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Personality in Norm and in Pathology**MONITORING OF BODY'S FUNCTIONAL SYSTEMS IN
STUDENTS AS HEALTH PROMOTION TECHNIQUE**

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mamylnanv@cspu.ru**Abstract**

In addition to theoretical and practical training, educational processes in a university for the humanities and education must include health promotion programs aimed at encouraging students improve their healthy lifestyle habits within the professional training. The purpose of the study was to evaluate the overall level of health of senior students based on the theory of functional systems with the use of psychophysiological and psychological monitoring. Integrated characteristics of the central nervous system were analysed using rapid computer-aided techniques and the Optical Bio Mouse computer appliance by Neurolab, Moscow. Reflex testing was conducted in the form of chronoreflexometric tests and hand-eye reaction time measurement. The functional state of the CNS was evaluated based on the criteria proposed by Loskutova, such as the functional level of the system, the nervous reaction stability and the level of functional capacities. The extent to which senior students value their health was studied using the Health Behaviour Index technique by Deryabo and Yasvin, and rapid evaluation of the level of health was performed based on V. Belov's criteria. Statistical analysis of the study findings was conducted with the application of Student's t-test. The results revealed a shortage of functional reserves of their central nervous system and the body resulting from emotional stress and study-related overworking that prevents them from improving their health. Implementing health promotion with the focus on functional systems will improve the adaptive behaviour and result in greater adaptability of the body and the nervous system to the workload.

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Keywords: Functional systems, functional capacities, health promotion, nervous reaction stability, psychophysiological monitoring, students



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1. Introduction

One of the most prominent needs among university and school students shall be the aspiration to be healthy and improve healthy lifestyle habits (Sudakov, 2015; Vidourek & Burbage, 2019). This need is rather of a social nature; however, it also displays some aspects of vitality that are associated with fulfilment of vital functions and improvement of adaptability of the body to the environment, emotional stress and information overload. As the process of growing up is closely connected to a change in personal values, it is possible that the younger generation will find its perfect need in the form of the need for a healthy lifestyle and adjust its behaviour accordingly in order to perfect one's mind and body and accumulate knowledge on improving one's life and health (Bukic et al., 2018; Estrada-Vidal & Tojar-Hurtado, 2017; Trubina et al., 2017).

Knowledge on psychology and pedagogy in relation to health is especially beneficial for students of universities for the humanities and education as it is closely connected to their future profession and implements both theory and practice. It is crucial that this special knowledge is realized in specific situations that require expertise in psychology and pedagogy, i.e. it is put into practice (Toybazarova & Nazarova, 2018). Accumulation of knowledge on psychology and pedagogy is at the core of training of students in universities for the humanities and education. It allows students to understand the nature of educational processes and prepare for their own future teaching activities (Aelenei et al., 2017; Faize & Akhtar, 2020).

Having learnt that, future specialists are able to correctly interpret various situations from their teaching practice taking into account specific psychological characteristics of their students using causal relationships dominant in the area of training and education, foresee the direction of personal development and improvement of intellectual and thought processes of their students, incorporate their knowledge of teaching processes into their own professional activity and make it conscious, purposeful and systematic (Alexandrov & Krylov, 2017; Sokol & Serper, 2017).

In addition to theoretical and practical training, educational processes in a university for the humanities and education must include health promotion programs aimed at encouraging students to value their health and improve their healthy lifestyle habits within the professional training (Dolgova, Kapitanets et al., 2019; Lachowicz-Tabaczek & Bajcar, 2017).

Health promotion must be incorporated into educational processes to such an extent that health becomes one of the most cherished values of each student, and the necessity to maintain it becomes their priority in life (Leontiev et al., 2017; Oyserman et al., 2014; Rahamim et al., 2016). The above clearly states that the development of healthy lifestyle habits is viewed as an important part of educational processes for students of universities for the humanities and education (Arynbaeva et al., 2015; Morrison et al., 2016; Yakovlev et al., 2015). It should be realized through various aspects of psychological, pedagogical and substantive training of future teachers during classes (lectures, seminars, practicums and case studies) as well as during extracurricular activities (teaching practices in schools, sport institutions and health camps).

Teaching activities of future teachers should be integrated and coherent yet tailored according to their subject and teaching content.

Training of primary school teachers is of particular importance in the educational process of a university for the humanities and education as they are responsible for the overall development of children. Moreover, they often have to evaluate their physical and mental conditions in order to adjust their educational programs according to their developmental characteristics (in cognitive, motor, emotional and behavioural aspects) (Dolgova, Kondratieva, Kozhurova et al., 2019; Dolgova, Kondratieva, Sencheva et al., 2019).

Formation of a healthy lifestyle habit involves several steps. The first step is to recognize personal needs that require improvement of physical health and development of a healthy lifestyle. The second step is to choose means and methods designed to meet the emerging needs; they can be either material or moral in nature. The third step is to begin the journey of physical improvement. The fourth step is to enjoy the results; they can include improved physical qualities, better physique and a desired social status or level of health.

Each of these steps may become a starting point for the introduction of motivational and informative components of criteria-based evaluation of effectiveness of health promotion programs. It should be reminded that the motivational component reflects the psychological aspect of a personality and its desire to be healthy and have health-related mindset and personal opinions. The informative component reflects theoretical knowledge of students on the level of their health and physiology of a body; it is associated with the stage of afferent synthesis.

Both components determine a behaviour pattern specific for each person based on their personal view on health and preferred ways to stay healthy (Plichta & Jezewska-Zychowicz, 2019). Each person has their own method of self-improvement consisting of specific methods, techniques and means of achieving the goals set. It should also be noted that each person has their own ideal level of health, body goals and preferred lifestyle. However, it is possible to find some common points there in order to evaluate them according to more or less uniform criteria (Litovchenko et al., 2014).

The establishment of uniform criteria marks the beginning of the behavioural component of a health promotion program.

It should be reminded that the behavioural component reflects the revitalization process of health-related activities aimed at the introduction and maintenance of a healthy lifestyle as well as the tailoring of personal health trajectory according to medical, biological, psychological, pedagogical and philosophical theories that serve as a basis for health behaviour and healthy lifestyle skills management. This also applies to the educational environment.

However, the above can only be viewed as a schematic interpretation of health-related behaviour pattern formation. It can be due to a number of reasons, among them are complexity of introduction and long-term maintenance of a healthy lifestyle and many other internal and external factors that have an adverse effect on a body, hinder its health-related improvement as well as permanent health behaviour formation and decrease the adaptability of a body. Each person is personally responsible for their ability to set priorities in life and establish a strategy to reach their objectives as this ability is built based on their intellectual and vital capacities, experience and target-setting. Health promotion should become an essential part of students' practical work.

2. Problem Statement

In addition to theoretical and practical training, educational processes in a university for the humanities and education must include health promotion programs aimed at encouraging students to value their health and improve their healthy lifestyle habits within the professional training.

3. Research Questions

- Study how high school students value their health.
- Conduct a rapid health assessment.
- Conduct a statistical analysis of the research results

4. Purpose of the Study

The purpose of the study was to evaluate the overall level of health of senior students based on the theory of functional systems with the use of psychophysiological and psychological monitoring.

5. Research Methods

The research on functional capacities of the central nervous system (CNS) and the level of health comprised 23 female graduate students ($n = 23$) of the Faculty of Primary School Teacher Training of the South Ural State Humanitarian Pedagogical University in Chelyabinsk. The average age was 20.2 years. The subjects gave their written consent to participate in the research in accordance to the legislation of the Russian Federation, in particular the Law on the Protection of Citizens' Health and Good Clinical Practice (Order No. 266 of the Ministry of Health of 19 July 2003, Order No. 2325-Pr/06 of the Federal Service for Surveillance in Healthcare of 17 October 2006). All subjects were in a good general health and were allowed to attend general P.E. classes by the doctor.

Integrated characteristics of the central nervous system (CNS) were analysed using rapid computer-aided techniques and the Optical Bio Mouse computer appliance by Neurolab LLC (Moscow). Reflex testing was conducted in the form of chronoreflexometric tests and hand-eye reaction time measurement. The functional state of the CNS was evaluated based on the criteria proposed by Loskutova (1975), such as the functional level of the system (FLS), the nervous reaction stability (NRS) and the level of functional capacities (LFC).

The extent to which senior students value their health was studied using the Health Behaviour Index technique by Deryabo and Yasvin (1996). The test helps to assess the health behaviour development in subjects. The test comprises four aspects related to the subject's attitude to health: emotional, cognitive, practical and action-oriented. Based on results of the test, the subject's health behaviour is described on the scale from "at risk" to "highly developed". Rapid evaluation of the level of health was performed using criteria of Belov (1993). The findings obtained on various physiological indicators and motor qualities were converted into points reflecting a subject's level of health.

Statistical analysis of the study findings was conducted through Excel 2000 and STATISTICA 8.0. software with the application of Student's t-test. When applying Student's t-test, the arithmetic mean formula was used.

6. Findings

Hand-eye reaction time reflects performance of the central nervous system. A lag period of hand-eye reaction time is a measure of the quickness of the neuronal response to visual stimuli; it can be used to evaluate the current functional state. Hand-eye reaction time was measured based on some criteria that reflect the functional state of the CNS, the nervous reaction stability, the performance capability, and the level of functional capacities of a body. The criteria studied (FLS, NRS and LFC) are associated with specific and non-specific activation levels of the central nervous system. The criteria were then compared against recommended standard values (specified by Moroz, 2007). Table 1 shows the findings.

Table 1. Functional state of the central nervous system of students (M±m)

Criterion	Fourth- and fifth-year students as study subjects (n=23)	Standard values (M.P. Moroz)
FLS, number of clicking with the mouse	2.7±0.2	4.9-5.9
NRS, number of clicking with the mouse	1.4±0.1	2-2.9
LFC, number of clicking with the mouse	2.6±0.2	3.8-4.9

Results of functional state measuring (the nervous reaction stability and the level of functional capacities) in the subjects showed a slightly reduced performance capability. According to Moroz (2007), the lower limits for these performance capability criteria are 2 and 3.8 respectively. The study findings showed that the functional level of the system (FLS) in students correlates with a slightly reduced performance capability. These findings are supported by other researchers who also describe the overall reduction in performance capability among students under cognitive load. The reduced mental performance in the subjects is caused by exhaustion, which in turn is a sign of the adaptive syndrome that often accompanies long learning processes filled with information overload and emotional stress. Such a state of the central nervous system is a result of inadequate cognitive load and a sign of reduced health.

In the study, the extent to which students value their health was analysed. Results in the form of raw points obtained through questionnaires were converted into scaled points on the scale from 1 (of the lowest value) to 9 (of the highest value). Table 2 shows the findings.

Table 2. The extent to which students value their health (M±m)

Aspect	Scaled points (n=23)	% of the subjects
Emotional	5.3±0.2	40-60
Cognitive	6.5±0.2	60-77
Practical	7.3±0.2	77-89
Action-oriented	5.4±0.2	40-60
Final points	6.1±0.1	60-77

The findings show that the studied group has an adequately developed and positive attitude to health and a healthy lifestyle, as it can be seen from average and above average results of the test and final results. The cognitive aspect results demonstrate an appropriate level of interest to health and a healthy lifestyle among the students. The study revealed that on the one hand, students find it necessary to take care of their emotional health as in their opinion, it is a basic rational act of health maintenance. On the other hand, the necessity of aesthetic health is less pronounced. Prevalence of the practical aspect displays willingness of students to participate in health maintenance activities (sports, introducing healthy lifestyle habits, etc.), thus demonstrating their high concern for health. Test results confirm effectiveness of the system of health promotion measures implemented by the university.

The percentage of subjects who display the studied criteria to the full extent corresponds to the scaled points. Their percentage values range from 60% and higher on the general scale. The emotional and action-oriented aspects are of lower percentage values and range from 40% to 60%. It is due to changes in the environment and surroundings as the emotional state of a person is considered to be one of the most dynamic parameters (Smortchkova, 2017).

Results of the rapid evaluation of the level of health (Belov, 1993) correspond to the above-described findings. The results are displayed in Table 3.

Table 3. Results of the rapid evaluation of the level of health (Belov, 1993)

Criteria	Points
Resting heart rate, bpm	3.4±0.5
Body mass index (height in cm minus weight in kg)	4.3±0.2
2-km run, min	2.8±0.4
Recovery time after 20 squats in 30 sec (min)	2.2±0.1
Sit-up exercises with hands locked behind the head (number of repetitions)	3.1±0.6
Broad jumps (cm)	3.3±0.5
Cold-related diseases in a year (number)	3.0±0.2

Based on these results, the total average was calculated that showed that the studied group possesses an average level of health (3.5±0.3 points).

7. Conclusion

Monitoring of the functional state and integrated characteristics of the central nervous system of students and evaluation of their level of health revealed that although senior students are motivated to maintain a healthy lifestyle, there is a shortage of functional reserves of their central nervous system and the body resulting from emotional stress and study-related overworking that prevents them from improving their health.

Implementing health promotion into educational processes with the focus on functional systems will improve the adaptive behaviour and result in greater adaptability of the body and the nervous system to the workload.

Therefore, it is deemed advisable to monitor students' health within the educational processes and evaluate their nervous system state in order to prevent possible diseases and other health conditions.

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