

KAPITEL 3 / CHAPTER 3³**PROGNOSTIC ASSESSMENT OF THE FEATURES OF THE PROCESSES OF PSYCHOPHYSIOLOGICAL AND MENTAL ADAPTATION OF STUDENTS OF MEDICAL INSTITUTIONS OF HIGHER EDUCATION****DOI: 10.30890/2709-2313.2024-26-00-008****Introduction**

Predictive assessment of the features of the course of psychophysiological and mental adaptation processes occurring in the human organism mastering a certain specialty in the conditions of study within the walls of higher educational institutions, including within the walls of higher educational institutions of medical profile, as a rule, determines the use of statistical models that involve the use of correlation procedures, cluster, regression and factor analysis. At the same time, it should be noted that the leading stages in the practical implementation of inherently predictive approaches should be recognized as: determining the purpose and objects of modeling, conducting reconnaissance data analysis, carrying out statistical formalization of models and in-depth assessment of their parameters, checking the adequacy, analysis and predictive interpretation of the results obtained [3, 4, 6, 8, 9, 10, 11, 12].

The aim of the scientific work is to carry out a prognostic assessment of the characteristics of the processes of psychophysiological and mental adaptation of students of medical higher educational institutions.

The research, which focused on determining the level of development of psychophysiological functions and personal traits and, accordingly, the level of psychophysiological and mental adaptation of 460 students (260 young women and 200 young men) aged 18-24 years, was carried out on the basis of National Pirogov Memorial Medical University.

The level of development of psychophysiological functions and personal traits that have social and professionally oriented significance was determined using methods generally accepted for psychohygienic, psychophysiological and psychodiagnostic studies. Thus, the functional features of higher nervous activity were studied using the

³*Authors: Serheta Ihor Volodymyrovych*



chronoreflexometry technique based on the assessment of indicators of simple and differentiated visual-motor reactions, as well as the mobility and balance of nervous processes, the functional features of the visual sensory system – using the “Light test” technique, which allows assessing the features of the critical frequency merging of light flickers, features of stability of attention – using Schulte tables, functional features of the somatosensory analyzer – using the tremometry technique.

The leading characteristics of temperament were assessed based on the use of the Eysenck personality questionnaire, indicators of state and trait anxiety – using the Spielberger personality questionnaire, character traits – based on the use of the Mini-mult and Shmishek personality questionnaires, the level of subjective control – using the Rotter questionnaire. Features of mental states and the severity of asthenia and depression were determined based on the use of Luscher color choice test method, Malkova personality questionnaire and Zung psychometric scale for self-assessment of depression, and the prevalence of aggressive manifestations using Bass and Darkie personality questionnaire. The patterns of formation of students’ psychological defense mechanisms were established based on the use of the Plutchik-Kellerman-Conte questionnaire, the level of social psychological adaptation of schoolchildren was determined using the Rogers and Diamond questionnaire too.

An assessment of housing, everyday and social living conditions, features of the organization of the educational process at school and extracurricular activities, daily routine and physical activity regime, features of educational adaptation and lifestyle was carried out on the basis of questionnaires and interviews. The sanitary and hygienic features of the university environment and the conditions of stay of students during extracurricular hours were determined using methods generally accepted in hygienic practice.

Statistical analysis of the obtained results involved the use procedures of descriptive statistics, correlation and stepwise regression analysis in the standard application package “Statistica 6.1” (license No. AXX910A374605FA).

The integral components and, accordingly, the main stages of the implementation of the developed and implemented health-improving programs of psychophysiological

influence and psychohygienic correction on the processes of personality formation of students should be considered: taking into account the leading trends in the formation of psychophysiological functions and personal traits in the specific conditions of organizing the educational process and determining the presence of prenosological changes (stage of hygienic psychodiagnostics), carrying out correction of the main regime elements of students' daily activities (stage of rational organization of daily activities), implementation of psychophysiological (stage of psychophysiological influence) and psychohygienic (stage of psychohygienic correction) structural components of the proposed programs.

3.1. Predictive assessment of the features of the processes of psychophysiological and mental adaptation of students based on correlation analysis procedures

Carrying out an adequate prognostic assessment of the patterns of the flow of processes that are significant from an adaptation point of view, occurring in the human organism under the influence of numerous factors that have both favorable and unfavorable effects on the body, including the process of obtaining higher education, is a probabilistic process based on there is a replacement of relationships of real objects with a certain statistical construction that adequately reflects the most essential features of the corresponding database and creates a simplified, schematic image of it abstracted from insignificant and insignificant features [1, 2, 5, 7].

In this regard, at the initial stage of modeling the processes of psychophysiological and mental adaptation characteristic of students of medical higher educational institutions both in traditional conditions of stay and in the conditions of using health-improving and correctional programs of psychophysiological influence and psychohygienic correction, a correlation analysis of the studied indicators was carried out, the purpose which was to establish the functional interdependence of the characteristics of the studied population by determining the degree of their proximity in the multidimensional space of the studied indicators.



Analyzing the data obtained, first of all, it was necessary to pay attention to the peculiarities of the interrelations of the criterion characteristics of the success of the processes of psychophysiological and mental adaptation of students mastering medical specialties of various profiles in the traditional conditions of stay in a higher educational institution. In this context, it should be noted that the level of academic performance in both medical-theoretical and, first of all, professionally oriented subjects in a higher educational institution is most closely related among young women (only statistically significant correlations are given: ($p < 0.05$ $p < 0.01$ or $p < 0.001$) data were associated with the duration of night sleep ($r = -0.38$), degree of training intensity ($r = -0.44$), characteristics of basic nervous processes ($r = -0.43$), indicators of speed of visual-motor reaction ($r = -0.39$) and coordination of movements ($r = -0.44$), level of neuroticism ($r = -0.43$), state ($r = -0.45$) and trait ($r = -0.41$) anxiety, characteristics of asthenic ($r = -0.40$) and depressive ($r = -0.38$) states, as well as the general internality of the level of subjective control ($r = 0.32$), among young men – with indicators indicating the prevalence of additional paid work for students outside of hours in order to improve their own material well-being ($r = -0.45$), characteristics of the level of well-being at the end of the day ($r = 0.41$), and the presence of certain personal problems (feeling of constant fatigue, poor health, etc.) ($r = -0.43$), characteristics of basic nervous processes ($r = -0.41$), indicators of motor coordination ($r = -0.56$), level of neuroticism ($r = -0.43$), state ($r = -0.45$) and trait ($r = -0.41$) anxiety, level of severity of depression (D) ($r = -0.45$) and psychopathy (Pd) ($r = -0.43$) in accordance with the data of the study of characterological properties of the individual, the degree of severity of indicators of character accentuations of dysthymic ($r = -0.46$) and anxious ($r = -0.44$) types, characteristics of mental states ($r = 0,41-0.53$), the level of subjective control ($r = 0,37-0.47$) relationships.

The picture of the relationship between the studied indicators in students under conditions of using health-improving and correctional programs of psychophysiological influence and psychohygienic correction on the processes of student personality formation should be considered almost similar. Thus, the level of success in a higher educational institution in medical-theoretical and professionally

oriented subjects among young women was most closely related to data on the peculiarities of the organization of breaks regulated by the educational schedule ($r = 0.52$), the peculiarities of the organization of extracurricular activities and free time ($r = 0.44$), level of well-being at the end of the day ($r = 0.44$), characteristics of basic nervous processes ($r = -0.47$), indicators of the speed of visual-motor reaction ($r = -0.39$), level of state ($r = -0.42$) and trait ($r = -0.49$) anxiety, asthenic ($r = -0.40$) and depressive ($r = -0.39$) states, the severity of indicators of dysthymic character accentuations (anxious ($r = -0.48$), emotive ($r = -0.49$) and excitable ($r = -0.38$) types, the level subjective control ($r = 0.39-0,45$), among young men – data regarding the characteristics of living conditions ($r = 0.49$), features of the organization of extracurricular activities and free time ($r = 0.34$), indicators of the speed of visual-motor reaction ($r = -0.37$), characteristics of basic nervous processes ($r = -0.43$), indicators of motor coordination ($r = -0.42$), effectiveness of the activity ($r = 0.51$), level of neuroticism (state ($r = -0.52$) and trait ($r = -0.46$) anxiety, asthenic ($r = -0,42$) and depressive states ($r = -0.39$), characteristics of mental states ($r = 0.43-0.51$), severity of depression (D) ($r = -0.46$) and psychopathy (Pd) ($r = 0.39$) in accordance with the data of the study of characterological properties of the individual, the degree of severity of accentuations of the dysthymic (anxious ($r = -0.38$), emotive ($r = -0.41$) and excitable character ($r = -0.38$) types.

Analyzing the features of the relationships between indicators of the degree of success of the processes of professional development and professional adaptation of students who are in conditions of using health-improving and correctional programs of psychophysiological influence and psychohygienic correction on the processes of personality formation of students, it was necessary, first of all, to pay attention to a significant increase in both their number and and degree of expression. This phenomenon should be interpreted as a very favorable positive adaptation-significant phenomenon, consisting in an increase in the number of structural relationships between individual components of the functional system, and, thus, in a significant increase in the degree of efficiency of functioning of both the organism and its individual components and systems in particular, adequate “transfer” of the



consequences of the accelerated development of one component of the working dynamic system, formed during professional training, to a number of others.

First of all, this concerned indicators that determine such characteristics of psychophysiological and mental adaptation as the degree of severity of neuroticism, state and trait anxiety, asthenic and depressive states, character accentuations, the level of subjective control, the speed of senso-motor reactions and the balancing of basic nervous processes, that is, those characteristics of psychophysiological functions and personal characteristics, for the purposeful development of which the developed programs of psychophysiological influence on the organism and psychohygienic correction of the processes of personality formation of students were aimed.

3.2. Predictive assessment of the features of the processes of psychophysiological and mental adaptation of students based on regression analysis procedures

Carrying out a prognostic assessment of the results of a hygienic assessment of the processes of formation of psychophysiological functions and personal traits of students during their studies at a higher educational institution of a medical profile necessitates the use of procedures for regression analysis of the determined indicators in order to establish the characteristics of the dependence of the resulting content, the characteristics of the totality of the data being studied and a number of nominal indicators based on the construction of special statistical models – linear regression equations [1, 2, 5, 7].

In this regard, in the course of the research, data on students' performance in medical-theoretical and professionally-oriented academic disciplines, as well as data on the generalized level of academic success, providing clear and specific information on the level of mastery of theoretical and practical skills, were used as the resulting indicators, the degree of functional readiness of the typical professional duties and professional tasks, as various nominal indicators – data reflecting the level of psychophysiological and mental adaptation of students. To objectify the data obtained, the method of direct step-by-step regression analysis was used, which involves the

step-by-step inclusion of the studied variables into linear regression equations with subsequent verification of the strength of their correlations with a certain resulting value.

In accordance with the data of the direct step-by-step regression analysis, the patterns of relationship between the psychophysiological correlates of the level of educational success of young women in traditional conditions of stay in a higher educational institution with a number of studied characteristics reflecting the level of development of the psychophysiological functions of male students should have been presented in the following form:

$$y = 4.793 - 1.020x_1 - 0.275x_2 + 0.247x_3 + 0.643x_4 \quad (R^2 = 0.568; F(4.25) = 3.643; p < 0.05);$$

where y is the level of educational success in a medical higher education institution (points); x_1 – the value of the integral indicator of coordination of movements according to tremometry data (units); x_2 – the value of the latent period of a simple visual-motor reaction according to chronoreflexometry data (ms); x_3 – level of balance of nervous processes according to the determination of the reaction to a moving object (error in ms); x_4 – the number of touches of the probe to the walls of the labyrinth according to tremometry data.

The patterns of relationship between psychophysiological correlates of academic success of young men in traditional conditions of stay in a higher educational institution with a number of characteristics reflecting the level of development of psychophysiological functions of the students must be presented in the following form:

$$y = 3.395 + 1.002x_1 - 0.451x_2 + 0.341x_3 - 0.219x_4 - 0.219x_5 \quad (R^2 = 0.521; F(5.24) = 5.221; p < 0.01);$$

where y is the level of educational success in a medical higher education institution (points); x_1 – number of touches with the probe to the walls of the labyrinth according to tremometry data; x_2 – the value of the indicators of the critical frequency of fusion of light flickers (Hz); x_3 – the value of the latent period of a simple visual-motor reaction according to chronoreflexometry data (ms); x_4 – efficiency of work performed according to Schulte tables (s); x_5 – level of mental stability according to



Schulte tables (s).

The patterns of relationship between psychophysiological correlates of the level of educational success of young women who are in conditions of using health-improving programs of psychophysiological influence and psychohygienic correction on the processes of personality formation, with a number of studied characteristics reflecting the level of development of psychophysiological functions students, should be presented in this form:

$$y = 3.117 + 0.532x_1 - 1.076x_2 + 0.761x_3 + 0.582x_4 - 0.458x_5 \quad (R^2 = 0.490; F(5,24) = 4.635; p < 0.01);$$

where y is the level of educational success in a medical higher education institution (points); x_1 – the value of the indicators of the critical frequency of fusion of light flickers (Hz); x_2 – the value of the integral indicator of coordination of movements according to tremometry data (units); x_3 – number of touches with the probe to the walls of the labyrinth according to tremometry data; x_4 – level of balance of nervous processes according to the data of determining the reaction to a moving object (error in ms); x_5 – efficiency of work performed according to Schulte tables (s).

The patterns of relationship between the psychophysiological correlates of educational success of young men who are in conditions of using health-improving and correctional programs of psychophysiological influence and psychohygienic correction on the processes of personality formation, with a number of studied characteristics reflecting the level of development of the psychophysiological functions of the students, must be presented in the following form:

$$y = 4.636 - 0.550x_1 - 0.161x_2 + 0.374x_3 + 0.416x_4 - 0.313x_5 \quad (R^2 = 0.526; F(6,23) = 4.267; p < 0.01);$$

where y is the level of educational success in a medical higher education institution (points); x_1 – level of mobility of nervous processes in accordance with the data on the number of failures of differentiation reactions during chronoreflexometry; x_2 – efficiency of work performed according to Schulte tables (s); x_3 – level of balance of nervous processes in accordance with the data of determining the reaction to a moving object (error in ms); x_4 – the value of the indicators of the critical frequency of

fusion of light flickers (Hz); x_5 – the value of the integral indicator of coordination of movements according to tremometry data (arbitrary units).

Conclusions

The results of the correlation analysis indicate the presence of fairly strong and stable relationships between the criterion characteristics of the success of the processes of professional development and psychophysiological and mental adaptation of students in the study groups and a number of indicators of the characteristics of the living conditions, health status and adaptation resources, characteristics of the functional state and personal traits of young women and young men. The closest relationship with the level of educational success had indicators of such psychophysiological functions as the speed of visual-motor reaction, characteristics of basic nervous processes, indicators of coordination of movements and the effectiveness of activities performed, as well as such personal traits as the level of neuroticism, state and trait anxiety, asthenic and depressive states, a number of character accentuations, and the level of subjective control.

Noteworthy is the fact that as a result of the use of developed health-improving programs of psychophysiological influence and psychohygienic correction on the processes of personality formation, a pronounced increase in both their number and degree of strength is recorded, and thus a phenomenon is observed that should be interpreted as favorable a positive adaptation-significant phenomenon caused by the effect of adequate “transfer” of the consequences of the accelerated development of one component of the working dynamic system, formed during professional training, to a number of others.

Based on step-by-step regression analysis, statistical models have been developed that make it possible to both determine the characteristics of the relationship between prognostically significant psychophysiological correlates of the level of educational success in a medical higher educational institution with a number of studied signs that reflect the leading characteristics of psychophysiological and mental adaptation, and to carry out their adequate prognostic assessment.