps in a milder form, posed to himself in those years: *"How to preserve social hygiene as a science and now as a socialist practice, in conditions when a society of total brotherhood and equality is being built, where social causes affecting human health cannot and should not exist? Is social hygiene as a science independent, does it have its own subject and method, or is it only a kind of «service sphere» called to disciplinarily accompany other hygienic (and not only) sciences*

Fig. 6. Zakhary Frenkel — deputy of the First State Duma, 1906

Рис. 6. Захарий Френкель — депутат Первой Государственной Думы, 1906 год

and provide them with correct and politically competent statistical-demographic materials?" [8].

For Zakhar Grigorievich, the answer was obvious. However, discussions on this issue continue and, probably, "philosophically" will continue further. Let's recall at least the article of a prominent public health specialist Professor V.N. Filatov, where he analyses the positions of our heroes and finds contradictions and shortcomings in both [4]. In any case, if G.V. Khlopin had not moved to the MMA in 1918, it is doubtful that the department of social hygiene under Z.G. Frenkel would have been born in "his" walls at Kirochnaya 41...

In the severe twenties, when only two goats saved his family in Lesnoy from hunger (where the owner cut grass for them is a separate story), simultaneously with the department, Zakhar Grigorievich found strength to manage the Department of Communal and Social Hygiene in the Museum of the City. The Soviet authorities provided the Anichkov Palace for the extensive exposition, which housed Frenkel's Department in 15 rooms. In the early 1930s this Department was disbanded for political reasons, and Zakhar Grigorievich was dismissed. The museum itself did not last long there: in 1932 it was merged with the Research Institute of Municipal Economy and had every chance to become just a fact of history.

However, the Museum of the City "died" then not completely. Those exhibits from the rich collection that were not sold abroad had to be placed somewhere. And in 1938 the renewed museum, which can be sarcastically called "*rising from the ashes of wormwood, cleansed by the starry dawn*", was given the Rumyantsev Palace on the English Embankment, and later moved to the bastions of the Peter and Paul Fortress, where it successfully stays even now. There is a wonderful film about it with a somewhat strange for the modern ear title "The Most Deliberate Museum", which, it must be assumed, refers us to F.M. Dostoevsky, who in "Notes from Underground" called St. Petersburg "a deliberate city". The film, alas, contains nothing about Frenkel's Department.

Perhaps, somewhere in the storerooms there are items from the future academician's exposition, "remembering the warmth of his hands". Some optimism in this respect is inspired by the fact that recently a representative of the museum visited me and after an interesting conversation asked for a book about Frenkel for the museum library. I signed the book for them.

To make the figure of Zakhar Frenkel more complete, it is impossible not to mention an episode of the twenties, when he and all his household in Lesnoye (his wife Lyubov Karpovna and three daughters) showed themselves in the highest human quality. The case concerns, surprisingly enough, the Kronstadt uprising of 1921.

Today we know, that the Kronstadt revolt was political only in the sense that its participants, united by "undiluted" island unity, "under-propagandised" sailors, opposed the domination of one party, which had taken power by bayonet and lies, brutally burning out any dissent (pre-revolutionary, "multi-coloured" sentiments were still fresh in Kronstadt). The insurrectionists rejected the Bolsheviks' illegal, cynical monopoly on power, their slogan was "Soviets without Bolsheviks!", which was a resolute, noble, but, alas, belated and futile attempt to correct the mistakes of 1917...

It would seem that Frenkel had nothing to do with this new situation, saving his family and himself by all means; after all, there is no doubt that the former prominent cadet, especially a member of the Central Committee of this party, a member of the Duma, and an active figure in the Provisional Government, had always been "on the pencil" of the organs, which affected the fate of his department in the Museum of the City, his arrest in 1938, and other difficult episodes of his long life.

The Bolsheviks declared the Kronstadt events to be a rebellion led by Entente agents and general Kozlovsky — Zakhar Grigorievich's friend and neighbour on the "Lesnoy". In fact, the general was not the leader of the rebels — served, was only the

commander of artillery, subordinate to the chief of staff of the base. But he was a senior officer in the garrison and turned out to be a suitable figure for the Bolsheviks to mobilise the soldiers and workers of Petrograd against the Kronstadtsy, to declare the events a "mutiny" of deceived sailors-statists, who were being pushed into battle by an unkilled Tsarist general. All this "by the hour" is traced by domestic historians. The defence of Kronstadt was led by the RevCom headed by S.M. Petrichenko, who appointed the commander of the former captain E.N. Solovyanov and chief of staff lieutenant colonel B.A. Arkannikov. In all the memoirs of eyewitnesses surname Kozlovsky almost not mentioned.

However, for Trotsky, who led the siege of Kronstadt, it was no longer important that the general accepted Soviet power and volunteered for service in the Red Army. Moreover, his eldest son Nikolai, a student at the Artillery Academy, was a member of the Bolshevik Party and a deputy of the Petrosoviet (Petrograd Council). His sons Konstantin and Dmitry, cadets of the Fleet Komsostava School, took part in the battles with Yudenich's troops. Younger children — son Paul and daughter Elizabeth — were still at school...

...The Kozlovsky family neighboured with Frenkels in "Lesnoy", the children studied at the same school, and the arrest of the general's wife Natalia Konstantinovna and four sons, and then the expulsion of the whole family to Solovki, deeply shook everyone who knew them. Anyway, it was known that under the pressure of superior forces, the surviving defenders of Kronstadt asked Finland to accept the garrison. Permission was granted, and some eight thousand fighting men, led by General Kozlowski, went behind the cordon. These men were saved, and the general himself lived in Finland until his death in 1940.

His family, which he could not help, had a hard time. Returning to Petrograd after several years on Solovki, they were exiled to Cherepovets. It is known that Kozlovsky's wife lived to our years, she passed away in 1958. Three of his four sons graduated from the Polytechnic Institute, but they could only work in the exile. The eldest of them, as mentioned, joined the Party, but shot himself in 1927. "*I cannot tolerate injustice"*, — he wrote in a suicide note.

The Kozlovskys' daughter Liza (whose home name was Lyulya) tried to evade expulsion, but her grandmother was afraid to shelter her in Lesnoye... Then Lyulya came to the Frenkels. Through the Finnish attaché they managed to establish contact with her father, and the girl decided to escape to Finland. To help her in such an enterprise, few would dare to help, but Zakhar Grigorievich and his family dressed Lyulia in the coat of his youngest daughter Valentina, sewed in the lining of the remnants of family valuables, and Zakhar Grigorievich, at unprecedented risk, sent the girl across the border to her father. In his memoirs, which he recorded in the 1940–1950s, Zakhar Grigorievich, of course, did not write about this truly heroic episode [5]. There is only a note about it on page 307.

Thus, only daughter Liza met her father, who had a hard time in emigration. Eking out an occasional living, he, not without much hesitation, even wrote a letter to President Mannerheim asking for help. The reply was short and categorical: "*I have not got any work for a red general*".

This is the bitter irony of fate: in his homeland Alexander Nikolayevich was considered an enemy and outlawed, while in Finland he remained a "red general". Despite the cool attitude of the Finns to the Kronstadt people, he somehow managed to "hang on" to life. In the years before the war, he was the director of a boarding school for children of emigrants, managed to give Lisa a good education. Elizaveta married a Finnish officer Arvo Viitasen. She travelled with him many years later to Moscow, where she met for the last time her brother Pavel, a hydrologist and associate professor at the Togliatti Polytechnic Institute. According to the Finnish press, her son, the grandson of General A.N. Kozlovsky, lawyer Kai Viitasen, lives in Helsinki, among the many descendants of the Kronstadt people.

Elizabeth lived to that day (she died in 1995), when the events in Kronstadt were objectively assessed and the Kronstadt residents were rehabilitated by the Decree of the President of the Russian Federation. And, as we can see, the daughter of General A.N. Kozlovsky owed her life to the courage and nobility of the Frenkel family.

* * *

Apart from the dramatic evacuation of Lisa Kozlovskaya and the destruction of his brainchild in the Museum of the City, Zakhar Grigorievich's long life had many more bitter and bitter minutes, hours, days... And sometimes months and years. Of pre-revolutionary events of this kind, one cannot but remember his first imprisonment for signing the Vyborg appeal to the "citizens of Russia", with which some deputies of the dissolved First State Duma expressed their protest against the lawlessness of autocracy. Then, in correspondence, Leo Tolstoy supported Frenkel with his letter.

Since the 1930s Zakhar Grigorievich, generalising his experience as a clinician, hygienist, epidemiologist and demographer, worked a lot on the problems of ageing, which was embodied in his main monograph "Lengthening Life and Active Old Age" — this "bible" of social gerontology. Everything was not easy with it either. For the first time it saw the light in State Institute for Advanced Medical Education in 1940, and two institutes where the scientist worked, was nominated for the Stalin Prize. Zakhar Grigorievich did not receive this prize and commented on it as follows: "*Of course, I do not think for a minute that in Moscow in the prize commissions, where A.N. Bakh*[1] *presides, my book could have been a success...*". (The same happened in 1950, when in connection with his 80th birthday Zakhar Grigorievich was presented to the Order of Lenin. The submission and the award list were approved by the Ministry of Health, but the scientist did not receive any award).

The next edition of the book was published in the State Institute for Advanced Medical Education in 1945, and in 1949 it was published by the Academy of Medical Sciences. These were years when it was not easy for scientists with wrong surnames to work, and even to exist, and the censors distorted the book because of the "new" view of the social causes affecting human health. Zakhar Grigorievich severely experienced this rude interference in his author's position, in the following years he prepared a new expanded edition, but it was not possible to realise it. Moreover, in these years he was successively dismissed first from the 2nd Medical Institute, and in 1952 — from State Institute for Advanced Medical Education.

However, let us go back a little. The merciless thirties did not spare the already very young Z. Frenkel: in the summer of 1938 he was almost seventy, he was arrested and subjected to subtle tortures on Spalernaya Street. R.A. Babayants was immediately elected head of his chair at State Institute for Advanced Medical Education. However, even here fate kept Zakhar Grigorievich safe; Beriev's "relaxation" came, and on the 9th of April 1939, on Easter, he was released. Ruben Ambartsumovich should be given credit: he immediately applied to the directorate with a report on his refusal to head the department and on Frenkel's return to this position. And ahead was the war and the blockade of Leningrad. How it survived the elderly scientist, here, in a nutshell, it is impossible to describe — it is necessary to read his own memories and blockade diary of his eldest daughter, a famous statistician and demographer Zinaida Zakharovna Shnitnikova-Lagarp [6]. Suffice it to say that severely suffering from dystrophy, the old scientist, as long as he could, under shelling and bombs, walked (!) from Lesnoy to State Institute for Advanced Medical Education to work...

For the sake of justice it is impossible not to say a few words about personal life of Zakhar Grigorievich, which added a lot of bitterness to his difficult existence and the life of his relatives. It happened that in 1918, almost 50-year-old father of three daughters in one of the official trips met a doctor Ekaterina Ilinichna Munvez, who a year later gave birth to his son Ilya. And since that time he actually lived on two families and took care of both.

The housemates of the first family knew everything and, as far as they could, treated the situation with understanding, as they soon became convinced that it was not just a hobby. But what it cost his wife Lyubov Karpovna ...Grandson of Zahar Grigorievich — Konstantin Savvich, with whom I was fortunate to be acquainted, in resentment for his grandmother, harshly condemned his grandfather in his notes, but summarised as follows: "*Perhaps it was that rare case when a man loves two women at the same time. He also had deepest affection for both his daughters and his son*".

That is why Zakhar Grigorievich would have to endure two heavy blows: the first was the death of Lyubov Karpovna in 1948, and the second was the death of Ekaterina Ilinichna in 1962, and that was his "sorrowful cross". Zakhar Grigorievich recalled with warmth how they together with Ekaterina Ilinichna in 1949–1951 years on their own project built their house in Pushkin. In 2008, when I was preparing a book about Frenkel, I had a chance to visit there and take advantage of the hospitality of Zakhar Grigorievich's son Ilya Zakharovich, a veteran of the Great Patriotic War, and granddaughter Tatiana Ilinichna. In 1970, Z.G. Frenkel was buried in the Kazan cemetery in Pushkin.

Somehow rounding off the memories of the two great hygienists, I will note again that they did not really pity each other; in "Khlopin's" years there was a difference in their social and scientific status, which was emphasised, as Frenkel puts it, by Khlopin's "generalship" (for the Order of St. Vladimir in his time he received personal nobility), opposing views on the management of ward collectives,

[1] Zakhar's maternal uncle, an academician, a Stalinist with whom Frenkel had an extremely unpleasant relationship for political reasons.

scientific disagreements about the place and role of social hygiene. Whether there was a whiff of anti-semitism on Khlopin's, it is difficult to say, but it is possible to assume. Not without reason, the maestro of hygiene in 1923 in MMA was at the centre of a scandal, when three Jewish students complained of harassment by the professor. The case reached the head of the Main Military Sanitary Department of the RSFSR Z.P. Soloviev, who entrusted the proceedings to the head of the MMA V.N. Tonkov, who received a lengthy and convincing letter of explanation from Khlopin. On a copy of the letter Khlopin made an inscription: "*12–13 Oct. 1923 I went to Moscow for explanations, which were recognised as quite exhaustive by Z.P. Soloviev"*.

These notes of mine testify both to the considerable merits of two great Russian scientists, whose life paths personally, and in no small sense virtually, crossed, but also to the fact that, as it happens, "there are spots in the sun", which tells us a lot about the human nature and character of our two remarkable predecessors. And because of this, it seems to me, their portraits and the memory of them become fuller.

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ARCHITECTURAL STYLE OF SAINT PETERSBURG HOSPITALS: FROM PETROVSKY BAROQUE TO HI-TECH. PART III. ECLECTICISM

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ABSTRACT. This article continues a research project devoted to the peculiar hospital architecture of St. Petersburg from a view point of historical perspective: from Peter the Great's baroque style on to that of high-tech. The third article in the series is devoted to the period of eclecticism, the established architectural style in Russia in 1830–1840s. This trend is known by implementation of different architectural forms of the past times in a free combination in one building and is characterized by the simultaneous coexistence of several substyles: neo-gothic, neo-baroque, neo-renaissance, neo-russian style and others. Artistic and architectural-compositional features of different neo-styles are considered on the example of the Evangelical Women's Hospital, the Holy Cross Community of Sisters of Mercy, the City Hospital named after Peter the Great, the Hospital of the Community of Sisters of Charity of St. George of the Russian Red Cross Society, a building complex of the French charitable society, the Prince Peter of Oldenburg Children's Hospital, the Holy Trinity Community of Sisters of Mercy, the Imperial Clinical Midwifery and Gynecological Institute. It was the achievements of natural and medical sciences in the 2nd half of the 19th century, discoveries in the field of hygiene, microbiology and infectious pathology, that predetermined, while designing of hospital buildings, necessarily take into consideration the requirements for their layout, ensuring the implementation of measures for prevention of nosocomial infections, creation of optimal hygienic accommodation conditions patients, proper lighting, ventilation, water supply and heating, functional connection of hospital premises. Increasingly, doctors started taking an active part in the design or reconstruction of hospital complexes on a regular basis. It should be also mentioned that the specific peculiarities of hospitals' construction style during the period under review include forming of the new trends concerning the choice of the hospital location, requirements for the site and its functional zoning, including the arrangement of green areas on the territory of hospitals.

KEYWORDS: Saint Petersburg, hospital architecture, eclecticism, neo-gothic, neo-baroque, neo-renaissance, neo-russian style

АРХИТЕКТУРА БОЛЬНИЦ САНКТ-ПЕТЕРБУРГА: ОТ ПЕТРОВСКОГО БАРОККО К ХАЙ-ТЕКУ. ЧАСТЬ III. ЭКЛЕКТИКА

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РЕЗЮМЕ. Настоящая статья продолжает исследовательский проект, посвященный больничной архитектуре Санкт-Петербурга в историческом ракурсе: от петровского барокко к хай-теку. Третья статья цикла рассматривает период эклектики — стиля, утвердившегося в России в 1830–1840-х гг. Это течение предполагает использование в одном сооружении архитектурных форм прошлого в любых сочетаниях и характеризуется одновременным сосуществованием нескольких направлений: неоготики, необарокко, неоренессанса, неорусского стиля и других. Художественные и архитектурно-композиционные особенности разных неостилей рассмотрены на примере Евангелической женской больницы, Крестовоздвиженской общины сестер милосердия, Городской больницы имени Петра Великого, Больницы Общины сестер милосердия св. Георгия Российского Общества Красного Креста, комплекса зданий французского благотворительного общества, Детской больницы принца Петра Ольденбургского, Свято-Троицкой общины сестер милосердия, Императорского Клинического повивально-гинекологического института. В связи с достижениями естественных и медицинских наук во 2-й половине XIX века, открытиями в области гигиены, микробиологии и инфекционной патологии, при проектировании больничных зданий начинают учитываться требования к их планировке, обеспечивающие проведение мероприятий по профилактике внутрибольничных инфекций, создание оптимальных гигиенических условий размещения больных, правильного освещения, вентиляции, водоснабжения и отопления, функциональной связи больничных помещений. Все чаще при проектировании или перестройке больничных комплексов активное участие принимают врачи. К особенностям больничного строительства в рассматриваемый период следует отнести также формирующиеся подходы к выбору местоположения больницы, требований к участку и его функциональному зонированию, в том числе устройству зеленых зон на территории больниц.

КЛЮЧЕВЫЕ СЛОВА: Санкт-Петербург, больничная архитектура, эклектика, неоготика, необарокко, неоренессанс, неорусский стиль

The hospital architecture of St. Petersburg dates back to the first quarter of the 18th century, when the Admiralty (Naval) and Army hospitals were built [31]. Classicism, which replaced Peter the Great's Baroque, gave the city a number of magnificent hospitals that became a real jewel of the Northern capital [30]. Architects refused from compositional techniques and decorative motifs developed by classicism and began to look for other ways of architectural development since the classicism crisis came. Urban planning measures gradually lose scope and scale, the ensemble orientation is reduced [43]. In 1830–1840s eclecticism was established in Russia as an architectural trend that rebelled against the routinization of outdated academic dogmas that demanded to follow the eternal laws of ancient architecture and the Renaissance.

Eclecticism (from the ancient Greek ἐκλέγω — I choose) is an artistic trend in architecture, oriented towards the use of forms of the past in any combination in one structure [55]. A number of directions can be distinguished. All of them are characterized by the predominance of one of the architectural styles among a large variety. For this reason, one can distinguish: Neo-Gothic, Neo-Russian style, Neo-Baroque, brick style[1], as well as a number of others (Table 1). These styles are also called historical styles.

NEO-GOTHIC

Neo-Gothic is one of the earliest eclecticism trends of the 19th century. Architects, creating buildings in the "Gothic style", borrowed elements of medieval architecture: lancet window and doorway terminations, large towers with clocks and miniature pinnacles with vials[2], "crockets"[3] и "cross flowers",

[1] The next article will be devoted to the brick style hospitals of St Petersburg.

[2] Pinnacle is a small ornamental tower topped by a miniature marquee — a phial.

[3] Crocket (Crabbe) — a characteristic element of decoration in Gothic and Neo-Gothic architecture in the form of stylised buds or leaves.

Table 1

The most famous hospitals of St. Petersburg, built in the Eclectic style

Таблица 1

Наиболее известные больницы Санкт-Петербурга, построенные в стиле эклектика

Стиль / Style	Историческое название / Historical name	Современное название / Modern name	Архитектор(-ы) / Architect(s)	Время строительства / Time of construction	Современный адрес / Current address
Неоготика / Neo-Gothic	Больница для душевнобольных. Усадьба Новознаменка / Hospital for the mentally ill. Novoznamenka Estate	«Готический дом» — культурно-досуговый комплекс Красносельского района / “Gothic House” is the cultural and leisure complex of the Krasnoselsky district	–	1830–1839	ул. Чекистов, 13 / str. Chekistov, 13
	Евангелическая женская больница / Evangelical Women’s Hospital	Научно-исследовательский институт фтизиопульмонологии / Research Institute of Phthisiopulmonology	Р.Б. Бернгард, О.Г. фон Гиппиус / R.B. Bernhard, von O.G. Gippius	1869–1873	Лиговский пр., 2–4 / Ligovsky ave., 2–4
Неорусский стиль / Neo-Russian style	Крестовоздвиженская община сестер милосердия / Holy Cross Community of Sisters of Mercy	Клиника высоких медицинских технологий имени Н.И. Пирогова Санкт-Петербургского государственного университета / Clinic of High Medical Technologies named after N.I. Pirogov of St. Petersburg State University	Ю.Ю. Бенуа / Yu.Yu. Benua	1903–1904	Фонтанки наб., 154 / Fontanki emb., 154
Необарроко / Neo-baroque	Городская больница имени Петра Великого / City Hospital named after Peter the Great	Городская больница имени Петра Великого / City Hospital named after Peter the Great	Л.А. Ильин, А.И. Клейн, А.В. Розенберг / L.A. Ilyin, A.I. Klein, A.V. Rosenberg	1907–1918	Пискаревский пр., 47 / Piskarevsky ave., 47
Неоренессанс / Neo-Renaissance	Калинкинский военно-морской госпиталь. Главный корпус / Kalinkinsky Naval Hospital. Main building	Филиал № 5 442 военно-клинического госпиталя / Branch No. 5 442 military clinical hospital	М.А. Пасыпкин / M.A. Pasypkin перестройка / reconstruction	1845–1853 1880	Старо-Петергофский пр., 2 / Staro-Petergofsky ave., 2
	Елизаветинская клиническая больница для малолетних детей / Elizavetinskaya Clinical Hospital for Children	Комплексный центр социального обслуживания населения Адмиралтейского района Санкт-Петербурга / Comprehensive center for social services for the population of the Admiralteysky district of St. Petersburg	Р.А. Гедике / R.A. Goedicke	1869–1871, 1887–1888	Фонтанка наб., 152 / Fontanka emb., 152
	Больница Общины сестер милосердия Св. Георгия Российского общества Красного Креста / Hospital of the Community of Sisters of Charity of St. George of the Russian Red Cross Society	Главное здание снесено / The main building demolished Банкетно-ресторанный комплекс, / Banquet and restaurant complex, Бизнес-центр «Оренбургская 4» / Business center “Orenburgskaya 4”	Н.А. Мельников / N.A. Melnikov П.И. Балинский / P.I. Balinskij Р.А. Берзен / R.A. Berzen	1870 1889–1892 1907–1908	ул. Оренбургская, 4 Пироговская наб., 7 ул. Оренбургская, 4А / str. Orenburgskaya 4 Pirogovskaya emb., 7 str. Orenburgskaya, 4A

Ending of the table 1 / Окончание табл. 1

Стиль / Style	Историческое название / Historical name	Современное название / Modern name	Архитектор(-ы) / Architect(s)	Время строительства / Time of construction	Современный адрес / Current address
	Комплекс зданий французского благотворительного общества / Complex of buildings of the French charitable society	Детская городская больница № 2 св. Марии Магдалины. Лечебный корпус / St. Mary Magdalene Children's City Hospital № 2. Medical building	П.Ю. Сюзор / P.Yu. Suzor	1898–1901, 1907	14-я линия Васильевского острова, 57–61М / 14th line of Vasilyevsky Island, 57–61M
Кирпичный стиль / Brick style	Волковская купеческая богадельня / Volkovskaya merchant almshouse	Городской кожно-венерологический диспансер / City Dermatovenerological Dispensary	Ф.И. Габерцетель, А.И. Томишко / F.I. Haberzetel, A.I. Tomishko,	1880–1881	наб. реки Волковки, 3 / emb. Volkovka River, 3
	Больница Биржевого купечества в память Александра II / Hospital of the Exchange Merchants in memory of Alexander II	Детская городская инфекционная больница № 3 / Children's City Infectious Diseases Hospital № 3	В.А. Шретер, В.С. Карпович, А.К. Гаммерштедт / V.A. Schreter, V.S. Karpovich, A.K. Hammerstedt	1887–1889	Большой пр. Васильевского острова, 77/17 / Bolshoi ave. Vasilievsky Island, 77/17
	Евгениевская Община сестер милосердия Красного Креста / Evgeniyevskaya community of sisters of mercy	Клиническая городская больница № 46 святой Евгении / St. Eugenia Clinical City Hospital № 46	Д.К. Пруссак / D.K. Prussak	1896–1899	ул. Старорусская, д. 3 / str. Starorusskaya, 3
	Больница Обуховского завода / Obukhov Plant Hospital	Производственно-технологический комплекс «Модерам». Центральный офис / Production and technological complex "Moderam". Main office	Ф.Ф. Лумберг / F.F. Lumberg	1897	пр. Обуховской Обороны, 124 / Obukhovskaya Oborony ave., 124
	Лазарет Охтинского порохового завода / Infirmary of the Okhtinsky Powder Plant	Клиническая больница № 122 имени Л.Г. Соколова / Clinical Hospital No. 122 named after L.G. Sokolov	А.А. Пашихин, В.Я. Симонов / A.A. Pashikhin, V.Ya. Simonov	1912	Красина ул., 10 / Krasina str., 10
	Александровский женский приют / Alexandrovsky Women's Shelter	Многопрофильный медицинский центр «Клиника Пирогова» / Multidisciplinary medical center "Pirogov Clinic	К.К. Шмидт	1897–1899	Большой пр. Васильевского острова, 49–51 14-я линия Васильевского острова, 13–15 / Bolshoi Ave. Vasilyevsky Island, 49–51 14th line of Vasilyevsky Island, 13–15

Стиль / Style	Историческое название / Historical name	Современное название / Modern name	Архитектор(-ы) / Architect(s)	Время строительства / Time of construction	Современный адрес / Current address
Смешение исторических стилей / Mix of historical styles	Лечебница Св. Лазаря (Максимилиановская больница) / Hospital of St. Lazarus (Maximilian Hospital)	Городская больница № 28 «Максимилиановская» / City Hospital № 28 “Maximilianovskaya”	А.Х. Пель А.Ф. Пель / A.H. Pel, A.F. Pel	1855–1859 1908–1913	Декабристов ул., 1–3 / Dekabristov str., 1–3
	Детская больница принца Ольденбургского / Prince’s Oldenburgsky Children’s Hospital	Детский городской многопрофильный клинический центр высоких медицинских технологий им. К.А. Раухфуса / Children’s City Multidisciplinary Clinical Center for High Medical Technologies named after K.A. Rauchfus	Ц.А. Кавос / Ts.A. Kavos	1864–1869	Лиговский пр., 8 / Ligovsky ave., 8
	Свято-Троицкая община сестер милосердия / Holy Trinity Community of Sisters of Mercy	Научно-исследовательский институт гематологии и трансфузиологии / Research Institute of Hematology and Transfusiology	Е.С. Воротилов В.Р. Курзанов / E.S. Vorotilov, V.R. Kurzanov	1876, 1889–1891	2-я Советская ул., 16 Дегтярная ул., 3 3-я Советская ул., 13 / 2nd Sovetskaya str., 16 Degtyarnaya str., 3 3rd Sovetskaya str., 13
	Императорский Клинический повивально-гинекологический институт / Imperial St. Petersburg Clinical Midwifery Institute	Научно-исследовательский институт акушерства, гинекологии и репродуктологии им. Д.О. Отта / Research Institute of Obstetrics, Gynecology and Reproductology named after D.O. Ott	Л.Н. Бенуа / L.N. Benois	1897–1904	Менделеевская линия, 3 / Mendeleevskaya line, 3
	Клиника кожных болезней им. В.К. Синягина и А.К. Чекалевой / Clinic of Skin Diseases named after V.K. Sinyagin and A.K. Chekaleva	Институт мозга человека им. Н.П. Бехтеревой Российской академии наук / Institute of Human Brain named after N.P. Bekhterev Russian Academy of Sciences	С.А. Баранкеев / S.A. Barankeev	1904–1906	Академика Павлова ул., 9 / Academician Pavlov str., 9
	Еленинская женская раковая больница им. А.Г. и Е.И. Елисеевых / Eleninskaya Women’s Cancer Hospital named after A.G. and E.I. Eliseev	Филиал научно-исследовательского института фтизиопульмонологии / Branch of the Research Phthisiopulmonology Institute	А.К. Гаммерштедт И.С. Китнер Л.В. Шмеллинг / A.K. Hammerstedt, I.S. Kitner, L.V. Schmelling	1909–1911	Политехническая ул., 32 / Politekhnicheskaya str., 32

Fig. 1. “Gothic house”, Novoznamenka estate [57]

Рис. 1. «Готический дом», усадьба Новознаменка [57]

зcrenellated wall terminations and blind arcades[1], sculptural ornamentation and stained glass, the system of counterforces[2] and flying buttresses[3], as well as other details which are characteristic of European Gothic and Neo-Gothic architecture. An important feature of the “Gothic style” in the architecture of the Northern capital was the frequent mixing of “Gothic” elements with “Romanesque” [2].

An example of imitation of European castle architecture is the “Gothic House” in Novoznamenka on the Peterhof road. High lancet windows and doors, a square three-tier tower with a crenellated finial in the form of a swallow’s tail in the north-eastern part of the facade are attributes of the Gothic style (Fig. 1). The building was originally used by the owner of the estate, Senator P.V. Metlyaev, to store a rich library of French publications. In 1888 the dacha was purchased by the Treasury for 300 thousand rubles and became the property of the Empress Maria Alexandrovna’s Trust for the Blind. In 1892 the territory was given to the City Hospital-colony for the mentally ill [11]. The City Duma bought the Novoznamenskaya dacha for the soonest opening of the hospital-colony because of the overcrowding of the hospital of St. Nicholas the Wonderworker [45]. The “Gothic House” served as the hospital office, and the main house of the estate, built in the Baroque style with elements of classicism, housed the hospital wards[4] [23]. After the building was transferred to the city administration, the House was re-equipped according to the project of architect M.A. Ivanov (1849–1909) and the famous psychiatrist, chief physician of the hospital of St. Nicholas the Wonderworker O.A. Chechott (1842–1924) [50, 51]. The chief physician and his subordinates made great efforts to provide leisure and employment for patients, justly considering it an important therapeutic factor.

After the revolution, the hospital was closed, and the building served as a correctional labour colony. During the Great Patriotic War “Gothic House” was badly damaged. In 1960s the external appearance of the building was restored according to the project

[1] Blind (blank) arcade — wall decoration in the form of a series of decorative arches.

[2] Counterforce — an architectural detail to support the walls.

[3] Flying buttress — one of the key constructions in Gothic architecture, it is a stone half-arch, which transfers the horizontal force of spreading from the vaults of the building to the supporting pillar located outside the building.

[4] Datcha (mansion) of Chancellor M.I. Vorontsov in Novoznamenka was built in 1755–1757 by architects G. Trezzini (1697–1768) and A. Rinaldi (1709–1794).

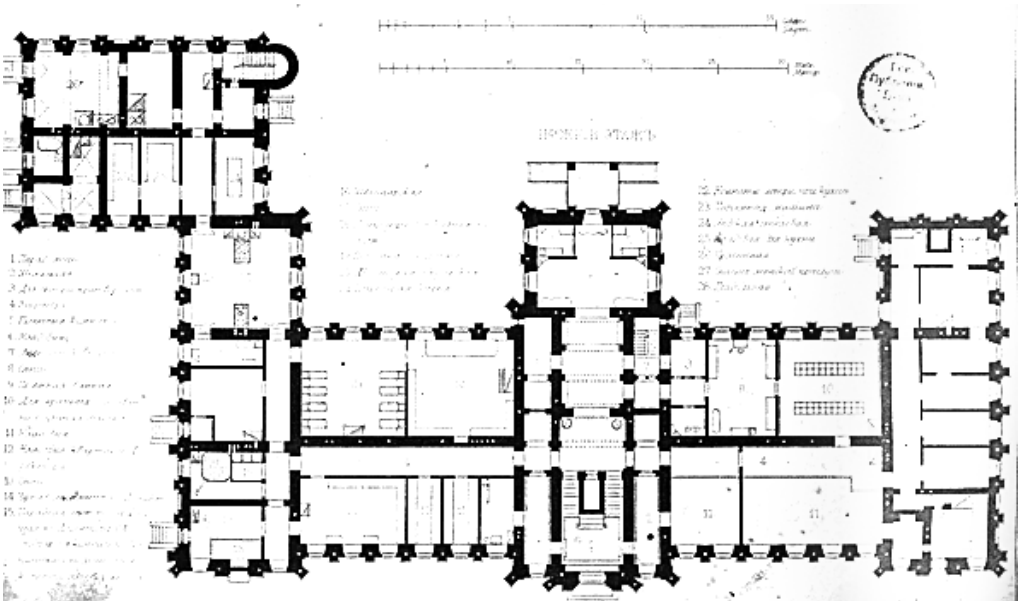

Fig. 2. Plan of the Evangelical Women's Hospital. First floor [17]

Рис. 2. План Евангелической женской больницы. Первый этаж [17]

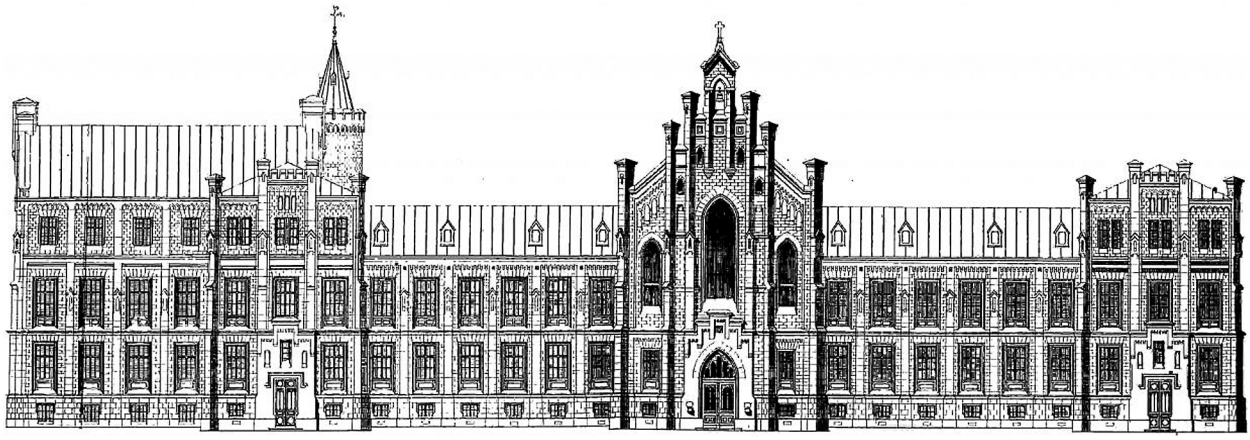

Fig. 3. Facade of the Evangelical Women's Hospital building. Project and construction R.B. Bernhard and O.G. Gippius [18]

Рис. 3. Фасад здания Евангелической женской больницы. Проект и постройка Р.Б. Бернгарда и О.Г. Гиппиуса [18]

of architect M.M. Plotnikov (1901–1992), but as a result of these works the internal historical layout was lost. After a fire in 2011 the building was restored again, and now it serves as a youth cultural and leisure centre.

One of the pearls of St. Petersburg neo-Gothic architecture is the Evangelical Women's Hospital. The hospital was established in 1859 on the initiative of Dr. Karl Karlovich Mayer (1830–1883), originally located in a small wooden house on Kirochnaya Street and was maintained on voluntary donations from the German community and citizens. After ten years, the money raised allowed the committee (consisting of the hospital director, prioress, pastor, cashier and chairman) to start construction of a new, more suitable building for the hospital. The St. Petersburg City Council donated land to the Evangelical Society, it was located on the embankment of the Ligovsky Canal (now Ligovsky Prospekt) near Prudki[1]. The plan of the stone building of the hospital was designed by Dr. K.K. Mayer himself, who thought over every detail, taking into account all modern requirements for hygiene, ventilation, etc. He entrusted the work on the facade to Professor R.B. Bern-Gard (1818–1887) and Academician of the Imperial Academy

[1] Prudki — now Nekrasovsky square

Fig. 4. Front facade of the Evangelical Women's Hospital [57]

Рис. 4. Лицевой фасад Евангелической женской больницы [57]

Fig. 5. Evangelical Women's Hospital. Facade elements. Main entrance [57]

Рис. 5. Евангелическая женская больница. Элементы фасада. Главный вход [57]

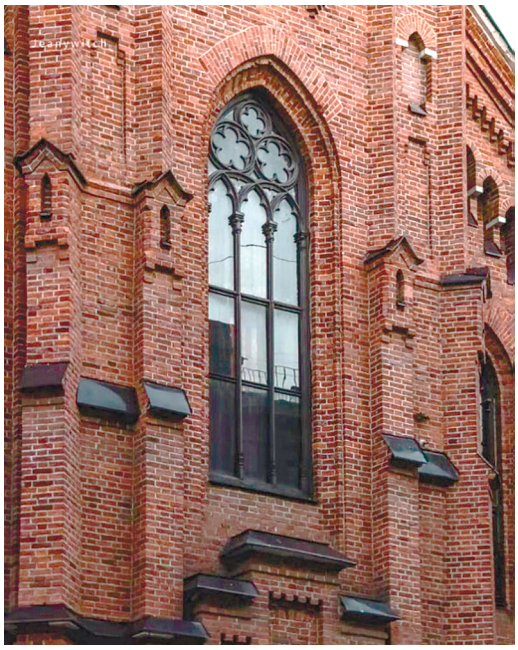

Fig. 6. Evangelical Women's Hospital. Facade elements. Central window [57]

Рис. 6. Евангелическая женская больница. Элементы фасада. Центральное окно [57]

of Arts O.G. Gippius (1825–1883) (Fig. 2, 3). Later, O.G. Gippius described the originality of the project: "Since the hospital is kept on good donations, without government aid, the committee wished to give the building such a look that would take it out of the row of ordinary buildings, this is partly the reason for its Gothic architecture" [9].

On 4 February 1873 the Evangelical Women's Hospital for 96 beds was opened in the presence of Grand Duchess Catherine Mikhailovna (1827–1894) and her husband Duke Georg Mecklenburg-Strelitsky (1824–1876).

The main building is two or three storeys high, on a high semi-basement, finished with brick-

work[1]. The front facade, facing Ligovsky Prospekt, is marked by three avant-corpses[2]. The central avant-corps ends with a high gable[3] with small decorative turrets and a belfry (Fig. 4). Its multi-stage structure repeats the gable over the main entrance to the building — a perspective portal[4] on the basis of a lancet arch (Fig. 5). High lancet windows with elegant Gothic rosettes used to be glazed with stained glass (Fig. 6). The Lutheran Church of Christ the Saviour was located in this part of the building on the first floor. The cross vault and arcade with lancet arches which are typical for a Gothic church can be seen in the photograph[5] (Fig. 7). The symmetrical side avant-corps also end with a stepped gable and are decorated with small turrets and dentils. Perspective platbands[6] of rectangular windows add volume to the general appearance of the building. A rounded turret with a balcony and a hipped roof with weather vane gives it a romantic look (Fig. 8, 9). The building is strengthened by stepped buttresses ornamented at the level of the 2–3rd floor with sharp-edged pinnacles with arches and rectangular tops. Vertical lines dominating in the appearance of the building create a silhouette pointing upwards.

Gothic elements are also present in the interior of the hospital: visitors are greeted by the inscription "willkommen" (welcome) in Gothic script on the floor in the main entrance hall, the niches in the walls are lancet-shaped, and the staircase railings are decorated with openwork Gothic patterns — quadrifolia.

Fig. 7. Evangelical Women's Hospital. Lutheran Church of Christ the Savior [1]

Рис. 7. Евангелическая женская больница. Лютеранская церковь Христа Спасителя [1]

Apart from the style, the building was distinguished from other hospitals in the city by its plan — it was arranged as a private house, without wards along the corridors. The balconies were extended by two, one or three arches for the most convenient placement of beds of convalescents. The wards had 1700 cubic feet of air for each bed. Cookers were tiled, with a supply of outside air; beds assigned for more severe patients were directly vented from under them into channels built in walls, at the height of the mattress. Latrines were made on the system of air-closets. Baths were heated by steam; separate rooms for showering and inhalation of various healing substances were arranged in the bathroom, and a steam bath was also arranged. Poor patients of all classes and religions were admitted free of charge. Dr K.K. Mayer and all employees of the hospital did not receive any salary, and Professor R.B. Berngard, who was engaged in the construction of the new hospital, refused any remuneration[7] [9].

[1] In some studies the Evangelical Women's Hospital is referred to the brick style, but it should be remembered that originally the structure was "assigned to plaster" [37, 47].

[2] Avant-corps — the part of a building that protrudes beyond the main line of the façade to its full height.

[3] Gable — an architectural element that is the completion of a façade but is not bounded by a cornice at the base, making it part of the wall plane.

[4] Perspective portal is a series of diminishing concentric arches by narrowing the side ledges and arched slabs.

[5] The rear stained glass window depicting the Saviour and the four Evangelists, made in the workshop of V.D. Sverchkov in Munich, was presented to the church by Grand Duchess Catherine Mikhailovna. In addition to the sick the church was used by the nurses of mercy who lived at the hospital — Deaconesses and neighbouring Lutherans. At the beginning of XX century there were 300 people in the parish [1]. In the beginning of 1920th years the church was closed. Now the conference hall of the Research Institute of Phthisiopulmonology is located here.

[6] Perspective platbands — platbands with ledges of similar outline in the vertical plane that go into the depth.

[7] In 1886 a stone funeral parlour was built at the hospital (architect V.V. Nikolya (1852–1901)). Nicolas (1852–1901)), in 1893 — a wooden surgical barrack on stone cellars

Fig. 8. Evangelical Women's Hospital. Turret in the north-eastern part of the building. Photo by L.N. Lisenkova

Рис. 8. Евангелическая женская больница. Башенка в северо-восточной части здания. Фото Л.Н. Лисенковой

Fig. 9. Evangelical Women's Hospital. Weathervane on the turret [57]

Рис. 9. Евангелическая женская больница. Флюгер на башенке [57]

After the revolution the Evangelical Women's Hospital was renamed to the S.P. Voskov Hospital for pulmonary patients, and from 1 May 1922 it was converted into a specialized hospital for patients with pulmonary tuberculosis [12]. Currently, the building houses the St. Petersburg Research Institute of Phthisiopulmonology.

NEO-RUSSIAN STYLE

Neo-Russian style is one of the forms of architectural eclecticism of the XIX century, based on the appeal to traditions of folk art and architecture of pre- Peter the Great Russia. The buildings of this style are richly decorated: stone "patterning", hipped tops, arched galleries, carved window platbands, colourful exterior decoration.

A striking example of a hospital built in the Neo-Russian style is the building of the Krestovozdvizhenskaya Community of Sisters of Charity on the Fontanka embankment near the Staro-Kalinkina Bridge. The community was founded in 1854 on the initiative of Grand Duchess Elena Pavlovna (1823–1873) to train sisters of mercy to work in field hospitals during the Crimean War [44]. In 1860 the sisters moved to the mansion of Dr L.F. Dost (154 Fontanka Embankment), built in classical style[1].

In 1903–1904, by the 50th anniversary of the Community of the Holy Cross, the building was completely rebuilt by the architect Julius Yulevich Benois (1852–1929), after which it acquired its final appearance (Fig. 10) [44, 48, 53]. The third floor of the stone mansion was added, a three-storey building was built, and the first floor of the

(architect I.S. Kitner (1839–1929)), in 1895 — a two-storey laundry building (architect B.E. Furman (1845–1922)), in 1901–1902 — a building of the surgical department (architect A.S. Kitner (1839–1929)), in 1895 — a two-storey laundry building (architect B.E. Furman (1845–1922)). — The building of the surgical department (architect A.I. Stunkel (1865–1920)). The surgical building is decorated with pilasters, dentils and Flemish masonry; the windows are crowned with a beam lintel. In 1902–1904 the building was built by A.I. Stunkel. A.I. Stunkel built on the plot a residential house of the Evangelical Women's Hospital, which housed a children's shelter and a school [6].

[1] In the 90s of the XIX century the building was rebuilt several times by architect Y. Y. Benois.

Fig. 10. Building of the Holy Cross Community of Sisters of Charity [44]

Рис. 10. Здание Крестовоздвиженской общины сестер милосердия [44]

Fig. 11. Elements of design of window openings on the first floor of the building of the Holy Cross Community of Sisters of Mercy [57]

Рис. 11. Элементы оформления оконных проемов первого этажа здания Крестовоздвиженской общины сестер милосердия [57]

Fig. 12. Elements of design of window openings on the second floor of the building of the Holy Cross Community of Sisters of Mercy [57]

Рис. 12. Элементы оформления оконных проемов второго этажа здания Крестовоздвиженской общины сестер милосердия [57]

neighboring house, which housed an outpatient clinic, was also added[1, 2].

The building of the Community of the Holy Cross is lavishly decorated and evokes examples of Old Russian architecture. The consistency of the two wings of the building is achieved by the floor-by-floor division of the facade with a continuous cornice and the design of the ground floor windows, they are flanked by columns with a carved floral

[1] Central State Historical Archive. F. 513. Op.102. D. 6046. L.92.

[2] In 1955–1960 the building of the outpatient clinic was completed to 4 floors with the addition of 2 axes on the left. The outpatient clinic is located here.

Fig. 13. The main entrance to the building of the Holy Cross Community of Sisters of Mercy [57]

Рис. 13. Главный вход в здание Крестовоздвиженской общины сестер милосердия [57]

Fig. 14. Design elements of the facade of the building of the Holy Cross Community of Sisters of Mercy [57]

Рис. 14. Элементы оформления фасада здания Крестовоздвиженской общины сестер милосердия [57]

pattern (Fig. 11). Emphasis is made on the left facade with an avant-corps — its window cills are decorated more vividly: on the first floor — geometric carved patterns and triangular sandrics[1] (Fig. 12), on the third floor — Venetian windows with twisted columns. In the right wing of the building on the first floor there are arched windows with keel-shaped sandwiches and graceful columns, on the third floor — rectangular windows, framing columns continue the vertical lines of the frieze[2], decorated with shirinkas[3] and a kerb[4]. The left wing is also decorated with shirinkas and frieze with a kerb, the avant-corps ends with a keel-shaped pediment. In the centre of the composition is a turret with the main entrance. The portal is built on the site of the old entrance to the mansion, which determines its arched form. The archivolt[5] is marked by a wide kerb and a row of dynkas[6], resting on a pedestal (Fig. 13). The combination of different patterns and the bollard carried forward create the impression of a perspective portal. Above the entrance there is a three-part arched window with two pendants[7] (Fig. 13), on the third floor the rectangular window is framed by columns with dynkas, a rich platband and a keel-shaped sandrics with a floral pattern. Three small windows at the top are decorated with corbels, creating a sense of a blind arcade[8] (Fig. 14). The turret ends with kokoshniks[9]. Originally it was crowned with a capitol and represented the belfry of the church in the name of the Exaltation of the Holy Cross located on the third

[1] Sandric — a decorative architectural detail in the form of a small cornice located above the window or door aperture on the facades of buildings.

[2] Frieze — an architectural element of a building, one of the horizontal parts of the facade above the columns.

[3] Shirinka — a small square or rectangular recess in the wall of a stone building, bordered by a profiled frame.

[4] Kerb — a type of ornamental brickwork in which a row of bricks is laid at an angle to the wall surface

[5] Archivolt — external framing of an archway, highlighting the curve of an arch from the plane of a wall.

[6] Dynka — (in architecture), a decorative detail (thickening) of pillars, columns, window trim and door portals.

[7] Pendant — is a figurative architectural detail, mainly in the form of an overturned pyramid made of brick or stone.

[8] Blind arcade (architecture) — a decorative motif consisting of arches of small size.

[9] Kokoshnik (in architecture) — a semicircular or keel-shaped external decorative element in the form of a false zakomar

Fig. 15. Clinic of High Medical Technologies named after N.I. Pirogov St. Petersburg State University [57]

Рис. 15. Клиника высоких медицинских технологий имени Н.И. Пирогова Санкт-Петербургского государственного университета [57]

floor. The last photo on which it can be seen was taken in 1927[1]. At present the facades of the two wings are painted in different colours, which makes it difficult to perceive the building as a single composition (Fig. 15). A small, almost 'toy' chapel, also in the Neo-Russian style — the Chapel of the Exaltation of the Holy Cross and the Holy Equal-to-the-Apostles Tsarina Elena — adjoins the community building on the left[2].

After the October Revolution in 1918 the building was seized from the Cross Church and a hospital was opened on its basis, which was given the name of the Bolshevik revolutionary G.I. Chudnovsky. The hospital bore this name until 2002. Now it is the modern Pirogov Clinic of High Medical Technologies of the St. Petersburg State University.

NEO-BAROQUE

Neo-baroque is an attempt to revise the well-known style of the XVI–XVIII centuries. In Russia, neo-baroque architecture interprets the forms of the Peter the Great and Elizabethan Baroque and is characterized by a freer interpretation of architectural order, more moderate forms and more restrained decoration.

The pavilions of the Emperor Peter the Great Hospital were built in the Neo-Baroque style. The construction of the new hospital was included in the events dedicated to the 200th anniversary of St. Petersburg. In 1903 the City Duma (Parliament) decided to name it the Peter the Great Hospital "in memory of the founder of the city". A tender for the construction was announced in 1906 [24].

24 projects were received in total. The first prize was awarded to the project "Green Circle" by engineers L.A. Ilyin (1879–1942), A.I. Klein (1879–1961), A.V. Rosenberg (1877–1935) (Fig. 16) [38, 39][3]. It was refined for several more

[1] Central State Archive of Film and Photo Documents of St. Petersburg. Gr. 12149.

[2] During the Soviet years, the chapel was closed and its premises were used for household needs. Since 2013, regular services have been held in the chapel.

[3] According to the commission's report, "Architecturally, the project is interesting, but rather rich and not quite characteristic for a hospital". For L.A. Ilyin the design and construction of the hospital became an important stage in his creative life. By his own admission, "the construction of the hospital awakened and fostered interest in a large complex, in the ensemble" [19]. To finalize the plan, the architects made a trip abroad to familiarize themselves with the experience of modern

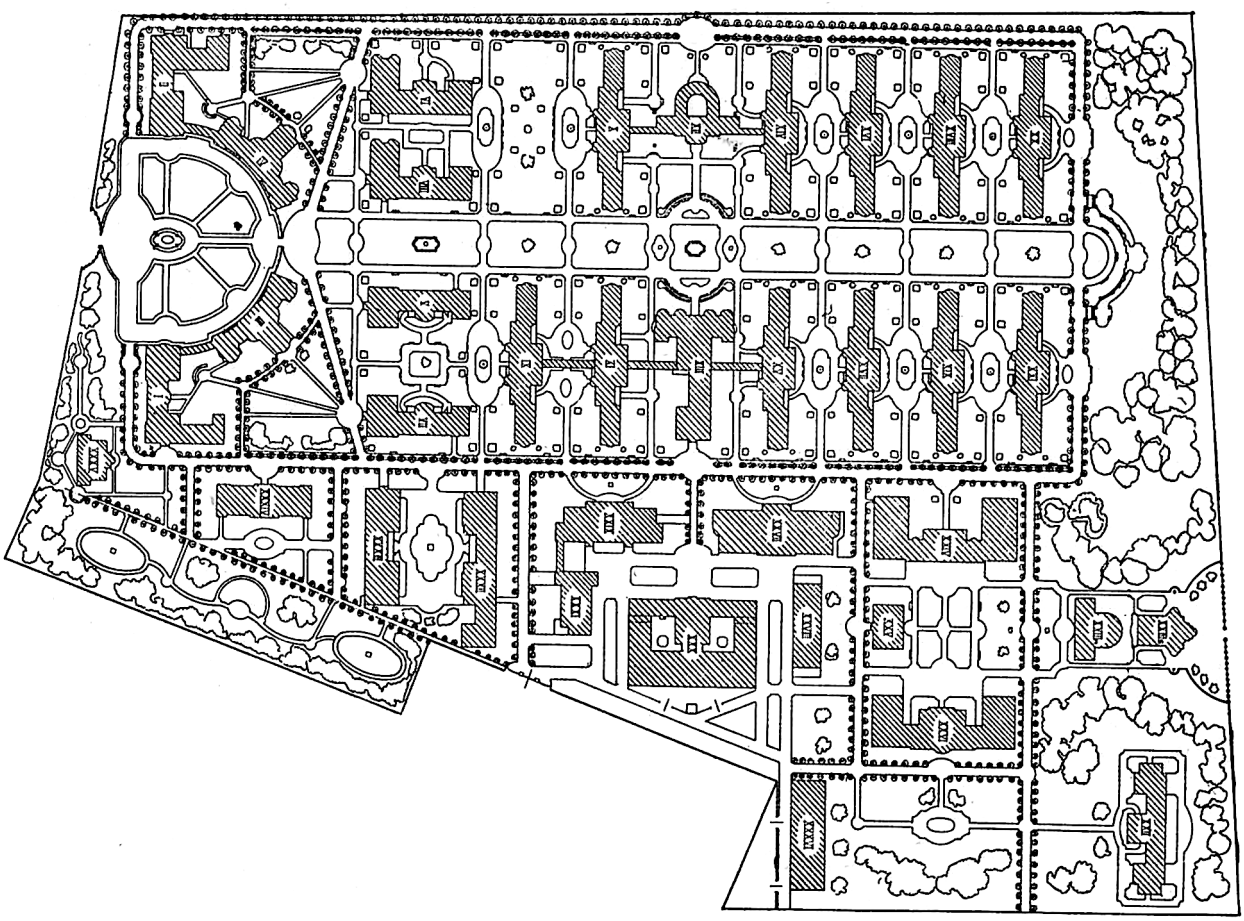

Fig. 16. General plan of the hospital named after Emperor Peter the Great [41]

Рис. 16. Генеральный план больницы имени Императора Петра Великого [41]

years, taking into account the latest achievements of science and technology of that time. The pavilion system of construction was popular in the 19th and early 20th centuries, because it best corresponded to the hygienic achievements of medicine of that time: it allowed to distribute different functional units or different hospital departments in several buildings called "pavilions", created conditions for the prevention of hospital infections, air renewal and circulation, better lighting, etc.

A part of the area called "Rublevik", after the common name of a small village on the Okhta River, was designated for the construction of the hospital. The final project envisaged 16 two- and three-storey pavilion buildings isolated from each other with a total capacity of 2000 beds. Administrative buildings and the reception with a sorting department formed a semi-circular square at the main entrance.

A wide green alley ran from the main entrance into the territory, on the sides of which hospital pavilions were symmetrically arranged. A special building was reserved for chargeable patients. One of the hospital pavilions was intended for isolation of infectious patients. The place for a pathological anatomy department was allocated in the south-eastern part of the vast territory, so that it could not be seen either from wards or from the garden during walks[1] [10].

hospital construction in the West and the originals of German and Dutch architecture of the XVIII century. The report of the trip was set out in the form of a report and published [20].

[1] The design was based on the interconnection of separate buildings, covered passages, and the need to transport patients to operating theatres in autumn and winter via warm basement tunnels. In addition to clinical wards, large and comfortable premises for doctors, nurses, medical assistants, attendants and service personnel were envisaged. The structure of the hospital town also incorporated the ideas of a garden city. The town was planned in such a way that the treatment pavilions were located in a green zone — away from administrative and household buildings [16].

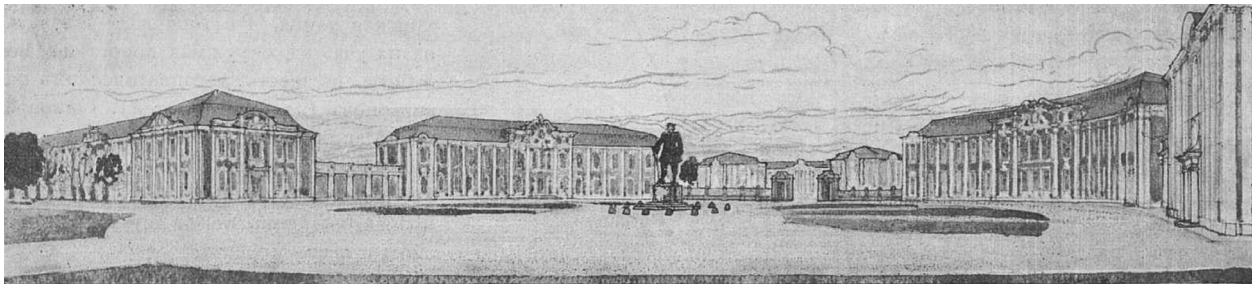

Fig. 17. Perspective view of the front part of the Emperor Peter the Great Hospital [41]

Рис. 17. Перспективный вид передней части больницы имени Императора Петра Великого [41]

Fig. 18. General view of the front part of the hospital named after Emperor Peter the Great [57]

Рис. 18. Общий вид передней части больницы имени Императора Петра Великого [57]

The ceremonial foundation of the first building took place on 29 June 1910 [41]. The construction of six therapeutic pavilions for 600 beds, a kitchen building, a bathhouse, a laundry, a central electric station and the foundation of 15 more pavilions was laid. The first stage of construction had finished by May 1914.

The name of Peter the Great inspired the authors to use Peter the Great Baroque motifs in architectural solutions, so images of buildings refer to real constructions of Peter the Great's time. The main prototype is the building of the Twelve Colleges, small gatehouses or watchhouses on the sides of the main gate partly remind the cronshpitses[1] of the Galernaya Harbour, the silhouette of the chapel repeats in miniature the outlines of the Peter and Paul Cathedral [4, 5]. The hospital buildings are subordinated to strict symmetry, the central part is emphasized by avant-corpss, the main administrative buildings have additional glazed porticoes. The facade design is flat, graceful but restrained decoration is used: vertical division with lesenes (pilaster strips)[2], rustication[3], decorative beam and neck pediments[4] with volutes[5]. The use of two colours, typical of the Baroque architecture, creates a cheerful appearance of the complex. White architectural details stand out brightly against the background of red-brick walls. The windows with fine glazing, and profiled platbands are crowned with keystones[6] or decorated with "ears"[7]. Green spaces play an

[1] Kronshpitsy is an architectural monument of the XVIII century (approximately built in 1722). These are two small guard pavilions with spires, which are located on the opposite banks of the Shkipersky Channel (Vasilyevsky Island).

[2] Lesenes — a vertical ribbon projection of a wall without a base and capitals, dividing or limiting its surface.

[3] Rustication — decoration of the wall surface, resembling a masonry of large stones or having a number of horizontal strips of equal width, protruding above the background.

[4] Gable — triangular, semicircular, rayed or complexly shaped end of the cornice or platband.

[5] Volute — a decorative element in the form of a spiral curl.

[6] Keystone — wedge-shaped stone in the top of the arch, as well as imitation of its element in the middle of the lintel of the platband or doorway.

[7] Ears — curve or rectangular projections of the platband, symmetrically located on different sides of the top of the doorway.

Fig. 19. Pre-revolutionary sewer hatch with the monogram of Peter I. Photo by Dmitry Sokolov [49]

Рис. 19. Дореволюционный канализационный люк с монограммой Петра I. Фото Дмитрия Соколова [49]

important role in the appearance of the hospital complex. The original idea of authors went back to examples of regular planning of suburban palace and park complexes. Apart from the external appearance of the buildings, individual details of the complex's decoration were to remind of Peter the Great[1]. For example, there are signs with the monogram of Peter the Great on the sewer manholes — the intertwining of two crossed Latin letters P, meaning Petrus Primus (Fig. 19). A monument to the emperor was supposed to be placed on the territory (Fig. 17).

The construction of the hospital was interrupted by the First World War. The final opening took place during the years of Soviet period. In December 1918 the hospital was named after I.I. Mechnikov. By 1924 almost all the buildings envisaged by the general plan were completed and those that were in bad condition were restored. On 30 June 1936 a monument to I.I. Mechnikov by L.V. Sherwood (1871–1954) was erected on the pedestal prepared for the monument to Peter the Great. During the Great Patriotic War the Medical Centre on Piskarevsky Prospekt was a clinical base of the Leningrad Front. In 1994 the name of Peter the Great was returned to the institution. Currently, the Emperor Peter the Great Hospital is the base of the I.I. Mechnikov Northwestern State Medical University (Fig. 18).

NEO-RENESSANCE

Neo-Renaissance is one of the widespread directions of eclecticism of the XIX century, which is characterized by an appeal to the architectural solutions of the Renaissance. We can distinguish two varieties of Neo-Renaissance — with the use of order and with the rejection of it. In the second case, only rustication and ornate Renaissance cornices and platbands were used in facade decoration [26].

The real hospital town, built in neo-Renaissance style, is a complex of buildings of the Community of Sisters of Charity of St. George of the Russian Red Cross Society. The Community of St. George was opened on 26 November 1870. The idea of its creation belonged to Countess Elizaveta Nikolaevna Geiden (1833–1894). She appealed to Princess Eugenia Maximilianovna Oldenburgskaya (1845–1925) with a proposal to jointly establish a community of sisters of mercy. The new institution was taken under her patronage by Empress Maria Feodorovna (1847–1928). The purpose of the community, outlined by its founders, was extremely broad: "to stand firm against the onslaught of calamities that haunt mankind in the form of miserable hygienic conditions of our everyday life, daily diseases, epidemics, and in the case of war, to alleviate the suffering of the wounded on the battlefield" [13]. The activity of the community was supervised by the famous professor of the Medical and Surgical Academy S.P. Botkin (1832–1889). In St. Petersburg the Community of St. George, as the first Red Cross Community in the capital, played a prominent role, being the largest both by the number of sisters and by the scale of therapeutic activities [46].

At first, the community was located on Malaya Grebetskaya Street. In 1871 it moved into the house of the lieutenant-surgeon P.A. Naranovich on the Peterburg side. Since 1879, when the Community was granted a plot of land next to the Clinical Military Hospital on the Vyborg side by the Military Council, a real

[1] We can notice the unity of the whole composition, symmetry and balance. All buildings of the hospital complex were surrounded by lawns, as well as row and group plantings of blue spruce. In the southern part of the park there is a greenhouse, and in the early twentieth century there was an fruit garden with a large number of apple trees. It was adjoined by a small backyard garden, which provided the hospital with fresh food and served as a place for patients' walks [16].

hospital town began to form near Sampsonievsky Bridge — the only centre of medical care for workers of numerous enterprises on the Vyborg and Petrograd sides [27][1]. Architect N.A. Melnikov (1846–1911) carried out a major reconstruction of the stone building on the northern part of the site. The renovated three-storey building with two two-storey wings became the main building of the Community (Fig. 20, 21). The ground floor is completely rusticated, the arches of high windows are crowned with keystones, under the window openings there are fielded[2] panels. The central avant-corps is decorated with pilasters, the frieze — with triglyphs[3], metopes[4] — with fillets, and the cornice with dentils. The inscription "Community of St. George" and the symbol of the Red Cross were placed on the top. The main building housed: on the ground floor — a hospital for incoming patients, pharmacy, office, dining room for sisters and servants, kitchen, pantry and laundry, on the second floor — living quarters for sisters, lecture hall, flats of the chief doctor and surgeon, since they permanently lived in the community. The third floor was occupied by the church and the hall for general meetings [27]. The low dome over the church was built according to the design of F.K. von Pirwitz (1845(2?)–1919?), who also built in a chapel dedicated to the salvation of the Imperial family in Borki in 1889 [1]. At present, a new four-storey building imitating the historical appearance has been built in place of the demolished one. It is now occupied by the North-West Trunk Power Grids, a branch of Rosseti.

In 1889–1892 a two-storey stone building of the water hospital was built along the red line of the Bolshaya Nevka embankment, between two wooden hospital buildings, according to the project of civil engineer P.I. Balinsky (1861–1925) (Fig. 22)[5]. It contained the following departments: hydrotherapeutic one, consisting of a shower room with all the necessary appliances, a doctor's office in charge of showers, rooms for undressing, separate and common, in which the temperature could be brought up to 45 °C; electrotherapeutic department, consisting of a room with an electric bath and a room with a static electricity machine; gymnastic-massage department, consisting of a common gymnastic room and separate rooms for massage, with specially arranged benches; bacteriological department, microscopic and chemical department, consisting of two rooms: for working with acids and for analyses and sterilisation; a library, a museum, rooms for dishes, and enormous cellars [34]. The ground floor is completely rusticated, on the first floor and the turret the rustication is only on the corners and on the edges of the windows. The combination of different designs of window openings is interesting: square windows of the basement, arched windows of the first and second floors, some of which have the form of biforia or trifora, separated by columns; on the first floor of the main facade — bramante windows with a triangular sandric, sill with a blind balustrade; narrow rectangular windows with pilasters in the turret for research. The turret itself has the form of an octagon and was crowned, like the main building, with a strongly rendered cornice with modulars. A balustrade encloses the roof. The use of the Red Cross emblem in the decoration of the columns and the rosette in the centrepiece is interesting. Purpose of the building was: electrotherapy, hydrotherapy, massage.

In 1906–1908, according to the project of civil engineer R.A. Berzen (1868–1958), a three-storey stone building on the basement of the old wooden surgical pavilion was built instead of it.

[1] In 1880-1882 two wooden barracks were constructed on the stone basement, they served for nursing the sick. The buildings were designed by architect S.V. Sadovnikov (1835–1906), in the southern part of the site, along the bank of the Bolshaya Nevka. By 1882-1883, a one-story stone building of the hospital with a chapel was constructed along the red line of Orenburgskaya Street by the project of architect N.A. Melnikov. In 1884, at the expense and under the supervision of the honorary member of the Community, the actual State Counselor Z.I. Degtyarev, the vacant lot between the buildings was turned into a garden, which served as a place of rest for the sisters and convalescing patients. In 1886-1888 a surgical pavilion was built along the red line of Orenburgskaya Street according to the project of architect N.V. Nabokov (1838 — after 1907) [14]. It was a one-storey wooden building with a stone semi-basement.

[2] Fielded pannel — a framed or recessed blank section of a façade or wall panel that is rectangular or close to it (e.g. with coved corners or semi-circles at the ends).

[3] Triglyphs — doric frieze elements alternating with metopes, in the form of a square or similar rectangle with vertical grooves.

[4] Metopes — doric frieze elements close to the square, alternating with triglyphs.

[5] Donations were made by Privy Councillor V.A. Ratkov-Rozhnov, who responded to the idea of N.P. Bogoyavlensky, the chief physician of the Community of St. George, to build a facility where the sisters of mercy could study hydrotherapy, electrotherapy, gymnastics, massage, bacteriology, as well as perform chemical examinations of saliva, sputum, etc. in practice.

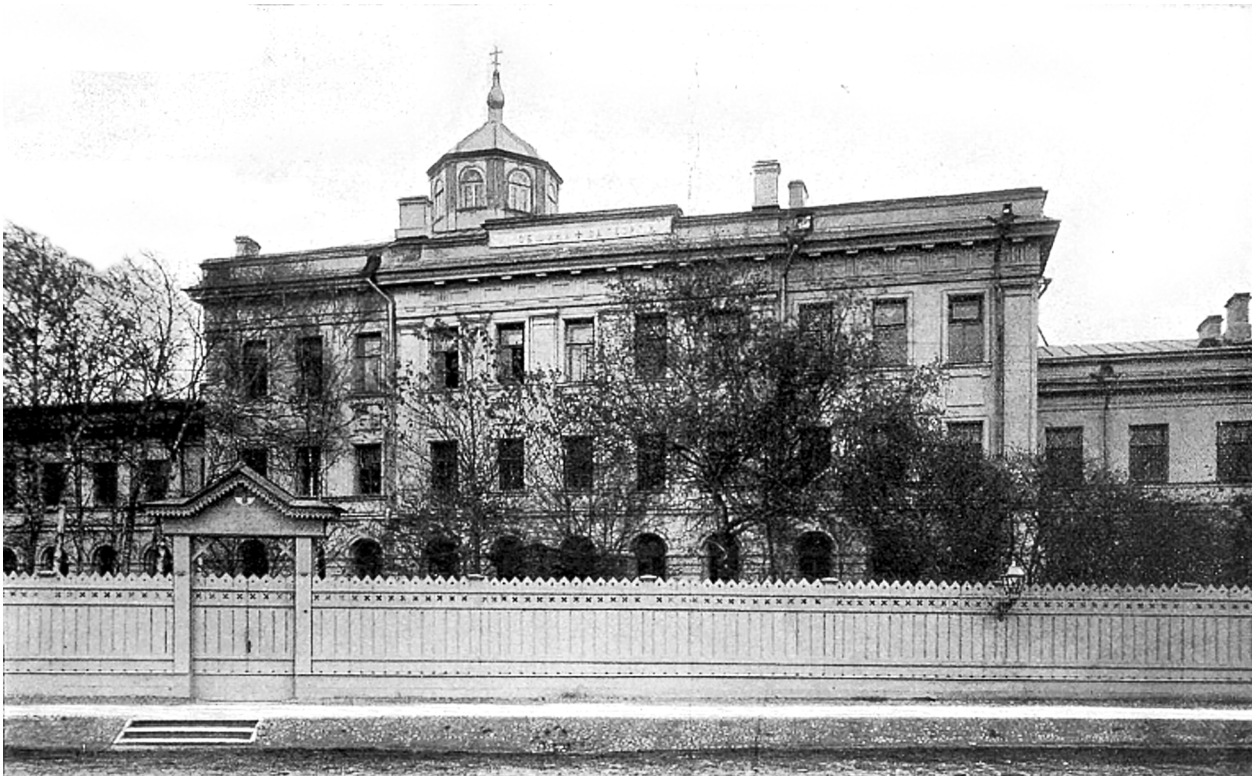

Fig. 20. Main building of the Community of Sisters of Charity of St. George [57]

Рис. 20. Главный корпус Общины сестер милосердия Св. Георгия [57]

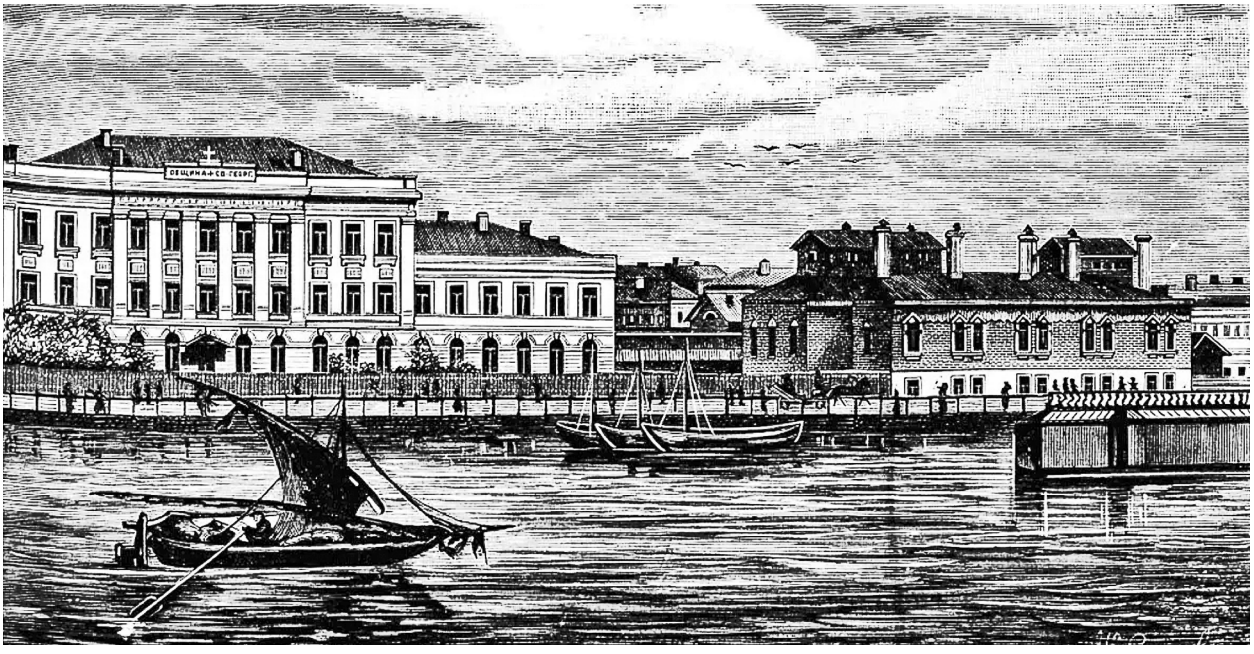

Fig. 21. Community of Sisters of Charity of St. George, on the Vyborg side. Original drawing from life by I. Suslov, engraver M. Rashevsky [37]

Рис. 21. Община сестер милосердия Св. Георгия на Выборгской стороне. Оригинальный рисунок с натуры И. Суслова, гравер М. Рашевский [37]

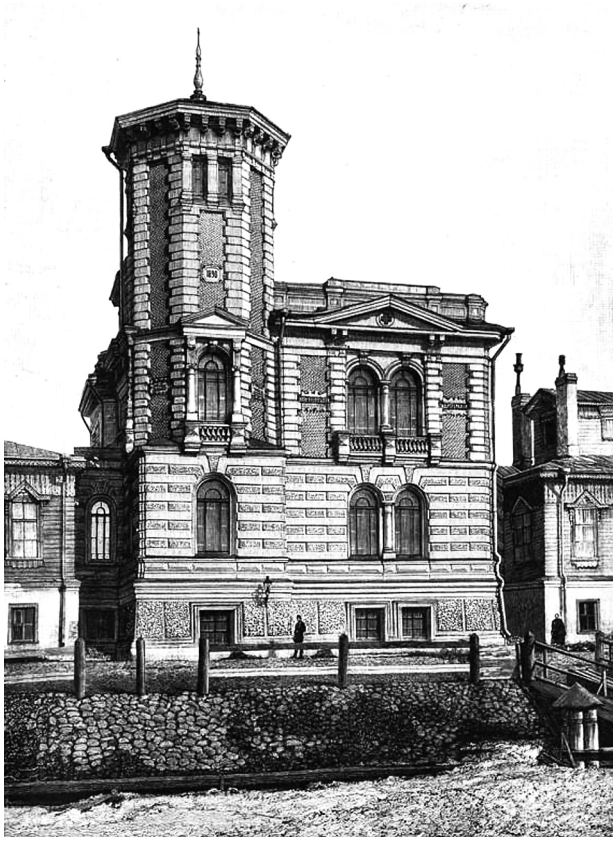

Fig. 22. Institute of Hydrotherapy, Electrotherapy and Massage of the Community of St. George. From a photograph, engraver M. Rashevsky [34]

Рис. 22. Институт гидротерапии, электротерапии и массажа Общины Св. Георгия. С фотографии, гравер М. Рашевский [34]

The new building continued the neo-Renaissance theme of the hospital complex. The lower floor and corners of the building were finished with rusticated plaster. The centre avant-corps was decorated with pilasters and festoons. The use of the Red Cross symbol (in the rosette under the first floor windows) can be seen again. On the facade there were inscriptions 'St. George's Community' and "St. George's Surgical Pavilion"[1].

After 1917 the community was abolished, and the Joint Infirmary No. 2 was located here for some time.

From the 1920s until 1985 it housed the Karl Marx Hospital, which then moved to a new building at 1 Severny Prospect. By now the complex of St George's Community has been only partially preserved.

A classic example of neo-Renaissance in hospital architecture is the complex of buildings of the French Charity Society.

In 1880 the French Charitable Society purchased neighbouring plots on the 13th and 14th lines of Vasilyevsky Island, where it was planned to open an orphanage and almshouse. The project of the three-storey building constructed in 1885–1887 was designed by architect P.Y. Suzor (1844–1919). He would later become the author of designs for other buildings of the complex. The foundation stone of the new hospital building was laid on 12 August 1897 in the presence of the President of the French Republic F. Faure (Fig. 23). The houses on the 12th and 13th lines of Vasilievsky Island were luxuriously decorated with coloured cloths and flags in honour of the honorable guest [42, 54]. On 9 May 1902 the President of the French Republic E. Loubet laid a new two-storey wing, which included an outpatient clinic, surgical and isolation departments. Expansion of the hospital was due to the large influx of patients. It was noted that the institution had a very special character, so that patients felt at home, and that it could be used not only by Frenchmen, but also by people of other nations [52]. The ground floor is finished with grooved rustication, fan-shaped capstones over the window openings and entrance. The second and third floors are smoothly plastered, the rectangular windows are decorated with profiled platbands. There are rectangular mouldings under the windows, in the windows of the first floor one can see a "French balcony"[2].

In 1918, the French hospital was nationalized and the N.K. Krupskaya Children's Specialised Somatic Hospital was established on its basis (14th line of Vasilievsky Island, 57). In 1973 it was united with the Vera Slutskaya Children's Surgical Hospital (1st line of Vasilievsky Island, 58). Before the revolution the hospital was named after St. Mary Magdalene and in 1993, the united children's hospital was returned to its original

[1] Central State Historical Archive. F. 403. D. 162. L.119.

[2] The main building of the orphanage was demolished in 2005. There were plans to build a hotel complex instead, restoring the appearance of the historic building. The construction was stopped due to financial problems, and in 2021 the building was demolished. Now the construction of the residential complex "Manhattan" is underway in its place. The first floors will be made with a hint of the orphanage's architecture, "to somehow preserve the memory of the place". Another building is occupied by St. Mary Magdalene Children's City Hospital No. 2 [32].

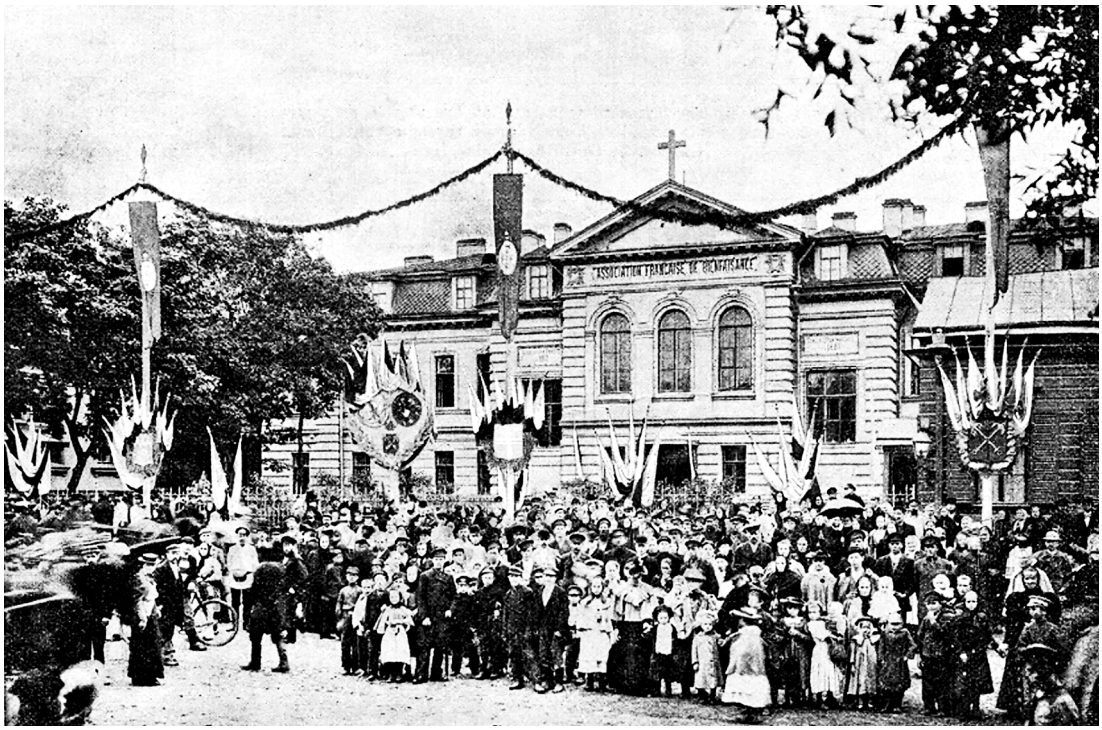

Fig. 23. Building of the French Charitable Society, August 12, 1897. Photo by C. Bulla [42]

Рис. 23. Здание французского благотворительного Общества, 12 августа 1897. Фото К. Булла [42]

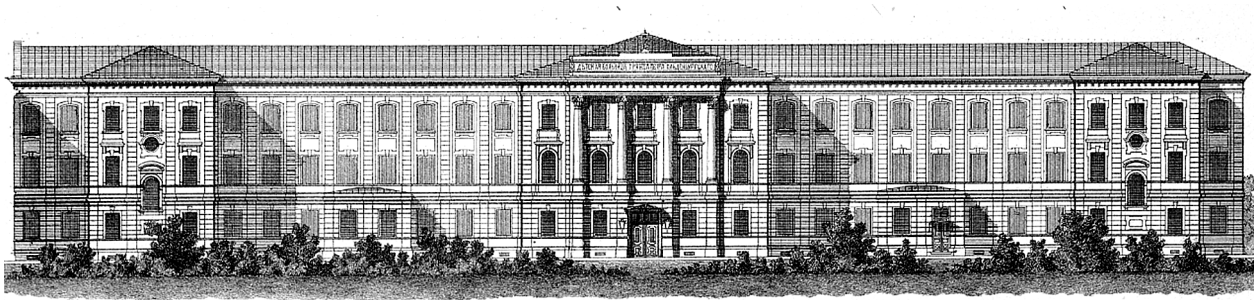

Fig. 24. The main facade of the Prince Peter of Oldenburg Children's Hospital building [15]

Рис. 24. Главный фасад здания Детской больницы принца Петра Ольденбургского [15]

historical name — St Mary Magdalene Children's City Hospital No. 2.

In the second half of the 19th century, architects more often applied to mixing different historical styles in one building, which makes it difficult to classify them. Buildings can not always be accurately attributed to any direction of eclecticism, as architects skillfully combined characteristic features of different epochs. The Children's Hospital of Prince Peter Oldenburgsky is exemplary.

The facade of the building is designed in classicist traditions, and its decoration refers to the Baroque era images (Fig. 24, 25). The main facade of the building is divided by three avant-corpss, which is emphasized by rustication at the corners. The ground floor is separated by a profiled cornice and is emphasized by rusticated plasterwork. The storey division is also emphasized by windows of different shapes, all of which are decorated with capstones. The centre avant-corps is the most richly decorated: Bramante windows with a sandric, baroque volutes of S-bend, Corinthian columns.

In 1864, he was the Chief Administrator of the Department of Institutions of Empress Maria[1] Prince P.G. Oldenburgsky (1812–1881), who

[1] After the death of Empress Maria Feodorovna in 1828, all the supervised charitable cultural, educational, and health

Fig. 25. The main facade of the building of the Children's Hospital named after Dr. K.A. Rauchfus. Modern look [57]

Рис. 25. Главный фасад здания Детской больницы им. доктора К.А. Раухфуса. Современный вид [57]

knew K.A. Rauchfuss (1835–1915) as an energetic and enterprising paediatrician, entrusted him to draw up a program for the construction of a new children's hospital. In addition, a commission of the most famous St. Petersburg doctors doctors and architects was set up. Accordingly, a competition for preparing plans and estimates was opened on the basis of the program approved by the commission[1]. The hospital was intended for children of all classes. It was intended to be an exemplary institution where the latest medical achievements were applied. The Prince's personal funds and the Charity Fund of Empress Maria's were invested in its creation.

The first competition of projects did not bring the desired result. In the second competition, the first prize was awarded to the project of C.A. Kavos (1824–1883). The construction began in 1867, the opening of the hospital, which

care institutions that were part of her chancellery were transformed into the IV Department of His Imperial Majesty's Own Chancellery. The authorities attached state significance to activities activities of these institutions. At the same time, they were named "Institutions of Empress Maria" in memory of her patroness. Since October 1854, the name "The Office of the Institutions of Empress Maria" appears in official documents. Like the Office of the Empress Dowager, it was in charge of charity: women's education, orphanages, health care.

Prince P.G. Oldenburgsky started managing the Empress Maria's institutions in 1839, when he became an honorary guardian in the St. Petersburg guardianship council and a member of the councils of the Educational Society for Noble Maidens and the school of the Order of St. Catherine. In the same year he was entrusted with the management of the St. Petersburg Mariinsky Hospital for the Poor. In 1860, he was appointed to administer all the institutions of the department of Empress Maria Fyodorovna, with the appointment of chief administrator of the IV Department of H.I.H.'s own Chancellery [28, 56].

[1] When drawing up the programme for the construction of the children's hospital, the following objectives were highlighted: to accommodate heterogeneous diseases, avoiding the danger of infecting other sick and convalescent patients. Not to limit the admission of children by age and nature of the disease. To allow the admission of children to the hospital together with their mothers. Organise separate rooms for the sick, thus making it possible to maintain the usual conditions of home life and to individualise the grouping of homogeneous cases; ensure good lighting and ventilation in all rooms. Organise a large room for incoming patients, where children could rest after baths, operations, gymnastic exercises [40].

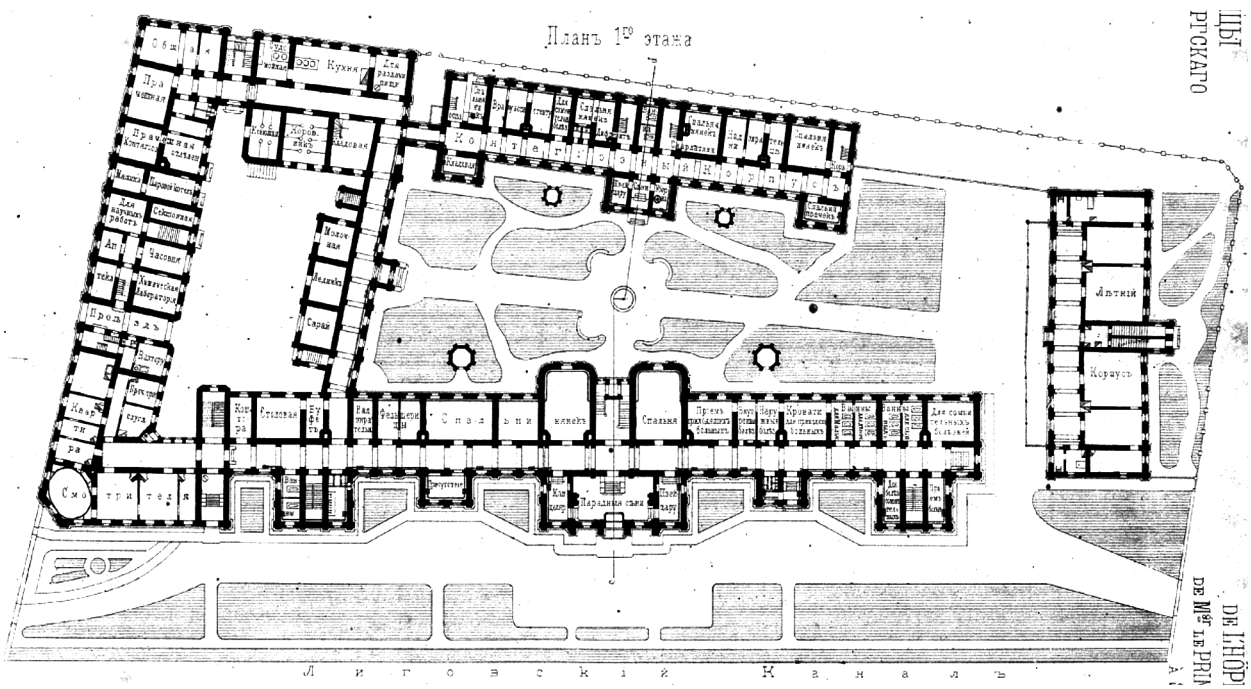

Fig. 26. Prince Peter of Oldenburg Children's Hospital. Ground floor plan [15]

Рис. 26. Детская больница принца Петра Ольденбургского. План первого этажа [15]

was named after Peter Oldenburgsky, took place in 1869. It was the first specially built exemplary children's hospital in Russia, which had no equal abroad.

The hospital building and equipment corresponded to the highest standards of the latest medical achievements, it embodied the latest discoveries of L. Pasteur and D. Lister. Patients were divided according to the type of disease into the following departments: somatic, surgical and contagious ones (Fig. 26). The surgical department of the hospital was the first special paediatric department in Russia. Special wards for infants and rooms for mothers were allocated in the somatic department. K.A. Rauchfuss implemented the principle of strict isolation of acutely contagious patients. The contagious ward was separated from the main building. Four special departments for contagious patients were allocated: for diphtheria, scarlet fever, measles and smallpox. Each department was provided for its separate staff. There were also wards for doubtful patients. All internal equipment was made according to the drawings of K.A. Rauchfuss and provided the greatest comfort for sick children. There was a special system of ventilation, modern type sewerage, disinfection chamber. White coats for doctors and special uniforms for nurses and nannies were introduced for the first time in order to comply with the rules of hygiene [7, 29].

Unlike the existing children's hospitals, the wards here were designed for a smaller number of patients: from 1 to 8 patients per ward. In addition, the area per 1 patient was increased to an average of 10.7 m^2. The walls of wards had rounded corners. There was a special forced ventilation system, separate for each ward, with heating and humidification of the air. All staff were specially trained in childcare, which converted medical care to home care.

Three buildings were built for ill patients: the main building, a separate one and a summer building, with a hospital garden between them (Fig. 27) [40]. The main building was set back from the embankment of the Ligovsky Canal, trees and bushes planted in front of the hospital protected it from street noise and dust.

In 1918 the Children's Hospital of Prince P.G. Oldenburgsky was named after K.A. Rauchfuss, who had been the hospital's director for 40 years (1869–1908). Today it is the K.A. Rauchfuss Children's City Multidisciplinary Clinical Centre of High Medical Technologies named after K.A. Rauchfuss.

In March 1844, the Holy Trinity Community was established in St. Petersburg, which became the first community of Sisters of Mercy in Rus-

Fig. 27. Inner garden of the Prince Peter of Oldenburg Children's Hospital [57]

Рис. 27. Внутренний сад Детской больницы принца Петра Ольденбургского [57]

sia. The daughters of Emperor Nicholas I — Grand Duchesses Maria and Alexandra, Princess T.V. Oldenburgskaya and several ladies from the highest St. Petersburg society[1] [25] took part in discussions on establishing a "nursing institution". The community was aimed at "caring for the poor sick, consoling the grieving, bringing to the path of truth persons who have betrayed vice, education of homeless children and correction of children with bad inclinations" [35].

The buildings of the Holy Trinity Community, occupying the area between the 2nd and 3rd Rozhdestvenskiy Streets[2], were repeatedly rebuilt, which determined the eclectic appearance of the whole complex[3].

The building of the women's hospital was built in Neo-Renaissance forms. The front facade with a side avant-corps facing the 2nd Sovetskaya Street is divided by symmetrical pilasters marked with rustication. The window openings of the first and basement floors with an arrow-like pediment are decorated with twin platbands. The second and third floors are also decorated with twin platbands[4], however, they have more complex archivolts topped with capstones (Fig. 28). The restrained decoration reflects the strict beauty of the late eclecticism. The building of the men's hospital has a more severe appearance: the facades are highlighted with contrastingly colored scapulars, the powerful belt of the cornice consoles

[1] In 1844, after the death of the Grand Duchess Alexandra Nikolaevna, the imperial couple took the community under their patronage in memory of their daughter. Nicholas I allocated funds for the construction of the church. It was consecrated on the eve of the fortieth day of the death of Grand Duchess Alexandra Nikolaevna in the name of the Holy Life-Giving Trinity. According to its name the community of sisters of mercy was given the name "Holy Trinity" in 1873.

[2] In 1923 Rozhdestvenskie Streets were renamed Sovetskie Streets.

[3] The first buildings that belonged to the community since the mid 1940s were enlarged in 1861 by architect G.H. Shtermanov (1815–1872); some buildings were rebuilt in 1872–1876 according to the project of E.S. Vorotilov (1836–1910). In 1882-1884 architect A.F. Krasovsky (1848–1918) built a men's hospital for 50 beds with 13 wards on the plot neighbouring the community, situated on Degtyarnaya Street. In 1889–1891, architect V.R. Kurzanov (1845–1913) rebuilt the living quarters and the women's hospital, projected according to the linear system, it had 7 wards with 36 beds. After this reconstruction, the buildings of the Holy Trinity community acquired the appearance preserved to this day [8].

[4] Archivolt is the outer framing of an arched opening, which distinguishes the curve of the arch from the plane of the wall.

Fig. 28. Holy Trinity Community of Sisters of Mercy from 2nd Rozhdestvenskaya Street (now Sovetskaya) [57]

Рис. 28. Свято-Троицкая община сестер милосердия со стороны 2-й Рождественской улицы (ныне — Советской) [57]

Fig. 29. Holy Trinity Community of Sisters of Mercy from Degtyarny Lane [57]

Рис. 29. Свято-Троицкая община сестер милосердия со стороны Дегтярного переулка [57]

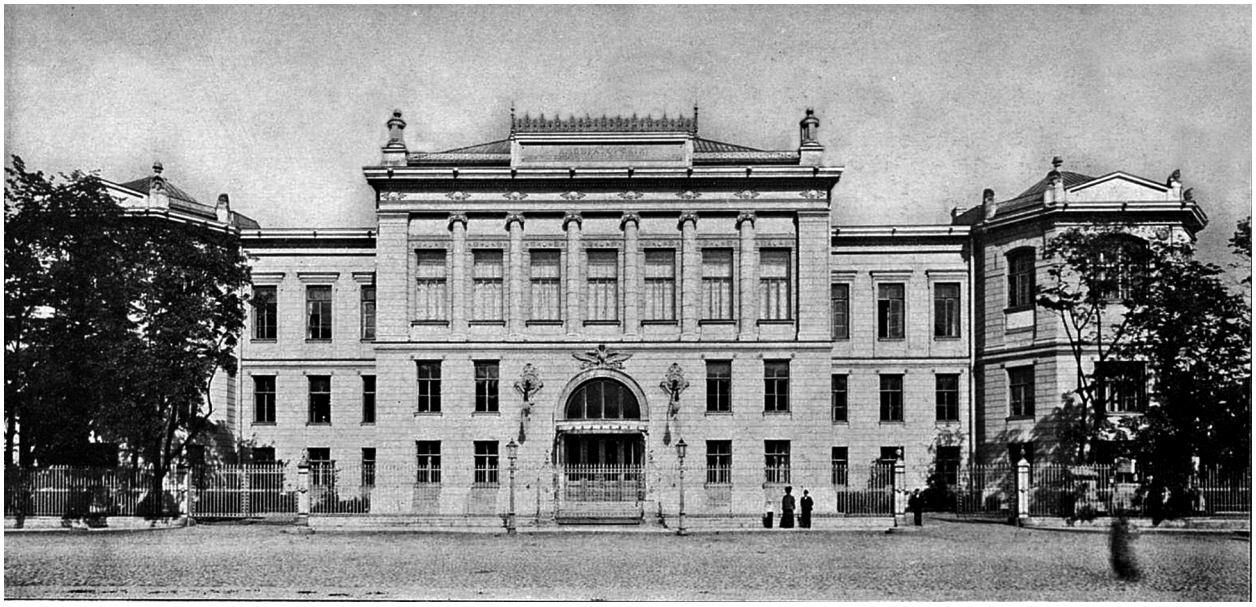

Fig. 30. Imperial Clinical Obstetric and Gynecological Institute. Main facade [23]

Рис. 30. Императорский клинический повивально-гинекологический институт. Главный фасад [23]

creates the impression of a fortress. In the central part of the facade, along Degtyarnaya Street, is the chapel bell tower with semi-columns at the corners of the pole, a hipped roof and a dome above it (Fig. 29). The bell tower designed in the Neo-Russian style is the architectural dominant of the entire hospital complex[1].

As an honorary guardian of the Holy Trinity Community since 1881, in 1886 Prince Alexander P. Oldenburgsky (1844–1932) established a Pasteur inoculation station at the community for the treatment of patients bitten by animals. In 1888 the Prince found the first scientific research institution in Russia, "which would aim to study and apply the innovative methods of prevention and treatment which had been recently discovered by science, and must be implemented only in specially adapted environment, like the Pasteur Institute in Paris and the Institute of Public Health in Berlin" [25]. A.P. Oldenburgsky bought two plots of land on Aptekarsky Island on his personal savings. There necessary buildings were erected and laboratories were set up. The new type of scientific institution attracted the attention of Emperor Alexander III. In 1890 the Imperial Institute was established on its basis.

In 1917, the Holy Trinity Community of Sisters of Mercy became part of the Russian branch of the Red Cross.

When the Bolsheviks came to power, the community ceased to exist, but the medical institutions continued to function. In 1922 they received the name "Hospital named after the 5th Anniversary of the October Revolution". In 1931 the first blood transfusion station of the city was opened there, the next year it was transformed into the Leningrad Blood Transfusion Institute. Currently, the building houses the Russian Research Institute of Haematology and Transfusiology of the Federal Medical and Biological Agency.

The Imperial Clinical Institute of Obstetrics and Gynaecology (Fig. 30) is an example of a building constructed in the eclectic style with predominantly classicistic tendencies. It traces its origins back to the Imperial Maternity Hospital founded in 1797 on the initiative of Empress Maria Fyodorovna (1759–1828). Initially, the Povival Institute was located in a building at 148 Fontanka Embankment. Despite numerous reconstructions, the building remained small [30].

In 1893 D.O. Ott (1855–1929) became the director of the Institute and initiated the construction of a new complex of buildings designed and supervised by architect L.N. Benois (1856–1928). Construction works started in July 1899 and were completed in 1901, the arrangement works were finished in 1904. The central

[1] The community complex includes a women's hospital building (with a church, outpatient clinic and living quarters), a men's hospital building, a women's school building and a chapel.

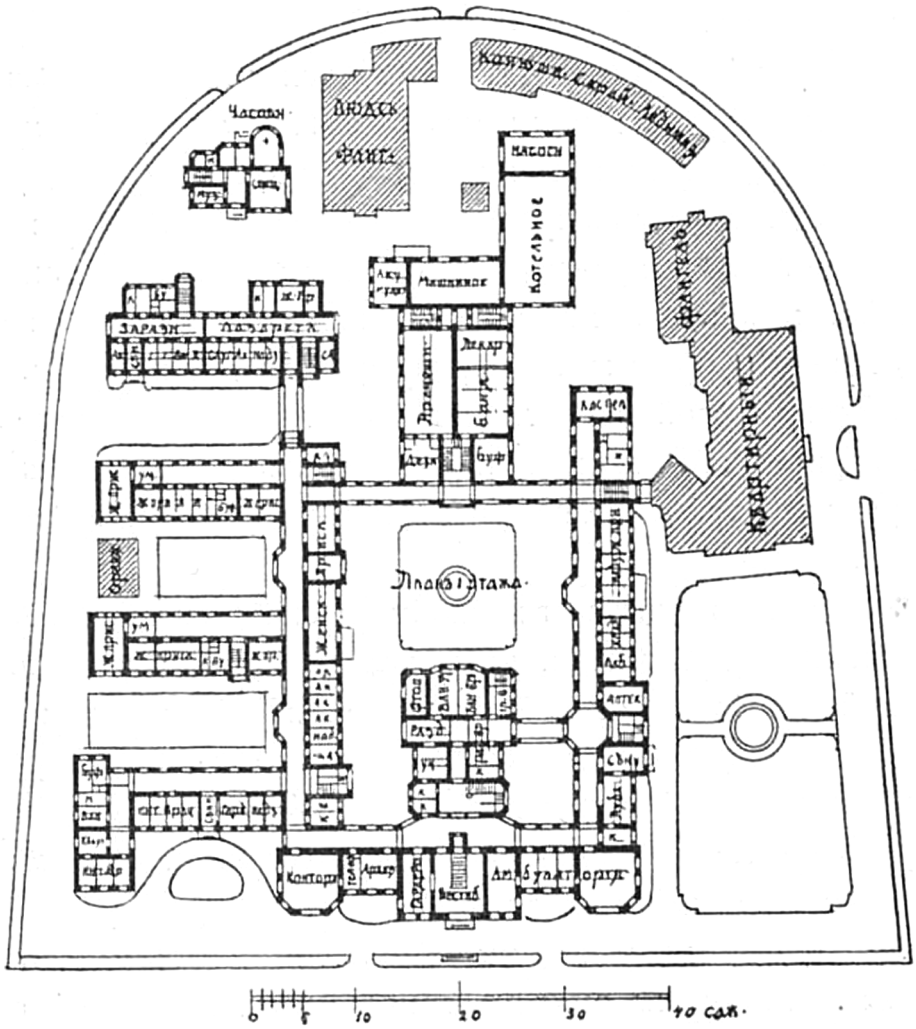

Fig. 31. Imperial Clinical Midwifery Institute. Ground floor plan [22]

Рис. 31. Императорский Клинический повивальный институт. План первого этажа [22]

building was intended for scientific and educational premises. Its facade is completely covered with rusticated plaster. Floor division is emphasized by different sizes and decorations of windows: on the ground floor — fan rustication, on the second floor — rectangular panels with rosettes, on the third floor — rectangular moldings, profiles with 'ears' or ornaments with palmette[1]. The central avant-corps is decorated with Ionic semi-columns with Ionic belt[2], frieze with symmetrical pattern, cornice with dentils and mascarones[3] in the form of lions' heads, roof fence with meanders[4], vases. Above the semi-circular window of the main entrance there used to be a double-headed eagle balancing the composition of two symmetrical lanterns. The design of the canopy over the entrance, the design of the lanterns and some elements in the interior of the building are influenced by the Art Nouveau style. The northern building, consisting of four pavilions, served as the obstetric department: rooms for women in labor, additional rooms. The eastern pavilion housed the infirmary for isolation of infectious and suspicious patients.

[1] Palmette is a decorative motif in the form of a multi-bladed palm leaf.

[2] Ionic — an ornamental motif characteristic of the Ionic, Corinthian and Composite Orders with an equal placement of ellipsoids in the frames.

[3] Mascaron —sculptural image of a lion's face, human face, faun, hydra, etc. included in the architectural decoration.

[4] Meander — elongated ornament: a continuous line with identical L-shaped breaks.

Fig. 32. Maternity room with six beds [21]

Рис. 32. Родильня на шесть кроватей [21]

The southern building included rooms for gynecological patients, doctors and nurses, bathrooms and toilets, and a flat wing adjoining the building. The eastern building was occupied by utility rooms. The Institute had its own electric power station, mechanical laundry, kitchen, bakery, its own water supply and sewerage system. The building for pathological anatomy was placed separately. The eastern part of the site also housed stables, rooms for animals used in experiments, storerooms, a building for the section room, with a chapel and a museum (Fig. 31).

The hospital wards were arranged for one or two beds, sometimes as general wards (Fig. 32). Each bed had a telephone, an electric bell button, a microphone to listen to the orgy in the assembly hall, an electric lamp at the feet, and a washbasin. There was a veranda for air treatment, facing the sunny side and protected from the northern winds. The operating and maternity rooms faced east; large windows and powerful lamps created good illumination. The latter were installed on long movable rods, without interfering with the doctor and spectators. Portable amphitheater seats were installed in the operating theatres for the audience attending operations. Cabinets and sterilization devices were built into the walls, and ovens were installed for burning used dressing material.

The Institute has changed its name several times throughout its history[1]. Currently it is the D.O. Ott Research Institute of Obstetrics, Gynecology and Reproductology.

Eclectic architecture, which passed through various stages in its development, seeking to respond to public demands, enriched Russian architecture with a number of major achievements:

[1] In 1918 — Palace of Maternity and Childhood, in 1931 — Central Research Institute of Obstetrics and Gynecology of the People's Commissariat of Health of the USSR, in 1940 — Central Institute of Obstetrics and Gynecology of the People's Commissariat of Health of the USSR, in 1948 — Institute of Obstetrics and Gynecology of the Academy of Medical Sciences of the USSR, in 1989 the Institute was named after D.O. Ott, in 1999 — Research Institute of Obstetrics and Gynecology named after D.O. Ott, in 2014 — D.O. Ott Research Institute of Obstetrics, Gynaecology and Reproductology.

the creation of new types of residential and public buildings, the introduction of the latest construction techniques, the organization of comfortable conditions for human life and activity. Hospital planning and construction began to search for new, more rational compositional methods during this period. More attention was paid to the convenient connection of rooms, their ventilation and illumination, which, in turn, influenced the architecture of facades, contributing to a further departure from the canons of classicism. Many medical centers began to 'grow' and turned into entire hospital towns. A new trend of the time was the construction of hospital complexes with the participation of leading physicians. They promoted the use of hospital premises of new medical achievements of that time, which were associated with discoveries in the field of physiology, hygiene, microbiology, general and infectious pathology and others. Hospital buildings in St. Petersburg were built not only by the government, but also by private individuals and charitable donations. The changing social composition of customers, the possibility of free choice of architectural styles and their mixing contributed to the fact that the city became multi-faceted, characterized by unique charm and beauty.

ADDITIONAL INFORMATION

Author contribution. Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

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ABSTRACT. Andrzeevskiy Ivan Ivanovich is a Russian military doctor, Doctor of Medical Sciences. In 1857–1885 I.I. Andrzeevskiy was the junior and then senior physician of the Izhevsk Arms Factory. In addition to the daily care of patients, the doctor studied the specifics and causes of high diseases rate of the population of the factory village. He fought epidemics, made considerable efforts to create effective methods of treating various fevers and typhus. He did his best to improve the organization of medical services at the Izhevsk plant by increasing the number of the medical staff and the number of the beds for the patients in the inpatient department. In the doctoral dissertation “Swamp diseases in the north. Medical and topographic description of Izhevsk Arms Factory” he was the first to introduce important medical, topographic and statistical materials, analyzed the class, national, age and gender of the factory population, marriage, fertility, morbidity and mortality, the influence of climate, epidemics and social problems on the dynamics of reproduction. I.I. Andrzeevskiy also made a significant contribution to the study of the living conditions of the factory population.

KEYWORDS: Andrzeevskiy Ivan Ivanovich, Izhevsk Arms Factory, medical and topographic research, “swamp diseases”, fevers, life expectancy, mortality, birth rate, social and hygienic living conditions of Izhevsk workers

АНДРЖЕЕВСКИЙ ИВАН ИВАНОВИЧ — РУССКИЙ ВОЕННЫЙ ВРАЧ, ДОКТОР МЕДИЦИНСКИХ НАУК, СТАРШИЙ ЛЕКАРЬ ИЖЕВСКОГО ОРУЖЕЙНОГО ЗАВОДА

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РЕЗЮМЕ. Андржеевский Иван Иванович — русский военный врач, доктор медицинских наук. В 1857–1885 гг. И.И. Андржеевский являлся младшим, а затем старшим лекарем Ижевского оружейного завода. Иван Иванович проводил прием пациентов, выявлял основные факторы возникновения болезней среди рабочих оружейного завода, определял структуру патологии среди приписного населения. Боролся с эпидемиями, приложил немалые усилия для создания эффективных методов лечения лихорадок и тифов. Осуществлял мероприятия по увеличению численности медицинских кадров и коек в лазарете. В научной работе «Болотные болезни на севере. Медико-топографическое описание Ижевского оружейного завода» впервые дал характеристику заболеваемости, рождаемости, смертности рабочих завода, представил соотношения мужского и женского населения, их национальность и распределение по сословиям. И.И. Андржеевский также внес весомый вклад в изучение быта заводского населения.

КЛЮЧЕВЫЕ СЛОВА: Андржеевский Иван Иванович, Ижевский оружейный завод, медико-топографическое исследование, «болотные болезни», лихорадки, продолжительность жизни, смертность, рождаемость, социально-гигиенические условия жизни ижевских рабочих

Ivan Ivanovich Andrzejewski (Andreevsky) was born 23.04.1832 in a family of Polish nobles in the family estate Fortunatovo (now the village Surmilitsy) in Vitebsk province. At baptism he received the name Jan Marzelius. His grandfather was Jozef (Joseph) Bialetsky-Andrzejewski. His father was Jan Mikołaj Białecki-Andrzejewski (Jan Mikołaj Białecki-Andrzejewski), his mother was Rozalia Bobaszynska [5, 6].

It is interesting to note that in 1844 Antonina Frantsevna Andrzejewski (Eliashevich), the second wife of Jan Mikołaj Białecki-Andrzejewski, submitted a petition to the Vitebsk Noble Deputation Assembly to recognise her husband's sons from the first marriage Ivan-Marcelius and Pavel in the nobility. The request was satisfied [5, 6].

Ivan Ivanovich Andrzejewski studied in Vitebsk gymnasium. In 1855 he graduated from the Imperial Medical and Surgical Academy in St. Petersburg. During the Crimean War he was sent to the Novoglukhov military hospital of the Ukrainian military settlement (1853–1856). On 17.11.1857, as a military doctor, he was appointed junior doctor at the Izhevsk gun factory (Fig. 1).

After the abolition of the serfdom "the gunsmiths were granted the rights of rural inhabitants and given freedom: to continue to engage in the gunsmithing business, ...or to move to the allotted land plots and become farmers" [1, 7]. At the Izhevsk gun factory there was a hospital with 150 beds, in 1865 an emergency room with 8 beds was opened. I.I. Andrzejewski was the director of the hospital [2]. Medical care, including in-patient care, and drug supply were provided free of charge. However, most workers could not exercise their right to free medical care due to the high workload of medical centres. In addition, workers often preferred to be treated at home, as they lost part of their wages and provisions while in hospital. The situation was aggravated by the lack of medicines [3].

According to statistical reports of 1866, up to 65 patients, mostly traumatised factory workers, applied to the hospital every day [3]. In 1868 the mortality rate in the emergency room was 6.7%, in 1872 — 2.7%. In 1870, 3248 people were treated as outpatients, of whom 1629 were factory workers. "The local hospital or emergency room would not correspond neither to the population of the factory, nor to the number of workers ... if patients did not prefer to be treated at home, by their own resources..." [1, 3].

Since 1873 I.I. Andrzejewski headed the military infirmary, the staff of which consisted of a head doctor, two paramedics, a pharmacy para-

Fig. 1. Dam of the Izhevsk Arms Factory

Рис. 1. Плотина Ижевского оружейного завода

medic, a supervisor, infirmary attendants and service personnel. Financing was envisaged — 25 kopecks per patient per day. Medicines were provided from the Moscow pharmacy. Patients of the infirmary were soldiers of garrison artillery companies, regimental students and artillery observers. For the maintenance of the infirmary in 1883 were spent 4456 rubles 68 kopecks [2, 3].

The head doctor reported to the administration of the factory on the expenditure of funds, the work of medical and paramedical staff, the number of patients on in-patient and out-patient treatment once a quarter. He provided information on the structure of sickness rate of factory workers, industrial injuries and accidents. In his report dated 02.01.1877 Ivan Ivanovich gave an analysis of the organisation of the factory health care and revealed a decrease in the general level of health of the lower ranks. Among the main reasons for the development of high morbidity and traumatism I.I. Andrzejewski noted the poor health of recruits, who mostly suffered from the tuberculosis. Local unfavourable climatic conditions and, as a consequence, the prevalence of endemic diseases have had an impact [2].

The epidemiological situation was complicated by the fact that the infirmary was located in the building of the former factory hospital, in a dilapidated building without major repairs. By 1870, the roof of the building was leaking, the rooms were cold and damp. In order to prevent the spread of typhus and disinfection, patients had to be constantly transferred from one ward to another [2].

In 1880, I.I. Andrzejewski received the degree of Doctor of Medical Sciences for his dissertation “Swamp Diseases in the North. Medico-topographical description of the Izhevsk gun factory”. I.I. Andrzejewski’s dissertation research begins with a description of the territory of the Izhevsk factory and the livelihood of the workers and their families. Describing the territorial location of the Izhevsk iron forging (founded in the early 18th century) and gun works (founded in 1807), I.I. Andrzejewski noted that the Izh River divided the Izhevsk settlement into two almost equal parts: the highland and the backland. The zarechnaya part of the Izhevsk factory was located below the level of the pond. “In many houses, for the better part of the year, the water stands right under the floor

... the dampness and swampiness of this area is further increased by the considerable number of springs...". The damp climate, according to I.I. Andrzejewski, was the cause of high morbidity and recurrent epidemic fevers among the local population. Thus, according to the doctor, "terrible sickness was rampant among the workers of the iron forging plant and they quickly died out". "In their place came in large numbers others..., but the same fate awaited these too" [1].

The epidemic of fever in 1807–1816 I.I. Andrzejewski defined it as "horrifying in its strength and duration" with a mortality rate of up to 13.5% per year. "During the epidemic, relocations to the factory, or, as they were called, 'manning of workers' must have continued almost continuously and occurred in batches of several hundred to 2,000 people at a time", the doctor wrote. During the fever epidemic of 1842–1845 "with a population of about 15,000 souls, the daily number of sick exceeded ... 1,500 people". The sick were placed "in corridors, sometimes two by two on one bed, ... several people on one bunk, ... just on the floor, on straw". They died from fevers at the peak of the disease and from its consequences: tuberculosis and disorders of the digestive system [1].

It is interesting to note that during the epidemic of 1842–1845 "skilful and experienced doctors" sent to the plant saw the main cause of epidemics "in the damp, swampy terrain of the plant and demanded radical measures to improve it" [1]. The factory authorities, on the contrary, "insisted that the epidemic was nothing but an accidental 'weather' ", which was left to the "art" of doctors to fight. In the end, they agreed on "medium measures aimed at improving the life of gunsmiths". Wages were increased and rations were introduced for the family members of the workers, who "literally ... starved to death during the workers' illness". However, as I.I. Andrzejewski notes, these measures "were implemented slowly and reluctantly", and epidemics of fevers did not stop (1853, 1863, 1876) [1].

I.I. Andrzejewski studied the climate in detail, during twelve years he recorded the average monthly and average annual temperature, also studied daily temperature fluctuations, monthly distribution of clear and cloudy days with precipitation, wind direction, conducted a comparative analysis of Izhevsk climate with the climate of Yaroslavl. Thus, among "the most unhealthy winds" he referred to "south-east and especially south-west wind" — wind "from the rotten corner", i.e. "from the swampy basins of the rivers Posimi and Izh". "...and always at the same time the most violent and transient forms of swamp fever spread through the factory", Ivan Ivanovich wrote. In addition, the dissertation research contains data on the monthly distribution of thunderstorms at the plant, the observation of which was carried out for eight years. The doctor revealed the dependence of certain diseases on the time of year. He also described the quality of water used in the home. Water is "abundant everywhere; but good water for drinking is a scarce resource". Analyses of key water, water from deep and shallow wells, pond and river water are presented. He considered water from springs to be the most suitable for drinking, and the least suitable — pond and river water, water from shallow wells, because after heavy rain and snow melting "whole dirty streams with a mass of organic residues and rubbish" were poured there. According to I.I. Andrzejewski's findings, poor water quality led to an increase in the incidence of typhoid fever, cholera, and worm infections [1].

Describing the difficult working conditions of gunsmiths, the influence of the swampy area around the settlement as the main cause of many diseases, I.I. Andrzejewski first determined the average life expectancy of the factory workers — 17.6 years due to the exceptionally high infant mortality and male mortality [1].

In the period from 1839–1878 he found a decrease in the number of marriages (in 1839–1842 one marriage was registered per 77 citizens, in 1872–1878 one marriage was registered per 100 citizens). It revealed seasonality of weddings (mainly in winter and autumn periods), predominance of early marriages (marriage age was 20–25 years for grooms and 16–20 years for brides). There were from 4.3 to 6.1 births per marriage. The couples, according to the doctor, had very limited life needs and did not think about the fate of their offspring [1, 2].

The highest birth rate was recorded by Ivan Ivanovich in the period from 1854–1860, when after the fever of 1842–1844 gunsmiths were granted various privileges. I.I. Andrzejewski also studied the monthly distribution of births and conception at the factory depending on the fasts, sowing and harvesting works. The dissertation research presents data on stillborn, illegitimate and abandoned children. Thus, for the period

from 1860–1878 illegitimate children made up 3.03% of all newborns, foundlings — 2.47% [1].

According to the study of I.I. Andrzejewski, mortality among workers and peasants of the Izhevsk plant was high, in 1840–1880 was 1:23 people, or 4.33%. The "Medico-topographical description" presents data that one dead person was one per 26 citizens in 1840, in 1845 — per 23.5, in 1850 — per 20, in 1855 — per 20, in 1855 — per 26, in 1860 — per 22.5. In 1867 the death rate was 50‰ [1–3].

Among all the dead children under the age of one year made up 41.3%, boys prevailed (117 boys per 100 dead girls) [3]. The high infant mortality rate was attributed to poor hygiene and early complementary feeding (from one month of age) with steamed bread, semolina and buckwheat porridge, which upset the digestion of newborns. Scarlet fever, measles, whooping cough, smallpox, and diphtheria were common among older children. However, "...none of these diseases was particularly widespread, nor particularly malignant, but .... each of them raised more or less significantly the percentage of mortality" [1].

I.I. Andrzejewski for the first time carried out an in-depth analysis of mortality at the Izhevsk gun factory in the period from 1860 to 1878, revealing a particularly high mortality rate at the age of up to 4 years (Table 1).

From 1860 to 1866 a total of 5677 men and women died from various causes. In 1866–1872 — 5770 people, for 1872–1878 — 4941 people. The mortality of children under 6 months accounted for 32.83 % of the total mortality, and the mortality of children under 1 year of age was 41.29%.

The production experience of an Izhevsk worker began "often from the age of 10, or even from the age of 9". "...the most frequent reason for their admission to the factory is that an adult worker in the family either falls ill without end, or died, or, finally, became a soldier, and the whole family ... sits literally without any bread" [1, 7].

The mortality rate of men of working age was higher compared to the mortality rate of women, which contributed to the increase of women in the structure of factory workers. In 1860–1866 there were 134.15 dead men per 100 dead women, in 1878 this indicator increased to 160.90 dead men. The highest mortality rate in 1860–1878 among men of the factory was registered at the age of 20–25 years, then — after the age of 35 years, and from the age of 40 years the mortality rate began to decrease. Throughout the history of the Izhevsk plant, the mortality of the male population in the working age prevailed over the mortality of the female population [7]. "According to the number of orthodox parishioners of the plant by the beginning of 1878, there were already more than 115 women per 100 men". The doctor explained this fact by "increasing physiological weakening — degeneration of the population and, predominantly, of its male half" [1].

Ivan Ivanovich among the causes and factors contributing to high mortality indicated physical or natural (soil, climate, "national peculiarities") and social conditions of life. Ivan Ivanovich identified the leading factors of population reproduction as a natural and climatic factor (the swampy terrain, poor quality of drinking water and changeable cold climate), unsanitation, unfavourable living and production conditions [1–3]. He attributed the excess mortality rate of men

Table 1

Distribution of children from 0.5 to 4 years died in 1860 to 1878 in the Izhevsk arms factory

Таблица 1

Распределение умерших детей с 0,5 до 4 лет с 1860 по 1878 гг. в Ижевском оружейном заводе

Возраст / Age	С 1860 по 1866 гг. / From 1860 to 1866			С 1866 по 1872 гг. / From 1866 to 1872			С 1872 по 1878 гг. / From 1872 to 1878		
	муж. / male	жен. / female	итого / total	муж. / male	жен. / female	итого / total	муж. / male	жен. / female	итого/ total
До 0,5 лет / Up to 0.5 years	982	853	1835	1024	802	10 826	923	796	1719
До 1 года / Up to 1 year	240	222	462	226	219	445	256	224	480
1 год / 1 year	180	190	370	197	179	376	167	144	311
2 года / 2 years	200	201	401	144	123	267	117	96	213
3 года / 3 years	123	107	230	95	95	190	61	67	128
4 года / 4 years	66	81	147	64	56	120	41	49	90

working at the factory to high traumatism and the presence of metallic and organic dust in the air [8]. In the workshops "people crammed together like herrings in a barrel". "When working in the polishing and sharpening workshops, workers inhale mineral dust heated by friction ..., and a rare one of them, after several years of work does not suffer from chronic bronchitis or pulmonary emphysema. In addition, sparks bursting out by the jet ..., often get into the eyes, burn the skin on the hands ...". In a steel factory "with an atmosphere constantly poisoned by coal smoke, ... do not get sick, but die quickly from carbon monoxide" [1].

In addition, the high mortality rate of Izhevsk workers was partly due to their adherence to folk medicine. Factory workers and their families often turned to retired paramedics, folk healers and witch doctors [1, 3].

The population of the Izhevsk factory in 1866 was 20,618 people, including 9,886 men and 10,732 women.

I.I. Andrzejewski considered the spread of alcoholism as one of the most unfavourable factors reducing the population. The number of drinking establishments in Izhevsk increased from 4 to 88 from between 1862 and 1874. Thus, in 1874 there was one pub per 273 citizens, in 1880 — one pub per 190 citizens. Ivan Ivanovich noted that the younger generation also followed the harmful example of adults. Ivan Ivanovich explained the growth of criminal statistics by "the influence of the machine mode of production, which turns man into some kind of automaton, suppressing the mind and consideration" [1].

The thesis presents a characterisation of the health of workers at the factory for the period 1866–1878. Ivan Ivanovich noted that "given the insufficient size of the hospital, it was necessary to take there exclusively men working at the factory, and moreover with the most severe and, mostly, acute disease forms". The doctor begins his description of the diseases common among the factory population with contagious diseases of childhood (scarlatina, measles, smallpox) and typhus (typhus and typhoid). The doctor examines the characteristics of typhoid fevers in detail. According to I.I. Andrzejewski's data, typhoid fever accounted for 0.43% of the total morbidity rate. The doctor explained the rarity of typhuses by "very satisfactory hygienic conditions of gunsmiths' dwellings". "Contagious diseases of childhood draw attention to themselves... unusually high percentage of mortality", — wrote Ivan Ivanovich. At the same time, "a few of the gunsmiths consider it necessary to consult a doctor about any childhood diseases, especially in the first months of life of newborns". "By a ridiculous prejudice, ... those possessed of these diseases are endeavoured always to keep as hot as possible . ...the unfortunate child is almost always found red as a kumach, somewhere in a stuffy corner, or near a hot-heated cooker, wrapped in all sorts of blankets, and, literally, suffocating from the violent rush of blood to the lungs" [1].

Malarial diseases (swamp fever) accounted for 33.05% of the total morbidity. I.I. Andrzejewski considered it obligatory for a doctor "to keep in mind constantly the possibility of complication of any disease by swamp fever". In the dissertation study the types of fevers with clinical characteristics, consequences of the disease, including swamp fever — a non-intermittent form of swamp fever are considered in detail. Quinine was used in the treatment of various swamp fever processes. "In Izhevsk plant, among gunsmiths, deaf-mutes after swamp fever are counted by dozens", — wrote Ivan Ivanovich [1].

I.I. Andrzejewski also mentions syphilis among other diseases — 1.15% of the total morbidity rate. "One of the conditions facilitating the spread of syphilis among adults is... the work at the factory, where the whole workshop quenches its thirst from a single ladle", Ivan Ivanovich noted. Respiratory pathology (18.02%), gastrointestinal diseases (9.37%), diseases of the musculoskeletal system (5.10%) and skin pathology (19.43%) prevailed among the workers. The doctor gives clinical characteristics of pneumonia, bronchitis and emphasises their close connection with the spread of swamp fever. Diseases of gastro-intestinal tract "are also in close connection with the spread of swamp fever processes". According to the doctor's observations, "a particularly close correlation is found between bog diseases and the most numerous class of digestive disorders... diarrhoea", accounting for 72.7% of all gastrointestinal diseases. "Among the immediate causes of digestive disorders a prominent role is played at the factory by worms (1.06%)....; then water of bad quality, and also... disproportionate consumption of... kvass".

Among skin diseases the doctor notes rashes, ulcers, burns, scabies, eczema, caused by the conditions of work at the factory. Ivan Ivanovich attributes a very large number of injuries to the too early age of workers, the duration and monotony

Fig. 2. Ivan I. Andrzeevsky

Рис. 2. Иван Иванович Андржеевский

Fig. 3. I.I. Andrezheevsky's wife

Рис. 3. Жена И.И. Андржеевского

of work, insufficient lighting, terrible cramped workshops due to "a disproportionate number of machines cluttering them..." [1].

In his study I.I. Andrzejewski gives some details of the life of Izhevsk gunsmiths of the second half of the XIX century. The number of houses in Izhevsk settlement at that period was 3870.

"And if we take into account the enormous spread of sickness in the factory in general, and among the workers in particular, it becomes quite understandable that strange at first glance phenomenon that, with the apparently increasing prosperity of the population, long ago there had not been in the factory so many hungry poor people, as now, and never before there were outwardly such striking contrasts between large affluence and extreme poverty" [1].

In 1872, the preparations for the Russo-Turkish war, which had begun, led to a significant increase in the productivity of the factory. Workers laboured at the factory both during the day and night, on weekdays and on holidays (except Sundays). Gunsmiths produced 150 thousand guns annually. The number of workers at the gun and steel factories increased from 3 thousand in the early 1870s to 5 thousand in 1878, labour remuneration increased to 17 rubles. Izhevsk factory was transformed, stone and wooden buildings were built. Trade in the factory settlement reached unprecedented proportions. Factory workers owned meadows, mowings, raised cattle [1, 7].

I.I. Andrzejewski's dissertation describes the interior decoration of workers houses, which consisted of a wooden table, 2–3 chairs and benches along the walls. Two walls of the armourer's hut had windows. They slept mostly on the floorboards or on the cooker, although some houses had a bed. However, even in the homes of well-to-do workers, clean rooms with European furniture were either rented or not used, and the family lived "somewhere in the kitchen with cockroaches and other household insects". "Cleanliness in the workers' homes is maintained by the women very satisfactorily. The family bathes in a bathhouse, which is available in almost every house, but most of the bathhouses are built 'black'. There are no latrines in the house, they are replaced by a stable and a corner in the yard". "A Tula samovar is the first sign of the developing contentment in an armourer's house. They are followed by cheap wall clocks of the largest sizes. As soon as there is a need, the clock and samovar are sold to a happier neighbour, but at the first opportunity they are bought again, and if there are no longer these objects in the house, it means that the gunsmith's budget is in the worst condition" [1].

"Women in general are kept tidy. Unfortunately, the same cannot be said for children. But the cleanliness of men is dependent on the way they work. There are such kinds of factory work, in which the whole body of the worker is covered with a layer of liquid and at that greasy dirt (a mixture of mineral dust and oil), which

penetrates deeply into the skin and is washed off with the greatest difficulty, after repeated smearing with oil. Such workers are washed clean only once a week, in the bath, and it is clear that only the habitual, rough skin can bear such dirt without inflammation" [1, 7].

The predominant place in the diet of factory workers was occupied by vegetable food. "Fresh fish, due to its rarity and high cost, was available to the few. But a lot of salted and dried fish is brought to the factory. ... Meat is consumed quite often in the form of various pies and the famous dumplings. .... Dumplings are also made from fish and even from cabbage ... each Izhevsk resident consumes at least 60 pounds of meat per year ...". However, the doctor notes the insufficient nutrition of a significant part of the factory workers during the working day. "In some workshops the work starts from 5 a.m. and continues until 7 p.m. (sometimes later), with a lunch break of only 2 hours. Therefore those gunsmiths who live closer to the factory have breakfast (not always), lunch and dinner, but those further away must be content with dinner alone. They bring with them to work a slice of bread and dried fish, which they break with a spoon, soak a little in water, and then eat. Their favourite drink is kvass, sometimes homemade beer, which is sold in mugs in the streets" [1, 7].

I.I. Andrzejewski characterises workers' clothes from the point of view of health preservation. The elderly dressed in "zipuns" and long-sleeved caftans, while the clothes of the young did not correspond to the harsh climate: "the predominant style was a puffy coat, sometimes made of very expensive drape and with ...a beaver collar, and in summer — a 'vizitka', with the inevitable open waistcoat and a tightly starched shirt. The happy owner of such a 'German' suit considers it ... a duty to show himself in it on the first Sunday, walking along the streets, with his chest open to all winds, and he is shivering from the cold. Women still retain the former half-peasant costume, but even here the motivation in the form of velvet katsavekas, burnuses, dandy shoes, etc. begins to peep through" [1, 7].

I.I. Andrzejewski during his service at the Izhevsk factories was repeatedly promoted in rank, having passed the way from titular counsellor (IX class of the "Table of Ranks") to collegiate counsellor (VI class).

For his diligent service, on 23.07.1868 I.I. Andrzejewski was awarded the Order of St. Anne of the 3rd degree. In 1880 Ivan Ivanovich was awarded the Order of St. Stanislaus of the 2nd degree, and in 1883 — the Order of St. Anne of the 2nd degree. He had a bronze medal on the St. Andrew's ribbon in memory of the war of 1853–1856 [2, 4, 5, 9].

By the highest order of 08.09.1885 I.I. Andrzejewski was appointed chief doctor of the Chuguev military plant [2]. The last years of his life he spent in Ufa, having the rank of State Counsellor. The Andrzejewski family had a stone house with a wooden wing for 8 rooms in Ufa [2, 5, 10].

I.I. Andrzheevsky (fig. 2) was married to Lyudmila Zakharovna Popova (fig. 3), a native of Vyatka province. The marriage produced 5 daughters: Marionilla (1868–1958), Elizaveta (1874–1948), Natalia, Olga, Lyudmila and a son Pavel. His wife and children professed orthodoxy [5].

The work of Ivan Ivanovich Andrzejewski in the military medical service entered the history of national medicine. From 1857 to 1885 he served as junior and elder doctor of the factory hospital. The statistical data of his doctoral dissertation are important information characterising the birth rate, mortality and morbidity of the population of a large industrial settlement. I.I. Andrzejewski studied in detail the influence of climatic and sanitary conditions, religious and production factors on health indicators and life expectancy of the population of the Izhevsk gun factory.

ADDITIONAL INFORMATION

Author contribution. Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

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Конфликт интересов. Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

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THE MAIN DIRECTIONS OF IMPROVING DISPENSARY MONITORING OF PATIENTS USING DIGITAL TECHNOLOGIES

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ABSTRACT. Modern development of society is characterized by an increase in the pace of socio-economic development, an increase in average life expectancy, demographic and epidemiological changes, which up to date status demands for affordable, high-quality and timely medical care. Over the past five years, the rate of adoption of digital technologies has increased significantly, both in government and private sectors. Wearable electronics (smart watches, fitness trackers), which can determine activity, pulse, amount of oxygen in blood, instability while walking and falls, can transmit data tagged with geoposition to medical institutions and save people's lives. Telemedicine technologies play an important role in providing qualified medical care, overcoming time and territory restrictions in the provision of medical care in remote areas. Remote monitoring systems can detect potential health problems, raise alarms, and notify appropriate individuals or medical services via wireless communications for immediate medical intervention. All this optimizes the load on personnel and equipment, and reduces the amount of resources and budgetary funds involved. The introduction of digital technologies plays a particularly significant role in the organization of dispensary observation. The use of an information system allows medical personnel to effectively compile lists of patients who need clinical observation, issue referrals for laboratory and diagnostic tests, and also register patients for the necessary examinations and clinical examinations without wasting additional time. Thus, the global strategy for the digitalization of healthcare provides an opportunity to improve health, prevent epidemics and pandemics, and develop programs using health data to promote health and well-being.

KEYWORDS: digitalization, telemedicine, digital technologies, artificial intelligence, wearable electronics, medical examination, dispensary supervision, remote monitoring, remote medical services, preventive medical examination

ОСНОВНЫЕ НАПРАВЛЕНИЯ УЛУЧШЕНИЯ ДИСПАНСЕРНОГО НАБЛЮДЕНИЯ ЗА ПАЦИЕНТАМИ С ПРИМЕНЕНИЕМ ЦИФРОВЫХ ТЕХНОЛОГИЙ

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РЕЗЮМЕ. Современное общество характеризуется увеличением темпов социально-экономического развития, ростом средней продолжительности жизни, демографическими и эпидемиологическими сдвигами, что повышает спрос на доступную, качественную и своевременную медицинскую помощь. За последние пять лет значительно увеличилась скорость распространения цифровых технологий, как в органах государственного управления, так и в частном секторе. Носимая электроника (умные часы, фитнес-трекеры), позволяющая определять активность, пульс, количество кислорода в крови, неустойчивость во время ходьбы и падение, способна передавать данные с пометкой о геопозиции в медицинские учреждения и спасать жизни людей. Телемедицинские технологии играют важную роль в обеспечении квалифицированной медицинской помощи, преодолении временных и территориях ограничений в области оказания медицинской помощи на удаленных территориях. Системы удаленного мониторинга позволяют обнаруживать потенциальные проблемы со здоровьем, вызывать тревогу и уведомлять соответствующих лиц или медицинские службы через беспроводные средства связи для немедленного медицинского вмешательства. Это оптимизирует нагрузку на персонал и оборудование и позволяет уменьшить использование ресурсов и бюджетных средств. Особенно значимую роль внедрение цифровых технологий приобретает в организации диспансерного наблюдения. Использование информационной системы позволяет медицинскому персоналу эффективно составлять списки пациентов, которые нуждаются в диспансерном наблюдении, оформлять направления на лабораторные и диагностические исследования, а также записывать пациентов на необходимые обследования и диспансерные осмотры без лишних затрат времени. Таким образом, глобальная стратегия цифровизации здравоохранения дает возможность повысить уровень здоровья, предотвращать эпидемии и пандемии, разрабатывать программы, используя данные о здоровье для укрепления здоровья и благополучия.

КЛЮЧЕВЫЕ СЛОВА: цифровизация, телемедицина, цифровые технологии, искусственный интеллект, носимая электроника, диспансеризация, диспансерное наблюдение, дистанционный мониторинг, дистанционные медицинские услуги, профилактический медицинский осмотр

INTRODUCTION

Health check-up is a priority area in the activities of medical institutions, including a set of measures to promote a healthy lifestyle, prevention and early diagnosis of diseases, effective treatment of patients and their dynamic observation. The main objectives of health check-ups are to preserve the health of people, as well as to actively identify patients in the early stages of diseases and reduce incapacity for work and disability. It plays an important role in the sociohygienic aspect of health check-up.

Medical follow-up is an important component of medical care for persons suffering from chronic diseases, functional disorders and for those who are in the process of recovery from severe acute illnesses. The main purpose of dispensary observation is to prevent complications, timely detection of exacerbations and medical rehabilitation.

The main regulatory legal document of medical follow-up of patients is the Order of the Ministry of Health of Russia from 15.03.2022, No. 168n “On approval of the procedure for the dispensary observation of adults”, based in

accordance with Part 7 of Article 46 of the Federal Law of 12 November 2011, No. 323-FL "On the basis of health protection of citizens in the Russian Federation" (Legislation of the Russian Federation, 201, No. 48, Art. 6724; 2016, No. 27, Art. 4219) [23, 30]. Medical follow-up implies regular examination of patients with various infectious and non-infectious chronic diseases, as well as those who are at high risk or recovering from injuries and poisonings. The purpose of such surveillance is to detect and prevent complications of diseases in a timely manner, as well as to provide the necessary rehabilitation to patients.

Medical follow-up includes preventive medical examinations at the initial visit of the patient and is scheduled within three working days after confirmation of the diagnosis in outpatient conditions or after discharge from hospital. The organisation of the process and the achievement of targets are monitored by the management of the medical organisation, collecting and analysing information on the progress of medical follow-up. The work with patients based on these data is carried out within the framework of established clinical recommendations and standards of care.

Medical follow-up is carried out by a variety of health-care professionals, including general practitioners, specialised physicians, medical preventologists and paramedics at feldsher and obestric stations or feldsher health centres. However, if a specialist for certain diseases or conditions is not available in a medical organisation, a therapist arranges a consultation with an appropriate specialist from another organisation, including through the use of telemedicine technologies.

During medical follow-up, medical workers keep records of patients, inform and train them to monitor their health indicators and organise medical follow-up appointments. During the appointments, the patient's condition is assessed, a diagnosis is made, the effectiveness of previous treatment is evaluated and additional medical measures are prescribed. All information on medical follow-up is recorded in the patient's medical records and a record form.

Medical follow-up is one of the functions of doctors in out-of-hospital institutions, such as polyclinics and outpatient clinics, as well as specialised dispensaries. It is intended for the treatment and prevention of certain diseases and plays an important role in the system of specialised medical care for the population. Dispensaries fulfil the following functions: development and implementation of preventive measures, active detection of sick people at early stages, treatment and rehabilitation of patients. They are specialised medical organisations combining the prevention, surveillance, qualified specialised care and health education. According to the Order of the Ministry of Health of the Russian Federation No. 529n dated 06.08.2013, the types of dispensaries include cardiological, oncological, tuberculosis, endocrinological, skin and venereological, medical and physical culture, psychoneurological, narcological and ophthalmological [24].

Dispensaries provide care to both adult and paediatric patients and include outpatient and inpatient departments. They play a leading role in providing specialised therapeutic and preventive care for socially significant diseases [17, 23, 37, 38].

It is important to note that, if necessary, general practitioners, paramedics and obstetricians keep records of patients on medical follow-up with specialists and form a consolidated follow-up plan for each patient, taking into account all diseases or conditions [39]. In this way, an exhaustive and holistic approach to patient health care is implemented, which includes various aspects of healthcare. Accordingly, the tasks of the health care system include not only the preservation and promotion of public health, but also the formation of an active position to achieve sustainable trends in its improvement, the ultimate goal of which is to reduce mortality and increase life expectancy. The introduction of digital technologies into practical medicine helps to realise these objectives.

HISTORICAL ASPECTS OF THE INTRODUCTION OF DIGITAL TECHNOLOGIES

All over the world, digitalisation has become one of the major trends in modern medicine. The need for digitalisation is explained by the obsolescence of health care systems formed in the last century in the absence of effective medical care and remote monitoring. The United Nations (UN) has recognised the importance of this trend by including a section on Digital Health in the Millennium Development Goals Declaration. This solution makes it possible to

significantly increase the availability of healthcare services.

Medical science has progressed in tandem with the development of practical healthcare. The desire to solve urgent problems and meet the needs of physiology, aerospace and sports medicine has led to the creation of new methods of scientific research based on telecommunications. Thus, the development of telemedicine can be divided into several periods [31].

From 1850 to 1920 there was an early experimental period. During this time, individual experiments were conducted to transmit medical information via telecommunications. They also began to integrate diagnostic tools and communications, and to use telegraphic communication in military field medicine and in emergency situations.

Between 1921 and 1954, the initial systematisation of telemedicine took place. Large and effective radio-based telemedicine networks were established, which became the main instrument of medical assistance to the crews of naval vessels and the inhabitants of isolated territories. Experiments in biological information transmission and video broadcasting were also conducted during this period.

Between 1955 and 1979, telemedicine began to be used on a mass scale. The most significant achievements were large effective telemedicine networks based on interactive videoconferencing and transtelephonic electrocardiography. The widespread use of bioradiotelemetry tools revolutionised the knowledge of physiology. Mobile telemedicine based on satellite communications also began to take shape at that time. Scientific research was conducted and the concept and methodology of telemedicine was developed.

From 1981 to the present, there is a period of technology change and gradual transition to modern clinical telemedicine. The methodology of telemedicine has been modernised along with the personalisation of computer technology, the development of the Internet and the emergence of digital diagnostics.

At the beginning of the XXI century, there has been a significant evolution in information technology — mobility has become one of the main characteristics of this evolution. This was manifested by the rapid growth in the number of portable computers and telecommunications, as well as the increase in the number of Internet users, with about 50% of the audience already in 2016 preferring to use mobile devices to access the Internet [14, 15].

In healthcare, the most common application of information technology is the MIS (medical information system), which integrates various functions such as medical decision support system, electronic medical record, digital research data, monitoring of the patient's condition using medical devices, means of communication between employees, as well as financial and administrative information [8, 22, 27].

The use of the Internet for the purposes of medical organisation management is taking place abroad. Foreign companies General Electric Healthcare and Stanley Healthcare use the "Internet of Things" technology to solve the problem of movement management and control the flow of staff and patients in medical institutions. These systems work on their own platforms and are compatible with electronic document management systems, ensuring interoperability.

An example of successful implementation of such a system is the implementation of AutoBed system in one of the largest medical centres of the USA "Sinai". Developed by General Electric Healthcare on the basis of the "Internet of Things" platform, this system helped to optimise bed allocation, reduce the number of unused beds and create an additional source of revenue for the institution.

Another example is the joint solution of Philips and OpenMarket Philips e-Alert, based on the same technology. This solution solved the problem of MRI machine outages. Using a special sensor, the system monitors the status of MRI devices in real time and warns staff about possible failures even before the equipment breaks down. This has minimised downtime and ensured that MRI devices are serviced according to their actual condition, rather than according to regulations.

In 2019, Skolkovo hosted an important event for healthcare in the Russian Federation. The Centre of innovation and the "Internet of things" in healthcare was established with the participation of the international biopharmaceutical company AstraZeneca, QIAGEN, Factory of Radiotherapy Technology LLC, Russian Post, Sberbank, Stantex, Nokia, as well as PJSC Vimpelcom and General Electric Healthcare. One of the Centre's projects is aimed at solving

the problem of optimising the ambulance route when a medical team visits a patient with acute coronary syndrome (ACS).

THE MAIN DIRECTIONS FOR THE IMPLEMENTATION OF DIGITAL HEALTH IN THE RUSSIAN FEDERATION

At the moment, the main examples of digital health in the Russian Federation are USHIS (Unified State Health Information System) and VIMIS "Prevention" (vertically integrated in the medical information system).

USHIS was created to improve the quality of medical care for citizens of the Russian Federation. The system's operation is based on the principles of global digital health and aims to provide a seamless, cost-effective and convenient service for patients and employees of medical institutions. The goals of USHIS include maintaining electronic medical records, improving coordination between health care providers, reducing duplication of services and ensuring rational use of health care resources. With USHIS healthcare providers have full access to a patient's medical history, allowing for personalised and efficient health care. For patients, this means the possibility of receiving medical consultations at a distance, making an appointment with a doctor via the Internet and receiving electronic prescriptions.

VIMIS (vertically integrated medical information system) "Prevention" provides the possibility of global management of the process of providing medical services to citizens. This includes health check-ups, medical screening and vaccination. With the help of the system, there is a possibility of premature diagnosis of various diseases and tracking of possible deviations from treatment standards.

VIMIS "Prophylaxis" enables medical institutions to keep records of patients in need of preventive measures, follow the process of undergoing medical procedures, and monitor the maintenance of the plan of preventive and dispensary services for patients.

The system is patient-centred and linked to the "My Health" personal account on the Russian Federation's public services portal. Patients can keep a personal log of their own and their children's health, as well as receive a vaccination plan and notifications about the need for vaccinations and health check-ups. This data is available to the doctor who is responsible for the patient's treatment.

VIMIS "Prevention" for the Russian Ministry of Health and sectoral national medical research centres (NMRCs) collects basic data from all health check-ups, vaccinations and preventive measures. Analytics and forecasts are created based on this data, a management decision support system, personnel and equipment requirements are formed [1].

The "My Health" portal of public services is an online platform that aims to provide citizens with convenient access to information about health and medical services. Through the My Health portal, people can make an appointment with a doctor, undergo online consultations, receive prescriptions, track their treatment history and obtain information on their health status. Each user has the right to access their electronic medical records, which simplifies the process of servicing and communicating with medical specialists. The "My Health" portal has become a significant step in the development of the healthcare system. It has increased the availability and quality of services, simplified and accelerated the interaction between patients and doctors, making it more efficient and patient-centred. In general, the portal of public services "My Health" is an example of successful digital transformation of the healthcare sector, contributing to the improvement of the quality of humans life [4, 6, 10–13, 18, 40, 43–47].

THE ROLE OF DIGITALISATION IN MEDICAL FOLLOW-UP

According to the World Health Organisation, more than 70% of all deaths worldwide in recent years have been caused by chronic non-communicable diseases (CNCDs). Four groups of such diseases stand out, accounting for about 80% of all deaths: cardiovascular diseases (17.9 million), cancer (9 million), chronic obstructive pulmonary disease (3.9 million) and diabetes mellitus (1.6 million). It is predicted that by 2030 the mortality from these causes could reach 52 million.

Russia is no exception, as more than 67% of deaths among its adult population are related to CNCDs. As in the whole world, cardiovascular diseases also occupy the first place in these statistics. According to the Russian Ministry

of Health, more than 77,000 people died from cardiovascular disease in January 2020, and although this number has decreased by 9% compared to January 2019, mortality from this cause remains high.

The high workload of the district general practitioner due to the large amount of administrative work often does not allow for a sufficiently comprehensive patient consultation during the visit and reduces the total number of patients seen by the doctor.

There are problems with the work of laboratories and insufficient equipment to carry out the necessary laboratory and functional tests.

In addition, some of the problems are related to the patients themselves:

- the low adherence to treatment;
- lack of or insufficient knowledge of blood pressure measurement techniques;
- inconsistent diary keeping due to irregularity of blood pressure monitoring.

To sum up the data obtained, it should be noted that the organisation and conduct of high-quality medical follow-up is one of the important parts of the work of the district general practitioner, which is aimed at preventing the progression of the pathological process and reducing the number of exacerbations of chronic non-infectious diseases. This, in turn, leads to an improvement in the efficiency of medical follow-up, including a reduction in the number of hospitalisations, ambulance calls for exacerbations of chronic diseases, hospitalisations in the phase of exacerbations and mortality of persons on the medical follow-up register [14].

In most countries in the 21st century, there is a need for active intervention to combat the economic and social consequences of non-communicable diseases (NCDs), which have reached high levels. The UN has recognised that prevention and control of these diseases have become priority issues in light of sustainable development. In order to achieve these 2015 targets, States must take targeted policy and legislative action and provide adequate resources for health systems.

Analysis of changes in the medical follow-up system indicates the need to improve the organisation of patient routing within the medical organisation and to improve communication between medical specialists and patients involved in medical follow-up.

The medical follow-up project provides for continuous and active follow-up of the patient, not just from appointment to appointment, which is achieved through the EMIAS (unified medical information and analytical system).

As part of EMIAS, a special subsystem for dynamic medical follow-up has been created, which includes doctor's and assistant's desks, an electronic medical record and a self-monitoring diary for patients. The introduction of a progressive medical follow-up system will reduce the number of premature deaths and disability among the population.

V.V. Shkarin, E.A. Berseneva et al. concluded that one of the key ways to reduce mortality from cardiovascular diseases (CVD) in the Volgograd region is to improve the diagnosis of CVD in the rural population in order to reduce mortality [35].

One of the new methods used for early detection of electrophysiological changes in the heart is electrocardiogram dispersion mapping (ECG DM). This method is based on the measurement of low-amplitude fluctuations in the ECG signal, which may indicate disturbances in the function of cardiomyocytes, the structure of their cell membranes, mitochondrial energy formation, as well as microcirculation disorders and other factors.

The use of remote cardiac screening in rural areas can improve the quality of life of the villagers, reduce mortality, reduce treatment costs and have a positive social and economic impact. Application of the screening diagnostic method does not require highly qualified medical personnel and can be carried out directly on the territory of the household, which is especially important in rural areas with a shortage of medical specialists. In our opinion, the introduction of the telecardiac screening project for rural population will become a new stage in the development of cardiology service in the health care system of Volgograd Region [8, 32].

G.Y. Bendyuk, M.A. Dokhov et al. consider health check-up as an important organisational means of prevention, which includes various components, such as early detection of cardiovascular diseases and assessment of the risk of their development, preventive counselling, identification of additional examinations to clarify the diagnosis, as well as the establishment of medical follow-up for all persons with detected diseases, especially for those who have such cases for the first time [3].

In the second stage of the work, a model was developed that can predict circulatory diseases leading to temporary disability (TD). To create this model, a neural network was used, which took into account the data on the incidence of TD and the results of periodic medical examinations for the previous two years. The model consisted of three layers: an input layer with 18 neurons, a hidden layer with 23 neurons, and an output layer with one neuron. The neural network was trained using error back propagation and conjugate gradient methods. Three groups were formed for training: training group (2344 individuals), control group (1112 individuals) and testing group (1177 individuals). The training results showed the correctness of the model predictions in the training group to be 90.4%, in the control group to be 92.4%, and in the testing group to be 94.2%. Validation of the model on the testing group showed a sensitivity of 97.7% and specificity of 90.7%.

With regard to the frequency of visits to medical centres due to illnesses, the visibility level for persons in the age group 60 years and older was 185.5% compared to persons in the age group under 25 years. In case of preventive visits, the visibility level was 70.8% and the frequency of such visits decreased with age. Maximum decrease in the frequency of preventive visits was recorded when moving from the age group below 25 years to the age group of 25–30 years (–36.8%) and the second highest (–6.9%) was observed in persons in the age group of 60 years and above.

The main elements of the work were the identification of persons suffering from hypertension and in need of medical follow-up. This definition was carried out by therapists of health centres of preliminary and periodic medical examinations, based on the analysis of risk factors for the development of this disease, as well as on the basis of formed risk groups defined using a neural network model.

The study conducted to analyse the morbidity using the TD before and after the introduction of the Regulation showed a statistically significant reduction in the number of cases of diseases associated with high blood pressure from 43.6 to 31.4% ($p < 0.05$). The Regulations also improved the uniformity of workload at health centres: the coefficient of variation in the number of visits per day decreased from 35.5 to 22.3% ($p < 0.05$) [3].

M.S. Sukhanov, Y.V. Karakulova et al. concluded that different systems of remote monitoring of patients with CHF can influence mortality and hospitalisations related to heart failure. In Perm Krai, a procedure for remote monitoring of patients' health status has been developed and approved as part of a cardiovascular disease control programme. Remote monitoring includes periodic telephone contacts between the operator or medical staff and the patient, which determine the need for further face-to-face counselling, additional examination and treatment tactics. Calls to patients are made every 30 days, and a report on the work done is made every 7 days and submitted to the person responsible for the "Remote Monitoring" programme in the given territory of Perm Krai [25].

Taking into account the procedure of preventive medical examination and health check-up for certain groups of the adult population, it is important to take into account that preventive examination can be carried out as an independent event, or as part of a health check-up, as well as during the first health check-up in the current year. Of particular importance is the medical follow-up of citizens subject to medical follow-up on the basis of approved plans for its implementation. The RMIS UR (Regional Medical Information System for Health Management of the Udmurt Republic) has a section dedicated to medical follow-up, which ensures timely informing of medical workers about the fact of medical follow-up of citizens.

The use of the information system allows medical staff to efficiently compile lists of patients who need medical follow-up on a quarterly or monthly basis. The system also helps doctors to issue referrals for laboratory and diagnostic tests, and to enrol patients for necessary examinations and dispensary check-ups without wasting time.

In cases of acute coronary syndrome and acute cerebral circulatory failure, this information is transmitted through a unified information system to insurance medical organisations. They ensure control over the implementation of recommendations, timeliness of visits and inclusion of these patients in the dispensary record [2, 28, 29, 42, 47].

In view of the identified opportunities for monitoring and analysing the medical follow-

up of patients with angina pectoris according to the invoices-registers, as well as according to the results obtained, an information system for managing medical follow-up of such patients was developed. Management of medical follow-up of patients with angina pectoris on the basis of their electronic database in cooperation between TFOMS (Territorial Fund of Compulsory Medical Insurance), IMO (Insurance Medical Organisation), MIAC (Medical Information and Analytical Centre), MO (Medical Organisation) and the Ministry of Health of the Region leads to increased coverage of such patients with medical follow-up and outpatient treatment. This helps to reduce the risks of myocardial infarction in angina pectoris and save money from the CMI (compulsory medical insurance) fund [20].

When conducting a comparative analysis of clinical endpoints in the group of patients suffering from tension angina pectoris for 2017 and 2019, a significant and reliable reduction in the number of emergency calls and emergency hospitalisations was found. In 2017, out of 13,208 patients with this pathology, 4,445 (33.6%) experienced emergency calls and emergency hospitalisations, whereas in 2019, the number of such cases among the same patients, but among 10,205 patients, was 2,908 (28.5%). The obtained data in the same group of patients suffering from angina pectoris indicate that the implementation of information management technology for the quality of medical follow-up is effective and productive. Based on the analysis of large amounts of medical data, the developed technology of information management of the quality of medical follow-up in ischaemic heart disease contributes to the improvement of treatment efficiency and leads to an increase in the number of patients under medical follow-up for angina pectoris and myocardial infarction, as well as to a decrease in adverse outcomes [19, 21, 36].

A pilot project carried out in an urban polyclinic aimed to evaluate the effectiveness of remote blood pressure monitoring in achieving target blood pressure values, patient adherence to antihypertensive therapy and the dynamics of using fixed drug combinations, as well as reducing emergency medical calls.

The results of this study indicate that the use of remote blood pressure monitoring for 6 months leads to a 3.1-fold increase in adherence to antihypertensive treatment. In addition, there is a decrease in the load on ambulance crews, reducing the number of calls by 12.5% [41].

Within the framework of the same pilot project, the effectiveness of comprehensive rehabilitation of patients after stroke was assessed using the method of telephone interviews, which also showed a high level of effectiveness.

Since 2009, a regional vascular centre (located in the Krai Clinical Hospital) and 8 primary vascular departments (3 in Krasnoyarsk and 5 in the regions of the Krai) have been functioning in Krasnoyarsk Krai. All of them are united by a single electronic monitoring system. There are also rehabilitation centres that provide level II and III care (inpatient and outpatient care at the Federal Siberian Research and Clinical Centre of FMBA of Russia and outpatient treatment at the Professor's Clinic of the Krasnoyarsk State Medical University named after Professor V.F. Voyno-Yasenetsky). All inpatient clinics operate in accordance with the Order of the Ministry of Health of Russia No. 1705n of 29.12.2012 on the organisation of medical rehabilitation. The research programme of the pilot project "Improving the system of medical rehabilitation in Russia" covers all stages of care for patients after stroke.

As a result of the telephone interview I.Yu. Gordyukova, S.V. Prokopenko and others report that 90 days after admission to hospital it was found that 96% of patients are able to move independently. The results of remote monitoring showed that more than half of the patients were grateful for the treatment and would like to undergo the rehabilitation course again.

This shows that the telephone interview method is an effective means of monitoring patients during the recovery period after stroke. It makes it possible to assess the patient's mobility, his/her ability to perform arbitrary movements and indirectly assess the degree of disability and independence [7].

The results of the study showed that the optimised medical follow-up programme for patients with atherosclerosis of the lower limb arteries reduced the risks of acute ischaemic events and hypertensive crisis. Fewer unplanned and emergency hospitalisations were noted in the main group. In addition, existing literature suggests that telemedicine monitoring may be more effective and cost-advantageous compared to traditional face-to-face monitoring.

Analyses of the results of medical follow-up of patients with chronic obliterative disease of the lower limb arteries in the remote period showed that there were fewer deaths and fewer cases of severe lower limb ischaemia in the main group. This indicates the effectiveness of using remote telemedical follow-up as part of an optimized medical follow-up programme [9, 16, 26, 33, 34].

At the moment, a pilot project under the auspices of the Ministry of Health has been launched in the Russian Federation to remotely monitor the health status of patients with diabetes and hypertension. The implementation of the project, called "Personal Medical Assistants", began in 2023 and will continue until the end of 2024.

The essence of the project is to provide patients with special diagnostic devices. The indicators collected by these devices are automatically transferred to a digital platform, where they are processed by specialists from the E.I. Chazov National Medical Research Centre for Cardiology and the National Medical Research Centre for Endocrinology.

All data collected as part of the project are combined on the information platform in an anonymised form, checked for security and sent to medical organisations for further use. This ensures that all patients' personal data is safe, confidential and protected from leaks.

Remote monitoring and subsequent data processing are aimed at collecting the most complete information on the patient's health status, which affects the quality of medical decisions. In particular, such indicators as blood pressure and pulse rate in patients with cardiovascular diseases and blood sugar levels in patients with diabetes are monitored.

The project is expected to reduce the incidence of complications and acute conditions in patients with these diseases. By the end of 2024, the project "Personal Medical Assistants" is planned to cover up to 25 thousand patients with remote health monitoring [5].

CONCLUSION

Digitalisation of the healthcare system within the framework of the national project approved by Presidential Decree No. 204 "On National Goals and Strategic Objectives for the Development of the Russian Federation for the Period until 2024" plays an important role in improving healthcare services. The implementation of the platform (USHIS) in all segments of the Russian Federation has made it possible to provide a single format for the exchange of medical information, which has made it possible to integrate data from different sources and improve the availability and quality of medical care. An example of the successful implementation of digital solutions is the "My Health" portal of state services, which provides electronic certificates of incapacity for work, appointment booking and online access to analyses. Telemedicine technologies play an important role in providing qualified medical care, overcoming time and territorial limitations in the provision of medical care in remote areas. Remote monitoring eliminates gaps in the health care system, engages patients through mobile devices and enables the detection of health problems. Remote monitoring systems allow notification of relevant individuals or medical services via wireless communications for immediate medical intervention. This optimises the workload of staff and equipment and reduces the use of resources and budgets. Thus, a global digital health strategy offers an opportunity to improve health, prevent epidemics and pandemics, and develop programmes to promote the health and well-being of people.

ADDITIONAL INFORMATION

Author contribution. Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

Competing interests. The authors declare that they have no competing interests.

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ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

Вклад авторов. Все авторы внесли существенный вклад в разработку концепции, проведение исследования и подготовку статьи, прочли и одобрили финальную версию перед публикацией.

Конфликт интересов. Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

Источник финансирования. Авторы заявляют об отсутствии внешнего финансирования при проведении исследования.

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ПРАВИЛА ДЛЯ АВТОРОВ

Утв. приказом и.о. ректора
ФГБОУ ВО СПбГПМУ Минздрава России от 05.04.24

НАСТОЯЩИЕ ПРАВИЛА ДЛЯ АВТОРОВ ЯВЛЯЮТСЯ ИЗДАТЕЛЬСКИМ ДОГОВОРОМ

Условия настоящего Договора (далее «Договор») являются публичной офертой в соответствии с п. 2 ст. 437 Гражданского кодекса Российской Федерации. Данный Договор определяет взаимоотношения между редакцией журнала «Medicine and health care organization / Медицина и организация здравоохранения» (далее по тексту «Журнал»), зарегистрированного Управлением Федеральной службы по надзору в сфере связи, информационных технологий и массовых коммуникаций по Северо-Западному федеральному округу 17 мая 2016 года, свидетельство ПИ № ТУ78–01872, именуемой в дальнейшем «Редакция» и являющейся структурным подразделением ФГБОУ ВО СПбГПМУ Минздрава России, и автором и/или авторским коллективом (или иным правообладателем), именуемым в дальнейшем «Автор», принявшим публичное предложение (оферту) о заключении Договора.

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СОПРОВОДИТЕЛЬНЫЕ ДОКУМЕНТЫ

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ПОРЯДОК АКЛЮЧЕНИЯ ДОГОВОРА И ИЗМЕНЕНИЯ ЕГО УСЛОВИЙ

Заключением Договора со стороны Редакции является опубликование рукописи данного Автора в журнале «Medicine and health care organization / Медицина и организация здравоохранения» и размещение его текста в сети Интернет. Заключением Договора со стороны Автора, т. е. полным и безоговорочным принятием Автором условий Договора, является передача Автором рукописи и экспертного заключения.

ОФОРМЛЕНИЕ РУКОПИСИ

Редакция журнала приветствует полностью двуязычные статьи.

Статья должна иметь (НА РУССКОМ И АНГЛИЙСКОМ ЯЗЫКАХ):

1. Заглавие (Title). Должно быть кратким (не более 120 знаков), точно отражающим содержание статьи.
2. Сведения об авторах (публикуются). Для каждого автора указываются: фамилия, имя и отчество, место работы, почтовый адрес места работы, e-mail, ORCID. Фамилии авторов рекомендуется транслитерировать так же, как в предыдущих публикациях или по системе BGN (Board of Geographic Names), см. сайт http://www.translit.ru.
3. Резюме (Summary) (1500–2000 знаков, или 200–250 слов) помещают перед текстом статьи. Резюме не требуется при публикации рецензий, отчетов о конференциях, информационных писем.

Авторское резюме к статье является основным источником информации в отечественных

и зарубежных информационных системах и базах данных, индексирующих журнал. Резюме доступно на сайте журнала «Medicine and health care organization / Медицина и организация здравоохранения» и индексируется сетевыми поисковыми системами. Из аннотации должна быть понятна суть исследования, нужно ли обращаться к полному тексту статьи для получения более подробной, интересующей его информации. Резюме должно излагать только существенные факты работы.

Рекомендуемая структура аннотации: введение (Background), цели и задачи (Purposes and tasks), методы (Materials and methods), результаты (Results), выводы (Conclusion). Предмет, тему, цель работы нужно указывать, если они не ясны из заглавия статьи; метод или методологию проведения работы целесообразно описывать, если они отличаются новизной или представляют интерес с точки зрения данной работы. Объем текста авторского резюме определяется содержанием публикации (объемом сведений, их научной ценностью и/или практическим значением) и должен быть в пределах 200–250 слов (1500–2000 знаков).

4. Ключевые слова (Key words) — от 3 до 10 ключевых слов или словосочетаний, которые будут способствовать правильному перекрестному индексированию статьи, помещаются под резюме с подзаголовком «ключевые слова». Используйте термины из списка медицинских предметных заголовков (Medical Subject Headings), приведенного в Index Medicus (если в этом списке еще отсутствуют подходящие обозначения для недавно введенных терминов, подберите наиболее близкие из имеющихся). Ключевые слова разделяются точкой с запятой.
5. Заголовки таблиц, подписи к рисункам, а также все тексты на рисунках и в таблицах должны быть на русском и английском языках.
6. Литература (References). Список литературы должен представлять полное библиографическое описание цитируемых работ в соответствии с NLM (National Library of Medicine) Author A.A., Author B.B., Author C.C. Title of article. Title of Journal. 2005;10(2):49–53. Фамилии и инициалы авторов в пристатейном списке приводятся в алфавитном порядке, сначала русского, затем латинского алфавита. В описании указываются ВСЕ авторы публикации. Библиографические ссылки в тексте статьи даются цифрой в квадратных скобках. Ссылки на неопубликованные работы не допускаются.

Книга: Автор(ы) название книги (знак точка) место издания (двоеточие) название издательства (знак точка с запятой) год издания.

Если в качестве автора книги выступает редактор, то после фамилии следует ред.

Преображенский Б.С., Темкин Я.С., Лихачев А.Г. Болезни уха, горла и носа. М.: Медицина; 1968.

Радзинский В.Е., ред. Перинеология: учебное пособие. М.: РУДН; 2008.

Brandenburg J.H., Ponti G.S., Worring A.F. eds. Vocal cord injection with autogenous fat. 3rd ed. NY: Mosby; 1998.

Глава из книги: Автор (ы) название главы (знак точка) В кн.: или In: далее описание книги [Автор (ы) название книги (знак точка) место издания (двоеточие) название издательства (знак точка с запятой) год издания] (двоеточие) стр. от и до.

Коробков Г.А. Темп речи. В кн.: Современные проблемы физиологии и патологии речи: сб. тр. Т. 23. М.; 1989: 107–11.

Статья из журнала

Автор (ы) название статьи (знак точка) название журнала (знак точка) год издания (знак точка с запятой) том (если есть в круглых скобках номер журнала) затем знак (двоеточие) страницы от и до.

Кирющенков А.П., Совчи М.Г., Иванова П. С. Поликистозные яичники. Акушерство и гинекология. 1994; N 1: 11–4.

Brandenburg J. H., Ponti G. S., Worring A. F. Vocal cord injection with autogenous fat: a long-term magnetic resona. Laryngoscope. 1996; l06 (2, pt l): 174–80.

Тезисы докладов, материалы научных конф.

Бабий А.И., Левашов М.М. Новый алгоритм нахождения кульминации экспериментального нистагма (миниметрия). III съезд оториноларингологов Респ. Беларусь: тез. докл. Минск; 1992: 68–70.

Салов И.А., Маринушкин Д.Н. Акушерская тактика при внутриутробной гибели плода. В кн.: Материалы IV Российского форума «Мать и дитя». М.; 2000; ч. 1: 516–9.

Авторефераты

Петров С.М. Время реакции и слуховая адаптация в норме и при периферических поражениях слуха. Автореф. дис… канд. мед. наук. СПб.; 1993.

Описание интернет-ресурса

Щеглов И. Насколько велика роль микрофлоры в биологии вида-хозяина? Живые системы: научный электронный журнал. Доступен по: http://www.biorf.ru/catalog.aspx?cat_id=396&d_no=3576 (дата обращения 02.07.2012).

Kealy M.A., Small R.E., Liamputtong P. Recovery after caesarean birth: a qualitative study of women's accounts in Victoria, Australia. BMC Pregnancy and Childbirth. 2010. Available at: http://www.biomedcentral.com/1471–2393/10/47/. (accessed 11.09.2013).

Для всех статей, имеющих DOI, индекс необходимо указывать в конце библиографического описания.

По новым правилам, учитывающим требования международных систем цитирования, библиографические списки (References) входят в англоязычный блок статьи и, соответственно, должны даваться не только на языке оригинала, но и в латинице (романским алфавитом). Поэтому авторы статей должны давать список литературы в двух вариантах: один на языке оригинала (русскоязычные источники кириллицей, англоязычные латиницей), как было принято ранее, и отдельным блоком тот же список литературы (References) в романском алфавите для Scopus и других международных баз данных, повторяя в нем все источники литературы, независимо от того, имеются ли среди них иностранные. Если в списке есть ссылки на иностранные публикации, они полностью повторяются в списке, готовящемся в романском алфавите.

В романском алфавите для русскоязычных источников требуется следующая структура библиографической ссылки: автор(ы) (транслитерация), перевод названия книги или статьи на английский язык, название источника (транслитерация), выходные данные в цифровом формате, указание на язык статьи в скобках (in Russian).

Технология подготовки ссылок с использованием системы автоматической транслитерации и переводчика.

На сайте http://www.translit.ru можно бесплатно воспользоваться программой транслитерации русского текста в латиницу. Программа очень простая.

1. Входим в программу Translit.ru. В окошке «варианты» выбираем систему транслитерации BGN (Board of Geographic Names). Вставляем в специальное поле весь текст библиографии на русском языке и нажимаем кнопку «в транслит».
2. Копируем транслитерированный текст в готовящийся список References.
3. Переводим с помощью автоматического переводчика название книги, статьи, постановления и т.д. на английский язык, переносим его в готовящийся список. Перевод, безусловно, требует редактирования, поэтому данную часть необходимо готовить человеку, понимающему английский язык.
4. Объединяем описания в соответствии с принятыми правилами и редактируем список.
5. В конце ссылки в круглых скобках указывается (in Russian). Ссылка готова.

Примеры транслитерации русскоязычных источников литературы для англоязычного блока статьи

Книга: Avtor (y) Nazvanie knigi (znak tochka) [The title of the book in english] (znak tochka) Mesto izdaniya (dvoetochie) Nazvanie izdatel'stva (znak tochka s zapyatoy) god izdaniya.

Preobrazhenskiy B. S., Temkin Ya. S., Likhachev A. G. Bolezni ukha, gorla i nosa. [Diseases of the ear, nose and throat]. M.: Meditsina; 1968. (in Russian).

Radzinskiy V. E., ed. Perioneologiya: uchebnoe posobie. [Perineology tutorial]. M.: RUDN; 2008. (in Russian).

Глава из книги: Avtor (y) Nazvanie glavy (znak tochka) [The title of the article in english] (znak tochka) In: Avtor (y) Nazvanie knigi (znak tochka) Mesto izdaniya (dvoetochie) Nazvanie izdatel'stva (znak tochka s zapyatoy) god izdaniya]. (dvoetochie) stranisi ot i do.

Korobkov G. A. Temp rechi. [Rate of speech]. In.: Sovremennye problemy fiziologii i patologii rechi: sb. tr. T. 23. M.; 1989: 107–11. (in Russian).

Статья из журнала: Avtor (y) Nazvanie stat'I (znak tochka) [The title of the article in english] (znak tochka) Nazvanie zhurnala (znak tochka) god izdaniya (znak tochka s zapyatoy) tom (esli est' v kruglykh skobkakh nomer zhurnala) zatem (znak dvoetochie) stranitsy ot i do.

Kiryushchenkov A. P., Sovchi M. G., Ivanova P. S. Polikistoznye yaichniki. [Polycystic ovary]. Akusherstvo i ginekologiya. 1994; N 1: 11–4. (in Russian).

Тезисы докладов, материалы научных конф.

Babiy A. I., Levashov M. M. Novyy algoritm nakhozhdeniya kul'minatsii eksperimental'nogo nistagma (minimetriya). [New algorithm of finding of the culmination experimental nystagmus (minimetriya)]. III s'ezd otorinolaringologov Resp. Belarus': tez. dokl. Minsk; 1992: 68–70. (in Russian).

Salov I. A., Marinushkin D. N. Akusherskaya taktika pri vnutriutrobnoy gibeli ploda. [Obstetric tactics in intrauterine fetal death]. In: Materialy IV Rossiyskogo foruma «Mat' i ditya». M.; 2000; ch.1:516–9. (in Russian).

Авторефераты

Petrov S. M. Vremya reaktsii i slukhovaya adaptatsiya v norme i pri perifericheskikh porazheniyakh slukha. [Time of reaction and acous-

tical adaptation in norm and at peripheral defeats of hearing]. PhD thesis. SPb.; 1993. (in Russian).

Описание интернет-ресурса

Shcheglov I. Naskol'ko velika rol' mikroflory v biologii vida-khozyaina? [How great is the microflora role in type-owner biology?]. Zhivye sistemy: nauchnyy elektronnyy zhurnal. Available at: http://www.biorf.ru/catalog.aspx?cat_id=396&d_no=3576 (accessed 02.07.2012). (in Russian).

ОТВЕТСТВЕННОСТЬ ЗА ПРАВИЛЬНОСТЬ БИБЛИОГРАФИЧЕСКИХ ДАННЫХ НЕСЕТ АВТОР.

Остальные материалы предоставляются либо на русском, либо на английском языке, либо на обоих языках по желанию.

Структура основного текста статьи.

Введение, изложение основного материала, заключение, литература. Для оригинальных исследований — введение, методика, результаты исследования, обсуждение результатов, литература.

В разделе «методика» обязательно указываются сведения о статистической обработке экспериментального или клинического материала. Единицы измерения даются в соответствии с Международной системой единиц — СИ. Фамилии иностранных авторов, цитируемые в тексте рукописи, приводятся в оригинальной транскрипции.

В конце каждой статьи обязательно указываются вклад авторов в написание статьи, источники финансирования (если имеются), отсутствие конфликта интересов, наличие согласия на публикацию со стороны пациентов.

Объем рукописей.

Объем рукописи обзора не должен превышать 25 стр. машинописного текста через два интервала, 12 кеглем (включая таблицы, список литературы, подписи к рисункам и резюме на английском языке), поля не менее 25 мм. Нумеруйте страницы последовательно, начиная с титульной. Объем рукописи статьи экспериментального характера не должен превышать 15 стр. машинописного текста; кратких сообщений (писем в редакцию) — 7 стр.; отчетов о конференциях — 3 стр.; рецензий на книги — 3 стр. Используйте колонтитул — сокращенный заголовок и нумерацию страниц, для помещения вверху или внизу всех страниц статьи.

Иллюстрации и таблицы. Число рисунков рекомендуется не более 5. В подписях под рисунками должны быть сделаны объяснения значений всех кривых, букв, цифр и прочих условных обозначений. Все графы в таблицах должны иметь заголовки. Повторять одни и те же данные в тексте, на рисунках и в таблицах не следует. Рисунки, схемы, фотографии должны быть представлены в расчете на печать в черно-белом виде или уровнями серого в точечных форматах tif, bmp (300–600 dpi), или в векторных форматах pdf, ai, eps, cdr. При оформлении графических материалов учитывайте размеры печатного поля Журнала (ширина иллюстрации в одну колонку — 90 мм, в 2 — 180 мм). Масштаб 1:1.

РЕЦЕНЗИРОВАНИЕ

Статьи, поступившие в редакцию, обязательно рецензируются. Если у рецензента возникают вопросы, то статья с комментариями рецензента возвращается Автору. Датой поступления статьи считается дата получения Редакцией окончательного варианта статьи. Редакция оставляет за собой право внесения редакторских изменений в текст, не искажающих смысла статьи (литературная и технологическая правка).

АВТОРСКИЕ ЭКЗЕМПЛЯРЫ ЖУРНАЛА

Редакция обязуется выдать Автору 1 экземпляр Журнала на каждую опубликованную статью вне зависимости от числа авторов. Авторы, проживающие в Санкт-Петербурге, получают авторский экземпляр Журнала непосредственно в Редакции. Иногородним Авторам авторский экземпляр Журнала высылается на адрес автора по запросу от автора. Экземпляры спецвыпусков не отправляются авторам.

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Сайт журнала: http://www.gpmu.org/science/pediatrics-magazine/Medicine_organization.