

Application of various forms of physical education as a factor of increase in the level of physical activity of medical students

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Abstract

Purpose: increase in the level of weekly physical activity of medical students of HEI by application of various forms of physical education training.

Material: Senior students participated in a research (n=78 – males, n=190 – females, age – 21-23 years). Indicators of physical strength development were estimated by the number of pull-ups on a horizontal bar (males) and by the number of floor push-ups (females). Development of speed was estimated by the time of cover 100 m a distance. Level of the general endurance of an organism was estimated by results of cover 3000 m a distance by male students and 2000 m by female students.

Results: it was revealed a significant increase in time of physical activity training in students of experimental groups. The average time of physical training was $3\pm 0,08$ hours per a week. This indicator is significantly above ($P<0,01$), than in students of control groups. Indicators of strength development, speed and general endurance in students of experimental groups is significantly above ($P<0,01$). Body weight indicators significantly increased ($P<0,05$) in $2,3\pm 0,2$ kg in students of control groups. Indicators of body weight slightly increased in $0,4\pm 0,2$ kg in students of experimental groups.

Conclusions: Various forms of physical education promote increase in the weekly level of physical activity of students.

Keywords: health, physical activity, students, medical, various, physical training, body weight.

Introduction

Health care experts confirm that the lack of physical activity is one of the leading risk factors of global mortality. It is revealed the significant decrease in the level of daily physical activity of the population [1] in the countries with the high standard of living and in developing countries [2]. The decrease in physical activity is caused by the spread of noninfectious diseases in the majority of the countries in the world. These diseases have essential connection with a personal way of life and with a lack of physical training and motor actions in daily activity [3]. The essential lack of physical activity is observed in students of medical higher education institutes. More than a half of medical students in Thailand have no sufficient level of physical activity during a day. The decrease in the level of physical activity of future doctors is connected with intensive educational activity and overtime work in hospitals [4]. According to the experts' opinion, there is a strong connection between the personal level of physical activity and success of medical practice [5]. Also, there are data concerning a positive connection between the regular physical activity of medical students and level of their academic achievements [6]. Thus, the lack of daily physical activity exerts a significantly negative impact on the level of physical health and professional readiness of

future doctors. It is necessary to recognize that the problem of physical activity lack is relevant not only for medical students. Researches devoted to the physical activity level of USA colleges' students demonstrated that from 40 till 50% of young people has essential lack of daily physical activity [7].

The development of obesity in young people [8] during the study at the higher education institutions is also a serious problem [9]. This problem is distinctive of medical students. The researches of G. El-Kassas demonstrated that about a third of medical university students of Lebanon have overweight and obesity [11]. Experts confirm that young people nowadays don't pay attention to the daily physical exercises [10, 12] and have sedentary lifestyle [13] in front of TV and computers [14]. It is revealed the lack of daily physical activity in a significant number of students in South Korea. Unfortunately, most of Korean students don't consider physical training as the important part of a study, in comparison with study mathematics or medical sciences [14].

It is determined the need to develop and apply the specific programs for the increase in physical activity and the decrease in the sedentary lifestyle of students at the universities worldwide [15, 16]. Special attention should be paid on normalization of nutrition and actions promoting the increase in physical activity in students. Performance of these tasks will allow to decrease significantly the future risk of emergence of various noninfectious diseases

[17]. The normal body weight, the optimum mode of every day and daily physical activity [18] are the factors exerting a positive impact on the level of young people health [19]. The overweight of a body is a factor of negative influence on youth health [12]. Researches demonstrated that the operated intervention in the educational process allows to achieve significant changes in the culture of food and physical activity level of students [20]. According to S. Beni's opinion, the operated intervention in programs of physical training and youth sport has to be based on a social interaction of teachers and students and increase of positive emotions. It is also necessary to provide growth of positive emotions in students of physical exercises and sport [21].

Researches demonstrate that the main motives for sports activities and physical training for modern students are: the growth of popularity among other students of higher education institution, the social status and physical appeal [22]. The motivation plays a crucial role in the maintenance of physical activity [2]. Therefore, it is necessary to maintain the motivation of young people at the high level for increase the physical activity of students. Achievement of the high level of students' motivations is possible only by the transition from obligatory programs of physical education of youth to individual and personal programs of physical development of student's youth [23]. It is known that in some countries educational programs devoted to the physical training of youth significantly change the orientation from sports improvement to fitness [24]. In China, the government accepted the national strategy providing participation of the population in physical activity not less than 30 minutes 3 times a week [25]. It is known that obligatory physical training classes are carried out only 2 times a week. Therefore, it is necessary to motivate and stimulate young people to regular independent training in a free time. Unfortunately, in many countries, educational institutions and teachers of physical training don't see the need for changes in the existing standards of physical training of youth. So, in Greece, a lot of physical culture teachers prefer to apply the authoritative and completely regulated style of training. Teachers don't consider an initiative and a needs of students [26].

Students with sufficient free time for physical training don't reach the recommended daily volume of physical activity – 30 minutes and more a day [27]. Changes in programs of physical training in students are necessary: a significant increase in the volume of physical activity. Among such changes, experts consider the possibility of the choice by young people the various forms and types of physical training in convenient time [28].

Hypothesis. Authors presupposed that providing the choice of a various option of physical activity to medical students in convenient time will promote an essential increase in the level of their daily physical activity. The variability meant a possibility to choose the most attractive a type of physical activity.

The purpose of the research. Increase in level of weekly physical activity of medical universities students by application of various forms of physical training classes in

the educational process.

Material and methods.

Participants: The total number of examined people was 268 (males – n=78, females – n=190). All examined persons were students of senior (4-5) courses of Krasnoyarsk State Medical University named after Prof. V.F. Voyno-Yasenetsky. Age of examined persons was 21-23 years. All students had to attend physical culture classes not less than once a week. Such trainings are provided by curricula of future doctors. All students annually underwent medical inspection at the university clinic and had no contraindications to physical activity. Level of students' physical development at the beginning of the experiment wasn't significantly differed. All students gave the consent to participation in researches.

Organization of a research: Researches were conducted within an academic year. Students (males and females) were divided into equal groups: control – № 1 – males (n=39) and experimental – № 2 – males (n=39), control – № 3 – females (n=95) and experimental – № 4 – females (n=95). The students of control groups attended physical culture classes according to the educational schedule and the educational program. The students of experimental groups attended physical culture classes in the personal choice. It was allowed visits to the fitness centers, swimming pools, gyms, etc. At the same time, only students determined time of these visits, choosing the most convenient schedule. The indispensable condition was performance of temporary requirements to training – not less than 120 minutes per a week. All students submitted reporting documents: checks, bills, training plans. It allowed to determine precisely the time volume and intensity of physical activity on the various type of training.

At the beginning and at the end of the academic year all students hit a control qualifying standard allowing to estimate objectively their level of physical development. Indicators of physical strength development were estimated by the number of pull-ups on a horizontal bar (males) and by the number of floor push-ups (females). Development of speed was estimated by time of cover 100 m a distance. Level of the general endurance of an organism was estimated by results of cover 3000 m a distance by male students and 2000 m a distance by female students.

It was applied data concerning dynamics of body weight changes for estimation students' health level. Assessment of body weight indicators was performed by regular weighing. Authors didn't purposefully applicate different body weight indexes for assessment. According to the data of the last researches BMI indicators – Body Mass Index are exposed to considerable criticism of experts. Experts consider that BMI doesn't consider a correlation of muscular and body fat mass [29] and types of fat tissue distribution in organism [30].

Statistical analysis: The statistical analysis of control results was carried out by SPSS 20 program. The Student t-test was applied for checking results of average values in the connected samples.

Results

At the beginning of researches the physical strength development indicators in male students weren't practically differed. Students of group №1 in the test of pull-ups on a horizontal bar performed 9 ± 2 pull-ups on average. Students of group №2 performed 9 ± 3 pull-ups on average. At the end of researches was revealed a significant difference ($P<0,01$) in the number of pull-ups in students of the experimental group. Students of group №1 performed 7 ± 2 pull-ups. Students of group №2 performed 10 ± 3 pull-ups on average. At the beginning of researches, female students didn't have significant differences in results of the test – floor push-ups. The number of push-ups in students of the control group was 13 ± 3 push-ups on average. In students of the experimental group, the number of push-ups was 14 ± 2 on average. At the end of researches results of performance of this test were significantly differed ($P<0,01$) in students of the experimental group. Females from group №3 performed 12 ± 3 push-ups on average, and females from group №4 performed 16 ± 3 push-ups on average.

At the beginning of academic year indicators of speed development in male students of experimental and control groups weren't significantly differ. The average time of cover 100 m a distance by students of group №1 was $14\pm 0,8$ s. Students of group №2 demonstrated $14\pm 0,9$ s on average. At the end of researches was revealed a significant difference ($P<0,01$) in indicators of cover time 100 m a distance by students of the experimental group. The average time of students of group №1 was $15\pm 0,4$ s. Students of group №2 demonstrated $14\pm 0,3$ s on average. Female students at the beginning of the researches had identical indicators of speed development. Average time in students of group №3 was $16\pm 0,3$ s. Students of group №4 demonstrated $16\pm 0,5$ s on average. At the end of the academic year was revealed a significant difference ($P<0,01$) in indicators of cover time 100 m a distance in students of the experimental group. On average students of group №3 cover a distance in $17\pm 0,8$ s, and students of group №4 in $15\pm 0,9$ s.

At the beginning of researches the level of the general endurance development in students wasn't significantly differed. At the end of researches were revealed significant differences ($P<0,01$) in 2000 m run tests and 3000 m run in experimental groups. In males of group №1 results of this test were worse in 30 s on average. In males of group №2 results of cover 3000 m a distance improved in 38 s on average. In females of group №3 results of test run became worse in 37 s on average. Females of group №4 increased the results in this test in 44 s. Thus, the difference between control and experimental groups in results of this test was more than 1 minute.

At the beginning of researches body weight indicators had no significant differences. In students of group №1 the average value of body weight was $86\pm 0,7$ kg. In students of group №2 this indicator was $87\pm 0,2$ kg. In females of group №3 the value of body weight was $65\pm 0,6$ kg on average. In students of group №4 this indicator was $66\pm 0,4$ kg. At the end of researches the average values of body weight indicators became significantly differ ($P<0,05$). It was revealed differences in groups of males and females. It was revealed the increase in body weight within 2,2-2,6 kg in males of the control group. Males from the experimental group didn't demonstrate significant differences in body weight indicators. It was revealed the increase in body weight in 1,8-2,2 kg on average in females of the control group. Female students of experimental group didn't demonstrate significant changes in body weight indicators. It should be noted that it was revealed dynamics of increase in body weight in all examined students. It can be explained by the natural process of growth of students' organism. Key indicators of students' tests are presented in table 1.

The volume of physical activity of students was considered according to the general time spent by young people for weekly physical activity. The track of time was carried out directly on physical culture classes. Also, students provided data concerning number and time of training in sports complexes and fitness clubs within every week of researches. At the beginning of researches data

Table 1. Indicators of physical development and physical fitness of students (males – $n=78$; females – $n=190$).

Indicators	Group №1 (n=39)		Group №2 (n=39)		Group №3 (n=95)		Group №4 (n=95)	
	b.r.	e.r.	b.r.	e.r.	b.r.	e.r.	b.r.	e.r.
Strength, times	9 ± 2	7 ± 2	9 ± 3	10 ± 3	13 ± 3	12 ± 3	14 ± 2	16 ± 3
Speed, s	$14\pm 0,8$	$15\pm 0,4$	$14\pm 0,9$	$14\pm 0,3$	$16\pm 0,3$	$17\pm 0,8$	$16\pm 0,5$	$15\pm 0,9$
Endurance, min	14,22	14,58	14,20	13,42	12,35	13,12	12,32	11,48
Volume of physical activity, min/week	136 ± 4	134 ± 5	138 ± 3	182 ± 4	131 ± 5	132 ± 4	130 ± 3	176 ± 4
Body weight, kg	$86\pm 0,7$	$89\pm 0,4$	$87\pm 0,2$	$87\pm 0,6$	$65\pm 0,6$	$67\pm 0,8$	$66\pm 0,4$	$66\pm 0,9$

Note. b.r. – beginning of researches; e.r. – end of researches

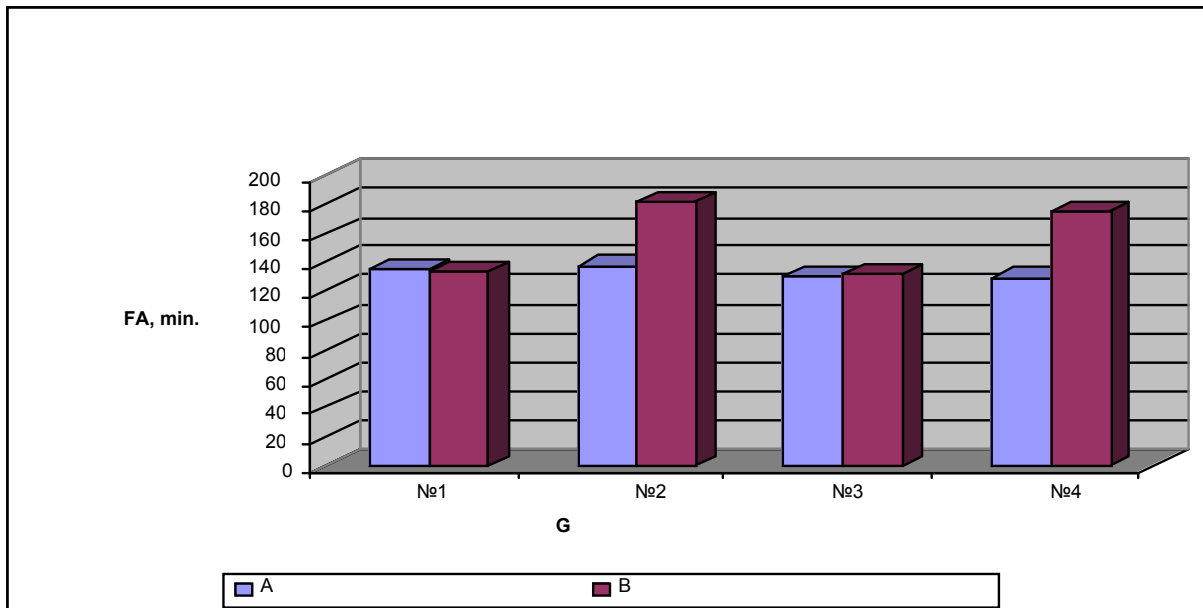


Fig. 1. Dynamics of volume changes of students physical activity per week during researches. FA – the volume of physical activity (minutes), A – the beginning of researches, B – the end of researches, G – the examined groups.

concerning the weekly volume of physical activity of students of experimental and control groups wasn't significantly differ. At the end of researches was revealed quite significant increase ($P < 0,01$) in time of physical activity training in students of experimental groups. In males of the experimental group the weekly volume of physical activity increased in 41 ± 2 minutes on average, in comparison with data at the beginning of researches. In females of the experimental group this indicator increased in 44 ± 1 minutes on average. In students of control groups (males and females) the volume of weekly physical activity was practically at the level of the beginning of researches. Dynamics of volume changes of students' physical activity during researches is presented in figure 1.

Discussion

The scientific discussion devoted to the most suitable pedagogical models of physical education of youth and students in modern conditions is continued nowadays [31-34]. Experts confirm that the exists structure of medical higher education could cause violation of a healthy lifestyle of future doctors. It is rather difficult to maintain optimum level of physical activity during training of medical students. Busy schedule of training and features of educational activity prevent young people to find time for regular training of physical activity [35]. It should be noted the negative dynamics of decline in level of physical health of medical universities students (in particular Krasnoyarsk State Medical University named after prof. V.F Voino-Yasenetsky) during study period [36]. It was revealed considerable deviations in values of body weight in modern medical students towards increase in body weight and development of obesity [37]. Experts need to pay special attention to this problem and to find effective ways of its decision. Researches demonstrate the ex-

istence of essential communication between the level of physical activity and health of the doctor [5] and success of its medical practice [38]. Results of the last researches of level of physical activity of medical students and the practicing doctors in the USA demonstrate: doctors with normal body weight index more likely will achieve increase in level of physical activity of the patients [39]. Polls of patients demonstrate that most of them expect from doctors the health services delivery service in various and emergency situations. Sports activities help medical students to increase the level of the physical and mental training necessary for carrying out various rescue operations [40].

Modern sociological researches demonstrated that a considerable part of students is ready to pay for physical culture extra classes. According to data of S. Kościółek, about 64% of higher education institutions students of Poland pay for physical culture extra classes [41]. Teachers should support the high level of interest of students to physical culture classes. Scientists confirm that situational interest is the main motivation for students in the field of physical training [42]. It is revealed that positive emotions and increase in popularity among coursemates are the main motives to sports activities and physical activity in students from European countries [22]. The main motives of students to physical activity in Russian higher education institutions are: increase in physical appeal and popularity of different types of physical activity among peers [43].

Scientists confirm that essential changes in the existing programs of physical training of youth are necessary. These changes have to promote formation in young people of the resistant motivational need for the active motion [44]. It should be noted that changes shouldn't include the only simple increase in daily physical activity. Experts

confirm that the existing education systems don't allow to increase significantly the time of physical training [45], games and sport [46]. It is necessary to develop activities for the increase in motivations to physical activity in free time. Researches demonstrate that regular physical activity promotes decrease of fat tissue content in organism and increase in functionality of cardio respiratory system [47]. The experts emphasized the need for physical activity promotion among medical universities students. In the future (as the practicing doctors) such students could conduct the successful professional practice of patients' consultation concerning physical activity in everyday life [1].

Thus, data of experts' scientific observations are consistent with the direction of authors' researches. Increase in level of physical activity of students is recognized as one of the main directions of high-quality vocational training of future doctors. Various forms of physical education promote the increase in weekly level of physical activity of students. It allows to confirm the achievement of the goal of a research.

Conclusions.

1. In the modern scientific literature, experts express the essential doubt of concerning the level of physical development and health of students of medical schools

is expressed. The researches demonstrate that a considerable part of future doctors has no sufficient volume of daily physical activity. The lack of physical activity negatively affects the level of physical development and health of future doctors.

2. The significant increase in weekly volume of physical activity of medical students is possible by application of various forms of physical culture in the course of physical training. It is revealed the essential increase in time of physical training within a week by students of experimental groups (on average in 42 ± 1 minutes). These students attended classes on the basis of personal preferences and in convenient time only.

3. It is revealed significant ($P < 0,01$) increase in key indicators of physical fitness of experimental groups of students, in comparison with control groups students. Results of tests allow to confirm the higher level of development of the main physical qualities of the students with various forms of physical culture.

4. The obtained data allow to recommend various forms of physical education of youth for counteraction to obesity spread among young people.

Conflict of interests

The authors state that there is no conflict of interest.

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