

Features of life activity and the incidence rate of anxiety and depressive disorders among medical students studying remotely during the epidemic of a new coronavirus infection (Covid 19)

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Abstract

Aims. The aim is to study the features of life and the incidence rate of anxiety and depressive disorders among medical faculty students studying remotely during the epidemic of a new coronavirus infection (Covid 19) at the Kabardino-Balkarian State University named after H.M. Berbekov.

Materials and methods. We examined 335 students (34% males, 66% females) at the Faculty of Medicine in November-December 2020. The average age of the students examined was 20.3±2.3 years. The study included an anonymous mail survey to examine educational conditions, lifestyle, levels of anxiety and depression.

Results. 43.8% of the students had insufficient sleep duration, 58.5% had low physical activity, in 24.8% of them we recorded high levels of situational anxiety and in 82.1% of them personal anxiety, in 7.1% of the students we recorded clinically expressed anxiety and 1.8% had clinically expressed depression. During the transition to remote learning, students increased the time use to prepare for classes (51.2%) and the duration of sleep (61.5%), while their physical activity decreased (76.5%). Statistically significant linear correlations were identified between the level of anxiety and depression and the duration of sleep, low physical activity, preparation time for classes, academic performance, and academic debt.

Conclusions. The results obtained by us can be used to optimize the educational process, as well as to preserve the mental health of students during the transition to distance learning.

Keywords

Students, Distance learning, Lifestyle, New coronavirus infection (Covid 19), Situational anxiety, Personal anxiety, Depression

Imprint

Aksana M. Kardangusheva, Diana Z. Kaskulova, Maryam H. Kurdanova, Antonina F. Budnik, Olga V. Voronova, Zukhra A. Gelyakhova. Features of life activity and the incidence-rate of anxiety and depressive disorders among medical students studying remotely during the epidemic of a new coronavirus infection (covid 19). *Cardiometry*; Issue 21; February 2022; p. 130-137; DOI: 10.18137/cardiometry.2022.21130137; Available from: <http://www.cardiometry.net/issues/no21-february-2022/features-of-life-activity>

Due to the spread of the new coronavirus infection (Covid 19), many higher education institutions around the world have decided to manage distance learning. According to the International Association of Universities, some colleges and universities continued full-time education, some switched to mixed or hybrid education, while other used part- or full-time online education only [1]. The transition to distance learning made it possible to ensure the continuity of the educational process. Along with the pedagogical aspects of education, maintaining the health of students is of great importance. The organization of education, which is unusual for most students, the alarming epidemic situation, and the restrictions on life activity associated with the pandemic could have an impact on the health of students [1,2].

Currently, the results of scientific studies on the impact of the pandemic on university students have been published. The largest number of publications is devoted to studies of students' adaptation to online learning and the impact of Covid-19 on students' mental health [2-8]. There are fewer studies on the impact of the pandemic on academic, social aspects, health, lifestyle and behavioral elements of students [9, 10].

In our study, we focused more on the specifics of the learning environment and lifestyle of distance learning medical students during the Covid-19 pan-

demic. In our opinion, this problem is of particular relevance for students of medical universities due to their exposure to high psychological, emotional, physical and intellectual stress in the learning process [3].

The **aim** hereof is to study the characteristics of life and the incidence rate of anxiety and depressive disorders among students of the Medical Faculty of the Kabardino-Balkarian State University named after H.M. Berbekov (KBSU), who were studying remotely during the epidemic of a new coronavirus infection (Covid 19).

Material and methods

The study was conducted at the Faculty of Medicine at KBSU in November-December 2020. During the study at KBSU, the students were taught remotely. Distance learning was organized mainly in the format of digital information system Open University at KBSU under open.kbsu.ru. Taking into account the capabilities of students (the presence and type of a gadget, the availability of Internet access and the stability of the Internet connection), Zoom, WhatsApp, etc. were also used. Remote practical, seminar and lecture online classes were held, as well as the exchange of educational information (tasks, abstracts, essays, etc.) using various digital devices. Personal contact between lecturers and students was excluded.

We interviewed 335 students (34% (n=114) males, 66% (n=221) females) of 3-4 courses, Medicine specialty. The average age of the surveyed students was 20.3 ± 2.3 years. The majority of students were not married (85.6%). Only 14.4% of the students, of which 22.5% of the males and 77.5% of the females were married ($p < 0.0001$). Among the students we interviewed, 4.7% (6.8% of males and 3.6% of females) were employed. In the structure of positions of employed students, the positions of paramedic (12.5%), nurse (37.5%) and orderly (18.8%) prevailed.

Our study included an anonymous mail survey to examine educational conditions, lifestyle, levels of anxiety and depression. The questionnaire contained questions that allowed assessing marital status, education, information about employment, level of physical activity, academic performance, academic debt, time used to prepare for classes, duration of classes, sleep duration, as well as respondents' assessment of changes in learning conditions, lifestyle when switching to distance learning. To determine the level of situational anxiety (SA) and personal anxiety (PA), testing was carried out according to the Spielberger-Khanin

method [11]. When assessing levels of anxiety, a score under 30 was assessed as low anxiety; from 31 to 45 – moderate anxiety and from 46 or over – high anxiety [11]. Anxiety and depression levels were measured using the HADS Anxiety and Depression Scale developed by A.S. Zigmond and R.P. Snaith in 1983 [12]. When assessing the levels of anxiety and depression, a score under 8 is regarded as the absence of significantly expressed symptoms of anxiety and depression, 8-11 as subclinically expressed anxiety/depression, 12 and over as clinically expressed anxiety/depression [12]. Physical activity was assessed according to the Global Questionnaire on Physical Activity recommended by the World Health Organization. The group of persons with low physical activity (LPA) included students whose moderate-intensity physical activity was less than 150 minutes per week, or high-intensity physical activity less than 75 minutes per week [13].

Statistical analysis of the data was carried out using STATISTICA 6.0 software (StatSoft Inc, USA). The results are presented as the mean and its standard deviation for continuous variables and as a percentage for categorical variables. Hypotheses about a possible relationship between individual quantitative variables were refined by the method of paired correlation analysis. The results of the correlation analysis were interpreted on the basis of the Spearman criterion, while determining the rank correlation coefficient r . The values of $p < 0.05$ were taken as the critical level of significance when testing statistical hypotheses.

Results

The average sleep duration of students is 7.5 ± 1.5 hours. As shown in Figure 1, 43.8% of students sleep less than 8 hours a day (44.8% of the females and 41.9% of the males).

It is noteworthy that the duration of sleep on distance learning has changed in 70.3% of students (70.9% of the males and 70% of the females). Moreover, in 61.5% of the students (63.2% of males and 60.5% of females) the duration of sleep increased. The distribution of students according to the time of increasing the duration of sleep is shown in Figure 2 herein.

In 48.3% of the students (52% of the males and 46.6% of the females) the sleep duration increased by 2 hours and in 23% (26% of the males and 21.5% of the females) by 3 hours, respectively. Gender differences were statistically significant among those students which demonstrated an increase in the duration

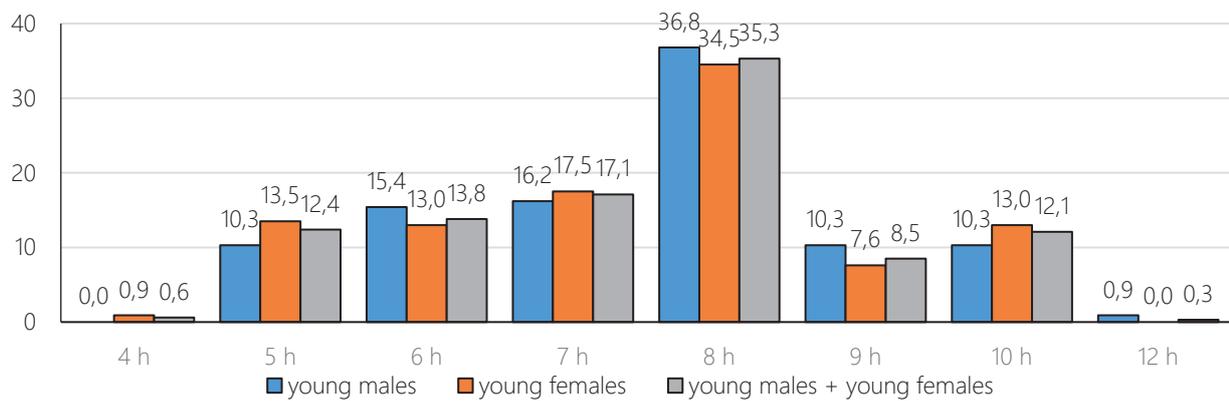


Figure 1. Distribution of students by sleep duration

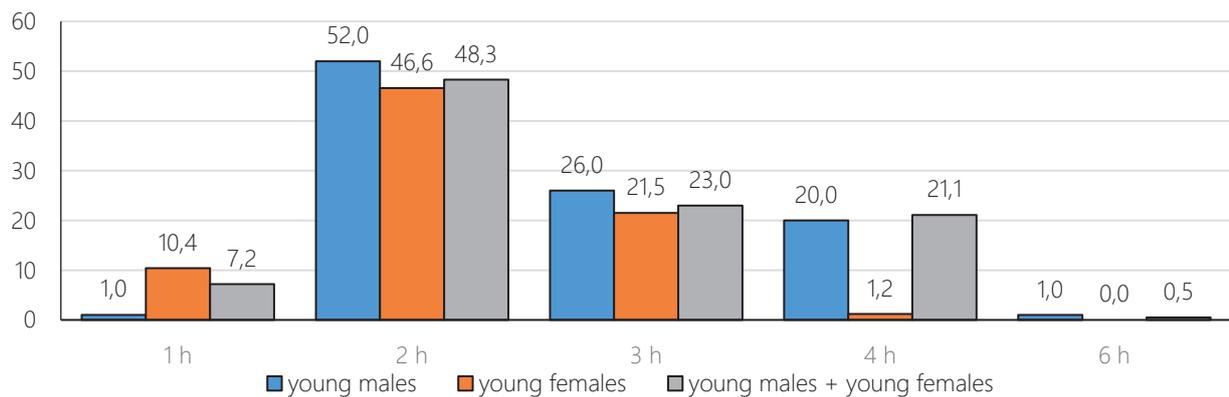


Figure 2. Distribution of students according to the time of increase in sleep duration (%)

of sleep by 1 hour (1% of the males and 10.4% of the females, $p < 0.01$) and by 4 hours (20% of the males and 1.2% of the females, $p < 0.0001$).

Along with this, 12.6% of the students (7.7% of the males and 9.4% of the females) reported a decrease in sleep duration. The distribution of students according to the time of the sleep duration decrease is shown in Figure 3 herein. It is noteworthy that in most students the duration of sleep decreased by 2 hours (77.7% of the males and 42.9% of the females, $p < 0.0001$) and 3 hours (22.2% of the males and 23.1% the females).

More than half of the students we surveyed (58.5%) were found to have LPA. Moreover, LPA was more common among females than among males (64.8% versus 46.6%, $p < 0.01$). It is noteworthy that 87.2% of the students (87.9% of the males and 86.8% of the females) indicated changes in their physical activity during distance learning. Among the students who indicated the nature of changes in physical activity (33.6%), 76.5% of the students reported a decrease in physical activity (56% of the males and 83.6% of the females, $p < 0.0001$), and an increase was reported in 23.5% of the students (44% males and 16.4% females, $p < 0.0001$).

Teaching hours spent on online learning varied from 1 hour to 8 hours per day, averaging 5.6 ± 3.3 hours. Moreover, 81.5% of students spent 5-6 hours per day on online learning, 10% - 4 hours, 5.9% - 1-2 hours, 2.6% - 7-8 hours. The time for preparing students for classes varied from 1 hour to 16 hours (see Figure 4 herein), averaging 6.0 ± 1.9 hours. More than a third of the students we surveyed spent 6 hours preparing for classes.

The time of preparation for classes during the transition to distance learning has changed for 57.7% of the students (59% of the males and 57% of the females). Moreover, 51.2% of the students (53.9% of the males and 49.8% of the females) increased the time of preparation for classes, and 6.5% of the students (5.1% of the males and 7.2% of the females) decreased it. In the distribution of students according to the change in the time of preparation for classes, gender differences were identified (see Figure 5,6 herein). In the males, the preparation time for classes increased by 1 hour and 8 hours, more often than it was the case with the females ($p < 0.01$): in the females we recorded an increase by 2 hours and 4 hours more often than the respective data in the males ($p < 0.05$; $p < 0.01$). Among

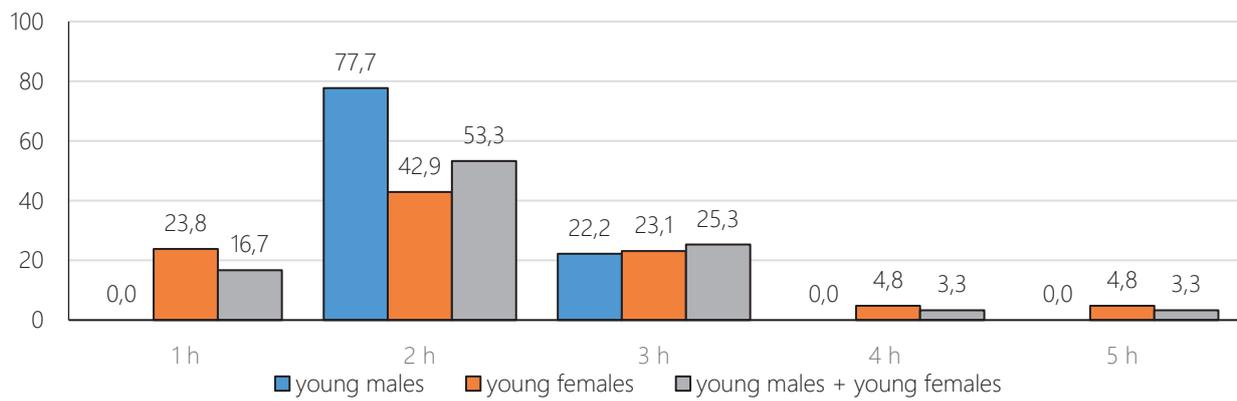


Figure 3. Distribution of students according to the time of decrease in sleep duration (%)

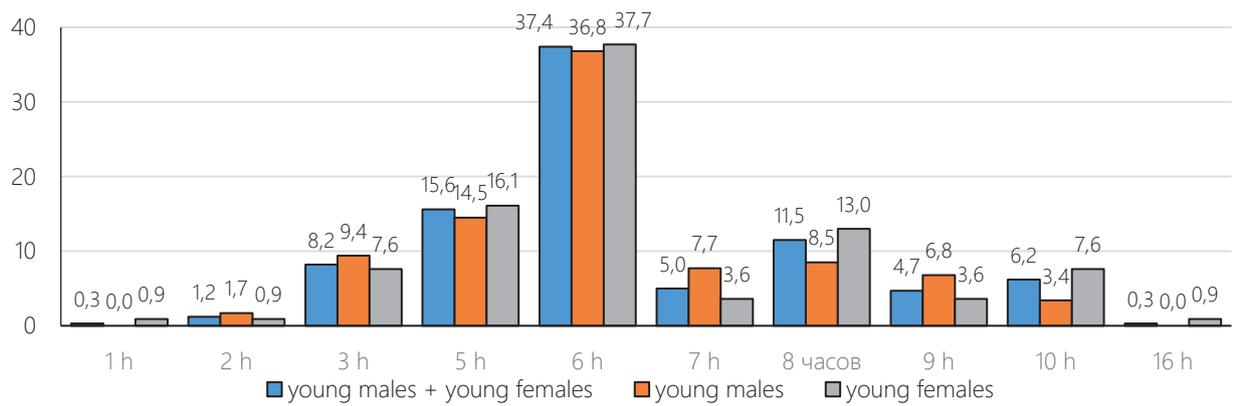


Figure 4. Distribution of students by time of preparation for classes (%)

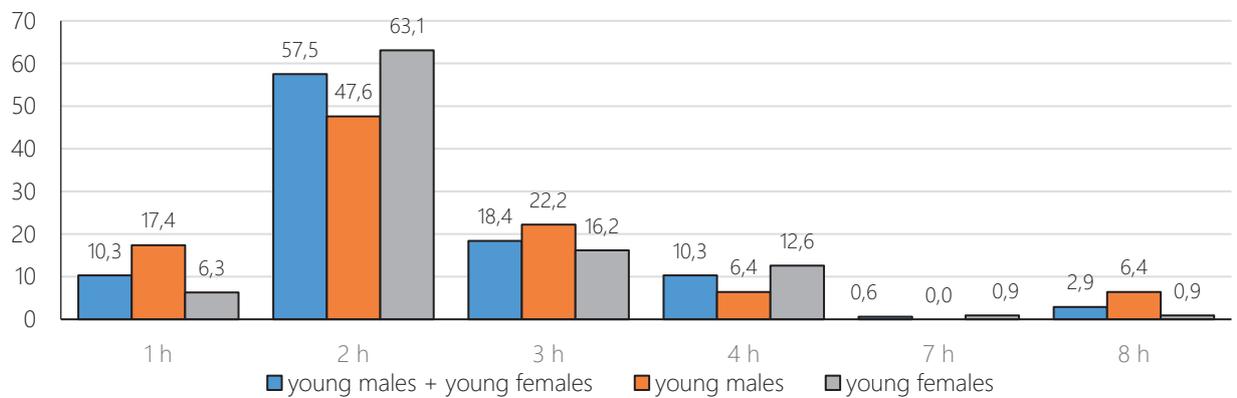


Figure 5. Distribution of students by increase in preparation time for classes (%)

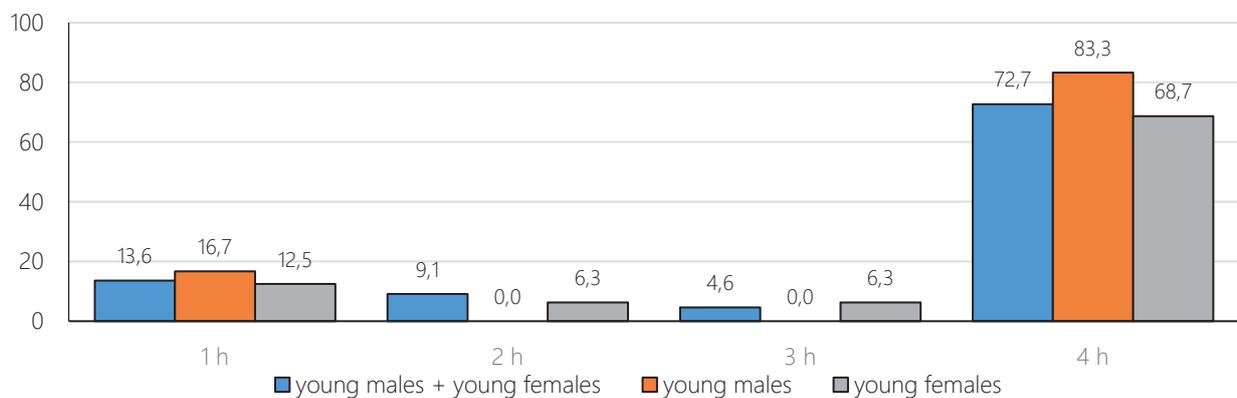


Figure 6. Distribution of students by reduction of preparation time for classes (%)

the males, the time of preparation for classes also decreased by 4 hours more often than among the females ($p < 0.01$).

17.1% of the students had academic debts (13.7% of the males and 18.8% of the females). The distribution of the students by the number of academic debts is shown in Figure 7 herein. The females more often than the males had 1 debt ($p < 0.0001$), and the males more often than the females had 2 and 4 debts ($p < 0.0001$, $p < 0.01$). The presence of 3 and 5 debts was indicated only by the females, and 6 debts only by the males.

Most of the students we interviewed (63.8%) indicated good academic performance (see Figure 8 herein).

Among the examined students, moderate levels of SA were determined (43.6 ± 4.8 points) and high levels of PA (49.1 ± 5.2 points, Table 1). Low levels of anxiety were detected only in three students, of which in two cases a low SA was determined, and in one case a low PA was recorded. Most of the students we interviewed had an average level of SA (74.6%) and a high level of PA (82.1%). The prevalence of high SA among all students was 24.8%. The gender differences in SA and PA levels did not reach the level of statistical significance.

The prevalence of anxiety and depression among students according to the HADS scale is presented in

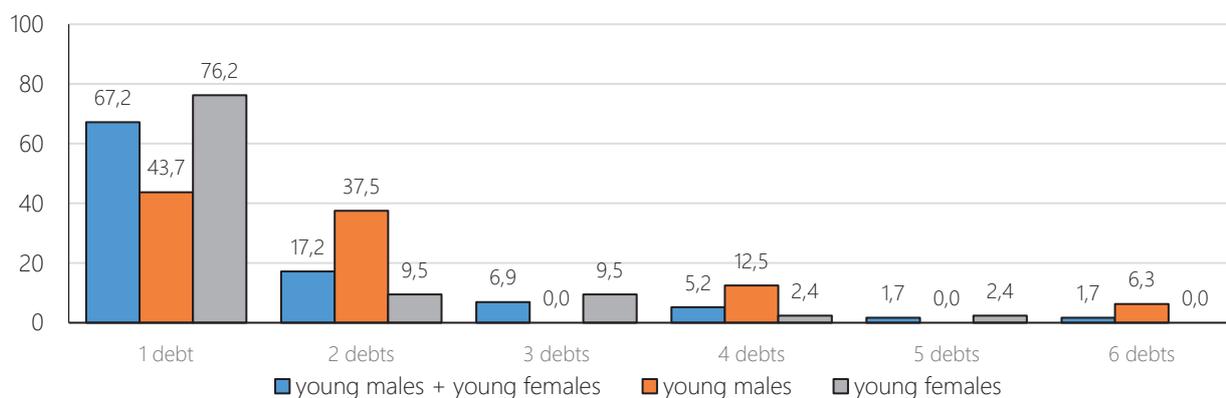


Figure 7. Distribution of students by the number of academic debts (%)

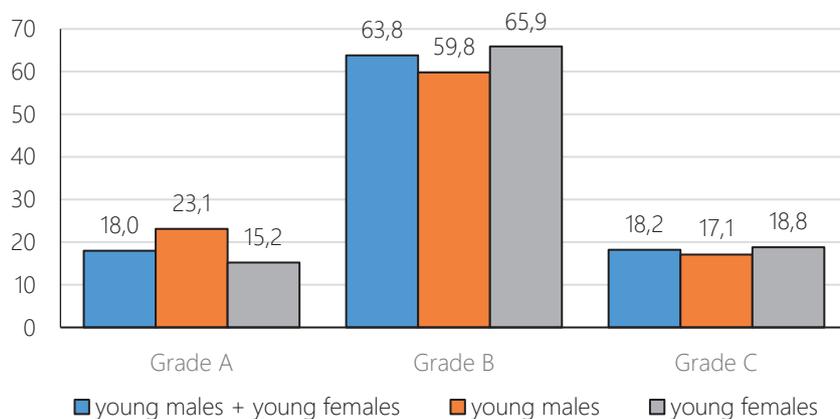


Figure 8. Distribution of students by academic performance (%)

Table 1
SA and PA levels of students

Levels	Situational anxiety			Personal anxiety		
	Males	Females	Total	Males	Females	Total
Average values, points ($M \pm \delta$)	43.7 ± 5.0	43.6 ± 4.7	43.6 ± 4.8	49.0 ± 5.3	49.2 ± 5.1	49.1 ± 5.2
Low, n (%)	0	2 (0.9)	2 (0.6)	1(0.9)	0	1(0.3)
Moderate, n (%)	83 (72.8)	167 (75.6)	250 (74.6)	17 (14.9)	42 (19)	59 (15.5)
High, n (%)	31(27.2)	52 (23.5)	83 (24.8)	96(84.2)	179 (81)	275 (82.1)

Table 2

Distribution of anxiety and depression among students according to the HADS scale

Indicators	Males	Females	Total
Subclinical anxiety	6.8	14.4	11.8
Clinical anxiety	9.4	5.9	7.1
Subclinical depression	8.5	7.7	8
Clinical depression	1.7	1.8	1.8

Table 2 herein. Symptoms of clinically expressed depression were recorded only in 1.8% of the students, and symptoms of clinically expressed anxiety in 11.8% of them. Gender differences did not reach the level of statistical significance.

To assess an impact of high anxiety, levels of anxiety and depression on other indicators studied by us, we conducted a correlation analysis. As shown in Table 3, a strong direct correlation was obtained between the level of PA and a decrease in the time of preparation for classes during the transition to distance learning; the severity of anxiety and an increase in the preparation time for classes when switching to distance learning. Moderate and inverse correlations were identified between the severity of anxiety and LPA; between the level of PA and the duration of sleep and a decrease in physical activity during the transition to distance learning. Medium strength and direct correlations have been found: between the severity of depression and a decrease in the time to prepare for classes and a decrease in physical activity during the transition to distance learning; between PA and the amount of debts. Weak strength and inverse correlations have been detected between the severity of anxiety and the duration of sleep, between the severity of depression and the duration of sleep and LPA; between PA and LPA. Weak strength and direct correlations have been revealed: between the severity of anxiety and the presence of academic debt; between the severity of depression and the time to prepare for classes, academic performance, the presence of academic debt, an increase in sleep duration and time to prepare for classes when switching to distance learning. In relation to SA, correlations of weak strength and direct correlations with academic performance, academic debt and LPA were obtained, in relation to PA – with the time of preparation for classes and the presence of academic debt.

Table 3

Correlations between the levels of anxiety and depression with some of the studied indicators ($p < 0,05$)

Indicator	Anxiety	Depression	Personal anxiety	Situational anxiety
Sleep duration	-0.24	-0.24	-0.35	
Increase in sleep duration when switching to distance learning (hours)		0.25		
Preparation time for classes (hours)		0.11	0.16	
Increase in preparation time for classes when switching to distance learning (hours)	0.89	0.16		
Decrease in the preparation time for classes when switching to distance learning (hours)		0.45	0.96	
Academic performance		0.18		0.22
Academic debts	0.12	0.14	0.16	0.14
Number of academic debts			0.35	
Low physical activity	-0.33	-0.22	-0.23	0.15
Increase in physical activity during the transition to distance learning (hours)		0.41		
Decrease in physical activity during the transition to distance learning (hours)			-0.33	

Discussion

The pandemic has produced a great impact on the activities of higher education institutions and the higher education system: millions of students around the world study remotely [1], and it is not known when higher education institutions will return to the traditional format of education, and whether they will return. In this regard, it is necessary to understand the patterns of changes in the life of students arising in connection with the pandemic and their impact on mental health. Important components of the life of students include adequate sleep duration, optimal physical activity, a healthy psychological atmosphere in their environment and the effective organization of the educational process. When studying the characteristics of the life of the students at the KBSU Fac-

ulty of Medicine, who were studying remotely during the Covid 19 pandemic, we found that almost every second student still has insufficient sleep, despite its increase with the transition to distance learning. The high prevalence of LPA and its increase with the transition to distance learning characterized the students we surveyed. Moreover, the most unfavorable situation in terms of LPA in the group of the females, among which both the prevalence of LPA and an increase in the latter during distance learning, is higher than among males. The high prevalence of LPA and its increase with the transition to distance learning have been established by other researchers [2,4,5,8]. J.F. Huckins et al (2020) notes that American college students have reduced their physical activity and are visiting fewer places, while reporting increased symptoms of anxiety and depression [5].

With regard to teaching hours spent on online learning, it can be concluded that in most cases, students were covered by online classes in accordance with the schedule. This is a teacher-controlled part of the learning process. Therefore, the study load in hours, according to the results of the survey of the students, does not differ from the study load in the curricula of the corresponding courses. As for the preparation time for students' classes, its variability and increase in the transition to a distance learning format for half of the students we surveyed can be associated both with the low adaptation of students to online learning and the need to reconsider the workload on the student. This can also be indicated by the presence of academic debt recorded for every sixth student. Despite the increase in preparation time for classes as a result of the transition to distance learning, the progress of most students is good that may indicate their high motivation. Summarizing the above, we can conclude that the university staff has done a good job organizing distance learning, and the recommendation to adapt students to online learning and review the workload on the student, in our opinion, can improve the quality of distance learning.

The Covid-19 pandemic, which has disrupted the daily lives of people around the world, can certainly put people at greater risk of mental health problems. Researchers consider high anxiety and depression as consequences of a viral pandemic [14]. When studying the anxiety level of the KBSU students, we have found a high prevalence of PA. It is known that PA is associated with genetically determined properties of the functioning human brain, which cause a constant-

ly elevated level of emotional arousal and, along with increased SA caused by various stress factors, contributes to the development of distress and psychosomatic pathologies [11].

In the context of the Covid-19 pandemic, symptoms of mental disorders are of growing concern around the world [4-8]. According to the Healthy Minds Study [15], more than 50% of American college students are concerned about becoming infected by Covid-19, and about 90% are concerned about their personal safety. Students also have a lower level of psychological well-being than before the pandemic [15]. A.H. Khan et al (2020) identify stress, anxiety and depression as common symptoms among Bangladeshi college students and fear of contracting Covid-19 as the main cause of these symptoms [7]. Studies conducted in Chinese colleges show that students are concerned about delays in their studies, negative economic consequences, routines and daily activities [6].

Our correlation analysis identified some statistically significant linear relationships of various strengths between the severity of anxiety and depression and the level of anxiety, on the one hand, and some lifestyle factors (sleep duration and its changes, low physical activity, changes in physical activity) and the educational process (time to prepare for classes and its change, academic performance, academic debt) on the other hand. Although the correlation does not directly indicate a causal relationship, it can be assumed that the factors we have identified can influence both the level of anxiety and the severity of anxiety and depression. These factors are quite flexible and easily manageable. Rational modulation and control over them can neutralize high anxiety, as well as manifestations of anxiety and depression. There is no doubt that recommendations on the organization of sports or physical exercises and the rational distribution of preparation time for classes for students in distance learning can be useful.

Conclusions

Thus, we have studied the characteristics of life activity and the incidence rate of anxiety and depressive disorders among the students at the KBSU Faculty of Medicine, who were studying remotely during the Covid 19 pandemic, as well as the relationship between the state of mental health of students and the parameters of their life included in the study. We have found that during the transition to distance learning in the life of the KBSU students, there are unfavorable

changes for their health in the form of a decrease in physical activity, an increase in the time for preparing for classes, and favorable changes in the form of an increase in the duration of sleep. We have shown that the students of the Medical Faculty at KBSU have a very high level of anxiety and developing anxiety-depressive disorders. Some statistically significant linear correlations have been detected between the level of anxiety and depression on the one hand and the duration of sleep, changes in sleep duration, LPA, changes in physical activity, time to prepare for classes and its changes, academic performance and the presence of academic debt, on the other hand. Knowledge of the factors contributing to the emergence of anxiety and depressive disorders in students will be useful for improving the educational process at the Faculty of Medicine at KBSU. The results obtained by us can be used to optimize the academic process, as well as to preserve the mental health of students during the transition to distance learning.

Statement on ethical issues

Research involving people and/or animals is in full compliance with current national and international ethical standards.

Conflict of interest

None declared.

Author contributions

The authors read the ICMJE criteria for authorship and approved the final manuscript.

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