

BIOCHEMICAL AUTO MONITORING OF HEALTH
OF STUDENTS-PHYSICAL THERAPISTS

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Lviv State University of Physical Culture named after Ivan Bobercky

Анотація. У статті проаналізовано стан здоров'я студентів 3 курсу спеціальності «Фізична терапія та ерготерапія» ЛДУФК за біохімічними показниками: швидкість виведення вітаміну С, активність каталази в крові та вміст гемоглобіну. Не виявлено жодних патологічних параметрів у сечі, крім слідів білків (у 4% усіх досліджуваних студентів). Знижені біохімічні параметри, що характеризують стан здоров'я, дозволяють запропонувати індивідуальну корекцію раціону, вітамінізацію та повторний самоконтроль.

Ключові слова: студенти, здоров'я, вітамін С, каталаза, гемоглобін, сеча, самоконтроль.

Abstract. There were analyzed the state of health of 3rd year students of the specialty "Physical therapy and ergotherapy" of the Lviv State University of Physical Culture (Ukraine) according to biochemical indicators: the speed of vitamin C excretion rates, blood catalase activity and hemoglobin content. There were not found any pathological urine parameters, except protein tracks (in 4% of all researched students). The lowered biochemical parameters that characterize the health state, allow offering individual correction of the diet, vitaminization and re-automonitoring.

Key words: students, health, vitamin C, catalase, hemoglobin, urine, auto monitoring.

Introduction. Studying the peculiarities of the students' lifestyle and their attitude to their own health indicate that there is a lack of knowledge on health issues in general and individual prevention in particular. This allows us to state that the skills of implementing health saving behavior are at a rather low level (Anikiev, 2012; Futorny & Rudnytskyi, 2013; Stoyan, 2016; Tovkun & Tsarova, 2017). In addition, there is concern about the ever-increasing level of morbidity, the trend in decreasing in average life expectancy and the general demographic situation in Ukraine. Maintaining health and full-fledged life of citizens is one of the most important goals of the world community that is reflected in the principles of the European policy "Health 2020: a European policy framework supporting action across government and society for health and well-being" (Aynaci & Akdemir, 2017; Concha-Cisternas et al., 2018). The health' problem of young people is also called one of the priority directions of WHO's work in the 21st century that is very

relevant for Ukraine (Loban et al., 2014; Boretskyi et al., 2016; Chernyavska et al., 2017;). There is a discrepancy between the subjective assessment of the health made by students and the objective data of the students' health, which emphasizes the topicality of the problem.

A lot of specialists have examined the formation of the health saving competence of students of higher educational institutions by means of physical education (Loban et al., 2014; Kensityska, 2018). In our opinion, the promising direction is the expansion of knowledge about the health saving competence of students by developing skills and abilities in the process of individual monitoring of their health according to individual biochemical indicators.

The **purpose** of our research is to analyze the state of health of 3rd year students of the specialty "Physical therapy and ergotherapy" of the Lviv State University of Physical Culture (Ukraine) according to biochemical indicators.

Methods of research – analysis of scientific and methodological literature, invasive and non-invasive methods of research (Ivanchykova, 2017), express method "Penta-PHAN" (LSA chema), methods of mathematical statistics. We have examined 50 students of 20–21 years old.

Results of the research and their discussion. We have independently analyzed biochemical parameters: vitamin C excretion, blood catalase activity, hemoglobin content in blood, urine analysis (for the presence of pathological constituents: protein, sugar, ketone bodies of blood) and pH to determine the students' health during the study of educational disciplines "Workshop on biochemistry of motor activity" and "Clinical biochemistry". This made it possible to create an impression of the state of health by objective biochemical indicators that contribute to the expansion of health saving competence. These indicators are quite important for a young organism. It should be noted that vitamin C (ascorbic acid) takes an active part in the oxidation-reducing processes, has a non-specific general strengthening effect, activates the activity of the glands of internal secretion, increases the adaptive properties of the organism and its resistance to infections, stimulates the synthesis of collagen (which accelerates the regeneration processes, strengthening capillaries), takes part in the exchange of iron and carbohydrates, increases cholesterol decomposition and is an integral part of the water phase of the antioxidant system. The minimum daily human need for vitamin C is 50–100 mg and for the athlete is 200–250 mg.

If this vitamin is absent the anemia, leukopenia, cachexia, secondary infection develops.

As a result of researches, we have found that excretion is 18.04 ± 0.522 mg/day in girls and 27.24 ± 0.746 mg/day in boys (Fig. 1, Fig. 2). Most indicators, both for girls and for boys, are close to or below the lower limit of the norm.

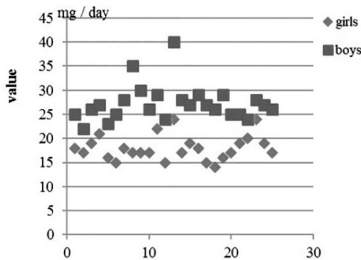


Fig.1 Vitamin C excretion of students

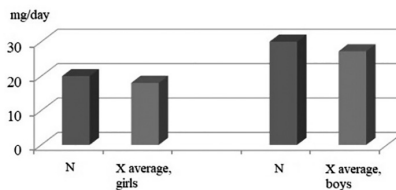


Fig. 2 Comparison of average rates to norm of vitamin C excretion of students

Investigating the activity of the enzyme of the blood catalase, the enzyme of the oxidoreductase class, we note that under normal physiological conditions it regulates the content of hydrogen peroxide, which is formed during oxidative-reduction reactions in the body, prevents its toxic effects.

The activity of catalase has a great diagnostic value: in particular, its activity decreases with anemia, tuberculosis, cancer diseases etc. Increased activity of catalase is observed in toxic hepatitis, with the effects of ionizing radiation and heavy metal salts.

The catalase number expresses the activity of catalase, which is normally 10–15. The mean value for the researched students was set at 9.4 ± 0.27 . That is, in most students, this indicator is close to or below the lower limit of the norm (Fig. 3).

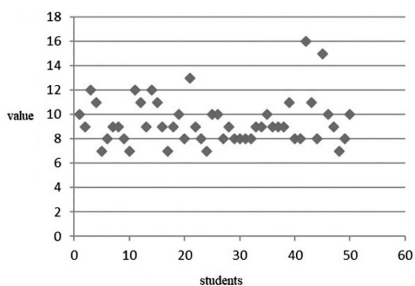


Fig.3 Activity of the enzyme catalase of blood

The hemoglobin content in the blood is one of the health indicators of the student. Normative rate in men reaches 130–170 g/l, and women 120–150 g/l. Abrupt reduction of hemoglobin is incompatible with life because its consequence is oxygen starvation and metabolic disorders that occur in blood loss, hypoplastic and hemolytic anemia. The increase of the hemoglobin content is observed with erythremia, cardiac decompensation, myeloproliferative diseases. The average rate for researched girls is set to $120 \pm 1,32$ g/l and in boys it is $130 \pm 1,9$ g/l. This indicates that in most girls and boys, this indicator is close to or below the lower limit of the norm (Fig. 4, Fig. 5).

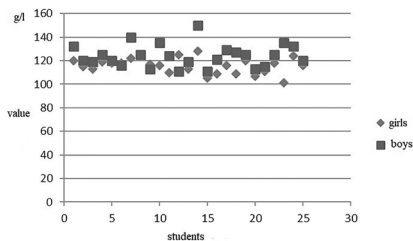


Fig. 4. Hemoglobin content in the blood of the researched students

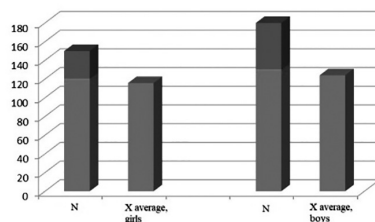


Fig. 5 Comparison of average indicators with norm

We have investigated some parameters from the urine using the express method "Penta-PHAN" (LSA chema). In general, all we know that urine analysis is included in the list of researches that are mandatory for each person. Usual constituents of urine are urea, creatinine, salts of uric and oxalic acids, chlorine ions, sodium and others. Unusual components are protein, sugar, ketone bodies, blood, which appear in the urine in prepathological (athletes) and in pathological (in sick people) states.

Table 1 shows the results of measurement of pathological factors and pH indices.

Table 1

Urine analysis of students (n = 50)

Indicator	Protein	Glucose	Ketone bodies	Blood	pH
Available	0%	0%	0%	0%	5,2 ± 0,3
Traces	4%	0%	0%	0%	
Absence	96%	100%	100%	100%	

Consequently, 4% of students have traces of protein in the urine. Other pathological elements were absent. Urine pH was 5.2 on average, which is normal.

Conclusions:

1. The life style of students and their attitude to own health indicate that there is a lack of knowledge on health care and individual prevention.
2. It was found that vitamin C excretion, activity of blood catalase and hemoglobin content in most of the researched students are about the lower limit of the norm.
3. Most researched students did not have pathological parameters of urine, except protein tracks that was in 4% of students.
4. The urine pH of researched students was 5.2 that is the norm.
5. The lowered biochemical parameters that characterize the health state, allow offering individual correction of the diet, vitaminization and re-automonitoring.

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