

THE PECULIARITIES OF FUNCTIONAL STATE CHANGES OF CARDIOVASCULAR SYSTEM OF GIRLS AT THE AGE OF 18-19 IN PROCESS OF PRACTICING THE SPORTS AND HEALTH TOURISM

Denysenko I.A.

Zaporozhye National University

Annotation. The dynamics estimation of the integral indices of cardiovascular system among the female students of higher educational institution during the process of physical education activities, including means of sports and health tourism, has been conducted. There are 40 girls at the age of 18-19 years that participated in the experiment. It is found that by the end of the research the positive decrease of all the types of arterial pressure, coefficient of blood circulation effectiveness, Robinson's and cardiac indices, common peripheral resistance and significant increase of functional state of cardiovascular system of the organism are being observed among the examined students. There were stated that significantly more optimal cardiac rate indices, systolic, diastolic and average, coefficient of blood circulation effectiveness, Robinson's index and the level of functional state of organism cardiovascular system (LFScvs) had been observed among the girls of experimental rather than control group of female students. It is found that the rates of almost all the used indices of cardiovascular system were significantly higher among the students practiced sports and health tourism, than those ones engaged into the traditional program of physical education for higher educational institution. Obtained results certified the sufficiently high effectiveness of using the tourism facilities in optimization of functional state of cardiovascular system among the female students at the age of 18-19 years.

Key words: functional, cardiovascular system, girls, physical education, health, tourism.

Introduction¹

A considerable decline of physical state and physical health of student-age population is being observed at the present time. Due to the opinion of the number of authors, it is connected with the environmental, social and economic degradation in the society, physical inactivity of the students, loss of interest to physical education and sport among them, and as the result – with the sharp decrease of adaptation degree of the main physiological systems of their organism, cardiovascular in the first turn, to the unfavorable environmental factors.

In connection with this, the researches oriented towards the studying of the possibility of cardiovascular system optimization of student-age population by using the various types of physical exercises are of sufficient current interest.

The analysis of the scientific and methodological literature has shown that the efficiency of using the means of rhythmic gymnastics, step aerobics, fitball aerobics, swimming, sports games etc. in cardiovascular system optimization of the students is proved.

At the same time, there are almost no researches related to the impact on the cardiovascular system of the students organism, such rapidly developing and highly popular among the students types of physical exercises as sports and health tourism.

It is evident, that the knowledge of these peculiarities is necessary for demonstrating the possibility of involving the sports and health tourism means into the program of physical education for students.

Relevance and undoubted practical importance of the indicated problem are the prerequisites for the given research.

The work is made in accordance with the Plan of scientific and research work of the Faculty of Physical Education, Physical Rehabilitation Department of Zaporozhye National University "Development of the modern recreational technologies for different groups of population" (2005-2015).

Purpose, tasks, materials and methods of the research.

The purpose of work is to study the features of cardiovascular functional state among the female student at the age of 18-19 that practice sports and health tourism.

Tasks of the work:

- To provide the critical analysis of the specified literature;
- To study the features of cardiovascular functional state among the female students at the age of 18-19;
- To develop the complex of sports and health tourism means for its using in the physical education program among the female students at the age of 18-19;
- To estimate the changes in cardiovascular system state of female students at the age of 18-19 under the influence of physical education exercises, including the means of sport and health tourism.

There are traditional physiological methods and computer program of express-estimation of functional state of the organism "ShVSM-integral" have been used in the tasks solving. There are 40 female students of Zaporozhye National University, divided into control (n=23) and experimental (n=17) groups participated in the research.

Results of the research.

Prior to the forming experiment, almost similar below the average level of the functional condition of the cardiovascular system of the organism (table 1) has been observed among the female students of the control and

experimental groups. Moreover, the decreased values of common peripheral resistance and hypokinetic type of cardiac function have been characteristic of all the female students.

Obtained results are fully consistent with the materials of other authors, studied the cardiovascular system features of girls at the age of 18-19.

With the aim to optimize the functional state of cardiovascular system of examined female students we proposed to involve into the traditional physical education program, including the means of sport games (basketball, volleyball), athletics, and rhythmic gymnastics, the means of sport and health tourism due to the hours number reduction for the represented types of physical exercises.

The complex of sport-and-health tourism means developed by us, involved the means of common and specified physical preparedness, weekend recreation trips of recreation and sport-and-fitness orientation, campings (first and second category of difficulty) and exercises of tourist multidiscipline competition.

Table 1

Cardiovascular system indices of the girls of control and experimental groups prior the forming experiment,

Indices	X±m		t	P
	Control group (n=23)	Experimental group (n=17)		
Cardiac rate, shorts•min ⁻¹	72,56±1,54	76±2,67	1,12	>0,05
Systolic blood pressure, mm of mercury	113,7±0,77	115,31±2,83	0,55	>0,05
Diastolic blood pressure, mm of mercury	68,48±1,13	71,88±2,66	1,18	>0,05
Pulse blood pressure, mm of mercury	45,22±0,95	43,44±1,97	0,81	>0,05
Average blood l pressure, mm of mercury	84,23±0,83	86,21±2,55	0,74	>0,05
Index of blood circulation efficiency, conditional units	3272,8±85,84 average	3279,38±166,55 average	0,04	>0,05
Robinson's index, conditional units	82,38±1,60 average	87,99±4,38 average	1,20	>0,05
Systolic blood volume, ml	65,52±1,22 average	64,78±1,91 average	0,32	>0,05
Minute blood volume, l•min ⁻¹	4,75±0,13 average	4,88±0,15 average	0,67	>0,05
Cardiac index, l•min•m ⁻²	3,01±0,07 hypocinetics	2,98±0,10 hypocinetics	0,22	>0,05
Common peripheral resistance of vessels, dins •c•sm ^{-0,5}	1434,34±51,36 below the average	1434,21±64,22 below the average	0,00	>0,05
Level of cardiovascular system functional state, points	58,82±2,37 below the average	55,36±1,83 below the average	1,16	>0,05

To estimate the effectiveness of using the sport and health tourism means in the increasing of functional state of cardiovascular system of female students at the age of 18-19, their further examination has been made at the end of academic year.

It is shown here that after the forming experiment the defined optimization of functional state of cardiovascular system has been observed among the female students of experimental group, that was fixed in positive decrease of Robinson index, index of blood circulation efficiency and increase of the functional state of cardiovascular system up to the functional class above the average (table 2).

Table 2

Cardiovascular system indices of the girls of experimental group (n=17) by the end of the forming experiment,

Indices	X±m		t	P
	Beginning of the experiment	The end of the experiment		
Cardiac rate, shorts•min ⁻¹	76±2,67	67,5±1,16	2,92	<0,01
Systolic blood pressure, mm of mercury	115,31±2,83	108,13±1,64	2,20	<0,05
Diastolic blood pressure, mm of mercury	71,88±2,66	66,88±1,51	1,64	>0,05
Pulse blood pressure, mm of mercury	43,44±1,97	41,25±1,48	0,89	>0,05
Average blood l pressure, mm of mercury	86,21±2,55	80,49±1,39	1,97	<0,05

Index of blood circulation efficiency, conditional units	3279,38±166,55 average	2767,5±77,09 average	2,79	<0,01
Robinson's index, conditional units	87,99±4,38 average	72,91±1,49 above the average	3,26	<0,01
Systolic blood volume, ml	64,78±1,91 average	66,32±1,46 average	0,64	>0,05
Minute blood volume, l•min ⁻¹	4,88±0,15 average	4,47±0,10 average	2,27	<0,05
Index of heart, l•min•m ⁻²	2,98±0,10 hypocinetics	2,73±0,05 hypocinetics	2,27	<0,05
Common peripheral resistance of vessels, dms •c•sm ^{-0,5}	1434,21±64,22 below the average	1456,06±50,03 below the average	0,27	>0,05
Level of cardiovascular system functional state, points	55,36±1,83 average	69,08±2,28 above the average	4,69	<0,001

Comparative analysis of the functional state of cardiovascular system of female students of experimental and control group after the research has been provided, became the strong confirmation of positive dynamics of functional state of cardiovascular system of girls in the experimental group (table 3).

There were found that significantly more optimal cardiac rate indices, systolic, diastolic and average arterial pressure, coefficient of blood circulation effectiveness, Robinson's index and the level of functional state of organism cardiovascular system (LFS_{CVS}) had been observed among the girls of experimental rather than control group of female students.

Table 3

Cardiovascular system indices of the female students of control and experimental groups by the end of the forming experiment, X±m

Indices	Control group (n=23)	Experimental group (n=17)	t	P
Cardiac rate, shorts•min ⁻¹	80,13±2,37	67,5±1,16	4,78	<0,001
Systolic blood pressure, mm of mercury	117,61±1,5	108,13±1,64	4,27	<0,001
Diastolic blood pressure, mm of mercury	73,26±1,5	66,88±1,51	3,01	<0,05
Pulse blood pressure, mm of mercury	44,35±1,95	41,25±1,48	1,26	>0,05
Average blood l pressure, mm of mercury	88,32±1,15	80,49±1,39	4,35	<0,001
Index of blood circulation efficiency, conditional units	3540,65±164,42	2767,5±77,09	4,26	<0,001
Robinson's index, conditional units	94,01±2,65	72,91±1,49	6,94	<0,001
Systolic blood volume, ml	62,47±2,11	66,32±1,46	1,50	>0,05
Minute blood volume, l•min ⁻¹	5±0,21	4,47±0,1	2,32	<0,05
Index of heart, l•min•m ⁻²	3,16±0,12	2,73±0,05	3,38	<0,01
Common peripheral resistance of vessels, dms •c•sm ^{-0,5}	1480,95±81,88	1456,06±50,03	0,26	>0,05
Level of cardiovascular system functional state, points	54,5±2,2	69,08±2,28	4,60	<0,001

Data upon the rate of functional state improvement of the organism cardiovascular system of the surveyed girls became indicative as well.

It was possible to state, that when the positive decrease of the cardiac rate (12%), systolic and diastolic blood pressure (5% to 7%), coefficient of blood circulation effectiveness by 15%, Robinson's index by 17% is characteristic for the girls of experimental group after the forming experiment, so that female students of the control group, on the contrary, showed the negative growth of the given indices from 3% up to 14%.

Conclusion:

1. Results of the conducted study showed that the significant improvement of the functional state of cardiovascular system has been observed among the female students at the age of 18-19 under the influence of physical education classes, including tourism facilities.

2. Obtained results confirmed the sufficiently high effectiveness of using the tourism facilities in process of physical education of the students within the higher educational institution conditions.

Perspectives of further researches within the given direction.

It is planned to study in the future the peculiarities of tourism influence on the level of physical health and physical preparedness of the girls at the age of 18-19.

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Information about the author

Denisenko I.A.: nvmalikov@mail.ru; Zaporozhia National University; Zhukovskogo str. 66, Zaporozhia, 69000, Ukraine.

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