INFLUENCE OF PHYSICAL CULTYRE AND SPORTS ON HEALTH STATUS OF PUPILS OF INDUSTRIAL CITY

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Annotation. The aim was to study in the city with large enterprises of ferrous metallurgy and coke health of schoolchildren under the influence of physical education and sports. The research of blood pressure and heart rate (HR) were 295 pupils aged 15-17 years, 390 - anthropometric study of body length, body weight, chest circumference and head, while the 584 teenagers - the prevalence of dental caries. HR assessment is made by comparing with the age norms, and indicators of physical development of pupils - centile method. It is shown that under the influence of employment morning gymnastics school students marked normalization of their heart rate. Waiver of physical exercise leads to a decrease in students in body length and circumference of the chest. Classes in morning exercises and sports are the factors antirisk caries among high school students. Proposed preventive recommendations.
Keywords: physical education, school, health, prevention.

Introduction

Providing of high levels of the health of children, teenagers and young people is an important public and social problem in Ukraine. According to the generally accepted determination, the health is this state of complete physical, spiritual and social prosperity, rather than just absence of illness and physical defects. The main health indicators traditionally include: physical development, immunological reactivity, morbidity, death rate, birth-rate [1].

The health is formed under influence of complex of natural ecological, technogenic ecological and socio-economic factors of environment of vital functions. The state of health of children and teenagers is determined by their adaptation possibilities that are depending on biological factors (heredity, age, sex) and terms of environment (nutrition, physical activity, social well-being, a way of life) [2].

Significant role in forming the health of children and adolescents is rendered by their way of life. Lifestyle is the method of vital functions of personality, social group or society, determined by their own nature, social-economic and naturally-geographical terms of their life [3]. According to the definition World Health Organization (WHO), lifestyle is a method of existence, that is based on the interaction between conditions and specific models of human behavior [4].

In accordance with the definition proposed by J.P. Lisitsin, healthy lifestyle (HLS) – is the method of vital functions, aimed at maintaining and improving the health of people [5-6]. HLS determines the so-called "healthy" model of behavior, that for corresponding, concrete terms diminishes the risk of origin of disease [7]. By the manifestations of "healthy" behaviors or healthy living traditionally include: smoking cessation and alcohol abuse, good nutrition, physical activity, including physical education and sports, observance of the mode of day and etc.

According to published data, in Ukraine optimal conditions for physical education education of schoolchildren are present only in 14,9% general educational establishments [8]. In schools, the physical development stands out 5 times less time than on mental development. In 56% of educational institutions on the grounds of redundancy health professionals is not carried out medical-pedagogical control of physical training. A number of schools canceled classes for children of special groups [9].

Specialists are set influence of terms for physical education and quality of organization of lessons of physical education in educational establishment on functional vital of students signs, especially cardiovascular, respiratory and vegetative nervous systems [10-11]. It is well-proven that absence of the regular going in for sports and walks on fresh air is risk of decline of somatic health of healthy children factors [12].

In the present period is not enough studied the effect of physical activity on health of the child population living in industrialized regions with unfavorable environmental conditions. At the same time, the combination of a sedentary lifestyle (inactivity) and high development pressure on the body of environmental pollutants should be considered as significant risk factors for ill health.

The aim of research was to study and evaluate the impact of physical education and sport on the health of school children of the industrial city and the subsequent development of preventive recommendations.

Materials and methods. Studies performed in Alchevsk (Lugansk region) with high-density residential, commercial and industrial buildings and large enterprises of ferrous metallurgy and coke-chemical production. The main industry in the city are located on a single industrial site PJSC "Alchevsk Iron and Steel Works" with a full-cycle and PJSC "Alchevskcokes" with a coke production. Major pollutants of atmospheric air are the self-weighted substances (dust), carbon monoxide, nitrogen oxides, sulfur dioxide, hydrogen sulfide, phenol ammonia and polycyclic aromatic hydrocarbons.

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In order to evaluate the effect of physical activity on the health of schoolchildrens in the upper grades of secondary schools and specialized surveys carried out these teens who voluntarily responded to questions about whether they are engaged in morning exercises (physical culture) and sports (associated with physical activity). Depending on the responses received were distributed to students at the appropriate group.

The study of the functioning of the cardiovascular system of 295 schoolchildrens completed the survey on systolic blood pressure (SBP), diastolic blood pressure (DBP) and heart rate (HR). The estimation of results of measuring of HR conducted by comparing the data with the performance of middle-aged HR [13]. Results, measuring of HR, getting in the borders of variants of norm (M ± of б), were considered normal, and going beyond the indicated limits, accordingly higher or below the age-related norm.

For assessing the physical development of 390 schoolchildrens conducted by conventional methods anthropometric study of body length, body weight, chest circumference and head. Statistical processing and analysis of the data made method of centile that allows us to consider the distribution of body length, body weight, chest circumference and head in percentage terms (in the hundredth stakes of a population). Signs that go beyond the 3 and 97 centiles are recorded as a deviation from the norms of physical development [14-15].

Assessing the prevalence of dental caries schoolchildrens performed according to routine medical examinations.

Results and discussion. As a result of assessing the impact of morning gymnastics sessions on performance indicators of the cardiovascular system of schoolchildrens found that the specific gravity of schoolchildrens with HR were within the age norm was significantly higher in the group of schoolchildrens involved in gymnastics – 39,36±5,04%, as compared to those that a gymnastics did not engage in – 25,87±3,09%, including in the group of boys respectively – 39,68±6,16% against 23,29±4,95% ($p < 0,05$). At the same time, boys with HR above the age-related norm higher among, than among adolescents who are involved in gymnastics – 69,86±5,37%, those who were engaged in gymnastics – 49,21±6,30% ($p < 0,02$). Informations are in the table. 1.

Table 1.

The specific gravity of schoolchildrens with HR, depending on the classes in morning exercises, % (n = 295)

Heart rate	Specific gravity of schoolchildrens who in morning exercises:		p
	engaged	not engaged	
General group (boys + girls)			
Below than the age-related norm	20,21±4,14	26,87±3,13	> 0,05
Within the limits of the age-related norm	39,36±5,04	25,87±3,09	< 0,01
Higher than the age-related norm	40,43±5,09	47,26±3,52	> 0,05
Boys			
Below than the age-related norm	11,11±3,96	6,85±2,96	> 0,05
Within the limits of the age-related norm	39,68±6,16	23,29±4,95	< 0,05
Higher than the age-related norm	49,21±6,30	69,86±5,37	< 0,02

Note: In the group of girls of distinction statistically not significant ($p > 0,05$).

Consequently, gymnastics high school students leads to normalization of their HR.

As a result of the research, information was obtained about the physical development of high school students, depending on their morning exercises classes. Informations are in the table 2-4.

Table 2.

Evaluation of the length of the body of schoolchildren aged 15-17 of Alchevsk using scales of centile, depending on the classes in morning exercises, % (n = 390)

Length of the body	Specific gravity of schoolchildrens who in morning exercises:		p
	engaged	not engaged	
General group (boys + girls), $\chi^2=10,11$, $p < 0,01$			
From 3 to 97 centile	90,14±2,50	94,76±1,42	> 0,05
Centile below 3	0	2,02±0,89	< 0,05
Above 97 centile	9,86± 2,50	3,22±1,12	< 0,02
Girls, $\chi^2=12,25$, $p < 0,01$			

From 3 to 97 centile	85,96±4,60	95,12±1,68	> 0,05
Centile below 3	0	2,44±1,20	< 0,05
Above 97 centile	14,04±4,60	2,44±1,20	< 0,02

Note: Distinctions in the compared groups of boys are not statistically significant (p > 0,05).

According to the obtained data, the percentage of students with high body length (above 97 centile) is more significant in a group of schoolchildrens who were engaged in morning exercises, – 9,86±2,50%, as compared to their peers, not engaging in these physical exercises – 3,22±1,12% (p < 0,02). Analogical conformity was found in the group of girls, respectively, – 14,04±4,60% against – 2,44±1,20% (p < 0,02). In the study group of students involved in gymnastics, schoolchildrens with low body length (less than 3 centile) is found, in contrast to the adolescents with low physical activity (p < 0,05).

Using the method χ^2-test found a statistically significant association between gymnastics and body length of the overall groups schoolchildrens χ^2=10,11 (p < 0,01) and also girls adolescents χ^2=12,25 (p < 0,01).

Table 3.

Rating chest circumference of schoolchildrens aged 15-17 of Alchevsk using scales of centile, depending on the classes in morning exercises, % (n = 390)

Rating chest circumference	Specific gravity of schoolchildrens who in morning exercises:		p
	engaged	not engaged	
From 3 to 97 centile	85,21±2,98	84,28±2,31	> 0,05
Centile below 3	4,93±1,82	12,90±2,13	< 0,01
Above 97 centile	9,86±2,50	2,82±1,05	< 0,01

Note: χ^2=14,05, p < 0,002.

The percentage of students with low circumference of the chest (below 3 centile) is more significant in the group of high schoolchildrens who are not engaged in morning exercises, – 12,90±2,13%, as compared to their peers, engaging in physical exercises, – 4,93±1,82% (p < 0,01). Conversely, schoolchildrens with high (above 97 centile), chest circumference was significantly higher among adolescents involved in gymnastics, – 9,86±2,50%, than in the control group – 2,82±1,05% (p < 0,01). By the method χ^2-test revealed the presence of a meaningful connection between gymnastics and circumference of the chest schoolchildrens χ^2=14,05 (p < 0,002).

Table 4.

Rating of head circumference of schoolchildrens aged 15-17 of Alchevsk using scales of centile, depending on the classes in morning exercises, % (n = 390)

Rating of head circumference	Specific gravity of schoolchildrens who in morning exercises:		p
	engaged	not engaged	
From 3 to 97 centile	94,37±1,93	85,89±2,21	< 0,01
Centile below 3	1,41±0,99	2,42±0,98	> 0,05
Above 97 centile	4,23±1,69	11,69±2,04	< 0,01

Note: χ^2=6,79, p < 0,05.

Specific gravity of students with a normal head circumference (3 to 97 centile) is more significant in the group of adolescents who were engaged – 94,37±1,93%, as compared to their peers, not engaging in physical exercises – 85,89±2,21% (p < 0,01). In this case, students with high (above 97 centile), head circumference was significantly higher among adolescents who are involved – 11,69±2,04%, than among those who are engaged in gymnastics, – 4,23±1,69% (p < 0,01). By the method χ^2-test revealed the presence of a meaningful connection between gymnastics and a circumference of head circumference χ^2= 6,79 (p < 0,05).

Consequently, the rejection of physical exercise leads to a decrease in students the basic anthropometric parameters are body length and circumference of the chest, while engaging in a gymnastics assists the increase of the indicated parameters of body. In this case, an exception to this pattern is the circumference of the head, the parameters of which conversely higher in adolescents who are not involved in gymnastics.

The evaluation of the influence of physical activity on the formation of chronic diseases in adolescents found that the prevalence of deep caries (1,000 schoolchildrens) were significantly higher in the group of girls not going in for

sports, – 65,93±13,39, as compared to students that sports went in for – 14,29±10,03 ($p < 0,02$). Therefore, the rejection of classes in morning gymnastics (exercise) and sport are risk of origin of caries factors for the schoolchildren of senior classes.

Conclusions and recommendations.

1. Engaging in a morning gymnastics by schoolchildren senior classes have a positive impact on the functioning of the circulatory system adolescents, which is manifested in the normalization of their heart rate.

2. Abandonment from engaging in physical exercises results in a decline for the schoolchildren of basic anthropometric indexes are body length and circumference of thorax, while engaging in a gymnastics assists the increase of the indicated parameters of body. The exception to this pattern is the circumference of the head, the parameters of which conversely higher in adolescents who are involved in gymnastics.

3. Classes in morning exercises and sports are antirisk factors of origin of caries among schoolchildren of senior classes, that is considered as measures to prevent this disease.

4. Given the positive impact of morning gymnastics and sports on the health of school physical culture exercises should be considered as part of a healthy lifestyle. It is therefore necessary to pediatricians, doctors, hygienists, teachers and members of other professions who work with children, to ensure the formation of the younger generation of a rational mode of life, mandating systematic physical training. It is also necessary to conduct outreach to parents of students on the feasibility of systematic training students in morning exercises and sports.

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