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PERSONAL CHARACTERISTICS AND ANXIETY OF STUDENTS AGAINST THE BACKGROUND OF THE COVID-19 PANDEMIC IN UKRAINE

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The purpose of the study was to investigate the level, state and signs of student anxiety in the COVID-19 pandemic, to identify the most significant factors associated with potential problems in these conditions, to investigate the relationship between anxiety, and individual psychological characteristics of students and autonomic nervous system disorders. systems. In December 2020 – to January 2021, an online survey was conducted to study the personal and situational anxiety, neuroticism and individual psychological orientation of H. Eysenck, the presence of autonomic nervous system dysfunction according to A.M. Wein and determine the level of specific anxieties caused by the pandemic. Until the end of the first year of the COVID-19 pandemic, we observed increased levels of situational and personal anxiety in medical students. In turn, the level of neuroticism was typical of this social group. Extraversion has decreased compared to the pre-pandemic period. The level of neuroticism correlated with anxiety about the risk of infection of family members of COVID-19, and the level of personal anxiety correlated with anxiety about their own risk of infection with COVID-19. The state of autonomic regulation remained at the level of the pandemic period.

Keywords: students, pandemic COVID-19, anxiety, neuroticism, autonomic nervous system.

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ОСОБИСТІСНІ ХАРАКТЕРИСТИКИ ТА ТРИВОЖНІСТЬ СТУДЕНТІВ НА ФОНІ ПАНДЕМІЇ COVID-19 В УКРАЇНІ

Мета роботи: дослідити рівень, стан і ознаки тривожності студентів в умовах пандемії COVID-19, виявити найбільш значущі фактори, пов'язані з потенційними проблемами в цих умовах, дослідити взаємозв'язок між тривожністю, індивідуально-психологічними особливостями студентів та порушенням регуляції вегетативної нервової системи. У грудні 2020 – січні 2021 року було проведено онлайн-опитування для дослідження особистісної та ситуативної тривожності, нейротизму та індивідуально-психологічної орієнтації за Г.Айзенком, наявності дисфункції автономної нервової системи за А.М.Вейном та визначення рівня специфічних тривог, викликаних пандемією COVID-19. У студентів-медиків до кінця першого року пандемії COVID-19 ми спостерігали підвищений рівень ситуативної та, особливо, особистісної тривожності. У свою чергу, рівень нейротизму був типовий для цієї соціальної групи. Екстраверсія знизилася порівняно з періодом до пандемії. Рівень нейротизму корелював із занепокоєнням щодо ризику зараження членів сім'ї COVID-19, а рівень особистісної тривожності корелював із занепокоєнням щодо власного ризику зараження COVID-19. Стан вегетативної регуляції залишався на рівні з до пандемічним періодом.

Ключові слова: студенти, пандемія COVID-19, тривожність, нейротизм, автономна нервова система.

The study is a part of the research project "Study of the role of exogenous and endogenous factors in the regulation of protective and adaptive systems of the body", state registration No 0118U004460.

The pandemic facing humanity today differs from epidemics such as SARS, Ebola, H_1N_1 influenza in terms of the breadth of country coverage and the number of cases. The current COVID-19 pandemic shows that new factors affecting mental health are added to the psychological impact of quarantine and the danger of contracting the virus [7], such as loneliness, limited contact with loved ones, lack of freedom of movement, uncertainty about the development of the disease, feelings of helplessness, economic problems and student academic difficulties [2, 9]. These factors can disrupt psycho-somatic health, cause a decrease in tolerance of distress and uncertainty, leading to severe consequences such as depression and reactive mental disorders [15]. There is evidence that anxiety and stress in young people is even higher than in older people [12].

A survey of college students during the epidemic in China showed that anxiety levels in young people are associated with factors such as living in urban areas, economic stability of the family and cohabitation with parents [9]. The illness of relatives or friends leads to an exacerbation of anxiety symptoms. In the work of J. Kolacz et al. the question is raised about the need to study the influence of pandemic threats on the state of the autonomic nervous system, which provides homeostasis [13].

In order to prevent the spread of acute respiratory disease caused by coronavirus SARS-CoV-2 (hereinafter – COVID-19) in Ukraine, quarantine measures were introduced on March 11, 2020 in Ukraine. On August 1, 2020, adaptive quarantine began to operate in Ukraine, divided into "green", "yellow", "orange" and "red" zones. However, in November, no region remained in the "green" zone. Therefore, on November 14, the government introduced a "weekend quarantine" that lasted until December 2. On the same day, restrictions on the "orange" quarantine zone were introduced in all territories of Ukraine, and on

January 8, 2021, the government introduced a lockdown, which lasted until January 24. At that time, it was forbidden to work in cultural and educational institutions, and students were taught remotely. On February 24, Ukraine returned to the adaptive quarantine model.

The purpose of the study was to access the level of anxiety state and trait of students in a pandemic COVID-19, to identify the most significant factors associated with potential problems in these conditions, to investigate the relationship between anxiety, individual psychological characteristics of students and autonomic nervous system dysregulation.

Materials and methods. In December 2020 – January 2021, we conducted an online survey of 1–3 year students of Poltava State Medical University to analyze their psycho-emotional state. Volunteers were invited to participate in the study. All persons were citizens of Ukraine and resided on its territory permanently.

Students of 1–3-year were asked to respond online either with personal details for further participation in the study, or anonymously to avoid excluding individuals with high social anxiety. The response rate was 72.5 %. We received 171 complete sets of questionnaires with personal data, and for certain types of questionnaires – from 192 to 219, including anonymous ones. Full sets of questionnaires were submitted by 57 boys and 114 girls, aged 17 to 29 years old, the average age was 19.3±0.1 years. The rest of the questionnaires were submitted by 23 boys and 39 girls with an average age of 19.0±0.3 years.

The level of state and trait anxiety was determined in students by the State Trait Anxiety Inventory (STAI) by the C.D. Spielberger, R.L. Gorsuch, R.E. Lushene modified by Yu.L. Khanin [3], neuroticism and individual psychological orientation were assessed using the Eysenck Personality Inventory (EPI) by H. Eysenck, adapted by A.G. Shmelev [3], and the presence of autonomic nervous system (ANS) dysfunction was determined according to A.M. Wein [6]. Students were also offered a questionnaire developed by us about the level of specific anxiety associated with various potential problems and anxiety motives in the context of the COVID-19 pandemic.

Quantitative indicators were expressed as Mean±SEM, frequency tables were constructed for ordinal indicators. The analysis of the normality of the indicator distributions was carried out using one-sample Kolmogorov-Smirnov test. Since some indicators did not have a normal distribution, the data was analyzed by Mann-Whitney U-test, and Spearman's Rho correlation coefficient was calculated. The limit of statistical significance was considered $p<0.05$. To measure the internal reliability of a tests we used Cronbach's alpha. The statistical analysis was performed using JASP 0.16.

For autonomic nervous system dysfunction questionnaire, Cronbach's alpha coefficient was $\alpha=0.76$; for specific anxiety factors questionnaire, Cronbach's alpha coefficient was $\alpha=0.91$ in the surveyed group.

Results of the study and their discussion. Anxiety state in boys was 46.1±0.7 points, in girls – 44.0±0.5 points ($p<0.05$). Trait anxiety in boys was 46.6±0.8 points, in girls – 51.0±0.6 points ($p<0.001$), both indicators correspond to a high level of anxiety. Only 1 student had a low level of state anxiety; low trait anxiety was not observed at all. High state anxiety was more common in boys (66.7 %), moderate – more often in girls (51.1 %). High trait anxiety prevailed in both boys and girls (fig. 1).

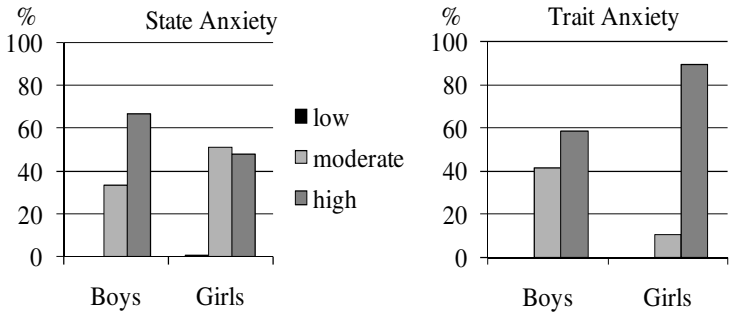

Fig. 1. Distribution of state and trait anxiety levels in medical students during adaptive quarantine under COVID-19.

The correlation between state and trait anxiety was low ($R=0.18$, $p<0.02$).

The level of neuroticism was 12.8±0.4 points, including 11.4±0.6 points for boys and 13.6±0.4 points for girls ($p<0.01$). Potential concordants and normostenics prevailed among young men (63.0 %), normostenics and potential discordants prevailed among girls (58.0 %) (fig. 2).

In terms of individual psychological orientation, ambiverts predominated (fig. 3). There were no differences between boys (11.4±0.4 points) and girls (11.3±0.3 points).

We assessed the sincerity of the responses using the EPI questionnaire also. The answers of 34.0 % of the respondents were assessed as sincere, 60.3 % were situational, and only 5.7 % corresponded to the assessment "insincere", i.e. socially acceptable. The number of socially acceptable responses decreased

with an increase in neuroticism (Rho=–0.30, p<0.001), increased with an increase in state anxiety (Rho=0.25, p<0.001), did not depend on sex, age, year of study, individual psychological orientation or trait anxiety.

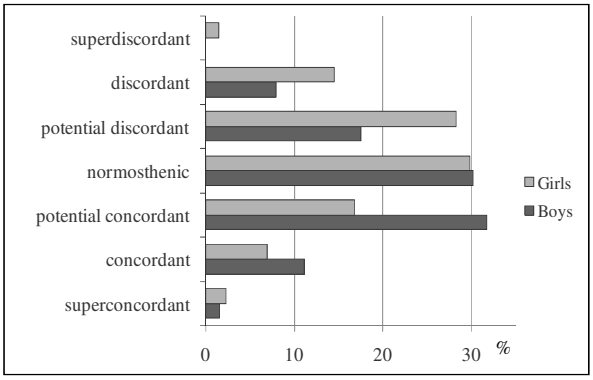

Fig. 2. Distribution of neuroticism levels of medical students during the adaptive quarantine period under COVID-19.

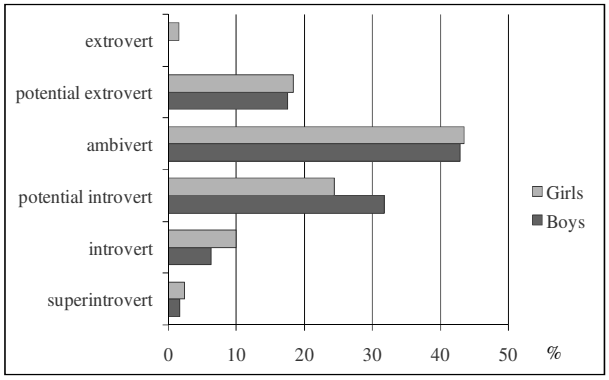

Fig. 3. Distribution of individual psychological orientation levels of medical students during the adaptive quarantine period under COVID-19.

The assessment of ANS dysfunction was 18.9±1.7 points in boys and 30.1±1.4 points in girls (p<0.001), pronounced ANS dysfunction was noted in 53.9 % of boys and 78.9 % of girls (p<0.001), on average 70.2 %. The severity of ANS dysfunction correlated with neuroticism (Rho=0.62, p<0.001) and trait anxiety (Rho=0.28, p<0.001).

The answers to questions about dominant specific anxieties on a six-point scale from 0 to 5 were distributed as follows (table 1), where specific anxiety levels are as follows:

– No, it doesn't matter to me – 0;
– Almost does not bother – 1;
– Sometimes it worries – 2;
– Worries – 3;
– Worries significantly – 4;
– It worries me a lot; I think about it almost constantly – 5.

Table 1

Specific anxiety factors in medical students during the adaptive quarantine period for COVID-19

Question	The average level of specific anxiety
Possible deterioration of my performance	2.96±0.09
Learning difficulties	2.87±0.08
Insufficient quality of the Internet and mobile communication	1.99±0.09
Financial opportunity to learn	2.06±0.10
Decreasing of my living standards today	2.06±0.10
Possible future deterioration of my living standard	2.30±0.10
Deterioration of the family's financial situation associated with COVID-19	2.44±0.10
The state of health of parents or other family members that is not related to COVID-19	3.08±0.10
Own health condition not related to COVID-19	2.52±0.10
Because of the likelihood of getting COVID-19	2.03±0.10
Due to the fact that relatives can get COVID-19	3.11±0.10
Reduce opportunities to have fun and attend entertainment events	1.77±0.10
Restrictions on travel and tourism	2.07±0.11
It seems to me that life passes by	2.21±0.11
The tense state of the people around me	1.94±0.10
Deterioration of relations with relatives in the last six months	1.71±0.10
Increasing the amount of independent work	2.67±0.10
The need to use masks and wash my hands often	1.64±0.10
I can't give a specific reason	1.16±0.10

The mean index of the level of specific anxiety was 2.25±0.06. Most often, anxiety was caused by the state of relatives health not related to COVID-19 (anxiety level 3.08±0.10) and associated with the risk of COVID-19 (3.11±0.10), as well as a possible decrease in academic performance (2.96±0.09) and learning difficulties in terms of alternating distance and full-time education (2.87±0.08). Accordingly, high and very high levels of anxiety were observed mainly due to the risk of COVID-19 disease in relatives (42.0 %), health status of relatives not related to COVID-19 (41.6 %), risk of reduced academic performance (34.7 % of respondents), an increase in the volume of independent work (28.8 %), and learning difficulties (27.0 %).

The lowest levels of anxiety were caused by the need to use personal protective equipment (1.64±0.10), and unmotivated anxiety (1.16±0.10), which is understandable, since medical students were interviewed.

There were statistically significant differences between boys and girls in only three of the studied factors: “The tense state of the people around me” (boys 1.70±0.18, girls 2.07±0.13, $p<0.05$), “Decreasing of my living standards today” (boys 2.35±0.17, girls 1.91±0.13, $p<0.05$), “Increasing the amount of independent work” (boys 2.42±0.18, girls 2.81±0.12, $p<0.05$).

In addition to the proposed options, respondents could provide answers in free form, indicating positive or other results of life in a pandemic. Free answers were provided by 29.7 % of those who filled out the questionnaires, some of the answers were complex, indicating several different emotional reactions. Among the respondents, 9.4 % positively noted the opportunity to spend more time with their family, 7.2 % of the respondents noted general satisfaction with their lives, independent of the pandemic, 2.7 % – an increase in the population's attention to health, 2.7 % – additional experience. In total, only 26.3 % of respondents noted individual positive consequences of social experience in the context of fighting the pandemic.

Correlations with neuroticism were observed in most indicators of specific anxiety, with the exception of their own risk of contracting COVID-19 ($Rho=0.07$, $p>0.05$), as well as objective specific anxieties, such as “Insufficient quality of the Internet and mobile communication”, “Financial opportunity to learn”, “Decreasing of my living standards today”, “Deterioration of the family's financial situation associated with COVID-19” (table 2).

Table 2

Correlations (Spearman's Rho) of specific anxiety factors in medical students during the adaptive quarantine period for COVID-19

Specific anxiety factor	Neuroticism	Trait anxiety	ANS dysfunction
Possible deterioration of my performance	0.32 p<0.001	0.27 p<0.001	0.17 p<0.02
Learning difficulties	0.38 p<0.001	0.32 p<0.001	0.20 p<0.005
Possible future deterioration of my living standard	0.20 p<0.01	0.08 p>0.05	0.12 p>0.05
Own health condition not related to COVID-19	0.18 p<0.05	0.20 p<0.01	0.12 p>0.05
Due to the fact that relatives can get COVID-19	0.20 p<0.01	0.09 p>0.05	0.03 p>0.05
Reduce opportunities to have fun and attend entertainment events	0.15 p<0.05	0.10 p>0.05	-0.02 p>0.05
Restrictions on travel and tourism	0.18 p<0.05	0.17 p<0.05	0.07 p>0.05
It seems to me that life passes by	0.35 p<0.001	0.25 p<0.002	0.22 p<0.002
The tense state of the people around me	0.29 p<0.001	0.28 p<0.001	0.21 p<0.002
Deterioration of relations with relatives in the last six months	0.27 p<0.001	0.03 p>0.05	0.14 p<0.05
Increasing the amount of independent work	0.35 p<0.001	0.28 p<0.001	0.26 p<0.001
The need to use masks and wash my hands often	0.16 p<0.05	0.12 p>0.05	0.08 p>0.05
I can't give a specific reason	0.22 p<0.005	0.15 p>0.05	0.05 p>0.05

Levels of anxiety due to "Financial opportunity to learn", "Decreasing of my living standards today", "Deterioration of the family's financial situation associated with COVID-19" and "The state of health of parents or other family members that is not related to COVID-19" hadn't significant correlations with neuroticism, trait anxiety or level of ANS dysfunction.

Levels of anxiety due to "Insufficient quality of the Internet and mobile communication" and "The likelihood of getting COVID-19" correlated with trait anxiety only (Rho=0.17, $p<0.05$ and Rho=0.22, $p<0.005$ correspondingly).

Individual psychological orientation correlated only with specific anxiety about the "Restrictions on travel and tourism" (Rho=0.19, $p<0.02$), as well as with the discovery of positive aspects of life under quarantine conditions (Rho=0.36, $p<0.05$), which was more typical for extroverts.

State anxiety did not significantly correlate with any of the indicators of specific anxiety, but it did correlate with the number of socially acceptable responses (Rho=0.25, $p<0.001$).

At the same time, trait anxiety had correlations both with the average level of specific anxiety (Rho=0.25, $p<0.001$) and with certain types of specific anxiety, in particular, with learning difficulties (Rho=0.32, $p<0.001$), a possible decrease in academic performance (Rho=0.27, $p<0.001$), with an increase in the volume of independent work (Rho=0.28, $p<0.001$), the tense state of the people around (Rho=0.28, $p<0.001$) and the feeling of passing life (Rho=0.24, $p<0.002$), with fear of contracting COVID-19 (Rho=0.22, $p<0.005$). However, there were fewer connections with specific anxiety factors, and their severity was weaker than in neuroticism, except for the correlation with the fear of COVID-19.

The level of ANS dysfunction had even fewer correlations with indicators of specific anxiety, namely with anxiety about learning difficulties (Rho=0.20, $p<0.005$), a possible decrease in academic performance (Rho=0.17, $p<0.02$), an increase the volume of independent work (Rho=0.26, $p<0.001$), the deterioration of relations with relatives (Rho=0.14, $p<0.05$), the tense state of others (Rho=0.21 $p<0.002$), and with a feeling of passing life (Rho=0.22, $p<0.002$).

The data on neuroticism and ANS dysfunction are close to those obtained by us before the COVID-19 pandemic in previous studies on a similar contingent [4]. Marked ANS dysfunction before the pandemic was observed in 68.6 % of students, during a pandemic – in 70.2 %. Before the pandemic, the assessment of ANS dysfunction was 18.6±0.2 points in boys and 26.8±1.0 points in girls, during the time – 18.9±1.7 points in boys ($p>0.05$) and 30.1±1.4 points for girls ($p<0.05$).

The level of neuroticism before the pandemic was 11.7±0.4 points in boys, 14.1±0.3 points in girls, which is close to the pandemic data. The level of extraversion decreased during the pandemic: from 13.3±0.3 points to 11.4±0.4 points in boys ($p<0.001$) and from 13.7±0.3 points to 11.3±0.3 points in girls ($p<0.001$) [4].

P. Długosz and L. Kryvachuk showed that average and high levels of neuroticism were observed in 61 % of students in Poland and 47 % in Ukraine, among those we interviewed there were 68 %. As in our studies, the level of neuroticism in girls was higher than in boys [11].

The decrease in the level of extraversion, apparently, is explained by the decrease in contacts and the limitation of movement caused by lockdowns. In our study, extraversion contributed to the ability to perceive the positive aspects of the situation, but correlated with anxiety associated with freedom of movement.

Other studies have shown an association between neuroticism and fear of COVID-19, which we did not observe [8], which may be explained by the association of this fear with boredom – a factor that was not relevant in our study group of students in the period poll. But the correlations between neuroticism and the factors "Worry about your own social life", "Worry about your own work and school", "Worry about other people's health", which were found [14] are similar to those observed in our subjects.

A.A. Cerda and L.Y. García showed that fears predominated in women, however, we did not see a significant difference in the anxiety of boys and girls. But the role of the health of relatives and economic factors shown by them in the development of fears against the background of a pandemic is fully consistent with our data [10]. Low anxiety for a number of factors also coincides well with their data on the role of education in preventing fears.

Data on student anxiety obtained in Ukraine before the pandemic in different educational institutions and at different times differ. I. Gerush et al. found in first-year medical students only high and medium levels of situational and personal anxiety, which corresponds to our results [1].

V.M. Moroz, S.Yu. Makarov found that the level of state anxiety in girls and boys of the medical university 1 month before the examination session was 43.77±1.41 points, and 42.75±1.31 points, respectively (close to those obtained in our study), and immediately before the examination session increased to 49.85±1.57 points for girls and to 47.46±1.05 points for boys [5]. Levels of trait anxiety were

46.28±1.51 points in girls and up to 40.65±1.79 points in boys 1 month before the examination session and did not change statistically significantly before the session; these values were lower than in our study (51.0±0.6 points in girls, 46.6±0.8 points in boys). But this more stable particular indicator had pronounced connections with specific anxiety indicators in our investigation.

Conclusion

In medical students, by the end of the first year of the COVID-19 pandemic, we observed increased levels of state and, especially, trait anxiety.

Among the individual disturbing factors, anxieties about the health of family members and about the difficulties and effectiveness of learning prevailed.

Anxiety state did not show correlations with the levels of specific anxiety indicators, while trait anxiety was associated with many disturbing factors.

Numerous correlations of the levels of anxiety for various specific factors with the level of neuroticism were observed. In turn, the level of neuroticism was typical for this social group.

Extraversion has decreased compared to the pre-pandemic period.

The level of neuroticism correlated with concern about the risk of family members of contracting COVID-19, while the level of trait anxiety correlated with concern about their own risk of contracting COVID-19.

The state of autonomic regulation expressed in manifestations of ANS dysfunction was typical for this social group in a boys and had minimal change in girls over the year in a pandemic.

Correlations of specific anxieties with the level of ANS dysfunction were less pronounced than with the levels of neuroticism and trait anxiety.

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