

Ecology of childhood health in Central Kazakhstan during the development of Virgin Lands

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Abstract. The article presents the results of historical and medical research showing the issues related to fighting against intestinal infectious and pulmonary diseases among Kazakhstani children during the development of virgin and fallow lands in the mid-1950s. The analysis of documents shows that the situation with infectious and pulmonary diseases among children was complex and characterized by a significant prevalence especially in the first year of life. Authors concluded that extensive sanitary and anti-epidemic measures at the national level, child care institutions supervision and the method of the Pirquet tuberculosis reaction had led to drop in childhood morbidity and mortality in some areas of the region. At the same time the analysis showed that the mortality rate among children in the first year of life in the region was higher than in the country as a whole. These data required further scientific and practical research by health authorities in terms of the study and practical application of medical-organizational mechanisms and measures.

1 Introduction

Carrying out the analysis of the child health care during the virgin years in Kazakhstan we should focus on the morbidity and mortality of children in the mid-1950s. It must be noted that this problem has not been studied in historical-medical research. There are several main reasons for high mortality and morbidity: socio-economic (lack of infrastructure, demographic problems), natural (environmental problems) and objective (consequences of the development of virgin and fallow lands under difficult conditions). The demographic explosion covered almost all the northern and central regions of the Kazakh SSR [1–8]. This has led to significant overcrowding of areas, a shortage of medical health facilities and a shortage of medical staff [9–11].

2 Materials and Methods

The following documents were used to cover the subject: medical reports, orders and other

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documents from published sources as well as articles published by children's health care organizers. The methods used are interdisciplinary in nature. They encompass historical and medical approaches which made it possible to examine the causes of the spread of childhood diseases and the activities of health authorities to address emerging problems in this issue in the study period.

3 Discussion of the results

3.1 Children's infectious diseases

The problem posed by the fight against childhood morbidity and mortality remained acute for a long time despite the notable successes achieved in the first half of the 1950s. Diphtheria and dysentery among acute intestinal diseases posed a great danger to children, especially during their first year of life [12–14].

Analysis of indicators of children's health care characterized the therapeutic and preventive care for children as unsatisfactory in Karaganda region. Despite relatively better pediatricians and management staff compared to other regions, the quality indicators were not higher and some were even lower than in other regions of the republic.

This concerned primarily the incidence of dysentery. The incidence of dysentery among children was increasing especially in Karaganda and Temir-Tau cities. This can be seen in the high mortality rate in Mikhailovka district Hospital – 12% and in Balkhash City Hospital – 6% [15].

The analysis showed that the highest incidence of infectious diseases was given by Balkhash and Temir-Tau cities, also by Voroshilov district. As can be seen in Table 1 the general morbidity of children increased slightly during 1955 while there was 19% decrease in the general morbidity throughout the country. Particularly large increases in general morbidity were observed in Kuvskiy district by 19.4%, in Voroshilovskiy district by 16.7%, in Telmanskiiy district by 5.7%, in Kounratskiy district by 2.1%, in Balkhash city by 1.2% and in Temir-Tau by 1.5% [16]. See Table 1.

Table 1. Infectious morbidity per 1,000 children during 1954–1955.

Name of the cities and districts	Diphtheria		Scarlet fever		Whooping cough		Measles	
	1954	1955	1954	1955	1954	1955	1954	1955
Karaganda	3.8	6.0	8.8	17.0	26.4	12.0	62.0	24.0
Balkhash	3.9	17.0	7.0	43.0	9.7	50.0	46.3	32.0
Dzhezkazgan	0.8	2.0	2.8	4.0	22.8	5.0	44.0	15.0
Temir-Tau	1.4	5.0	7.2	36.0	20.7	12.0	52.7	24.0
Voroshilovskiy	–	6.0	5.0	17.0	8.7	46.0	146.2	43.0
Kuvskiy	–	–	–	1.0	18.5	12.0	57.5	140.0
Dzhezkazgan district	1.3	6.0	2.4	0.3	37.7	1.0	54.2	26.0
By region	3.0	5.9	7.2	21.5	24.5	12.8	33.1	31.3
By republic	3.1	4.8	9.0	16.2	22.0	17.0	44.0	36.6

Increase in total morbidity was noted due to increase in the incidence of diphtheria by 2.9%, scarlet fever by 14.3% in Karaganda region. See Table 2.

Table 2. Data on infectious diseases.

	By region		By republic	
	1954	1955	1954	1955
	1:1000	1:1000	1:1000	1:1000
Measles	56.3	31.8	44	56.5
Scarlet fever	7.8	31.5	9	16.3
Whooping cough	34.5	18.8	32	17
Diphtheria	3.9	5.9	3.1	4.8
Infectious hepatitis	1.8	3.3	2	3.9
Acute poliomyelitis	0.3	0.5	0.7	0.4
Influenza epidemic (viral)	13.5	0.06	13	8
Total infectious diseases	106	103	99	77.2

An increase in the incidence of all infectious diseases was noted in Balkhash city: diphtheria by 13.1%, scarlet fever by 36.0%, whooping cough by 40.3%, measles by 5.7%. The incidence of diphtheria increased in Temir-Tau city by 3.6%, scarlet fever by 28.3%, in Karaganda city by 2.2% and scarlet fever by 8.2%. The incidence of diphtheria increased in Telman district – 14.8%, in Karkaraly district – 4.9% and in Dzhezkazgan district – 4.7%.

The high incidence of diphtheria in these cities and districts of the region can be explained by the low layer of children immunized against diphtheria as well as the presence of children who received the vaccine among those who fell ill. These factors obliged epidemiologists to check the technique of quality vaccination. The highest incidence of scarlet fever was in Balkhash (43 per 1,000) and Temir-Tau (36 per 1,000), while the regional average was 21.5 per 1,000 children [17].

Balkhash (50 per 1,000), Voroshilovskiy district (46 per 1,000) and Nurinskiy district (14 per 1,000) had the highest incidence of pertussis while the regional average was 12.8 per 1,000. The rate was 17.0 per 1,000 by the republic. Decrease in the general morbidity rate was recorded in Osakarovskiy district 3 times, in Shetskiy district 1.8 times in 1955.

Thus, the analysis shows that the highest incidence of infectious diseases was given by Balkhash and Temir-Tau cities, Voroshilovskiy and Kuvskiy districts. Of particular concern was the incidence of dysentery among children. See Table 3.

Table 3. Incidence of dysentery and other intestinal infections (per 1,000 children).

	1954 year		1955 year	
	Total intestinal infections	Including acute and chronic dysentery	Total intestinal infections	Including acute and chronic dysentery
Karaganda	635	36.8	73.8	30.0
Balkhash	58.7	31.6	215	27
Dzhezkazgan	22.2	26.6	42	23
Temir-Tau	87.4	44.7	133	31
Saran	–	–	30	20
Zhana-Arka district	49.5	2.0	23	2
Karkaralinsk	46.3	1.2	7	11
Shetskiy	9.5	1.2	80	10
Kuvsky	9.4	4.2	110	8
Ulutau	122.0	10.0	90	–
By region	40.4	34.0	67.1	32
By republic	–	–	71.0	33.6

It seems unlikely that incidence of gastrointestinal diseases among children increased and the incidence of dysentery decreased slightly compared with 1954.

The accuracy of the data on dysentery in Balkhash is particularly questionable, where the total number of gastrointestinal illnesses increased from 58 to 215 cases per 1,000 children in 1955 in comparison with 1954. The same doubt is raised by data in Temir-Tau, where the number of cases of gastrointestinal diseases in 1955 increased from 87.4 to 133 and cases of dysentery decreased from 44.7 to 31 cases per 1,000 children [18].

The highest number of gastrointestinal diseases, including dysentery, was registered in Balkhash – 242 cases, in Temir-Tau – 164, in Karaganda – 103.8, in Voroshilovskiy district – 192, in Kuvskiy – 118, in Shetskiy and Ulutau – 90, etc. See Table 4.

Table 4. Incidence of intestinal infections.

	By region		By republic	
	1954	1955	1954	1955
	1:1000	1:1000	1:1000	1:1000
Acute dysentery	35.0	25.3	35	27.4
Chronic dysentery	5.4	5.3	6.4	6.0
Dyspepsia (up to one year)	36.4	33.8	35	33
Gastritis and other intestinal diseases	10.3	13.5	19	16
Total intestinal diseases	75	73	88	77

The fight against measles among children during the first 3–4 years of life was still completely unsatisfactory. There is an unacceptable proportion of children under 4 years of age among those who fell ill. For example 53% were children under 2 years of age only. This caused a high lethality from measles – 1.8 and certainly increasing it from other diseases, in particular, pneumonia, tuberculosis, dysentery.

Seroprophylaxis was completely insufficient even quantitatively (1:1 instead of 1:4) not to mention its quality (timeliness of administration, doses, etc.). Early childhood morbidity figures and such lethality characterized it quite demonstrably [19].

Polyclinics remained the place where intra-institutional infections of children were possible, influencing the increased incidence of droplet infections. More than 1,000 children with measles have been to counseling sessions where they were diagnosed (14.7%) during the year. With the extremely high contact rate of this infection, there is no doubt that a significant number of children have contracted it by visiting pediatric clinics. For example, more than 100 children (26.4%) with diphtheria and 64.8% with pertussis were identified in the consultation.

Preventive work in outpatient departments did not meet the requirements of the national health authorities and stood at a low level. Less than half of newborns were patronized by doctors during the first 3 days, while this percentage reached 80-90% in most regions of the country.

A separate topic is the activity of the nurseries which can be characterized as unsatisfactory. There were still people in charge who had no medical education. The qualitative indicators of the nurseries did not improve but rather deteriorated: high turnover, the coverage of infants decreased, the plan of bed-days was not fulfilled. Morbidity was very high, especially among children in the first year of life. The nurseries were no guarantee even against measles (38 people sick, 8 died), dysentery (243, 11 died), pneumonia (449, 14 died).

Preventive and anti-epidemic work and hardening of children was not carried out at the proper level. Only 12 out of 65 city nurseries were sleeping on verandahs. Clearly, that most children did not take advantage of the external environmental factor. In particular, children did not have the opportunity to breathe fresh air [20].

Analysis of childhood morbidity in the mid-1950s showed that although the situation

with gastrointestinal infections in the course of medical and preventive health care in some areas has improved, but this pathology continued to be one of the main causes of childhood mortality and high morbidity.

3.2 Pulmonary disease morbidity rates

The incidence of pneumonia in 1955 was 6.4% of the total incidence in the region (6.7% in the Republic). The incidence of pneumonia in the region decreased from 67 cases per 1,000 children to 59 in 1955, i.e. 8 cases less than in 1954 (there were 67.2 cases of pneumonia per 1,000 in the republic in 1955). See Table 5.

Table 5. Pneumonia inflammation.

	By region		By republic	
	1954	1955	1954	1955
	1:1000	1:1000	1:1000	1:1000
Colonic pneumonia	2.2	1.6	1.5	2.1
Focal pneumonia	57.9	55.8	67	65.1
All types of pneumonia	65.2	57.5	68.5	67.3

The incidence of pneumonia among children remained high in Karaganda as well as high rates in Temir-Tau, Voroshilovskiy and Kuvskiy districts [18]. The incidence of pneumonia decreased in Balkhash from 57.9 to 50 per 1,000 children, in Dzhezkazgan from 21 to 13, in Osakarovskiy district from 26.6 to 11, in Nura district from 47.3 to 23, and in Kounrad from 172 to 63. See Table 6.

Table 6. Incidence of tuberculosis.

	By region		By republic	
	1954	1955	1954	1955
	1:1000	1:1000	1:1000	1:1000
Mechanical injuries	3.4	3.5	2.3	17
Rheumatism	1.7	3.2	2.5	3.7
Otitis	34.3	20.7	33	27
Tuberculosis of the respiratory organs	5.0	6.3	7	8
Meningitis tuberculosis	0.4	0.4	0.6	0.4
Tuberculosis of bones and joints	0.3	0.7	0.8	0.7
Total tuberculosis	6.2	7.5	11	12.4

The rates of pneumonia, which reached colossal figures, were alarming in Karaganda region. Although overall mortality decreased, it remained higher than in other areas, at about 2%. Mortality was particularly high in the first year of life. High loss was of 440 children.

An indicator of inadequate hospitalization and unsatisfactory home care was also the fact that more than half of the children died outside the hospital.

The high incidence of pneumonia was a consequence of poor control of hypotrophy, rickets, recreational activities and high incidence of infections such as measles, whooping cough, acute upper respiratory tract catarrh, dysentery and other diseases which reduce children's immunity [15].

3.3 Preventive work of children's consultations

In the medical care of young children, the main thing was to organize the systematic

observation of children and to carry out the necessary measures to ensure the child's proper growth and development. 68% of children who were one year old remained under systematic observation at least once a month, which was severely insufficient. The number of children under continuous observation was particularly low in Zhana-Arka district – 2.0% of those who reached one year of age, in Temir-Tau – 41% and in Karaganda – 62%. The best continuous observation of children of the first year of life was organized in Voroshilovskiy district – 91% and in Balkhash – 86%. But even in cities and villages, where most children were under systematic observation, it could not be stated that this observation was carried out in depth, with all preventive measures [20].

For example, in the Balkhash pediatric clinics, where the majority of children were continuously systematically observed, they could not achieve a reduction in early complementary feeding and artificial supplements in the early period. In Balkhash children received complementary feeding before 3 months of age were 15.6%; artificial children before 6 months of age were 4.1%.

Many children were not fed properly in Temirtau (18.7% received complementary feeding before 3 months of age) and 5.7% were artificial children before 6 months of age. In Karaganda these indicators were 12.3% and 4.3% respectively. In Shetskiy district – 33.7% of children received complementary food before 3 months of age.

Preventive vaccinations were poorly administered. For the region, only 71.2% of children who were one year old were immunized against smallpox. For the region, only 71.2% of children who were one year old had been immunized against smallpox. The situation with smallpox vaccinations was particularly bad in Karkaralinskiy district where 9.2% of children who were one year old had been immunized against smallpox. These indicators were also low in Dzhezkazgan district – 11.9%, in Temir-Tau – 44.3%. In Kuvskiy District 55 children were observed up to one year of age and 65 children were immunized against smallpox up to 8 months.

The pediatric consultations improved their work in the early detection of tuberculosis in 1955: 39.7% of the children had the Pirquet reaction (in 1954 – 37.2%) but this figure was still too low. It is obvious that there were significantly more unexamined children infected with tuberculosis. The best indicators for early detection of tuberculosis was in Balkhash where 88.1% of children had a Pirquet reaction before one year of age and among them 5.1% responded positively. Children had a Pirquet reaction in Dzhezkazgan – 59.2%, in Saran – 55.9% and in Karaganda – 44.3% [20].

The worst indicators of early detection of tuberculosis among children under one year of age were in Nura, Karkaraly, Zhana-Arka, Ulutau, and Dzhezkazgan districts. No children have been received a Pirquet reaction in these areas.

Thus, even in the cities with the best early tuberculosis detection rates only half of children under a year old were screened for tuberculosis. Consequently, the high incidence of tuberculosis with high mortality was associated with the weak and unsatisfactory work of children's pediatric clinics for early detection of tuberculosis. Hence, the children were not treated in a timely manner.

3.4 Effectiveness of children's hospitals and children's departments of general hospitals

The main indicators that determine the quality of the integrated hospitals work are the children morbidity and mortality on the area. See Table 7.

Table 7. Children mortality rate.

	1954 year		1955 year		By republic in 1955 year	
	Total	Including up to 1 year	Total	Including up to 1 year	Total	Including up to 1 year
Total	4.6	8.8	2.2	6.9	2.8	6.5
In acute dysentery	4.9	7.2	4.2	6.2	3.9	5.9
In chronic dysentery	4.0	6.2	7.5	5.7	3.3	4.6
In focal pneumonia	5.2	9.3	3.5	13.1	4.7	8.9
In diphtheria	3.7	13.5	5.7	11.2	5.5	9.7

As can be seen from this table, the overall mortality rate in children's hospitals decreased from 4.6 to 2.2. from pneumonia from 5.2 to 3.5 in the region. The mortality rate from pneumonia decreased from 5.2 to 3.5. Mortality increased from 9.3 to 13.1 for focal pneumonia and from 3.7 to 5.7 for diphtheria in the first year of life [16]. More detail data on infant mortality rates presented in the Table 8.

Table 8. Lethality in hospitals and hospital departments in the region during 1954–1955.

	1954 year					1955 year				
	Total	Acute dysentery	Chronic dysentery	Focal pneumonia	Diphtheria	Total	Acute dysentery	Chronic dysentery	Focal pneumonia	Diphtheria
Karaganda	4.3	4.0	3.4	4.6	2.7	2.05	4.6	3.1	4.06	2.8
Balkhash	4.8	11.7	10.6	5.3	–	2.8	2.6	5.8	3.4	9.6
Dzhezkazgan	6.1	3.2	14.1	15.0	18.7	4.2	3.6	6.3	5.8	9.09
Temir-Tau	5.3	0.7	9.9	4.3	–	3.3	2.6	5.4	5.3	9.8
Saran	–	–	–	–	–	3.3	2.6	5.4	5.3	9.8
Osakarovka	2.9	4.0	–	0.8	–	2.9	3.8	–	3.3	1 died
Zhana-Arka district	3.2	–	–	–	–	3.2	–	–	2.4	–
Telmanskiy	4.0	2.5	–	8.1	–	4.2	9.3	8.0	9.1	–
Nurinskiy	3.5	–	–	3.6	33.3	4.8	6.4	–	3.3	–
Voroshilovskiy	2.3	–	–	–	–	3.05	–	–	2.7	–
By region	4.6	4.9	4.0	5.2	3.7	2.2	4.2	4.5	3.5	5.7

The data in this table shows that mortality in diphtheria increased in Balkhash (from 0 to 9.6), Temir-Tau (0 to 9.8), Karkaraly district (from 0 to 10.7). Mortality in acute dysentery increased in Temir-Tau (from 0.7 to 2.6), Karaganda (from 4.0 to 4.6), in Telmanskiy district (from 2.5 to 9.3), Nurinskiy district (from 0 to 6.4). In chronic dysentery in Telman district (from 0 to 8.3). Mortality from focal pneumonia increased in Temir-Tau (from 4.3 to 5.4), in Osakarovskiy district (from 0.8 to 3.8), in Zhana-Arka district (from 0 to 2.4), in Telmanovskiy district (from 8.1 to 9.1), in Voroshilovskiy district (from 0 to 2.7) [18].

The highest mortality rate was given by children's hospitals and children's departments of general hospitals in Dzhezkazgan, Temir-Tau, Balkhash, Telmanskiy district where mortality in a number of diseases significantly exceeded the average regional indicators in

1955.

The high mortality rate in children's hospitals was the result of unsatisfactory work in the inpatient polyclinic departments of these hospitals (regime violations, poor quality treatment, irrational nutrition of patients, etc.) [20].

Also, high mortality rates were influenced by insufficient communication between the inpatient and outpatient departments, late and incomplete hospitalization of the children with pneumonia, intestinal infections and diphtheria. It should be noted that preventive work was at a low level and was limited to the patronage of newborns. Children's hospitals often conducted only preventive vaccinations which were often of poor quality and with incomplete coverage.

4 Conclusion

Analysis of available materials indicates that the situation with acute intestinal and pulmonary infections among the children of Karaganda region was complex and characterized by a significant prevalence in the mid-1950s. The child population increased in 1955 compared to 1954 in Karaganda region. At the same time, the overall morbidity and mortality of children, especially in the first year of life, has increased. However, some indicators for all types of medical care for children were inferior to national indicators. Pediatric clinics did not know their children's population well. Due to the sanitary and epidemiological measures at the national level a downward trend can be seen in some indicators of child morbidity and mortality, except focal pneumonia (especially among children in the first year of life). At the same time, analysis showed that the mortality rate among children in the first year of life in the region was higher than in the republic. Thus, these negative indicators required further scientific and practical research by health authorities in terms of the study of medical-organizational mechanisms and measures.

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