

Interrelation Between Life Quality Assessment and the Functional Status Indicators of the Organism Basic Systems of Students of Higher Education Institution of Emercom of Russia

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Abstract—This article presents the results of an experimental study assessing student's life quality and living standard, as well as the results of measurable physiological indicators that reflect the status of their cardiovascular and respiratory systems. The analysis of these results was carried out with the help of the "Quality of Life Questionnaire (WHOQOL-100)". The study found that taking into account the assessment of the life quality and living standard as an integral indicator, which includes a significant number of components (health, social relationships, spirituality, religion, personal beliefs, etc.), reflects the stress level of regulatory systems and can be meaningful criterion of students' successful adaptation to the conditions of educational and professional activities.

Key words—*living standard (standard of living), life quality (quality of life), domains of human life, adaptation, functional status.*

I. INTRODUCTION

The problem of professional health of specialists is caused not only by the objective features of professional activity, but also in many respects by their attitude to their own health and ways of preventing occupational diseases. In this regard, it is relevant to compare objectively existing risk factors of the professional environment with subjective perception of various aspects of life and professional activity.

At the present time, the concept of life quality (including the one related to health) is the theoretical basis for numerous applied scientific researches in various areas

of knowledge - psychology, psychophysiology, clinical and preventive medicine, etc. [1].

The category "quality of life" is considered as a system construct with multidimensional organization. The multidimensionality of organization is determined by the presence of various parameters of the quality of human life, including physical, psychological, social, economic, etc. Accordingly, the quality of life not only reflects the success in the mental adaptation of an individual, but is also mediated by the interaction of a number of individual psychological, physiological and socio-demographic factors [2].

The use of the knowledge system about the quality of life in assessing the functional status of the central nervous system provides valuable information about the subjective perception of specialists' life, their physical, psychological and psychophysiological capabilities in order to predict the response of the organism, when it is in adverse conditions of professional activity [3, 4].

The assessment of psychophysiological status of a person is possible on the basis of the analysis of the level and quality of life, needs and interests, manifested both in various types of professional activity and in the sense of life itself. The most reliable picture is given when the research subjects themselves determine the level of satisfaction of their needs and their life situation [2].

The analysis of generalizing indicators that objectively, reliably and trustworthy reflects the level and quality of life, as well as being one of the criteria for assessing the adaptive capabilities of specialists, always remains the pressing issue [4].

According to the World Health Organization (WHO), the quality of life is “a perception of a model of individual’s position in life in the context of the culture and value system, where he lives, in relation to his goals, expectations, standards and interests” [4]. The phenomenon may be indicated by the following criteria: cognitive component (assessment of overall life satisfaction); affective component with a positive assessment of life events (feeling of happiness, social support, personal competence) or a negative assessment (feelings of anxiety and stress, general subjective assessment).

It should be considered that the main socially significant criteria for assessing the quality of life are scientifically based or accepted in society standards (levels, volumes) of consumption of material and spiritual values. The ratio of the possible levels of meeting these needs largely determines the social and professional status of an individual. These indicators basically reflect the assessment characteristics of managers, colleagues, friends, etc.

On the other hand, the needs and motives of people are very individual and only the research subjects themselves can assess the level of their satisfaction [2]. They are not fixed by statistical quantities and practically exist only in the minds of people and, accordingly, in their personal opinions and assessments.

Anyway, the subjective picture of satisfying the system of vital human needs (including professional ones) is crucial for assessing the quality of life.

II. MATERIALS AND METHODS

The purpose of this study was to analyze the functional status and stress level of regulatory systems, as well as to assess the quality of students’ life as an integral indicator that includes a significant number of components (health, social relationships, spirituality, religion, personal beliefs). The assessment of the life quality and living standard of students, in the author’s personal opinion, may be a meaningful criterion for the students’ successful adaptation to the conditions of educational and professional activities [5–7].

The sample consisted of 125 cadets of the University of the State fire service of the Ministry of Emergency Situations of Russia, who are studying at the engineering-technical faculty in the specialty Fire Safety, aged 21 to 23 years. The study was conducted on the basis of the University.

The study was carried out using the following methodologies: assessing the quality of human life “WHOQOL-100”, which consists of 12 parameters of social category of life quality, first of all, health. For this study, the short version, which consists of 6 domains of human life of 6 domains of human life: “Physical Health”, “Psychological”, “Level of Independence”, “Social Relations”, “Environment”, “Personal beliefs”, including 26 items and 24 facets, was used.

Each of the domain consisted of a different number of facets incorporated within domains. For example, “Physical health, I” included the facets “Physical pain and

discomfort, F1”; “Vital activity, energy and fatigue, F2” and “Sleep and rest, F3”. In addition, these issues assessed the quality of life in general. Meanwhile, the first issue of the facet was the intensity scale, the second one was the ability scale, the third one was the frequency scale, and the fourth one was the rating scale.

The value of each domain is equal to the arithmetic mean of all facets included in it. The higher the value of the facet, the higher the quality of life: “Physical health, I”, “Psychological, II”, “Independence level, III”, “Social relationships, IV”, “Environment, V” and “Personal beliefs, VI”. The integral indicator of life quality was calculated as the sum of the values of all six domains.

In order to assess the status of the heart autonomous regulation, the interrelation of sympathetic and parasympathetic influences on cardiac activity, as well as characteristics of the functional status shift according to the level of activation, functional stress tests were performed [8].

The assessment of the functional status (FS) and physiological reserves of cardiovascular, respiratory and autonomic systems of the body included: anthropometric data (weight, height); heart rate measurement (HR, beats per minute); respiratory rate (RR, in 1 min.); blood pressure measurement - systolic (SBP, mm Hg), diastolic (DBP, mm Hg), pulse (PBP, mm Hg) and average dynamic (ADP, mm Hg); carrying out functional load tests, such as the Ruffier and breath-holding tests.

Based on the initial data, the following indicators were calculated: pulse pressure (PP, mm Hg), average dynamic pressure (ADP, mm Hg), stroke volume (SV, ml), minute circulation volume (MCV, functional standard units), the index of peripheral vascular resistance (IPVS, standard units), the Robinson index (RI, standard units), autonomic Kérdö index (AKI, standard units), fatigue coefficient (FC, standard units), Reid index (RI, standard units) [9].

Identification of the interrelation of the obtained indicators was calculated using the Spearman’s rank correlation criterion.

III. RESULTS

The analysis of a number of measurable and calculated physiological indicators, which reflect primarily the status of the cardiovascular and respiratory systems, as well as autonomic regulation and metabolic processes of a student’s body, showed the presence of statistically reliable interrelations with the level and quality of life.

In the correlation analysis of various domains, direct (positive) interrelations between the indicators of the “Physical health, I” and SV, ml ($r = 0.46$ with $p \leq 0.05$); “Physical health, I” and PP, mm Hg. ($r = 0.53$ with $p \leq 0.05$) were established. This domain included the following facets: “Vital activity, energy and fatigue, F2” and “Sleep and rest, F3”. The analysis of the obtained results may indicate a direct significant interrelation between the level and quality of life of these areas and such calculated physiological indicators of the body’s FS, as SV and PP. The higher the research subjects evaluated their sense of

life in these areas, the higher the values of the stroke volume and contractile ability of their heart were and the lower the stress level of regulatory systems became.

A special research interest was caused by the analysis of "Psychological, II", which includes the following facets: "Positive emotions, F4", "Thinking, learning, memory and concentration, F5", "Self-esteem, F6". In the process of analysis of the obtained results, the presence of direct interrelations between the "Psychological, II" and the physiological indicators of ADP mm Hg ($r = 0.42$ with $p \leq 0.05$); "Psychological, II" and CAI (Cardiac Activity Index), relative units ($r = 0.76$ with $p \leq 0.05$).

Also the interrelation of this domain with FR (Fatigue Ratio), standard units ($r = 0.56$ with $p \leq 0.05$) were noted. According to the study results of the psychophysiological status, it can be assumed that the level and quality of life of the research subjects have a direct interrelation with the coordination indicators of the cardiac output regulation and peripheral resistance, the status of the neurohumoral regulation of the cardiovascular system and the level of its training.

A direct interrelation has been established between the domain "Social Relations, IV" and CAI, relative units ($r = 0.41$ with $p \leq 0.05$). The integral indicator for assessing the quality and standard of living (QOL) had a direct interrelation with the CAI ($r = 0.63$ with $p \leq 0.01$).

This domain included the following facets: "Personal relations F13", "Practical Social Support F14".

These results indicate that there are reliable interrelations between the quality of life of the research subjects and the status of the cardiovascular and respiratory systems.

Thus, it is particularly noteworthy that the assessment of the quality and standard of living as an integral indicator reflects the stress level of regulatory systems and may be a significant criterion for the success of students' adaptation to the conditions of educational and professional activities.

The assessment of the life quality of students had a subjective character and, in the author's opinion, depended on many factors, including individual personality traits, character traits, typological features and upbringing.

IV. PRACTICAL RELEVANCE OF THE STUDY

The study results can be used in the psychological support of professional activities of EMERCOM of Russia employees, in particular, in the implementation of psychological support initiatives for cadets and students of the higher educational institutions of professional education EMERCOM of Russia.

The obtained data will help diagnose and correct the functional status timely, assess the expenditure of functional reserves for the preservation of health and professional longevity of specialists. The study results are of scientific interest and are the subject of further in-depth study.

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