

Quantitative Assessment of Students physical Health



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Abstract. This article will consider the using information technology in the system of monitoring the physical health of students in the testing process, evaluating, and statistical processing of the data, presenting them in a convenient and understandable form and transferring information to the appropriate databases. Software based on the method of scoring was developed, which allows you to determine the level of physical health of students. Particular attention was paid to researching of the cardiac system according to the tests of Rouflier, Genchi and Stange

Keywords: level of health, individual characteristics, physical activity, student, physical health screening.

I. INTRODUCTION

RelevanceThe individual aspect of health is closely related to the quantitative and qualitative approach to its assessment and the concept of the norm, which can be considered as the optimal range of fluctuations of indicators characterizing the structural and functional state of the organism, its organs and systems, within which this quality is maintained. The age aspect of health is determined by the fact that each stage of human development is characterized by its own specific features of relations with external (physical adaptation) and social (social adaptation) environments [1]. This is due to the peculiarities of the deployment of the human genetic program itself in time and the nature of the requirements of society to a person in each age period of his development. That is, it is about the fact that for each age stage there must be own criteria for health, determined by the morphofunctional organization peculiar to this age. The student period is characterized by the presence of a large number of physical and psycho-emotional stress. The degree to which the teacher can correctly determine the level of the psychophysical state of the student depends on his further health and the level of self-preparation [2-4].

Purpose of searching

Before the start of regular classes, first-year students undergo a medical health screening to identify diseases, determine levels of health and physical fitness.

In accordance with one of the levels of health, students are divided into groups. Formed groups of students are actively involved in the educational process, which helps first-year students to more quickly integrate into the student environment, adapt to new educational conditions, and sometimes solve psychological problems of adaptation at the university as a whole [5,6].

The implemented practice of studying the level of physical health has shown that the methodology for implementing monitoring over the course of the year, divided into groups according to physical fitness, allows you to change indicators and raise the level of physical health [5,6].

II. METHODS

The first researches are conducted with students in September-October, and for comparison - in April-May, in the end of the study year. Research was conducted on the following indicators:

- Rouflier test (heart rate (pulse beats / min);
- The time of Breath holding on inhalation (Stange test) and exhalation (Genchi test, sec);
- The Blood Pressure (mm.);
- The Vital Lung capacity (ml.);
- The Vital indicator.

The applied rapid assessment of the level of health is based on the presence of the following indicators of physical health and physical activity [7-9]:

1. Body weight - in kilograms (kg);
2. Growth - in centimeters (cm);
3. Vital lung capacity - in milliliters (ml.);
4. The heart rate at rest or pulse - the number of beats per minute (beats / min);
5. Blood pressure - in millimeters of mercury (mm.) Systolic and diastolic pressure;
6. Dynamometry of the left and right hands - in kilograms (kg.).

In addition to the above basic indicators, the teacher measures additional indicators:

1. The pulse obtained after squats for 5 minutes;
2. Pulse after 1 minute of rest obtained as a result of exercise.

These parameters are entered into the program and on their basis the level of physical health is calculated [5-8]:

1. Low;
2. Below average;
3. Medium;
4. Above average;
5. High.

The calculation method is based on scoring, which determines the level of health. A database is being formed for each group of students.

Manuscript published on 30 September 2019

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With the help of this program, the teacher collects and processes statistical data on the level of health of a group of students in order to further recommend certain sets of exercises or game sports to improve the level of health [6,7].

For research, tables were developed (Fig. 1), where the main parameters are entered

The Card of indicators of physical development										
Of students _____		course _____			department in 20 _____			year _____		
Surname ind Name	Weight (kg)	Growth (cm)	Weight and height index (g / cm)	Chest circumference (cm)				Hand dynamometry (kg)		Power indicator (%)
				At rest	At Breath	At Exhale	Excursion	Right	Left	

Fig 1The Card of indicators of physical development

Study design

The study deploys a prospective case series study design. Surveys were used as an initial screening tool and repeated after 6 months of observation.

In addition to collecting longitudinal data on physical condition and health behavior for one year, the student's physical activity was determined (Fig.2).

The Card of indicators of physical fitness							
Of students _____		course _____			department in 20 _____		year _____
Surname ind Name	Runing 30m (sec)	Long jump from a place (cm)	Torso raising (time)	Leaning forward sitting on the floor (cm)	Throwing a tennis ball at the goal (times)	Straight-eyed walking 10m (deviation in cm)	

Fig 2The Card of indicators of physical fitness

III. DATA COLLECTION AND ANALYSIS

So, if at the beginning of the school year, at the first measurement of the Roufier test, the average rate for freshmen girls is 8.21, then by the end of the first year it is 8.24. The Stange and Genchi tests change from 20 to 22

(sec), respectively. The changes are clearly visible in Figure 3. Research was conducted with first-year students. 41 girls from the history department of the National University of Uzbekistan took part in the testing.

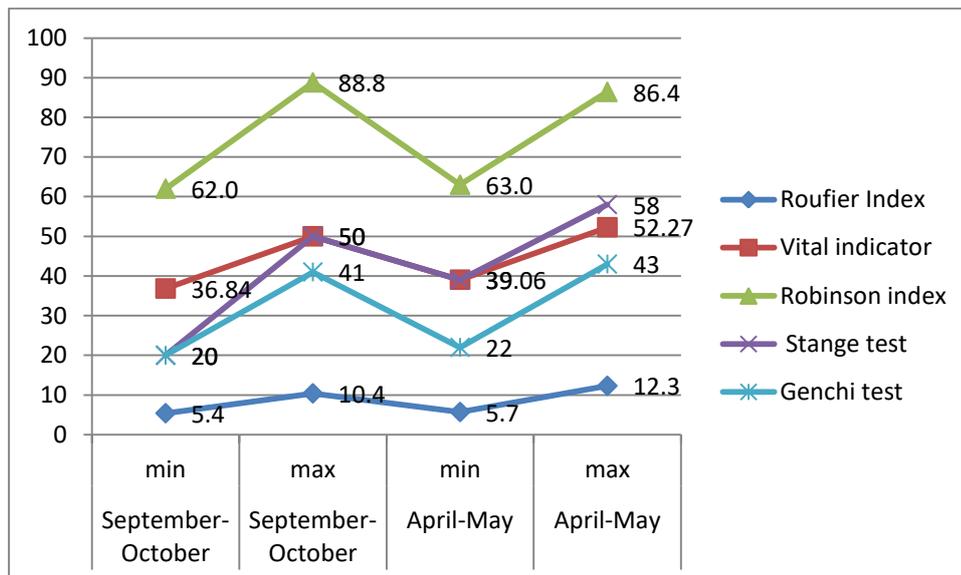


Fig 3The Changing of main indicators during of study year

Sample (test) Roufier is designed to assess the performance of the heart during physical exertion. For first-year students, on average, the lowest Roufier test score was 5.4 at the first phase of the research, 5.7 at the second phase of the study; the highest Roufier test score was 10.4 in the

first stage of the research, 12.3 in the second phase of the research.

The smallest vital indicator ranged from 36.84 - 37.0 at the first phase of the research, at the second stage of the research was 39.06; the highest vital indicator was 50.0 at the first phase, at the second phase of the research was - 52.27

The Robinson Index characterizes the functioning of the circulatory system. The smallest index was 62.0 at the first phase of the research, at the second phase of the research was 63.0; the highest index of the Robinson index was 88.8 in the first phase of the research and in the second phase of the research was 86.4.

Indicators of the state of the respiratory system. A breath-hold test is used to judge the body's oxygen supply. It is carried out in two versions: breath-holding on inhalation (Stange test) and breath-holding on exhalation (Genchi test). Estimated by the length of the delay time. At the first phase of the research, the minimum value of the Stange test was 20.0, at the second phase, the minimum value was 39.6; the maximum value of the Stange test was 50.0 at the first phase of the research and at the second phase of the research was 58.0. The Genchi test was at the first phase of the research 20.0–41.0 and at the second phase of the research 22.0–43.0.

IV. DATA ANALYSIS STRATEGY

In this work, we used the rapid assessment technique proposed by G. Apanasenko, based on scoring [5], as well as determining the level of health of the cardiovascular system, the so-called R. Bayevsky technique. [9], based on a donosological examination of the adaptive reactions of the whole organism. When using the technique [9], the adaptive capabilities of the cardiovascular system are taken into account. The essence of the approach lies in the fact that in the interval between full health and the first specific manifestations of cardiovascular pathology, a number of conditional gradations of the functional state, determined by the degree of adaptation of the organism to environmental conditions, have been identified [10-12]. Under the influence of inadequate conditions, protective, compensatory-adaptive mechanisms are activated that provide a sufficient level of adaptive capabilities. The adaptation fee ("adaptation price") is the tension of regulatory systems and the mobilization of functional reserves, due to which basic vital signs, such as heart rate, stroke and minute volume of blood circulation, blood pressure, are long kept within the clinical norm [13].

The target of researching the functional state of the circulatory system, thus, comes down to determining the "adaptation price", that is, to targeted analysis of a set of indicators that reflect the state of compensatory-adaptive mechanisms. Some researchers are of the opinion that health should be regarded as a process of a person's entire life, including the accumulation and use of "health resources" [12,13], as a complex, holistic multidimensional dynamic state that develops in the process of realization of the genetic potential in a specific social and environmental.

A correctly performed researching the functional state has a great importance, since it allows to study the effect of physical exercises on the body, it also helps to diagnose, sometimes hidden, diseases, establish adaptability to

physical activity, its optimality, etc. According to the results of the studies, 76.3% of students were found to be practically healthy, 15.8% were assigned to a special medical group, 7.9% were engaged in sports improvement groups.

An individual approach to each student is as follows: in accordance with indicators of physical health and physical activity, students deviate from the norm, and the distribution across five levels allows you to select an individual load. For students with medium, above average and high levels of health, are offered various types of game sports [14,15]. In addition, students are given lectures on the course of Valeology and they have the opportunity to independently select sets of exercises and thereby vary the individual load. Students learn to observe the state of their health and evenly give a load to all parts of the body. Game sports, including the elements of elective sports [14-16], develop evenly all parts of the body, increasing lung capacity, and hence the lung capacity and vital indicator. In the initial measurements, the VC in female students is 2100 ml, and at the end of the study year 2300 ml.

V. DISCUSSION

The physical education program provides for the direct involvement of each student in physical education and sports as the most effective means of promoting health. It is valeological aspects in the structure of the system of physical education of student youth that make up its priority essence. However, it can be noted that in the practice of physical education there is not always work to determine the level of students' health status and its control. It is known that it is the level of individual somatic health that determines the safe zone of the intensity of physical activity in physical exercises and is a criterion for the effectiveness of these exercises [1-4]. The research involved 61 students of various specialties from University. Among 76.3% of students who regularly attend more than half of the training sessions, namely 58.2%, motivated their attendance with a desire to improve their health; 27.9% of students attracted interest in certain sports; more than 9% used physical education to strengthen their character; 2.3% of students showed interest in sports success and the remaining slightly more than 2% of students explained physical education as needed. Based on the results of researching the motives for physical education and sports, students found that the motive for improving health is the leading one - over 53% for girls and almost 62% for boys; about 10% of girls and about 8% of boys indicated harmonious physical development. Important motives for physical education were: desire for self-improvement (about 15% of girls), achievement of high sports results (7% of girls and 2% of boys), reduction of stress and depression (4.9% of girls), development of strong-willed qualities (7.3 % of girls and over 21% of boys) [1, 4].

However, it should be noted that the lectures on valeology, healthy lifestyles, maintaining the level of health through physical activity, led to changes in the issues of motivation for physical education, interest in harmonious physical development increased even more.

VI. CONCLUSION

Research shows the correctness of the chosen approach to the use of sports technology during physical education classes. Moreover, among the student youth, there was an increased interest in individual physical education classes, as a result of which:

- indicators of health levels began to improve;
- students in their free time more often began to attend sports sections and more often consult with the teachers of the department "Physical culture and sport".

In addition, the direction of the researching showed the need to expand the methodological basis of a qualitative diagnosis of student health by highlighting five health components:

- 1) temperament (personal and mental stability, balance of extra-introversion, balance of excitatory-inhibitory processes, mobility of nervous processes);
- 2) mental component (situational mental stability, analysis of the current situation, prediction of one's own actions, mental realization of actions);
- 3) neurodynamic (excitability, mobility and stability of cortical processes, stability of autonomic regulation);
- 4) energy (the effectiveness of pulmonary ventilation and general blood flow, aerobic and anaerobic endurance);
- 5) motor (aerobic and anaerobic performance, power performance of the legs and hands).

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