THE ROLE OF PSYCHOLOGICAL SELECTION OF APPLICANTS FOR HIGHER EDUCATION IN DANGEROUS PROFESSIONS

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Summary

The aim of the study. It was compared the adaptive potential and readiness to perform professional duties among the medical students and cadets of NANGU.

Materials and methods. There were 134 respondents, who took part in a survey which was based on «Adaptability» questionnaire by A. Maklakov. The total time of the survey was thirty minutes. The criteria included respondents at the age from 18-30 and their regular physical activity for at least three times a week. The criteria included respondents at the age from 18-30 and their regular physical activity for at least three times a week. Among the exclusion criteria were duty or night shift in the hospital, taking psychotropic drugs, acute respiratory viral diseases during the survey period.

Results and discussion. Average indices of NANGU cadets belong to the third group of human adaptive abilities (satisfactory abilities), meanwhile the medical students show the prevailing indices of the fourth group (unsatisfactory abilities). Medical students demonstrate lower indices of neuropsychological stability ($28,13\pm12,97$ c.u.), comparing to cadets ($13,29\pm9,01$ c.u.; t1-2 = 6,87, at p ≤ 0,001). The group of medical students demonstrates worse indices on all scales of the «Adaptability» questionnaire, except for the «Probability» scale, comparing to the group of NANGU cadets. It is worth mentioning that medical students reveal greater self-criticism, introversion, they tend to self-reflection that hinders the process of secondary adaptation in society and reduces resistance to stressful conditions.

Conclusions. It indicates a poor adaptation to the requirements of professional activity and determines the need to conduct mandatory psychological selection among medical students during admission to an educational institution. In the future, the level and development of adaptive capabilities of young professionals among students might become one of the main reasons for their change of professional area and subsequently might lead to significant loss of state economic resources which were spent on their training.

Key words: **students, emergency situation, adaptation, stressful sustainability, educational institutions**

INTRODUCTION

Selection of specialists and professionals for performing the tasks which deal with risk and danger to life, or specific work conditions (e.g. atomic stations, fire stations, energetic systems) is the crucial element of successful mastering the practical skills that are necessary for a particular profession and reduce the risk of accidents in the workplace [13, 15]. Of vital importance here is psychological selection of the specialists at early stages of their career. Nowadays, this selection is performed by human resources managers who develop appropriate hiring criteria [17, 20]; criteria which are aimed at personnel selection and are extremely necessary for a certain corporation or enterprise. State institutions often ignore this process and it results in staff turnover [6], economic losses and inefficient running of budget organizations [16].

Taking into consideration the challenges that were faced within the last year of war in Ukraine, it becomes evident that care for the professional staff of the critical infrastructure and military personnel is the primary goal for regular functioning of the state. Employment of different approaches to recruitment during admission to

university will enhance the defense potential of Ukraine, improve health, prevent from diseases, increase the quality of life and life expectancy by reducing the negative impact of stress factors and preserving the health of specialists.

MATERIALS AND METHODS

It was surveyed two groups of respondents, including medical students of Taras Shevchenko National University of Kyiv (46 respondents) and cadets of NANGU (88 respondents). The number of respondents was calculated according to the statistical package G*Power [5], based on an assumed sensitivity and specificity of 50 %, with an error of 10 %, at p=0.05, and with a power of 80 %. The criteria included respondents at the age from 18-30 and their regular physical activity for at least three times a week. Among the exclusion criteria were duty or night shift in the hospital, taking psychotropic drugs (antidepressants, tranquilizers), acute respiratory viral diseases during the survey period (taking into account that the survey took place during the peak of the COVID-19 pandemic, namely from 2020 to 2021).

It was applied the automated psychodiagnostic complex «Psychological Safety of Personality» for the survey, which was developed by the scientists of the laboratory of moral and psychological support of the Internal Troops in Kharkiv. Data were collected due to the «Adaptability» questionnaire by A. Maklakov [4]. Respondents were questioned at the educational institution in their free time and the survey lasted for thirty minutes. In accordance with the Law of Ukraine «On Personal Data Protection», which was approved in 2010, all personal data of the respondents were encrypted.

Division of the NANGU cadets into subgroups was based on the stress resistance index after assessing respondents' reactions according to «Extreme Conditions» methodology which is used for psychophysiological examinations [3].

Statistical processing of the data was carried out due to a licensed statistical package (IBM SPSS Statistics Base v.22; sublicense agreement No. 138 of 04.08.2016, Licensee of Prognostic Solutions LLC) and Microsoft Excel 2016. The D'Agostino-Pearson test and Student's t-test were used for statistical analysis of the data [2].

REVIEW AND DISCUSSION

Professional psychological selection is one of the key elements of a long career for students who decided to study and work in the risky area for their health. The literature overview represents the information as to the decrease and loss of efficiency due to the stressful factors which leads to the decrease of motivation, professional burnout and psychosomatic disorders [7]. Psychological selection is recommended to undertake before hiring the staff or performing the dangerous tasks or tasks with a high level of

stressful sustainability. It should be also mentioned about the coping-strategies (e.g. «Active coping») among the medical students and NANGU cadets (i.e. respondents) who work at risky areas. These strategies are aimed to increase the stressful sustainability under harmful and traumatic conditions [11].

Temporary disability might cause the faults in the workplace, professional injuries, and become a risk of inadequate reactions of employees in emergency situations, which, in turn, can lead to significant material losses: loss of equipment, production defects, poor services quality; depletion of financial resources: material compensation for health loss, employee remuneration, loss of profit and additional tasks for administrative management: formation of new requests for restoring human resources potential and addressing issues of personnel security of the enterprise [8, 9]. However, in scholars' opinion, psychological selection is not efficient when hiring staff. It is recommended to conduct psychological selection during admission to educational institutions in order to identify those persons, who will not be able to perform their professional duties in the future [18, 19].

There are standardized questionnaires [12] and software/hardware systems [1, 10], which are used for psychological selection in the world. The general difference between these two is that the use of software and hardware systems eliminates the possibility of mechanical errors in data collection and processing.

Unfortunately, psychological selection is not always conducted in educational institutions of Ukraine, which prepare specialists for work that may involve a risk to life in the future. It might be one of the factors, determining that a person is not ready for the realities of the chosen profession. For instance, psychological selection is mandatory for admission of future officers at the National Academy of the National Guard of Ukraine [14]. Medical universities do not have such a practice. Thus, we were interested in comparing the adaptive potential of respondents who undergo psychological selection (NANGU cadets) and those who do not experience psychological selection during admission to an educational institution (such as medical students).

The collected statistical data on the «Adaptability» questionnaire (by A. Maklakov) were divided according to the groups of respondents, namely medical students and NANGU cadets.

On analyzing the obtained data of the «Adaptability» scale in both groups, which are presented in Table 1, we find that medical students reveal much more desadaptivity to stressful conditions (49.83±17.32 c.u.) comparing to NANGU cadets (29.93±13.43 c.u.), t1-2 = 6.72, at p ≤ 0.001. Thus, the average values of the index on the «Adaptability» scale among medical students are found in group four of human adaptive abilities. This group is

characterized by expressed character accentuations, signs of psychopathy, and manifestations of deviant behavior, which impedes the process of students' adaptation to adverse conditions.

At the same time, the average indices of NANGU cadets belong to group three of human adaptive abilities (satisfactory abilities). Cadets may have some problems with

adaptation to situations related to stressful factors, but their level of adaptation is highly dependent on the environment. It cannot be denied that respondents from the third group of human adaptive abilities may also manifest aggression and conflicts in case of tension or significant influence of stress factors in their professional area, but it should be noted that these reactions would not be dominating.

Table 1

Indices on the scales of the multilevel personality questionnaire «Adaptability» (by A. Maklakov) in groups of students and cadets

Methdology scales	Students	Cadets
Probability	4,33±3,17 c.u.	5,55±3,31 c.u.
Adaptability	49,83±17,32 c.u.	29,93±13,43 c.u.
Neuropsychological stability	28,13±12,97 c.u.	13,29±9,01 c.u.
Communication	12,41±4,37 c.u.	9,49±3,65 c.u.
Morality	8,43±3,02 c.u.	7,15±3,03 c.u.

Medical students reveal much lower indices of neuropsychological stability (28,13±12,97 c.u.), comparing to cadets (13,29±9,01 c.u.; $t_{1-2} = 6,87$, at $p \leq 0,001$), which, in turn, characterizes medical students with higher CNS lability. They are also characterized by an acute self-assessment of the results, actions, and their own potential.

Cadets possess much better communication skills than medical students. It means that students are more likely to experience domestic conflicts and more tense scenarios of interpersonal interaction. The students' indices on the «Communication» scale (12.41±4.37 s.e.) demonstrate more desadaptivity than those of NANGU cadets (9.49±3.65 s.e.), t1-2 = 3.83, at p ≤ 0.001.

In addition, medical students have not yet determined their own assessment of the role they will play in the professional environment and in the team (at university or at their workplace). This conclusion was based on the data analysis according to «Morality» scale (8.43±3.02 s.e.), that demonstrates more significant statistical information comparing to the common group of NANGU cadets (7.15±3.03 s.e.), t1-2 = 2.30, at p ≤ 0.05.

An interesting finding was that medical students were more sincere in their answers to questionnaire

than cadets, who overwhelmingly aimed to meet social expectations, which resulted in more frequent socially favorable answers to the questions. Thus, the differences on the scale of «Probability» between the group of medical students (4.33±3.17 s.e.) and the group of NANGU cadets (5.55±3.31 s.e.) reach the level of statistical significance (t1-2 = 2.05, at p ≤ 0.05).

Psychological adaptation of medical students is largely based on individual experience what disables to distinguish between the subgroups within it. On the other hand, the NANGU cadets were divided into three subgroups according to the index of «Sustainability under stressful conditions», which was obtained as the result of students observations and methodology of «Extreme Conditions».

Comparing to the medical students, the cadets demonstrate stronger differences according to the stressful sustainability and show greater statistic discrepancy. Thus, subgroup 1 contained the respondents with the lowest index of stressful sustainability, subgroup 2 — the highest indices of stressful sustainability, subgroup 3 included the respondents with good indices of stressful sustainability. However, the last subgroup revealed the lowest index of sincere responses. Statistic data according to each subgroup are described in Table 2.

Table 2

Indices according to the scales of multilevel personality questionnaire «Adaptability» (by A. Maklakov) in subgroups of cadets

Methdology scales	Subgroup 1	Subgroup 2	Subgroup 3
Probability	4,93±3,71 c.u.	4,63±3,03 c.u.	7,22±3,07 c.u.
Adaptability	42,93±12,34 c.u.	26,06±9,77 c.u.	27,48±14,57 c.u.
Neuropsychological stability	22,29±9,05 c.u.	10,29±4,57 c.u.	12,30±10,79 c.u.
Communication	12,00±2,88 c.u.	9,00±3,87 c.u.	8,43±2,90 c.u.
Morality	8,64±3,67 c.u.	6,77±3,10 c.u.	6,74±2,70 c.u.

Sincere responses index ($t_{2-3} = 3,16$, at $p \leq 0,01$). In the second subgroup of cadets, a high index of sincere answers (4.63±3.03 p.p.) is combined with satisfactory

indices of adaptive abilities. The sincerity indices in subgroup three (7.22±3.07), which are significantly above the norm, indicate the unreliability of the results

and illustrate that cadets describe their insight into their behavior expected by society, rather than real position and existing human adaptive abilities.

Having compared the obtained data with information of medical students group, we received the following indices: cadets in subgroup one reproduce the same indices as medical students on all scales of the «Adaptability» questionnaire and there are no statistically significant differences (p>0.05). However, the «Neuropsychological stability» index is better among the cadets than among the students (tc-1= 1.90, at p ≤ 0.1). Comparative characteristics are shown in Table 3.

Table 3

Indices of discrepancy significance in the scales of the multilevel personality questionnaire «Adaptability» (by A. Maklakov) between groups of students and cadets (according to Student's t-test)

Methdology scales	t_{s-c}	t_{1-2}	t_{1-3}	t_{2-3}	t_{s-1}	t_{s-2}	t_{s-3}
Probability	2,05*	0,27	$1,94^0$	3,16**	0,55	0,44	3,64***
Adaptability	6,72***	4,57***	3,45**	0,41	1,65	7,81***	5,63***
Neuropsychological stability	6,87***	4,73***	3,02**	0,85	$1,90^0$	8,65***	5,36***
Communication	3,83***	2,97**	3,64***	0,63	0,41	3,71***	4,50***
Moralty	2,30*	$1,68^0$	$1,69^0$	0,04	0,19	2,42*	2,36*

[1] Note: ^{0}p≤0,1; *p≤0,05; **p≤0,01; ***p≤0,001
[2] Note: s − students, c − cadets, 1 − cadets' subgroup one; 2 − cadets' subgroup two; 3 − cadets' subgroup three

Cadets of subgroup two demonstrate a high level of psychological adaptation, based on their communication skills, knowledge of the rules of cooperation and high ability to regulate their behavior that enables them to compensate a certain physiological deficiency. For instance, half of the cadet's subgroup two demonstrates the index of «Sustainability to stressful conditions» below the norm (by «Extreme Conditions» methodology).

Having analyzed the obtained data, we can conclude that the NANGU cadets tend to control their psychological and emotional reactions and demonstrate emotional stability, as compared to medical students, who are focused on their inner feelings and creativity in performing their tasks. It is worth mentioning that medical students reveal greater self-criticism, introversion, they tend to self-reflection that hinders the process of secondary adaptation in society and reduces resistance to stressful conditions.

Having compared the subgroups of cadets, we can state that not all respondents were sincere in their answers, even though some of them realize that their potential is not sufficient to successfully meet professional requirements. For example, cadets in subgroup one have show lowest level of adaptive abilities, they tend to accumulate negative experiences, have poorer secondary socialization, and do not fully realize their potential, which leads to a sense of dissatisfaction with reality. This creates a risk that young specialists would leave their chosen profession in the future.

The cadets of the second subgroup, on the other hand, demonstrate increased adaptive abilities and show high compliance with the conditions of self-realization due to their communication skills, neuropsychological stability and morality indicators, which enhance their satisfaction on the learning process and mastering professional skills. This illustrates the optimal correspondence between the available potential of respondents and the expected results. Instead, the cadets of the third subgroup with a low level of stress resistance demonstrate high scores on the scales of the «Adaptability» questionnaire, that testifies to their insincerity, based on the desire to correspond to the imaginary standards for successful mastering of professional skills. Such specialists tend to continue their career in the future, however, their professional success is questionable.

CONCLUSIONS

Thus, the received and analyzed data from the «Adaptability» questionnaire (by A. Maklakov) for the groups of students and cadets demonstrate a certain number of differences according to the scales of «Probability», Adaptability», «Neuropsychological stability» and «Communication». An employment of a stress sustainability criterion (by «Extreme Conditions» methodology) enabled to estimate their adaptive potential as to the professional demands. We have made the following conclusions:

1. By conducting a preliminary psychological selection of the NANGU cadets during admission to university, we divided the respondents into subgroups. This allowed us to determine the persons who are most and least adapted to the requirements of the future profession.

2. The group of medical students differs in all scales of the questionnaire on «Adaptability» scale, except for «Probability» scale comparing to the group of NANGU cadets. This indicates that students gave more sincere answers (t1-2 = 2.05, at p ≤ 0.05) and do not strive to meet other people's expectations of a successful specialist in their chosen profession, unlike some students who have such an expectation.

3. Medical students of the first years of study still possess the formed requirements for their own professional

activity. We have found that their adaptability indicators are fallen to the fourth group of human adaptive abilities, while the third group prevails among the NANGU cadets. In the future, the level and development of adaptive capabilities of young professionals among students might become one of the main reasons for their change of professional area and subsequently might lead to significant loss of state economic resources which were spent on their training.

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COMPLIANCE WITH ETHICAL REQUIREMENTS

Students and cadets were signed informed consent for participation in the study. Research protocol No. 127 approved by the commission for bioethical expertise and research ethics of Bogomolets National Medical University on December 2, 2019.

THE AUTHOR'S CONTRIBUTION TO THE ARTICLE

Anatolii M. Hrynzovskyi – A, F; Svitlana I. Kalashchenko – C, D; Ihor I. Prykhodko – A, E; Olena O. Lutsak – B, D; Serhii V. Belai – F, E.

A – Conception and design of the work

B – Collection and analysis of data

C – Responsibility for statistical analysis

D – Manuscript writing

E – Critical revision

F – Final approval of the article

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Резюме

ВАЖЛИВІСТЬ ПСИХОЛОГІЧНОГО ВІДБОРУ ДЛЯ ЗДОБУВАЧІВ ВИЩОЇ ОСВІТИ РИЗИКОНЕБЕЗПЕЧНИХ ПРОФЕСІЙ

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Мета роботи. Проведення порівняння адаптаційного потенціалу та готовності виконувати свої професійні обов'язки у студентів-медиків та курсантів НАНГУ.

Матеріали та методи. Було проведено обстеження 134 респондентів з використанням опитувальника «Адаптивність» (в модифікації А. Г. Маклакова). Опитування тривало тридцять хвилин. Критеріями включення респондентів були вік від 18 до 30 років, наявності фізичної активності не рідше 3-х разів на тиждень. Критерії включення респондентів: їх вік від 18 до 30 років і їхню регулярну фізичну активність не менше трьох разів на тиждень. Критеріями виключення: чергування в наряді або нічне чергування в лікарні, вживання психотропних препаратів, наявність гострих респіраторно-вірусних захворювань на період обстеження.

Результати дослідження та їх обговорення. Середні показники курсантів НАНГУ відносяться до 3-ї групи адаптаційних здібностей людини (задовільні здібності), в той час як у студентів-медиків превалюють показники, що характерні для 4-ї групи (незадовільні здібності). Студенти-медики мають суттєво нижчі показники нервово- психічної стійкості (28,13±12,97 у.о.), ніж курсанти (13,29±9,01 у.о.; t1-2 = 6,87, при p ≤0,001). Група студентів-медиків демонструє гірші показники за всіма шкалами опитувальника «Адаптивність», крім шкали «Вірогідність», порівняно з групою курсантів НАНГУ. Варто зазначити, що студенти-медики виявляють більшу самокритичність, замкнутість, схильні до саморефлексії, що перешкоджає процесу вторинної адаптації в суспільстві та знижує стійкість до стресових умов.

Висновки. Це свідчить про низьку адаптованість до вимог професійної діяльності та зумовлює необхідність проведення обов'язкового психологічного відбору студентів-медиків під час вступу до навчального закладу. Рівень і розвиток адаптаційних можливостей молодих спеціалістів серед студентів у майбутньому може стати однією з головних причин зміни ними професійної діяльності та згодом призвести до значних втрат державних та економічних ресурсів, які були витрачені на їхню підготовку.

Ключові слова: **студенти, надзвичайна ситуація, адаптація, стресостійкість, навчальні заклади**