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Structure of Morbidity and Prevalence of Congenital Malformations among Children of the Osh Region in 2018-2020

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Abstract

Analysis of the structure of morbidity and prevalence of congenital malformations among children in the Osh region in 2018-2020. The database was compiled based on the results of the analysis of 950 medical records of children with congenital heart defects (aged 0 to 15 years 11 months) filled in during 2018-2020. Results: the authors have noted an increase in the number of boys and a decrease in the number of girls with congenital heart defects in 2020 compared to 2019 and 2018 (66.4% and 33.6%; 61.3% and 38.7%; 47.3% and 52.7%, respectively). There was a significant decrease ($p < 0.05$) in the number of children aged 0 to 1 year (38.8% in 2020 versus 50.2% in 2018) and a significant ($p < 0.05$) increase in the number of children in the age range 6 to 15 years old (21.1% in 2020 compared to 12.5% in 2018). Significantly more often ($p < 0.05$) in 2018, 2019 and 2020, ventricular septal defect was registered (39.60%; 45.29% and 34.12% of cases, respectively). Conclusion: the study of the peculiarities of the dynamics of registered congenital heart defects among children of the Osh region in 2018-2020 taking into account gender and age characteristics is important for the development of organizational measures for diagnosis and treatment and will make it possible to create a congenital heart defects register in this region, the presence of which will ensure the monitoring of patients with congenital heart defects at every stage from registration to deregistration.

Keywords: Congenital heart defects, Morbidity, Ventricular septal defect, Osh region

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Introduction

Congenital heart defects (CHDs) and cardiovascular system defects account for 47% (12.2 per 10 thousand live births) of all causes of death from malformations (Alanazi *et al*., 2020; Permadi *et al*., 2020). Analysis of the total mortality data increased during the first week of life, accounting for 1/3 of newborns (Bokeriya & Shatalova, 2016).

In the Kyrgyz Republic, 1,700,000 — 2,000,000 children are born annually, and 20,000 of those children have heart defects at birth. The share of critical defects, where the surgical correction is necessary for the first days and even hours of life, amounts to approximately 25% (Kirillov *et al*., 2014; Bokeriya & Gudkova, 2016).

There are many classifications of congenital malformations (CMs) (Kirillov *et al*., 2014; Flocco *et al*., 2018).

Pathophysiological classification is considered one of the main kinds of classification. The malformations are divided into the following:

1. White (left-right shunt: no mixing of arterial and venous blood).
   - With an enrichment of the pulmonary circulation (patent ductus arteriosus (PDA), atrial septal defect (ASD), ventricular septal defect (VSD), AV communication, etc.);
   - With the depletion of the pulmonary circulation (isolated pulmonary stenosis, etc.);
   - With the depletion of the systemic circulation (isolated aortic stenosis, coarctation of the aorta, etc.);
   - Without a significant disturbance of systemic hemodynamics (disposition of the heart: dextro-, sinistro-, mesocardia; heart dystopias, such as cervical, thoracic, abdominal).

2. Blue (right-left blood discharge, mixing of arterial and venous blood occurs):
   - with enrichment of the pulmonary circulation (complete transposition of the great vessels (TGV), Eisenmenger complex, etc.);

- with the impoverishment of the pulmonary circulation (tetrad of Fallot, Ebstein's anomaly, etc.).

According to other researchers, defects can be isolated (VSD, ASD, pulmonary artery stenosis) and complex (combined), namely, defects of the atrioventricular septum, tetralogy of Fallot, and transposition of the great arteries (Ekenze *et al*., 2009; Lobzov, 2010; Flocco *et al*., 2018).

According to domestic researchers, it is important to classify CHD according to the criticality of the situation during the neonatal period (ductus-dependent and foramen-dependent) (Manuilenko *et al*., 2000; Bokeriya, 2019).

It is noted that the prevalence of CHDs in certain regions is characterized by significant variability. There are regional differences in prevalence and incidence due to genomic, clinical, and environmental factors (Papova, 2006; Lobzov, 2008; Federal clinical guidelines for medical care for children with congenital heart defects, 2015).

Clarification of the structural features and the prevalence rate of CHDs among children in each of the regions is a necessary step for creating a regional register of CHD patients. This will allow for dynamic monitoring of such patients and timely determination of the tactics of their management in the postpartum period.

In our work, we analyzed the structure of the incidence and prevalence of CHDs among children in the Osh region for 2018-2020.

Purpose of the study: analysis of the structure of morbidity and prevalence of CMs among children in the Osh region in 2018-2020.

Materials and Methods

This retrospective clinical study was conducted at the Osh Interregional Children's Clinical Hospital.

To compile the database, we used the results of the analysis of 950 medical records of children with CHDs (aged 0 to 15 years 11 months) filled in during 2018-2020. The accumulation of the initial data into the database was carried out using the Microsoft® Excel software.

Registration of CHDs was carried out following the nomenclature headings Q20-Q28 "Congenital anomalies of the circulatory system", class XVII "Congenital anomalies (malformations), deformities and chromosomal abnormalities" of the International Statistical Classification of Diseases and Problems Associated with Health (10th revision) (ICD-10). The following CHDs were taken into account: VSD/ASD (ventricular/atrial septal defect), VSD + ASD, atrioventricular canal (AVC), PDA, TGV, double vascular discharge from the right ventricle (DOS from the right ventricle) severe CHD, Fallot's disease, Epstein's disease.

The following were used as primary documentation: inpatient report forms (form No. 010u, order No. 1030 of the Ministry of Health of the USSR dated 04.10.1980); inpatient statistical cards (form No. 066/u-02, order No. 413 of the Ministry of Health of the Russian Federation dated 30.12.2002). The analysis of the prevalence of CHDs in the Osh region was carried out by territorial zones.

The analysis of the results is presented as M ± σ. Differences were considered significant when the significance level of the analyzed data was less than 0.05.

Results and Discussion

The gender/age characteristics of the respondents, according to a certain time interval in absolute and percentage terms, are presented in **Tables 1 and 2** and **Figures 1 and 2**.

Table 1. Gender characteristics of the subjects with CHDs according to the defined time interval.

Gender	2018	2019	2020
Boys	233	260	253
Girls	209	164	128
Total	442	424	381

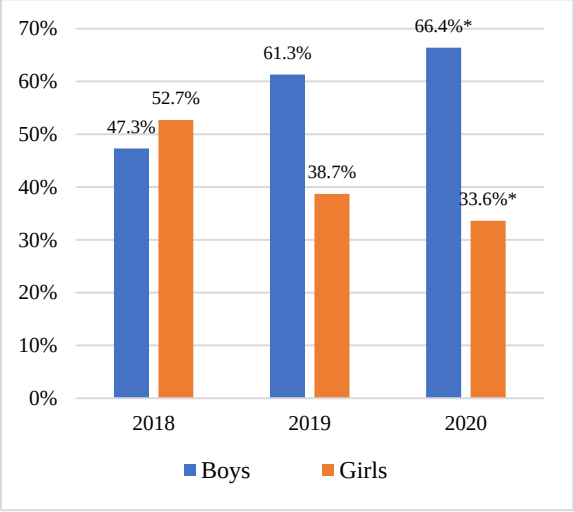

Figure 1. Gender characteristics of the subjects with CHD according to the defined time interval as a percentage.
Note: * p <0.05 is the reliability of the difference between the groups.

The presented data characterize the trend of an increase in the number of boys and a decrease in the number of girls with CHDs in 2020 compared to 2019 and 2018 (66.4% and 33.6%; 61.3% and 38.7%; 47.3% and 52.7%, respectively).

The age characteristics of the subjects, according to a certain time interval, are presented in **Table 2**.

Table 2. Comparative characteristics of the age-specific data of patients with CHDs according to the defined time interval (abs.).

Age	From 0 to 1 year 11 months (person, abs.)	From 2 to 5 years 11 months (people, abs.)	From 6 to 15 years 11 months (people, abs.)
2018	222	165	55
2019	131	235	58
2020	148	153	81

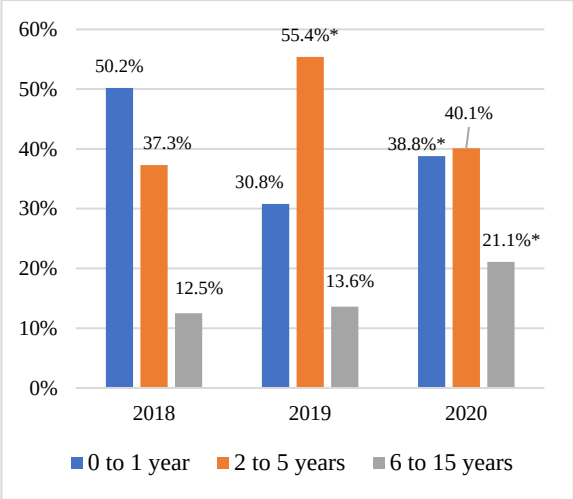

Figure 2. Comparative characteristics of the age-specific data of patients with CHDs according to the defined time interval in percentage terms.
Note: * p <0.05 is the reliability of the difference between the groups.

Analysis of age-specific data for the presented period (2018, 2019, and 2020) indicates a significant decrease (p <0.05) in the number of children aged 0 to 1 year (38.8% in 2020 versus 50.2% in 2018) and a significant (p <0.05) increase in the number of children in the age range from 6 to 15 years (21.1% in 2020 compared to 12.5% in 2018).

The structure of CHD morbidity for 2018-20 is presented in **Table 3**.

Table 3. Comparative characteristics of the structure of the CHD incidence in 2018-20.

No.		2018		2019		2020	
		Abs.	%	Abs.	%	Abs.	%
1.	VSD	175	39.60*	192	45.29*	130	34.12*
2.	ASD	110	24.89	94	22.17	87	22.84
3.	VSD + ASD	48	10.87	20	4.72	36	9.45
4.	Severe CHDs	36	8.14	31	7.31	27	7.09
5.	Fallot's disease	20	4.52	14	3.30	13	3.41
6.	Epstein's disease	20	4.52	17	4.01	18	4.72
7.	AVC	12	2.71	11	2.59	17	4.46
8.	PDA	8	1.81	34	8.02	40	10.50
9.	TGV	8	1.81	7	1.65	6	1.57
10.	DDBV from the RV (double discharge of blood vessels from the right ventricle)	5	1.13	4	0.94	7	1.84
	Total	442	100	424	100	381	100

Note: * p <0.05 is the reliability of the difference in the trait within the groups.

VSD was registered significantly more often (p <0.05) in 2018, 2019 and 2020 (39.60%; 45.29% and 34.12% of cases, respectively). The second place in the frequency of occurrence was held by ASD (24.89%; 22.17% and 22.84%, respectively).

An analysis of the prevalence of CHDs in the districts of Osh oblast is presented in **Table 4**.

Table 4. Comparative characteristics of the CHD prevalence in the districts of the Osh region.

	2018		2019		2020	
	Abs.	%	Abs.	%	Abs.	%
Osh	118	26.70*	117	27.59*	105	27.56*
Kara-suu	110	24.89	104	24.53	97	25.45
Nookat	60	13.58	57	13.44	52	13.65
Uzgen	50	11.31	48	11.32	44	11.55
Aravan	47	10.63	45	10.62	47	12.34
Kara-Kulzha	21	4.75	20	4.72	13	3.41
Alai	20	4.52	18	4.25	11	2.89
Chon Alai	16	3.62	15	3.53	12	3.15
Total	442	100	424	100	381	100

Note: * p <0.05 is the reliability of the difference in the trait within the groups.

The presented data indicate that the largest number of cases (p <0.05) of registration of children with CHD was recorded in Osh in 2018, 2019, and 2020.

CHDs are one of the main problems in pediatric cardiac surgery. This is since timely verification of one or another defect determines the further tactics of managing the child with the determination of the volume of surgery and the timing.

Some authors associate the increase in the incidence rate among children in the age range from 6 to 15 years, which was demonstrated in our study, with delayed diagnosis and, accordingly, later surgical intervention for this pathology, etc. (Nelunova *et al*., 2018).

When analyzing the gender characteristics of registered CHDs for the period 2018-2020, we noted an increase in the number of male children (p <0.05) (66.4% in 2020 compared to 47.3% in 2018) and a decrease in the number of female children with CHDs (52.7% and 33.6% in 2018 and 2020 respectively).

The study of the prevalence of CHD patient groups according to the districts of Osh oblast showed that most often they were registered (2018-2020) in Osh, Kara-Suu, and Nookat (26.70%; 24.89%; 13.58% in 2018., 2019 and 2020, respectively; 27.59%, 24.53%; 13.44% in 2018, 2019 and 2020, respectively; 27.56%, 25.45% and 13.65% in 2018, 2019, and 2020 respectively).

Conclusion

1. The study of the peculiarities of the dynamics of registered CHDs among children of the Osh region in 2018-2020 taking into account gender and age characteristics is important for the development of organizational measures for diagnosis and treatment.
2. The study of the prevalence of CHD groups in the districts of Osh oblast will make it possible to create a CHD register in this region, the presence of which will ensure the monitoring of CHD patients at every stage from registration to deregistration.

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