HEALTHY LIFESTYLE. PREVENTION

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CONGENITAL HEART DISEASES IN INDIGENOUS CHILDREN OF THE REPUBLIC SAKHA (YAKUTIA)

DOI 10.25789/YMJ.2020.70.10

УДК 616-053.2(571.56)

The aim of the research was to evaluate the prevalence of congenital heart diseases (CHDs) in children of different ethnic groups of the Republic of Sakha (Yakutia). In a 10-year dynamics of cases in Pediatric center of the Republican hospital №1 (National health center), statistically significant increase of the newborns with CHD associated with severe defects has been noticed. It is revealed that more complicated cases of congenital heart diseases are present in children of indigenous peoples of the Republic of Sakha (Yakutia) (indigenous small-numbered peoples of Russia and the Yakuts) rather than in children of the other ethnic groups.

Keywords: congenital defects, congenital heart disease, the Sakha, indigenous population of the North.

Introduction: Congenital heart diseases are multi-factor diseases that can result from genetic factors, maternal disease during pregnancy and her concomitant somatic disorders, the life level of the family (dietary peculiarities) and etc. [5]. The detection of CHD risk factors and primary prevention of CHD development are most considered as they are associated with possible incapacitating condition, decrease of life quality for a child and with the cost of high-technology medicine.

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Cardio-vascular system exposures have high prevalence (18.1%) according to the all-national register for CHDs [1]. There were 400.5 cases of CHD per 100 000 of children in 2014, and 439.0 cases in 2015 [3]. The morbidity indices and structure of CHD significantly differ in various regions of the Russian Federation. The regional register has been functioning in the Republic of Sakha (Yakutia) since 2000, all the cases of congenital malformations in newborns, including CHDs, are registered there. The data of the register make the base for scientific and statistic research work for CHD. In 2011 the morbidity rate for CHD was 29.1 per 100 000 children in the Republic of Sakha (Yakutia). The revealed cases of CHD are increasing and CHDs are the second cause of infant mortality for the long time [4].

Genetic factors are often considered as the main cause for CHD development. Perhaps, it is caused by accumulation of the mutated genes in the population, thus genetic disorders can be found in isolated groups of people, where there are many cases of so called homolocal and national families. i.e. families and marriages between those living in the same small geographic area and/or between one ethnic group. According to the data of the 'Yakut Republican medical center of informatics and analysis under the healthcare ministry of the Republic of Sakha (Yakutia)' for the period of 2002-2006, CHD turned to be a second level in mortal prevalence of children under 14 among the Evenks, Evens, Dolgans and Yukagirs. The maximum of CHD occurrence is registered in Olyokminskiy, Ust-Maiskiy and Nizhnekolymskiy regions of the Republic of Sakha (Yakutia) for the period of 1995-2012. The analysis of CHD occurrence reveals considerable number of cases in industrial, Arctic and Viluy regions [4]. The investigation of the CHD structure shows that 82.2% out of 899 total cases compose the ventricular septal and atrial septal defects; 8.9% are defects of great vessels and 4.67% are combined CHDs. CHD is rather common in indigenous peoples of the North. CHD and other congenital defects are known to be common in the Nenets children in Yamalo-Nenets Autonomous district [4, 2]. The prevalence and risks of CHD in newborns of the indigenous population of the Republic of Sakha (Yakutia) are not investigated in details.

Thus the research is **aimed** at analysis of CHD dynamics and structure among the newborns of different ethnic groups of the Republic Sakha (Yakutia).

Materials and methods: A retrospective clinical investigation was carried out on the base of the Perinatal center of the Republican hospital №1 (National health center). All the cases of CHD (n=1824) in newborns, born alive in the period of 2001-2003 and 2013-2015, were analyzed. The initial documentation was a statistical medical record of the hospitalized patient (form №066/y-02) and obstetric medical record (form №010y).

The nationality of the patients was registered according to self-identification. The indigenous peoples of Yakutia include the Yakuts and indigenous small-numbered peoples of the North such as the Evens, the Evenks, the Dolgans, the Yukagirs and the Chukchis are analyzed. Besides that, the Russians, the peoples of the Central Asia (the Kirgizes, the Tadzhikis and the Usbeks), the peoples of the Caucasus (the Tchechens, the Ingushes and the Armanians), and the representatives of the other nations (the Kumiks, the Khakasses, the Ukranians, the Polish, the German, the Tartar and the Buryats) were included in the analysis.

All the cases of CHD were divided into three groups. The first group consisted of the CHD newborns without signs of

cardiac insufficiency (CI); the second group consisted of CHD newborns with the first degree of cardiac insufficiency, according to the 1st class of the NYHA functional classification; in the third class the newborns with CHD with the 1st and 2nd degree of cardiac insufficiency, according to the 2nd and more class the NYHA functional classification. The third group of severe CHD was confirmed with echocardiographic methods, computed tomography angiography (CTA) with contrast material, aortography and selective coronary angiography.

Statistical data are calculated by IBM SPSS Statistics 17 (IBM®, USA). When comparing the groups, the Pearson's criterion (Pearson's chi-squared test ($\chi 2$)) was used. The critical value of the significance in checking the statistical hypothesis was equal to 5%.

The results and discussion: For the both periods there were registered 1824 cases of CHD in newborns. 697 cases were in 2000-2003, and 1127 cases in 2013-2015. When dividing children into groups according to the class of CHD expression it was determined that 44.5% cases had signs of cardiac insufficiency. The second period (2013-2015) the number of newborns with CHD considerably increased, moreover we noticed the increase of newborns with the signs of decompensated heart failure ($p<0.001$ when comparing the groups 2 and 3 with 1) (Tab.1).

The Table 2 represents the distribution of the newborns according to the national identification of the parents. More than 60% of mothers and fathers identified themselves as the Yakuts, approximately 20% the Russians, 5.0% of mothers and 3.4% of fathers were self-identified as indigenous small-numbered peoples of the North.

Two groups of families were identified as mononational and mixed families, when dividing the parents according to their ethnicity (Table 3). Mononational families are the families where a mother's

Table 1

The distribution of children into groups according to CHD and periods of examination

Period	CHD groups			p
	1, n (%)	2, n (%)	3, n (%)	
2001-2003 (n=697)	519 (74.5)	31 (4.4)	147 (21.1)	<0.001
2013-2015 (n=1127)	494 (43.8)	153 (13.6)	480 (42.6)	
Total (n=1824)	1013 (55.5)	184 (10.1)	627 (34.4)	

Note. p – the achieved level of significance in comparison of the both periods.

Table 2

The distribution of CHD newborns (n=1824) according to the parental ethnicityю

Ethnicity	Mother's ethnicity		Father's ethnicity	
	n	%	n	%
The Yakuts	1205	66.1	1205	66.1
The Russians	447	24.5	447	24.5
The Evenks and the Evens	62	3.4	31	1.7
Other indigenous small-numbered peoples of the North: the Dolgans, the Yukagirs and the Chukchies	30	1.6	31	1.7
The peoples of the Caucasus	26	1.4	37	2
The peoples of the Central Asia	16	0.9	19	1
Other nations: the Kumyks, the Khakasses, the Ukranians, the Polish, the German, the Tartar, and the Buryat	36	2	52	2.9
Unidentified	2	0.1	2	0.1

Table 3

Mono- and mixed ethnicities and CHD groups

Parental ethnicity	Всего, N	Группа ВПС					
		1-я, n=1013		2-я, n=184		3-я, n=625	
		n	%	n	%	n	%
Mononational families including:	1682	930	55,3	173	10,3	579	34,4
The Yakut / the Yakut	1153	601	52,1	131	11,4	421	36,5
The Russian / the Russian	414	261	63,0	35	8,5	118	28,5
Indigenous small-numbered peoples of the North / Indigenous small numbered peoples of the North	47	22	46,8	5	10,6	20	42,6
Other / other (coinciding nations)	68	46	67,6	2	2,9	20	29,4
Mixed nations, including:	140	83	59,3	11	7,9	46	32,9
The Yakut / the Russian	36	21	58,3	3	8,3	12	33,3
The Yakut / Indigenous small-numbered peoples of the North	45	23	51,1	2	4,4	20	44,4
The Yakut / other	23	18	78,3	2	8,7	3	13,0
The Russian / Indigenous small-numbered peoples of the North	10	3	30,0	1	10,0	6	60,0
Other / Indigenous small-numbered peoples of the North	5	3	60,0	1	20,0	1	20,0
Other mixed families (not coinciding nations)	21	15	71,4	2	9,5	4	19,0

Table 4

The distribution of CHD children within the groups of indigenous and non-indigenous nations of the Republic Sakha (Yakutia)

Groups	Total. N	CHD groups						p
		1 n=1013		2 n=184		3 n=625		
		n	%	n	%	n	%	
Indigenous and non-indigenous nations of the Republic of Sakha (Yakutia)*								
Indigenous	1319	691	52.4	145	11.0	483	36.6	<0.001
Non-indigenous	503	322	64.0	39	7.8	142	28.2	
Indigenous small-numbered peoples of the North and other nations **								
Indigenous small-numbered peoples of the North	107	51	47.7	9	8.4	47	43.9	0.097
Others	1715	962	56.1	175	10.2	578	33.7	

Note. In the Tables 4-5 * - The Yakuts and the indigenous small-numbered peoples of the North are referred to indigenous; non-indigenous – they are represented by the other nations; **- the Yakuts and the representatives of the other nations are referred to the group "Others"; p – the achieved level of significance. comparison of the both periods.

and a father's ethnicity are the same and in mixed national families both parents belong to different ethnicities. 7.7% of the newborns were born in ethnically mixed families. There were no statistically significant differences in distribution into the CHD groups (p=0.544) when comparing mononational families with mixed ones.

For further analyses the children with one or both parents represented by the indigenous small-numbered peoples of the North or the Yakuts were included in one group (Table 4). When comparing this group with the other one, where the children were from parents of different nationalities, the difference between both groups showed statistically significant discrepancies in prevalence of CHD with the signs of cardiac decompensation (p<0.001 when comparing 3rd and 1st groups; p=0.004 when comparing 2nd and 1st groups) (Table 4). When dividing the children into the groups, where one or both parents are represented by the indigenous small-numbered nations of the North, the same effects are noticed but the level of differences does not refer to statistically significant data.

Table 5

The comparison of CHD group distribution in dynamics

Groups	Time periods, years	N	CHD groups, n (%)			p
			1 n=1013	2 n=184	3 n=625	
Indigenous and non-indigenous peoples of Yakutia*						
Non-indigenous	2001-2003	211	171 (81.0)	5 (2.4)	35 (16.6)	<0.001
	2013-2015	292	151 (51.7)	34 (11.6)	107 (36.6)	
Indigenous	2001-2003	486	348 (71.6)	26 (5.3)	112 (23.0)	<0.001
		833	343 (41.2)	119 (14.3)	371 (44.5)	
Indigenous small-numbered peoples of the North and other nations**						
Indigenous small-numbered peoples of the North	2001-2003	27	23 (85.2)	0 (0)	4 (14.8)	<0.001
	2013-2015	80	28 (35.0)	9 (11.2)	43 (53.8)	
Others	2001-2003	670	496 (74.0)	31 (4.6)	143 (21.3)	<0.001
		1045	466 (44.6)	144 (13.8)	435 (41.6)	

The level of the 1st group of CHD has decreased for a 10-year period; increasing the level of the 2nd and 3rd groups CHD in all ethnic groups (table 5). Thus, in a group of non-indigenous peoples the 2nd group increased from 2.4% to 11.6% (p<0.001), the 3rd group increased from 16.6% to 36.6% (p<0.001). In indigenous peoples of the North the numbers of the 2nd group increased from 5.3% to 14.3% (p<0.001), the 3rd group from 23% to 44.5% (p<0.001) respectively. If we look at the indigenous small-numbered peoples of the North separately, there we also notice the increase of number of children in the 2nd group from 0.0% to 11.2%, the 3rd group increased from 14.8% to 53.8% (p<0.001). The analogous numbers for the representatives of the other nations increased from 4.6% to 13.8% in the 2nd group; and from 21.3% to 41.6% in the 3rd group.

Conclusion. The results of the research show the significant increase of CHD newborns, with prevalence of complicated cardiac defects with the signs of decompensation in 10-year dynamics, born in the Perinatal center of the Republican hospital №1 (the National health center). The comparison of parental nationality (those born in mixed or mono- families, i.e. the families, where the parents are of the same nations) did not reveal any significant discrepancies in distribution into CHD groups. The prevalence of complicated CHD cases is more common in newborns of indigenous peoples of Yakutia (the indigenous small-numbered peoples of the North and the Yakuts) than in newborns of the other ethnic groups.

This work was supported by the Budget Projects of YNC CMP "Monitoring the state of children's health of the Republic of Sakha (Yakutia)" (#0120-128-07-98), by the Project of the Ministry of Science and Higher Education of the Russian Federation (basic part of funding to M.K. Ammosov North-Eastern Federal University #FSRG-2020-0016) and by the RFBR grant #18-05-600035_Arctika.

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DOI 10.25789/YMJ.2020.70.11

УДК 796.35:159.9.612.018(571.56)

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EVALUATION OF PSYCHOLOGICAL STATUS AND LEVEL OF CORTISOL AND TESTOSTERONE IN THE PRE-COMPETITIVE PERIOD OF YAKUTIA ATHLETES

We examined 37 highly qualified freestyle wrestlers (candidates for master of sports (cms)) of Yakut nationality, aged 17 to 21 years. The control group consisted of 22 young men of students of the same age who are engaged in physical education at least twice a week. The article presents the results of studies of the level of psycho-emotional state in highly qualified martial artists in the pre-competition period. The level of situational and personal anxiety was high in 8 and 11% of athletes and in 23 and 36% of students, respectively. In the group of athletes, low depression was detected in 11, moderate in 6 and high in 7%. The level of depression in the group of students was 32, 9 and 5%, respectively.

The aggressiveness index showed that most young men have a low level of aggression, among athletes 61% - students 73%. In both groups, young men with a high level of aggression were not identified. In the first group of youths with a low and high index of hostility, there were 50 and 34% less than in the second, respectively. The willingness of athletes to compete depends on the psycho-emotional state, which can both contribute to the achievement of high results and prevent it.

Keywords: psycho-emotional state, testosterone, cortisol, athletes, psychological preparedness, Yakutia.

Introduction. The result of the performance of athletes in competitions is determined by the mechanism of behavior and specially directed actions, which are caused by the development of physical qualities, the level of technical preparedness, functional and mental capabilities [5, 7, 9, 16].

In conditions of direct pre-competitive training for a short period of time, it is impossible to significantly develop physical qualities, improve equipment, etc., therefore, at this stage, the athlete's psychological preparedness for competitions is of particular importance [1, 11]. Athlete participation in competitions, especially qualifying or high damage, is stressful. It is known that moderate stress has a positive effect on the effectiveness of training and competitive activity, and excessive stress leads to negative consequences [11].

The effects of stress are due to neurochemical changes in the body. In a state of acute physical and emotional stress in athletes, the hypothalamic-pituitary-adrenal system is activated, which leads to changes in the hormonal profile [5]. Changes in the concentration of hormones make a significant contribution to the course of physiological processes in the North and help to stabilize the processes of adaptation of the body of athletes to changing environmental conditions and high physical activity [4]. Steroid hormones act on the central nervous system, regulate not only neuroendocrine function, but also behavioral, emotional processes, such as thinking, sleep, perception, as well as emotional states: depression, anxiety, aggression [6; 10]. It is believed that aggressiveness contributes to the implementation of strength and explosive exercises. At the same time, it is associated with testosterone. The question arises of how much emotions of this kind affect the changes in the level of testosterone and cortisol when performing strength exercises. Testosterone provides confidence and motivation, but when there is too much of it, positive qualities are replaced by negative ones. Testosterone activates the subcortical regions of the brain responsible for aggressive behavior, while cortisol and serotonin act as antagonists and reduce the effect of testosterone. Researchers associate aggression in