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RISK FACTORS FOR THE FORMATION OF BORN HEART DEFECTS IN CHILDREN IN THE FERGHANA REGION

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Clinical and Diagnostic Characteristics in Children with Congenital Heart Defects and Pneumonia of the Ferghana Region Republic of Uzbekistan

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Abstract

The authors conducted a study on the influence of risk factors on the frequency and structure of congenital heart defects in children in the Ferghana region. It has been established that the incidence of VP is 2.6 cases per 1,000 births, which is 4 times more common in children living in rural areas. Analysis by cities and districts.

Keywords: congenital heart defects, risk factors, birth rate, mortality, frequency, structure, children.

Introduction

Congenital developmental disorders (CDP) are an important factor that affects the level of morbidity and mortality among the population and is a significant medical and social problem. The frequency of VPR, including its various forms, varies significantly depending on the region and even within the same state, which is related to historical, ethnic, demographic, environmental and other circumstances [1.4].

Teratogenic environmental factors include infectious agents (such as rubella virus, cytomegalovirus, herpes simplex virus, smallpox virus, HIV, toxoplasmosis, and pale treponema), physical factors (such as X-rays and hyperthermia), maternal diabetes, chemical substances (talidomide, aminopterin, fenole, valproic acid, warfarin, ethanol, isotretinoin), as well as hormones (androgen, diethylstilbestrol). Congenital malformations are most commonly caused by the action of teratogens in the 3-8th week of pregnancy, i.e. during organogenesis [2.9].



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Congenital malformations (CDL) often arise as a result of the interaction of multiple genes (polygenic etiology) or in combination with environmental factors (polyfactorial etiology). A connection has been established between the development of congenital malformations in newborns and vitamin deficiency, as well as zinc deficiency, which is an important microelement necessary for the normal functioning of DNA and RNA polymerases [4,5].

The risk of developing children with congenital heart defects (CHD) increases with certain conditions in the mother, such as gestosis, acute respiratory viral infections and their combinations (86.4% of cases), as well as with complicated course of the first trimester of pregnancy, disruption of uteroplacental blood flow and various combinations of these factors [7]. Intrauterine infections caused by more than 27 species of bacteria, viruses, parasites, 6 species of fungi, 4 species of protozoa and rickets also play a significant role in the development of congenital malformations. Viral infections during pregnancy can contribute to developmental defects and increase perinatal mortality to 19.3% [3.8]. The average annual cost of a child with congenital malformations for the state is significantly higher than the cost of prenatal diagnosis and prevention of viral infections. Virological studies show that enteroviruses are detected in 63.6% of cases of congenital malformations, and cytomegalovirus in 14.3%. Developmental defects in 3-5% of newborns are related to the influence of medications on the fetus, and the degree of influence depends on the duration of pregnancy and dosage. Alcohol, nicotine, and narcotics also have a negative impact on the mother and fetus [3.6].

The mortality of viable children in the first year of life largely depends on medical-biological and social-hygienic factors, as well as on the level and quality of medical care provided to children.

The purpose of the study: study the frequency and structure of VPS in children in the Fergana region.

Materials and research methods: To study the level and structure of VPZ in children, data from the official medical statistics of the Healthcare system of the Fergana region for 2019-2023 were used. The statistical data of the medical institutions of the cities and districts of the Fergana region (a total of 4 cities and 16 districts) were studied retrospectively.

Discussion:

A retrospective study of data over 5 years showed that between 2019 and 2023, 40,2382 births were registered in the Ferghana region. Among them, 867 cases of childbirth with VPJ were identified (Table 1).



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Tab	le 1 Th	ne birth	rate o	f child	ren wi	th VPJ	I in the	e Ferga	ana reg	ion		
Cities	Obser	vation per	iods (in	years)						total		
and districts of the	2019		2020		2021		2022		2023			
region	abs	%	abs	%	abs	%	abs	%	abs	%	abs	%
Fergana city	13	5.8	5	2.4	15	6.9	17	9.6	1	2.6	51	5.8
city of Kakand	8	3.6	7	3.3	5	2,3	10	5.6	2	5.1	32	3.8
Margilan city	5	2,2	7	3.3	9	4.1	11	6.2	5	12.8	37	4.3
Kuvasay city	1	0.4	4	1.9	4	1.8	4	2,2	2	5.1	15	1.7
Oltaric	8	3.6	4	1.9	6	2.8	4	2,2	2	5.1	24	2.8
Kushtepinsky	5	2,2	8	3.9	6	2.8	4	2,2	1	2.6	24	2.8
Baghdad	4	1.8	4	1.9	2	0.9	2	1,1	1	2.6	13	1.5
Buvaidinsky	7	3.1	10	4.8	3	1.4	1	0.6	3	7.6	24	2.8
Beshariksky	15	6.7	10	4.8	12	5.5	8	4.5	2	5.1	47	5.4
Kuvinsky	16	7.2	22	10.5	21	9.6	11	6.2	3	7.6	73	8.4
Uchkupriksky	22	9.8	18	8.6	25	11.5	20	11.2	2	5.1	87	10.0
Rishtansky	14	6.3	12	5.8	15	6.9	10	5.6	0	0,0	51	5.9
Sukhsky	5	2,2	5	2.4	6	2.8	4	2,2	1	2.6	21	2.4
Tashlaksky	15	6.7	17	8.1	11	5.0	8	4.5	2	5.1	53	6.1
Uzbek	21	9.4	15	7.2	25	11.5	17	9.6	5	12.8	83	9.6
Fergana	24	11.0	21	10.0	23	10.5	23	12.9	4	10.3	95	11.0
Dangarynsky	21	9.4	22	10.5	19	8.7	17	9.6	2	5.1	81	9.3
Furkatsky	8	3.6	8	3.9	7	3.2	4	2,2	1	2.6	28	3.2
Yazavansky	11	4.9	10	4.8	4	1.8	3	1.7	0	0,0	28	3.2
viloyat	223	100,0	209	100	218	100	178	100	39	100	867	100

In the Fergana region, the peak of CHD cases was recorded in 2019, when the rate was 2.6 per 1000 births. In subsequent years, from 2020 to 2023, this rate remained at a relatively stable level, amounting to 2.3, 2.2 and 1.8, respectively. (Table 2).

Date of study (in	Total number of births	Number of births with	Frequency per 1000 births								
years)	(abs)	congenital heart defects (abs)									
2019	86267	223	2.6								
2020	92745	209	2,3								
2021	99325	218	2,2								
2022	100843	178	1.8								
2023	23202	39	1.7								
Total	402382	867	10.6								

Table 2 Prevalence of congenital heart defects in children



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A retrospective study and analysis of the obtained materials showed that the birth of children with CHD during the studied period (2019-2023) tended to increase. Moreover, over the past 5 years, the average frequency of CHD has been 2.1 cases per 1000 births.

It should be noted that during the period under consideration, the number of children born with CHD in Fergana varied annually. However, on average, 402.3 cases of birth of newborns with CHD were registered annually. A significant contribution to the increase in the frequency of CHD in recent years was made by ventricular septal defects (VSD) 1102 (52.2%), atrial septal defects (ASD) 664 (31.4%), patent ductus arteriosus 81 (3.8%), tetrad of Fallot (TF) -59 (2.8%) and transposition of the great vessels (TGV) 22 (1%), respectively. The ratio of boys and girls is 1:1. (Table 3).

No.	Type of VPS	abs	%
1	Ventricular septal defect	1102	52.2
2	Tetrado of Fallot	59	2.8
3	Atrial septal defect	664	31.4
4	Transposition of the great vessels	22	1.0
5	Open AV channel	49	2,3
6	Patent ductus arteriosus	81	3.8
7	Isolated pulmonary artery stenosis	25	1,2
8	Pulmonary artery stenosis with VSD	35	1.7
9	Dextrocardia	3	0,1
10	Congenital mitral valve insufficiency	7	0.3
11	Epstein anomaly	2	0,1
12	Aortic stenosis	2	0,1
13	Bicuspid aortic valve	14	0.7

Table 3 The structure of congenital heart disease in children

Cases of infant mortality due to congenital heart disease are noteworthy. Considering the year-byyear dynamics, it was revealed that mortality due to congenital heart disease dominates in 2021-2022. In the structure of causes of death for the studied period, the mortality rate due to congenital heart disease is 5.4%, and in the structure of mortality due to congenital heart disease it is 20.4%. (Table 4).





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	Table 4 Infant mortality in Fergana region											
Study periods	Total number	r of deaths	mortality	rate p VPR	mortality due to congenital heart							
(in years)					disease							
	abs	%	abs	%	abs	%						
2019	983	20.9	210	21.9	76	30.0						
2020	1136	24.2	234	24.3	55	21.6						
2021	1142	24.3	226	23.5	56	22.1						
2022	1202	25.6	266	27.7	57	22.4						
2023	240	5.0	24	2.6	10	3.9						
Total	4703	100	960	100	254	100						

An analysis of mortality cases by place of residence of patients showed that the mortality rate of children due to congenital heart disease is 2.5 times higher than that of rural residents (Table 5).

residence										
Years of study	Number of deaths		Place of residence							
			city		village					
	abs	%	abs	%	abs	%				
2019	76	29.9	20	27.1	56	31.1				
2020	55	21.7	15	20.2	40	22.2				
2021	56	22.0	16	21.7	40	22.2				
2022	57	22.5	19	25.6	38	21.2				
2023	10	3.9	4	5.4	6	3.3				
Total	254	5.4	74	100	180	100				

Table 5 Distribution of deceased sick children with congenital heart disease by place of residence

The mortality rate of children due to congenital heart disease was higher at the age of up to 1 year, which accounted for 74.4% of all cases of mortality due to congenital heart disease (Table 6).

Table 6 Distribution of deceased patients with congenital heart disease by age

Years of study	Age of	deceased	l children							
	Up to 2	1 year	1-5 years		6-10 years		11-14 y	ears old	15-18 years old	
	abs	%	abs	%	abs	%	abs	%	abs	%
2019	48	25.4	18	54.5	7	43.8	2	18.2	1	20.0
2020	45	23.8	5	15.2	2	12.5	2	18.2	1	20.2
2021	41	21.7	7	21.2	3	18.7	3	27.3	2	40.0
2022	47	24.9	2	6.1	4	25.0	3	27.3	1	20.0
2023	8	4.2	1	3.0	0	0,0	1	9.0	0	0,0
Total	189	100	33	100	16	100	11	100	5	100

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In children, 73.2% of mortality due to congenital heart disease was determined in the preoperative period, i.e. without surgical correction, and only 68 cases (26.8%) of death were observed in the postoperative period (Table 7).

Years of study	mortality	due to	Periods of the course of congenital heart disease					
	congenital he	eart disease	Before surgery		After surgery			
	abs	%	abs	%	abs	%		
2019	76	29.9	56	30.1	20	29.4		
2020	55	21.7	41	21.8	14	20.6		
2021	56	22.1	39	21.0	17	25.0		
2022	57	22.4	48	26.0	9	13.2		
2023	10	3.9	2	1,1	8	11.8		
Total	254	100	186	100	68	100		

Table 7 Distribution of deceased patients with congenital heart disease by period of illness

Consequently, a high rate of the tendency to increase the frequency of births and deaths of children due to congenital heart disease is noted. The fact established about the high frequency of deaths of children under 5 years of age without surgical correction proves the need for timely surgical treatment of viable children in the first year of life.

The analysis of the results of the study showed the representativeness of the selected material in relation to the total population of children. Of the average total number of children in the population, 2113 children were hospitalized for congenital heart disease during the studied period. Among them, there were slightly fewer urban children (-310) (14.7%) than those living in rural areas - 1803 (85.3%). In the overall structure, the number of boys and girls was approximately the same, 1067 and 1046, respectively. When distributing by place of residence in the gender aspect, the ratio of the number of boys and girls had some peculiarities, i.e. there were slightly fewer urban boys (18.4%) than girls (81.6%), and more rural boys (56.0%) than girls (44.0%) (Table 8).

Place of residence	Boys		Girls		Total		
	Abs	%	Abs	%	Abs	%	
city	57	18.4	253	81.6	310	14.7	
Village	1010	56.0	793	44.0	1803	85.3	
Total	1067	50.5	1046	49.5	2113	100	

Table 8 Distribution of sick children by gender and place of residence

Analysis of the materials showed that sick children under 1 year of age were found with equal frequency - 450 (21.2%) and from 1 to 5 years old - 720 (34.0%) (Table 9)

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Total

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100

Table 9 Distribution of sick children with congenital heart disease by gender and age										
Place of residence	Boys		Girls		Both sexes					
	Abs	%	Abs	%	Abs	%				
Up to 1 year	191	18.5	259	23.9	450	21.2				
1-5 years	337	32.8	383	35.5	720	34.1				
6-10 years	196	19.0	205	18.9	401	19.0				
11-4 years	205	19.9	181	16.7	386	18.3				
15-18 years old	101	9.8	55	5.1	156	7.4				

The structure of hospitalized patients was dominated by children aged 0 to 5 years; no gender differences were observed at this age.

100

1083

100

2113

1030

The study of the structure of congenital heart disease indicates a high frequency of occurrence of such types of defects as VSD - 52.2%, TF - 2.8, ASD - 31.4%, and PDA - 3.8%. Table 9 shows the structure of congenital heart disease in children (Table 9).

No.	Type of VPS	abs	%
1	Ventricular septal defect	1102	52.2
2	Tetrado of Fallot	59	2.8
3	Atrial septal defect	664	31.4
4	Transposition of the great vessels	22	1.0
5	Open AV channel	49	2,3
6	Patent ductus arteriosus	81	3.8
7	Isolated pulmonary artery stenosis	25	1,2
8	Pulmonary artery stenosis with VSD	35	1.7
9	Dextrocardia	3	0,1
10	Congenital mitral valve insufficiency	7	0.3
11	Epstein anomaly	2	0,1
12	Aortic stenosis	2	0,1
13	Bicuspid aortic valve	14	0.7

 Table 9 The structure of congenital heart disease in children

A study of the structure of congenital heart defects depending on the place of residence indicates a high incidence of complex heart defects in rural residents. It was found that congenital heart defects are 5.4 times more common in children living in rural areas (Table 10).





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Table 10 The structure of the VPS depending on the place of residence											
Types of VPS	city	city			total						
	abs	%	abs	%	abs	%					
VSD	165	15.0	937	85.0	1102	100,0					
Tetrado of Fallot	15	25.4	44	74.6	59	100,0					
ASD	98	14.8	566	85.2	664	100,0					
TMS	4	18.2	18	81.8	22	100,0					
OAVK	7	14.3	42	85.7	49	100,0					
OAP	15	18.5	66	81.5	81	100,0					
other	25	18.4	111	81.6	136	100,0					
total	329	15.6	1784	84.4	2113	100,0					

The results of the studies confirm the enormous influence of working conditions and nutrition of pregnant women on the development of congenital malformations in the fetus and the birth of children with congenital heart disease. Characteristic features of the frequency of cardiovascular anomalies in children have been established. The frequency of congenital heart disease depends on the place of residence and the sex of the children. In our studies, congenital heart disease predominates in boys, especially those living in rural areas (Table 11)

No.	Place of residence	Boys			Girls				Total	
		Abs	city	village	Abs	city	village	Abs	city	village
1	VSD	570	122	448	532	43	489	1102	165	937
2	Tetralogy of Fallot	32	5	27	27	10	17	59	15	44
3	ASD	345	70	275	319	28	291	664	98	566
4	TMS	11	2	9	11	2	9	22	4	18
5	OAVK	25	5	20	24	2	22	49	7	42
6	OAP	45	10	35	36	5	31	81	15	66
7	other	70	12	58	66	13	53	136	25	111
	total	1098	226	872	1015	103	912	2113	329	1784

Table 11 Distribution of patients by gender and types of congenital heart disease

Conclusions

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In conclusion, it can be concluded that the frequency of hospitalization of children with VP depends on their place of residence and gender. It has been established that VPS is 5.4 times more common in children living in rural areas, where complex heart defects are also more common. Children from 0 to 5 years old are most often hospitalized, and no gender differences are observed at this age. The study, conducted using the example of the Ferghana region, highlights the importance of studying the frequency of VPS for planning medical care, especially for children living in rural areas, as well as for developing preventive measures.



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