

Children's health ecology in Molotov city: 1941-1942

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Abstract. The article presents an analysis of the condition of children's healthcare in Molotov city during the Second World War. The authors pay attention to the significant difficulties in protecting the children's health (under one year old): a significant rise in the incidence of childhood infections, malnutrition, incomplete vaccination of children, and a weak level of preventive work. It is emphasized that among nursery and unorganized children respiratory and gastrointestinal diseases were mainly common during the war years: measles, scarlet fever, whooping cough, diphtheria. It is concluded that shortage of qualified medical staff, untimely and partial vaccinations, errors in diagnosis and other reasons have led to an increase in morbidity and mortality among children. In addition, the high incidence of infections with high mortality among children was also associated with the weak and unsatisfactory work of children's consultations on the early detection of diseases which hindered timely treatment.

1 Introduction

The historiography devoted to the problems of children's health during the Second World War is quite extensive. The problems of the Soviet healthcare system development during the Second World War were studied by both foreign and Kazakh scientists [1–12]. However, there are no special works devoted to the analysis of the activities of children's healthcare in Molotov city (the modern name of the city is Perm. – Authors) during the war years. At the same time, the experience of creating and operating of the medical anti-epidemiological service to solve childhood issues of morbidity and mortality is not only of scientific interest, but it also has practical significance, given that the Soviet healthcare system was able to cope with the epidemics caused by the consequences of this war in the second half of the 20th century [13].

2 Materials and Methods

Authors used general interdisciplinary methodological approaches for historical medical

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research using a set of general scientific methods in the article: system analysis, comparative, statistical research methods. Historical materials, scientific publications and data from the health authorities of the war period were studied.

3 Discussion of the results

3.1 Child mortality from gastrointestinal diseases

In wartime conditions, local executive bodies and city health services made efforts to solve the problems of saving children's lives and their health. However, there were serious shortcomings in the work of city authorities in the protection of children's health [14]. Analysis of children's mortality indicates that gastrointestinal diseases (gastroenterocolitis, toxic dyspepsia, dysentery) were ranked first among the causes of death both in 1941 and in 1942. In 1941, the death rate from them was 7.2% of the number of births, and in 1942 it increased to 9.5% of deaths per 100 births.

According to movement of mortality from gastrointestinal diseases in 1942 by months, it is noteworthy that although the largest increase took place during 3 summer months (June – 13.8, July – 17.5, August – 13.8), but mortality from gastrointestinal diseases was also high in the first quarter, amounting to 8.3% against 2.0% in 1941. See Table 1.

Table 1. Children mortality from gastrointestinal diseases in 1941–1942 (per 100 births).

Months of the year	1941	1942	Months of the year	1941	1942
I	2.0	8.6.93	I	8.4	17.5
II	3.5	6.9	II	15.6	13.8
III	3.0	9.4	III	19.5	10.9
IV	3.7	9.5	IV	9.3	4.1
V	5.5	10.0	V	6.8	2.4
VI	6.6	13.8	VI	6.8	2.6

Turning to the incidence of gastrointestinal diseases among children under one year, it is easy to establish that the curve of incidence by months exactly corresponds to the movement of mortality. See Table 2.

Table 2. Morbidity and mortality among children under one year from gastrointestinal diseases in Molotov city in 1942 (per 100 children).

Number of sick on 100 children	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Number of sick on 100 children	24.8	15.2	32.3	28.7	25.9	73.4	83.9	83.6	48.7	20.1	18.0
Number of deaths on 100 children	8.3	6.9	9.4	9.5	10.0	13.8	17.5	13.8	10.9	4.1	2.4

The high mortality from this group of diseases, repeated from year to year, forced the health authorities to look for the causes of infection [15]. First of all, the question arose about the ways of infants feeding and the frequency of early complementary foods.

From the observations of the Institute of Pediatrics of the Academy of Medical Sciences of the USSR on the city consultations and nurseries work, it was clear that doctors in their daily work didn't pay much attention on breastfeeding issues in consultations and nurseries. As a rule, a mother who started work after maternity leave in the city with the doctor's consent immediately gave complementary foods to the child. She easily managed to

convince the doctor of the consultation or the nursery that it was impossible to use the legal break from work to feed the child – whether because of the distance of the place of work or because of the lack of milk. The doctor usually agreed with her and prescribed 1 or 2 bottles of complementary foods. For example, all of 2–3 months children received complementary foods in nursery No. 3 of the Stalin district. Doctors explained this situation by the fact that even before entering the nursery, the children attended consultations and they were prescribed complementary foods there. Approximately the same situation was noted in other nurseries and consultations of the city. Doctors shifted the responsibility for the neglect of breastfeeding issues to mothers without carrying out preventive work with them.

In addition, attention was drawn to the fact that an erroneous system of prescribing complementary foods was used in the practice of local doctors: it was customary to prescribe large dilutions in nurseries No. 1, No. 2 to children even at the age of 4–5 months, which, of course, led to their exhaustion, a decrease in resistance, and thus contributed to the development of gastrointestinal diseases [14].

There were almost no breast milk drain points, and where they were, the amount of drain milk was negligible: 1.0–1.5 liters of breast milk was collected per day with 1300 children under one year at the Lenin Central Consultation.

Since the vast majority of infants used complementary foods obtained in dairy kitchens, it is necessary to note their shortage when the causes of gastrointestinal diseases and high infant mortality identifying. So, there were 6 dairy kitchens in the city, providing 11000 infants with milk and milk mixtures that is 80% of all children under one year.

The production capacity of all dairy kitchens was determined by the production of approximately 12000–13000 portions before the war; in 1942, they gave out 25000–30000 portions. The inability to cope with the increased production output led to the fact that the sanitary conditions in the manufacture of food deteriorated significantly, there was a lack of qualified personnel, i.e. dairy kitchens clearly did not cope with their task. For example, in the dairy kitchen of the Stalin district not only whole milk, but also milk mixtures were given unsterilized into mother's dishes without packaging. The same situation was observed in the dairy kitchen of the Kaganovich district. Bacterial contamination was at a high level.

Along with the poor performance of the dairy kitchens, a completely unsatisfactory supply of milk was revealed: the acidity of the milk delivered by the dairy rarely met recognized standards and was equal to 20°, 21° and higher.

These very significant shortcomings in the organization of nutrition of the most vulnerable groups of children, in terms of morbidity, undoubtedly were reflected in an increase in the number of gastrointestinal diseases [16].

Among the factors influencing the spread of gastrointestinal diseases were the sanitary and hygienic conditions of the city as a whole, as well as separate institutions serving children. The health authorities were supposed to exert their influence through the state sanitary inspection on the timely cleaning of the city, on the operation of the water supply system, and putting the households in order. The cleaning of the city was difficult due to the lack of transport and labor caused by the war, which also influenced the emergence of an unfavorable state of the urban economy [17].

In most nurseries unsanitary conditions were observed: a significant number of flies (especially in the kitchens), dirty dishes were not removed from the premises promptly and the area around the nursery was not put in order. For example, there was a public lavatory in an extremely unsanitary condition approximately in 6–8 meters from the veranda in the nursery No. 10 of the Stalin district. Nursery named after March 8 with 180 children had the common courtyard with tenants which was difficult to maintain in the required order.

This led to the fact that in 1940, 1941 and 1942 years the incidence of dysentery among nursery children was higher than among non-nursery children. See Table 3.

Table 3. The incidence of dysentery among children aged 0.3 years (per 100 children).

Years	The number of diseased among children attending nurseries	The number of diseased among those who do not attend nursery
1940	10.7	7.0
1941	14.2	5.5
1942 (6 months)	6.4	1.7

A few words about the hospitalization of patients, in our opinion, it was one of the main causes of high mortality among children from this group of diseases.

The state of hospitalization in the city was clearly unfavorable: even in relation to dysentery patients, hospitalization was not carried out completely (in 1942, only 82% of all patients were hospitalized). The percentage of those who died from toxic dyspepsia was unacceptably negligible: 31% was in the Stalin district, 40% was in the Kaganovich district.

Main reason for increasing numbers of incidence among children during the first year of lifespan was insufficient doctor's qualification. Along with poorly conducted preventive work in the fight for the breastfeeding there were cases when doctors made an incorrect diagnosis: simple dyspepsia with the obvious presence of already developed toxic dyspepsia. It was identified during revising of the medical history of deceased children. At the same time, only drug treatment (bismuth, salol, etc.) was prescribed, completely ignoring the issues of the child's dietary nutrition [17].

3.2 Infant mortality from pneumonia

Among the causes of infant mortality, pneumonia occupied an equal place with gastrointestinal diseases (1941 – 6.3%; 1942 – 9.0%).

The main point in pneumonia was the spread of influenza infection among children [18]. The number of cases of influenza was 3800 children and 1202 children were sick by pneumonia according to local doctors in 1942.

Without a doubt, other factors also affected the development of respiratory tract morbidity: climatic conditions, hypothermia of the child at home and in the nursery, the harsh 1941 and 1942 years winters. If to take into account the lack of fuel, then in common these circumstances played a negative role. In the presence of high morbidity and difficult living conditions in 1942, widespread hospitalization could play a large role in reducing mortality. But the percentage of children hospitalization that died from pneumonia was even less than from gastrointestinal diseases. See Table 4.

Table 4. Percentage of hospitalizations among those who died from pneumonia.

	I (%)	II (%)	В год (%)
Stalin district	42	60	50
Kaganovich district	26	40	33

The reason for insufficient hospitalization should be identified not only the lack of beds, but a number of other relatively easily eliminated reasons: the presence of quarantine in the hospital, contact of a sick child with any other infection. In these cases, the hospital doctors showed exceptional sluggishness and inability to allocate the beds: in the 2nd department of the children's clinic, the measles quarantine was extended for several weeks with 17 free available beds.

High infant mortality and the increase of infectious diseases led to the fact that the health authorities began a "fight" for fresh air in the nursery: windows were opened to ventilate the room, in a number of nurseries children were sleeping on the veranda and where it was impossible children were warmly dressed and they slept in group rooms with an open window, the children went for a walk a lot. In some nurseries the whole life of the

group was transferred to the air in the summer. The preventive reform also affected hospitals where access to fresh air was also opened. These preventive measures, of course, could not have a quick effect on reducing the incidence, but they were important for the introduction of correct attitudes and the prevention of influenza and respiratory diseases.

3.3 Child mortality from diphtheria, scarlet fever, whooping cough

In studying of child mortality there wasn't paid special attention to mortality from acute infectious diseases during the war years, which, is well known, are a constant companion of war. Among the acute infections measles should be highlighted [17].

Mortality from acute infectious diseases (diphtheria, scarlet fever, whooping cough) in 1942 was higher than in 1941 (in 1941 – 0.7%, in 1942 – 1.0%). See Table 5.

Table 5. Children's mortality under one year from infectious diseases (diphtheria, scarlet fever, whooping cough) in 1941 and 1942 years. The number of deaths out of 100 births.

Months of the year	1941 y.	1942 y.	Months of the year	1941 y.	1942 y.
I	0.2	2.7	VII	0.2	0.1
II	0.6	1.6	VIII	0.3	0.2
III	0.2	1.3	IX	1.2	1.1
IV	0.2	1.0	X	1.2	0.9
V	0.6	1.1	XI	1.5	1.2
VI	0.4	0.3	XII	1.5	0.5

The high rise in mortality, as can be seen from the table, fell in the 1st quarter, after which it declined, rising again by the 4th quarter. The statistics of the incidence of these infectious diseases exactly corresponds to the mortality data for the same period. See Table 6.

Table 6. Morbidity and mortality of children under one year from infectious diseases (diphtheria, scarlet fever, whooping cough) in 1942 (out of 100 children).

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Number of sick on 100 children	6.4	5.6	3.3	3.4	3.0	1.8	2.3	3.4	3.2	2.0	3.3
Number of deaths on 100 children	2.7	1.6	1.3	1.0	1.1	0.3	0.1	0.2	1.1	0.9	1.2

An analysis of the activities of children's consultations and nurseries shows that there was a gross violation of the basic guidelines of the People's Commissariat of Health of the USSR in carrying out anti-epidemic measures in their work [17]. As is known, in order to combat spreading infections, the tasks of the children's clinic included preventing suspected patients of an infectious disease from being admitted to the consultation and visiting them at home. However, patients applied for an appointment in the Pervomaisky consultation of the Kirov region for the 1st half of 1942 with:

- measles – 62;
- scarlet fever – 10;
- diphtheria – 44;
- sore throat – 25;
- whooping cough – 28;
- meningitis – 13;

flu – 677.

Some consultations were appointed to a feverish child to come back to clarify the diagnosis in case of difficulties in making ones. This situation certainly contributed to the spread of infection diseases within the consultation and in the area.

In children's consultations, records of immunized children were not kept. So, it can be assumed that the coverage of children with vaccinations was low: vaccinations were carried out non-systematically, but within the campaigns [19].

Comparative data on the incidence of infectious diseases among children indicate that among nursery children they are higher than among children who do not attend them. See Table 7.

Table 7. The incidence of scarlet fever and diphtheria among children (per 100 children).

	1940 y.		1941 y.		1942 y. /6 months	
	The number of diseased among children	The number of diseased among those who do not attend nursery	The number of diseased among children	The number of diseased among those who do not attend nursery	The number of diseased among children	The number of diseased among those who do not attend nursery
scarlet fever	2.8	1.4	2.7	1.3	2.7	0.8
diphtheria	3.1	1.4	2.3	1.3	1.8	0.7

The situation with the incidence of measles was especially difficult in the city. The number of people who fell ill with this disease in 1942 indicated that in the first quarter the incidence was exceptionally high. See Table 8.

Table 8. Measles morbidity and mortality among children under one year in 1942.

Number of sick on 100 children	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
		6.4	5.6	3.3	3.4	3.0	1.8	2.3	3.4	3.2	2.0
Number of deaths on 100 children	2.7	1.6	1.3	1.0	1.1	0.3	0.1	0.2	1.1	0.9	1.2

Indeed, the measles epidemic in Molotov city spread widely in the autumn of 1941 and continued until the spring of 1943. The development of the epidemic was facilitated by the close contact of children on the way during the evacuation, their stay at prefabricated transshipment points and subsequent settlements around the city [19].

High rates of morbidity and mortality indicated that the city health department was not prepared for preventive control and allowed the disease to spread widely. Since the most radical measure of measles prevention was the widespread implementation of measles vaccinations among contacted children, the health authorities set themselves the task of providing city doctors with anti-measles serum. However, the solution of this problem was complicated by a number of circumstances.

Anti-measles serum was prepared by two institutions – the Measles Station at the City Infectious Diseases Hospital and the Regional Bacteriological Laboratory. It turned out that there was no organizational coordination in their activities: the city infectious diseases hospital had no plan for the production of serum, and the regional bacteriological laboratory planned serum much less than required.

Thus, at the time of the development of the epidemic, serum supplies were extremely limited. At the same time, it turned out that the doctors of the nursery and consultation used almost exclusively serum obtained from donor blood, and the blood of the parents was not used. At the same time, the serum was sometimes used insufficiently rationally: regardless of the age of the child, his condition and the timing of administration, the serum was administered in 50 cubic meters which led to the depletion of serum supplies even before the start of the epidemic.

528 children were given 26 liters of serum, i.e. up to 50 cubic meters to the child in the nursery of the Kaganovich district during 1941. At the same time, only 206 mothers donated blood (out of 456 who passed during the year), from their blood 9 liters of serum were made.

The epidemic reached its greatest development in the nursery: there were 156 cases during 1941 with 580 children of the average payroll and 123 cases in the first half of 1942 with 800 children in the Kaganovich region. There were 100 cases per 1000 children in the nursery of Stalin region in the first half of 1942.

The lack of serum affected only on children who did not attend the nursery in the city. The situation was good with the provision of serum to nursery children. It was found, however, that the doctors were very often late in administering the serum [14].

In the nursery No. 2 of the Stalin region due to the late serum injection 4 children out of 14 were died. In the Ordzhonikidze district 10 of those who fell ill died for the same reason. And, on the contrary, due to the timely administration of serum with 18 measles drifts there were only 4 repeated diseases in the nursery No. 2 of the Stalin region. There were no deaths in these nurseries.

The measles epidemic that took place in the first half of 1942 and caused a high mortality rate forced the adoption of a number of measures. In addition to the general measures to combat the development of infectious diseases measles seroprophylaxis occupied a special place: a plan was drawn up to combat the development infectious diseases, for the production of serum, nurseries were asked to involve mothers in blood donation without fail, doctors were given instructions on the use of anti-measles serum.

4 Conclusion

The development of children's health care in Molotov city in wartime was characterized by an increase in child morbidity and mortality and as a result the burden on medical institutions. Health authorities took measures to prevent the spread of gastrointestinal and infectious diseases. However, despite the measures taken, high morbidity and mortality were observed among children under one year.

The authors concluded that the lack of communication between the inpatient and outpatient departments, partial vaccination, late and incomplete hospitalization of children, especially those with pneumonia, intestinal infections and measles were the causes of the greatest childhood mortality.

The high incidence of infections among children with high mortality is also associated with the weak and unsatisfactory work of children's consultations for the early detection of diseases and consequently timely treatment.

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