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PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1467385>Available online at: <http://www.iajps.com>**Research Article****LEVEL OF DEVELOPMENT OF THE GENERAL ENDURANCE
OF STUDENTS AS MAJOR PARAMETER OF HEALTH****Gulnaz Sh. Ashrafullina, Nuriya H. Gzhemskaya, Olga N. Gallyamova***Naberezhnye Chelny Institute (branch) of Kazan (Volga) Federal University, Naberezhnye
Chelny, Kazan, Russia**Abstract:**

The relevance of research of a degree of development of the general endurance in students is connected with a question of improvement of their health and working capacity during training in an educational institution.

In given clause opportunities of use of an improving direction in physical training in which object of attention of the teacher become directly health of the student, its working capacity and resistibility of an organism are considered.

In research techniques of definition of a degree of development of physical qualities of the person and quantitative definition of a level of its health are applied. The estimation of efficiency of the improving program of physical training on the basis of the statistical analysis of the data received during experiment is given.

As a result of carried out research it was possible to define insufficient physical and functional readiness of students acted on the first rate of high school. Ways of increase of the general endurance and as consequence, quantities of health of students are offered. Efficiency of the improving program of physical training in development of physical quality of the general endurance is revealed.

Clause is intended for experts in the field of the physical training, working with students of the internal form of training.

Keywords: *the general endurance, quantity of health, zone of resistance, physical qualities of a person.*

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INTRODUCTION:

The goal of the physical education of students is "the formation of the physical culture of the individual and the ability to use the various means of physical culture, sport and tourism in order to preserve and promote health, psychophysical fitness and self-preparation for future professional activity" [1]. Thus, the physical education program at the university aims to strengthen and preserve the health of students.

N.M. Amosov [2] proposes to determine the amount of health as the sum of the reserve capacities of the main functional systems and introduce the concept of "capacity reserve factor" (CRF).

$$\text{CRF} = \text{MFL} / \text{MUF};$$

where MFL is the maximum function level

MUF - normal level (state at rest).

Based on this formula, in order to increase health we must increase MUF, which is achieved by training the function, and the only way to exercise the function is physical activity.

In the sixties of the last century, WHO (World Health Organization) recommended aerobic exercises to improve the functioning of functional systems. To do them, the body needs a lot of oxygen for a long time, involving all the functional systems of a person.

Here are just some of the shifts occurring in the human body under the influence of aerobic exercises:

- improved oxygen transport by blood;
- lung volume increases;
- the heart muscle becomes stronger;
- The risk of atherosclerosis decreases.

Doing aerobic exercises, we develop such physical quality as endurance. Endurance is the ability of a person to perform physical work effectively for a long time, despite the growing fatigue. Here is a quote from the textbook on sports physiology: "The level of development of general endurance is determined by the functional capabilities of the nervous and endocrine systems, cardiac output, coordination during functioning of the motor and autonomic apparatus" [3], that is, the functional capabilities of your body improve - the level of endurance increases. A number of studies confirm a direct relationship between the level of general endurance, the willingness of functions to work under stress and health [4,5].

The effect of exercise on endurance on the human body is characterized by the inclusion of an adaptive

mechanism that allows one to adapt to an effective resistance to fatigue in physical, emotional and mental activity. Kholodov Zh.K. and Kuznetsov V.S. in their studies show the link between general endurance and physical capacity, which acts as an important component of human somatic health [6].

We have set the following research tasks:

1. Determine the level of development of the general endurance of students at the beginning of their university study.
2. Determine the impact of physical education at the institute on the level of general endurance of students at the end of the 2nd year.

To determine the level of development of the general endurance of students enrolled in the first year at the Department of Physical Education and Sports of Naberezhnye Chelny Institute of the Federal State Unitary Enterprise "Kazan (Volga region) Federal University", the results were analyzed in the running types of the Ready for Labor and Defense program. During the first year, students were engaged in a health program to increase their level of endurance. It included slow running, winter skiing, sports games, general development exercises (GDE) performed in aerobic mode. Exercise time was set in the range of 15 to 30 minutes, and the intensity of the exercise depended on the heart rate of a particular student. It had to be not lower than 110 beats per minute and not exceed 150 beats per minute. Thus, students with better physical fitness performed the exercises at a higher speed, which allowed us to differentially approach the individual load in the group session. At the same time, there was no negative emotional background for weak students, since regardless of the speed of the exercise, the whole group began and ended it simultaneously. As a rule, by the end of the first semester, many students were able to perform continuous running of low intensity for 30 minutes.

At the end of the training in the first year, a second analysis of the results of the running programs was carried out.

METHODS:

To determine the level of general endurance, we applied an indirect method, when endurance is determined by the time of overcoming any sufficiently long distance. In particular, we relied on a test with a fixed running time - a 12-minute test by K. Cooper [7].

Since the main indicator of aerobic endurance is the maximum consumption of oxygen (MOC) - an indicator characterizing the athlete's ability to

perform long-term work of near-limit power [8,9,10], Cooper deduced the dependence of aerobic fitness from the distance overcome and gave characteristics of the zones of body resistance to external conditions:

1. less than 1.5 km - consumption up to 25 ml/kg - very poor fitness level;

Characteristic of the resistance zone:

HAZARD ZONE: Insufficiency of the cardiovascular and respiratory systems. Low working capacity, very low degree of physical fitness. The body can not resist changes in the usual conditions.

2. 1.5-1.8 km - consumption of 25-33.7 ml/kg - poor fitness;

Characteristic of the resistance zone:

RISK ZONE: Reduced functionality of the body's basic systems. Low working capacity, poor physical fitness. The reserve capacities of the main functions are insufficient to resist changing conditions

3. 1.8-2.1 km - consumption of 33.8-42.5 ml/kg - satisfactory physical fitness;

Characteristic of the resistance zone:

TRANSITIONAL ZONE: Functional systems approach the standard level. Slightly reduced working capacity. There are shortcomings in physical fitness. There is still a lack of reserve capacity of the basic functions.

4. 2.1-2.6 km - consumption of 42.6-51.5 ml/kg - good physical fitness;

5. 2.6 and over - consumption of 51.6 ml/kg and more - excellent physical fitness.

Characteristic of the resistance zone:

STABILITY ZONE: The reserve capacities of the basic functions are usually sufficient to resist negative changes in the environment. Working capacity is normal. The level of physical readiness corresponds to the estimates of "good" and "excellent"

Applying the methods of mathematical statistics, we recounted the results for 2 and 3 km running for students aged 18-20 years (see Table 1).

Table 1: Assessment of aerobic capability of the body derived from the Cooper's test

Rate	Girls, 2 km running (min)	Boys 3 km running (min)
very poor	15.00 min and less	18.00 min and less
poor	14.59-12.35	17.59-16.31
satisfactory	12.34-11.25	16.30-14.30
good	11.24-10.25	14.29-13.10
very good	10.24-9.45	13.09-12.00
excellent	9.45	Less than 12.00

All data from the study were processed using the statistical package SPSS-17. The statistical analysis used criteria:

- Shapiro-Wilkie (W criterion) for checking the normality of the distribution;
- Fisher's test - checking the equality of variances;
- paired Student t-test - to test the hypothesis of the difference between the two mean values.

The critical level of significance in this study was 0.05.

The experiment involved 397 students aged from 18 to 20 years: 210 - girls and 187 - boys.

RESULTS AND DISCUSSION:

Analysis of the test results showed that the state of general endurance of students at the beginning of the academic year is not satisfactory. The girls had low level of aerobic capacity (satisfactory and below) - 71.5%, boys - 53.2% (Table 2). Only 28.5% of girls and 46% of boys had normal working and reserve capacities of basic functions to resist negative changes in the environment (Table 3).

Table 2: Results of the evaluation of aerobic capability at the beginning of the I year (%)

Aerobic capability evaluation	Girls	Boys
very poor	2.5	2.9
poor	33.8	24.6
satisfactory	35.2	25.7
good	22.2	33.7
very good	4.6	9.7
excellent	1.8	3.4
Total	100.0	100.0

Table 3: Distribution of students by zones of resistance at the beginning of the I year (%)

Zones of resistance	Girls	Boys
Poor and worse (HAZARD and RISK zone)	36.5	27.5
Satisfactory (TRANSITIONAL zone)	35	26.5
Good and better (STABILITY zone)	28.5	46

As a result of purposeful and systematic training of students in physical culture classes during 1 year, the following changes were observed in the evaluation of aerobic capabilities: the number of girls with low level of fitness decreased by 11%, in boys - by 8.8% (Table 4). The distribution of students by zones of resistance has also changed for the better. Thus, 39.4% of the girls got into the zones characterized by normal working capacity by the adequacy of reserve capacities of the main functions to resist negative environmental changes (10.9% gain). The number of boys in these zones was 55.5% (gain- 9.5%) (Table 5).

Table 4: Results of the evaluation of aerobic capability at the end of the I year (%)

Aerobic capability evaluation	Girls	Boys
very poor	2.4	9.1
poor	31.4	7.0
satisfactory	26.7	28.3
good	32.9	34.2
very good	5.2	13.9
excellent	1.4	7.5
Total	100	100.0

Table 5: Distribution of students by zones of resistance at the end of the I year (%)

Zones of resistance	Girls	Boys
Poor and worse (HAZARD and RISK zone)	34	16
Satisfactory (TRANSITIONAL zone)	26.5	28.5
Good and better (STABILITY zone)	39.5	55.5

The statistical analysis showed a significant statistical difference in the incremental results between the two tests ($p < 0.05$) (Table 6.7)

Table 6: Paired Student t-test for girls

	2 km running Sep	2 km running May
Average	709 (11.49)	694 (11.34)
Dispersion	5,370.22	5,213.9
Observations	210	210
t-statistics	2.369	
two-way $P(T \leq t)$	0.019	
two-way critical t	1.979	

A significant statistical difference between the groups ($p=0.001$)

Table 7: Paired Student t-test for boys

	3 km running Sep	3 km running May
Average	875 (14.35)	854 (14.14)
Dispersion	8460.362	9908.343
Observations	187	187
t-statistics	3.359	
two-way P(T<=t)	0.001	
two-way critical t	1.979	

A significant statistical difference between the groups ($p=0.001$)

SUMMARY:

Given the low level of physical fitness and development of physical qualities of first-year students, we propose the introduction of practical training methods for recreational training, which have some differences from sports. If sports' training involves the use of physical exertion in order to achieve maximum results in the chosen sport, then recreational is aimed at improving the level of general physical fitness and health. Prioritizing the development of general endurance, it is necessary to allocate 55 - 65% of the total time of classes thereto. Either increase or decrease of the time spent for the development of general endurance can cause an imbalance in the development of the basic physical qualities of students, which will negatively affect their overall physical fitness.

The proposed health-improving program aimed at increasing the level of endurance in physical culture classes has proved its effectiveness. An increase in positive assessments of aerobic capabilities during the first year of study in girls was 11%, in boys - 9%.

However, 60% of girls and 44% of boys still lack physical fitness and reserve capacity of basic functions with reduced efficiency. It is necessary to pay special attention to the development of general endurance in students in subsequent courses.

CONCLUSIONS:

While a significant mass of students balances between "poor" and "satisfactory" ratings, we recommend teachers of physical culture pay close attention to the health-improving direction in physical education, which will allow them to significantly improve their students' health during the period of study at the university.

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