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THE ORGANIZATION OF EMERGENCY MEDICAL CARE FOR THE CHILDREN'S POPULATION DURING THE COVID-19 PANDEMIC

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ОБ ОРГАНИЗАЦИИ НЕОТЛОЖНОЙ МЕДИЦИНСКОЙ ПОМОЩИ ДЕТСКОМУ НАСЕЛЕНИЮ В ПЕРИОД ПАНДЕМИИ COVID-19

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Objective. To analyze the work of the emergency medical care department (EMCD) of the largest children's polyclinic of the city in 2020-2022 and to evaluate the organization of the EMC for the attached children during the Covid-19 pandemic.
Materials and methods. Mathematical and statistical analysis of quantitative and qualitative indicators of EMCD activity based on a continuous sample of primary accounting and reporting medical documentation.

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Results. A significant increase in the number of EMCD visits was demonstrated. In 2022, the growth was 40,96 % and 28,12 % compared to 2020 and 2021. It was found out that in 97,4–98,0 % of all cases provided with EMC, were the children with respiratory diseases. Their number in 2022 increased 1,3 times compared to 2021, and 1,43 times compared to 2020. In this group of patients, the number of children with pneumonia increased by 63.5 % in 2021 compared to 2020.

Conclusions. The proper organization of the work of the EMCD made it possible to provide children with available, timely and rapid primary medical social and emergency medical care during an increased workload in the context of the COVID-19 pandemic.

Keywords. Children, emergency medical care, pandemic, COVID-19.

Цель. Провести анализ работы отделения неотложной медицинской помощи (ОНМП) самой крупной детской поликлиники города в период 2020–2022 гг. и оценить организацию НМП прикрепленному детскому населению в пандемию COVID-19.

Материалы и методы. Математический и статистический анализ количественных и качественных показателей деятельности ОНМП на основе сплошной выборки первичной учетно-отчетной медицинской документации.

Результаты. Продемонстрировано значительное увеличение количества, выполненных ОНМП, выездов. В 2022 г. прирост составил 40,96 % и 28,12 % в сравнении с 2020 и 2021 гг. Отмечен рост общего числа вызовов, переадресованных из Центра медицины катастроф и скорой медицинской помощи (ЦМК и СМП) в ОНМП (в 1,2 раза по сравнению с 2020 г.). Установлено, что в 97,4–98,0 % случаев дети, которым была оказана НМП, это больные с заболеваниями органов дыхания. Их количество в 2022 г., по сравнению с данными 2021 г., стало больше в 1,3 раза, а по сравнению с 2020 г. – в 1,43 раза. В этой группе больных в 2021 г. в сравнении с 2020 г. выросло число детей с пневмонией на 63,5 %.

Выводы. Правильная организация работы ОНМП позволила обеспечить доступность, своевременность и оперативность оказания детям первичной медико-социальной и скорой медицинской помощи в неотложной форме при возросшей нагрузке в условиях пандемии COVID-19.

Ключевые слова. Дети, неотложная медицинская помощь, пандемия, COVID-19.

INTRODUCTION

One of the significant reserves for optimizing emergency medical care in Russia is improving of emergency medical care departments (EMCD) for adults and children in territorial polyclinics and increasing their efficiency[1].

The creation of EMCD network in primary health care institutions made it possible to optimize the work of Disaster Medicine Center (DMC) and Ambulance: to reduce the number of calls and reduce the number of Ambulance visits during polyclinic opening hours, to reduce the number of deaths before the Ambulance arrival, reduce the ambulance team daily workload, increase the level of accessibility and provision of emergency medical care to the population [1; 2].

The organization of the EMCD activities currently provides for continuity in work with the DMC and Ambulance and the transfer of the emergency calls flow to medical organizations providing pri-

[1] On approval of the Regulations on the procedure for providing primary medical and social care to children: Order of the Ministry of Health of the Russian Federation No. 92n dated March 7, 2017, M. 2017; 64, available at: http://publication.pravo.gov.ru/Document/View/0001201804180005

mary health care to the population on a territorial basis through unified dispatch services[2].

According to the Ministry of Health of the Russian Federation, in 2022, the number of Ambulance calls decreased by 2.9 million. The share of Ambulance visits with a time of arrival to the patient of less than 20 minutes from the moment of the call increased from 83.27 % of cases in 2021 to 85.91 % in 2022. At the end of last year, an improvement in the time of arrival at the scene of a traffic accident to 20 minutes was recorded at 95.03 % instead of 94.38 % in 2021[3].

Proper organization of the EMCD activities prevents the development of exacerbations of chronic diseases and the development of acute conditions in which there is a need to provide urgent medical care (UMC) [3; 4]. The true need for UMC in the structure of all calls does not exceed 10.3–20.5 %. In other cases, more than 80 % require emergency medical care[4].

It is noted that the largest number of emergency calls to children is observed due to illness (up to 67.52 %). In the age category up to one-year-old, the prevalence of calls for active observation is more than 2 times higher than calls for all other reasons [5].

The need for EMC is steadily increasing due to the increase in the prevalence of diseases in childhood – by 5 % annually. It is also known that with timely EMC provision, the prognosis for children's lives improves [6–8]. Therefore, to this day, the issues of organizing and improving primary health care and emergency medical care, including for the children's population, remain relevant. One of the conditions for the Ambulance reorganization and optimization is the effective organization of the EMCD activities in medical organizations providing outpatient care, which helps to reduce the number of Ambulance teams visits and increase Ambulance availability through the redistribution of calls [9; 10].

MATERIALS AND METHODS

A comprehensive study was carried out, methods of mathematical, statistical, content analysis were applied for primary accounting and reporting medical documents of the emergency department for children of Children's City Polyclinic No. 3: forms No. 112/u, Ambulance calls cards (form No. 120/u), signal sheets, logs for accounting of calls/visits for 2020–2022.

[2] On the organization of reception and transmission of ambulance and emergency medical care calls in the Astrakhan region: order of the Ministry of Health of the Astrakhan region dated June 07, 2019 No. 607r., available at: https://old.minzdravao.ru/sites/default/files/2019/2/rasporyazhenie_no_607r.pdf

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RESULTS AND DISCUSSION

Currently, 16 emergency care points are organized in Astrakhan at 15 territorial polyclinics. Close interaction with outpatient health care institutions in the Astrakhan region is ensured through the organization of emergency dispatch based on a single call center.

The unified dispatch service (UDS), created on the basis of the operational department of the State Budgetary Health Institution of the Astrakhan Region "Disaster Medicine Center and Ambulance", daily transmits from 60 to 100 calls to polyclinics for servicing by EMC stations teams.

All calls received by the UDS are divided into two categories: urgent and emergency. The main criteria are the presence or absence of a threat to the patient's life, the urgency of providing medical care.

The choice of Children's City Polyclinic No. 3 (CCP No. 3) as the object of study is due to the fact that it is the largest in terms of the number of served and attached population: it accounts for 14.88 % of the total child population of the region and about a third of the urban child population (–29.43 %) of the number of children living in Astrakhan (112,659 people from 0 to 18 years old). Of the total number of pediatric calls transferred by the DMC and Ambulance to the territorial polyclinics of the city, every 3–4th case is served by the EMCD of this medical institutions. Thus, the organization of work to provide EMC in this polyclinic can significantly influence the availability and quality of not only emergency primary health care, but also Ambulance, including emergency specialized medical care in the region as a whole.

Emergency medical care in CCP No. 3 is provided at home to children from 0 to 17 years 11 months 29 days old on a territorial basis in accordance with the Regulations on EMCD and all regulatory legal documents. 12 hour operating mode (from 10:00 a.m. to 10:00 p.m.), daily, seven days a week.

The EMCD staffing and equipment comply with current standards. The department employs four pediatricians and two nurses with appropriate training in EMC. Staffing is 100 %.

The EMCD is provided with a specialized sanitary and medical vehicle of B category, which is fully equipped in accordance with the equipment standard. There is a plan (scheme) of the activity area with a clear designation of streets, houses, medical institutions, police stations, as well as the necessary instructional and methodological material.

The EMCD is provided with fixed and mobile telephone communications for interaction with the structural units of the polyclinic and with the dispatchers of the DMC and Ambulance. Reception of calls requiring EMC is carried out by a medical registrar. After each home visit, information about each sick child is transferred to the local pediatrician for further medical supervision and treatment.

The size and characteristics of the population served are presented in Table 1.

Table 1

Characteristics of the pediatric population served by the Emergency Medical Care Department for 2020–2022

Name	Total children			Children 0–14 years 11 months 29 days old			Children 15–17 years 11 months 29 days old		
	2020	2021	2022	2020	2021	2022	2020	2021	2022
Total people	33.372	32.950	33.159	28.524	28.348	28.476	4.848	4.602	4.683

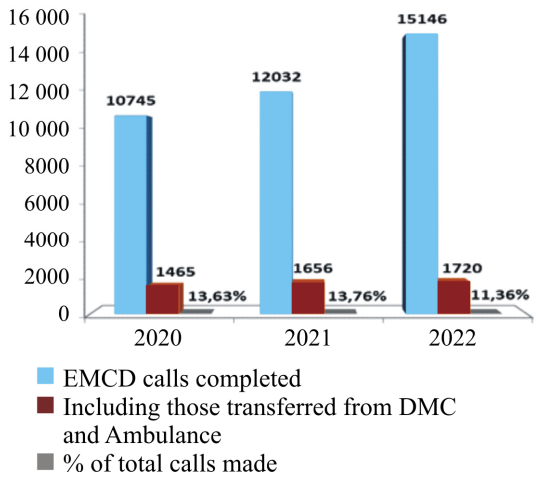

Fig. 1. Number of calls served by the EMCD of the CCP No. 3 for 2020–2022.

As can be seen from the data in Table 1, in 2022, compared to 2020, there is a slight decrease in the population by 213 children (0.64 %), the majority (85.9 %) are children under 14 years 11 months 29 days old, amounting in 2022 to 28,476 people (2020 – 28,524 children, 2021 – 28,348) and 4,683 adolescents (2020 – 4,848, 2021 – 4,602). It should be noted that frequently ill children under 5 years old make up 24.53 % of the population served, of which 1,497, or 4.51 % are children of the first year of life, and 20.02 % – from one to 5 years old.

During the researched period, EMCD specialists served 37,923 calls (Fig. 1).

The results obtained demonstrate a significant increase in the number of completed visits: in 2022 there were 1.26 times more, or by 28.12 % (3,114 visits), compared to 2021, by 1.41 times, or by 40.96 % (4,401), compared to 2020.

The presented data shows that the number of calls transferred from the DMC and Ambulance in 2022, compared to 2021, also increased by 1.03 times and amounted to 1,720, which is 64 cases more than in 2021; in 2021, compared to 2020, increased by 1.2 times (13.03 %) and amounted to 1,656, which is 191 cases more than in 2020. The were no cases returned back to the Ambulance and calls “to themselves" during this period.

The main indicator of timeliness, availability and efficiency of provision is the time of the visit service. The analysis showed that the share of visits serviced within 2 hours from the moment of the call received was 100 %, of which 98 % of the total were serviced within 40 minutes or less. It follows that even during the pandemic, with an increased load on the EMCD, emergency care was provided to children in a timely and efficient manner.

An analysis of the age structure of children who received medical treatment in 2020–2022 was carried out (Fig. 2).

An analysis of the age structure of children who received EMC showed that in 86.9 % of cases in 2020 and in 85 % in 2022,

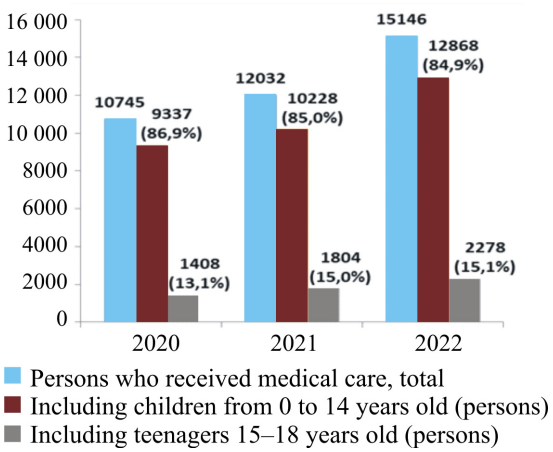

Fig. 2. Age structure of patients who received emergency medical care in 2020–2022

there were children aged 0 to 14 years old. The share of adolescent children accounts for from 13.1 % in 2020 to 15.1 % in 2022. In 2021, the proportion of adolescent children increased, which is associated with a higher incidence of Covid in this particular age category.

The structure of calls to children by disease class is shown in Table. 2.

Thus, the main part of the children who received EMC in these years were patients with respiratory diseases – 98.0 % (in 2021 – 97.4 %, 2020 – 97.3 %). Compared to 2021, visits to those patients increased by 1.3 times (by 3,120), and from 2020 – by 1.4 times (by 4,388).

It should be noted that in 2021 there was an increase in registered cases of pneumonia by 1.6 times. The increase relative to 2020 was 63.5 % (157 cases – 1.3 % in 2021, 96 cases – 0.9 % in 2020) of the total number of calls made. This is explained by the current epidemiological situation: the increase in the incidence of ARI and the COVID-19 pandemic.

In 2022, compared to 2021, there was a decrease in the number of registered cases of pneumonia by 2.8 times, or by 55 cases (0.4 %) of the total number of calls made, which is explained by a decrease in cases of new coronavirus infection among children.

Table 2

Structure of calls served by the Emergency Medical Care Department by nosology for 2020–2022

Class of diseases	Parameter					
	2020		2021		2022	
	abs.	%	abs.	%	abs.	%
Nervous system diseases	60	0.6	63	0.5	64	0.4
Respiratory diseases, including:	10.457	97.3	11.725	97.4	14.845	98.0
ARVI	10.361	96.4	11.568	96.1	14.790	97.6
pneumonia	96	0.9	157	1.3	55	0.4
Skin diseases	28	0.3	32	0.35	29	0.19
Digestive diseases	15	0.17	23	0.24	28	0.18
Diseases of the genitourinary system	–	–	6	0.04	2	0.01
Diseases of the ENT organs	3	0.03	9	0.07	12	0.07
Infectious diseases	182	1.6	174	1.4	166	1.15

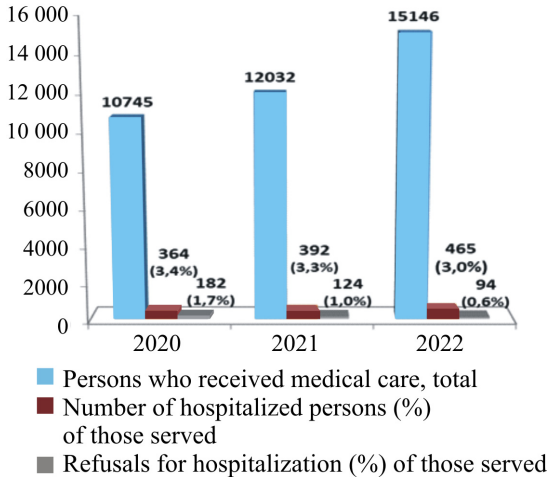

Fig. 3. Number of hospitalizations and refusals of hospitalization for 2020–2022

Infectious diseases are in the second place among the reasons for calling an EMCD doctor, just like in previous years. In 2022, their number decreased by 1.04 times compared to 2021 and amounted to 166 cases (1.15 % of the total number of calls served); in 2021 – 174 (1.4 %), in 2020 – 182 (1.6 %) of the total number of visits.

The third ranking place was taken by diseases of the nervous system – 0.4 %, compared to 2021 (0.5 %), there was a decrease by 1.25 times.

Thus, in the period 2020–2022 there is a trend towards a decrease in the proportion of infectious diseases and diseases of the nervous system, and all other classes of diseases in the aggregate account for no more than 0.6 %.

An analysis was carried out of cases that resulted in patients being hospitalized to in-patient clinic, and refusals of hospitalization (Fig. 3).

The data we obtained demonstrate positive trends towards a decrease in refusals from hospitalization (1.7; 1.0; 0.6 %, respectively, over the years). In 2022, their number decreased by 2.8 times compared to 2020, amounting to 94 cases versus 182. There were no cases of untimely hospitalization that led to a deterioration in the patient's condition. During the researched period, one case of discrepancy in diagnosis upon admission to the hospital was recorded, which did not lead to the development of severe complications or death of the patient.

Due to the epidemiological situation that has developed over the past three years, the share of diseases requiring medical care in a hospital setting has increased and amounted to an average of 3.3 % of the total number of patients served. The most common reasons for hospitalization were broncho-obstructive syndrome with respiratory failure, severe acute respiratory infections, and acute intestinal infections.

Over the past few years, there has been a tendency to increase the share of Ambulance teams calls to children due to the severe course of the new coronavirus infection, respiratory viral infections with a significant increase in body temperature and other complications. During the COVID-19 pandemic in 2020–2022 the load on institutions providing primary health care and emergency care, including emergency specialized medical care, has increased significantly. Effective ways to optimize their work were the creation of a unified dispatch center, a clear differentiation of all calls received from the popula-

tion into urgent and emergency ones, and redirection of calls requiring emergency medical care to primary health care institutions. In this situation, EMCD played a significant role in providing the population with primary health care and emergency medical care.

Over the past year, the number of requests for emergency medical services in the Astrakhan region decreased by 11.1 %; over the last three years, this figure decreased by 16.6 %.

In 2022, the rate of provision of the population with emergency medical care in the area of responsibility of the DMC and Ambulance amounted to 312.9 calls per 1000 persons, with a standard indicator of 290 per 1000 persons (in 2020 – 364.5; in 2021 – 347.6).

Thus, the intensive and effective work of polyclinics' EMCD makes it possible to bring the work of medical organizations providing emergency medical care to the standards of availability established by the Federal Compulsory Medical Insurance Fund, to increase the availability of emergency medical care for the population, including children.

Conclusions

The organization of the EMCD activities in territorial polyclinics in close connection with all departments of the medical organization and continuity with the DMC and Ambulance is aimed at maximum coverage of people in need of emergency medical care. During the pandemic, under conditions of increased workload, EMCDs demonstrated their effectiveness, consistency and great demand for ensuring accessibility, efficiency and timeliness of providing not only primary health care, but also emergency medical care.

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