



ORIGINAL ARTICLE / ОРИГИНАЛНИ РАД

Depression and insomnia among students during the COVID-19 pandemic – a cross sectional study

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SUMMARY

Introduction/Objective In the first year of the COVID-19 pandemic, global prevalence of anxiety and depression increased by a massive 25%, according to the World Health Organization. The objective of the study was to determine the level of depression and insomnia among students in North Macedonia during the COVID-19 pandemic.

Methods A cross-sectional study was performed among students of the Ss. Cyril and Methodius University in Skopje during May–July of 2021. The anonymous online survey contained questions regarding their sex, age, their opinion and attitude towards the COVID-19 infection, if they had any infection/isolation, and about physical activity during the pandemic. We used scales for assessment of insomnia (Insomnia Severity Index – ISI) and depression (Patient Health Questionnaire 9 – PHQ-9).

Results The study was completed by 355 participants, 28.4% of them had clinically important insomnia scores and almost 47.5% of the participants presented clinically important depression scores. Female and younger participants had higher scores for both scales. A highly statistically significant, positive correlation was detected between ISI and PHQ-9 scores ($\rho = 0.646$, $p = 4.05 \times 10^{-43}$), suggesting that during the examined cross-sectional period of the COVID-19 pandemic, depression and insomnia were mutually connected.

Conclusion The COVID-19 pandemic caused a serious impact on mental health of the population, especially on young people, girls, students, and those who live alone. Therefore, we should be prepared for support and treatment of these vulnerable groups, not only as health care services, but also as educational institutions, to provide support to students in terms of consultation and motivation.

Keywords: pandemic; COVID-19; adolescents; insomnia; depression

INTRODUCTION

Nowadays, depression is a considerable cause of disability worldwide and a leading causation of a mental health-related disease burden [1]. On the other hand, sleep is extremely important for the overall function of the body, so cumulative long-term effects of insomnia have health consequences such as increased risk of hypertension, diabetes, obesity, depression, heart attack, and stroke [2].

Contrary to fear, which is a natural physiologic reaction that prepares our body for action in case of real danger, anxiety is an emotional state that occurs even when no real danger is present. Anxiety can affect and influence both depression and insomnia. With appearance of the virus COVID-19 in early 2020, anxiety was pushed to new levels, because of many reasons: change of daily routines, threats of illness and possible death, social isolation, living in small, sometimes crowded living spaces [3].

Clinical signs of COVID-19 infection were unknown and uncertain in the beginning of

the pandemic and changing with time because of virus mutations. Fear of infection, other health, economic, and sociological challenges such as temporary unemployment, expensiveness, home-schooling/studying, and lack of physical contact with other family members, friends and colleagues contributed to different psychological problems during the pandemic.

In the first year of the COVID-19 pandemic, global prevalence of anxiety and depression increased by a massive 25%, according to a scientific brief released by the World Health Organization [4]. COVID-19 pandemic has had a tremendous impact on people's lives, affecting both physical and mental health [5]. Sleep disorders have been associated with infectious disease hazard, the incidence and progression of many diseases including depressive disorder [6]. During the COVID-19 pandemic depression, anxiety and insomnia were very prevalent [7]. The prevalence of anxiety, depression, and stress was 74.9%, 43.3%, and 78.9%, respectively, among medical students in North Macedonia during December 2020 [8].

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It is well known that depression, anxiety, and insomnia are important issues that could worsen mental wellbeing especially during a pandemic.

The objective of the study was to determine the level of depression and insomnia among students in North Macedonia during the COVID-19 pandemic.

METHODS

Study design and procedures

We designed and performed an anonymous online survey among students of the Ss. Cyril and Methodius University in Skopje, North Macedonia, for the period from May to the end of July 2021. The questionnaire especially created for this study consisted of questions regarding the sex and age of the participants, questions about their opinion of and attitude towards the COVID-19 infection, questions whether they had infection and/or isolation, and questions about physical activity during the pandemic. We used scales for the assessment of insomnia (Insomnia Severity Index – ISI) and depression (Patient Health Questionnaire 9 – PHQ-9). The ISI is a reliable and valid instrument consisting of seven-item assessment of insomnia symptoms over the prior two weeks, with items rated on a scale ranging from 0 (“no problems”) to 4 (“very severe”). Total scores are categorized as not clinically significant (0–7), subthreshold insomnia (8–14), moderate insomnia (15–21), or severe insomnia (22–28) [9]. PHQ-9 is a multipurpose instrument for screening, diagnosing, monitoring, and measuring depression severity and consists of nine questions that are relevant for rough estimation of the depression level. Each item is rated on a scale ranging 0–3. Total score below 4 suggests minimal depression and there is no need for treatment; 5–9 suggest mild depression; 10–14 suggest moderate depression, where clinical judgment based on duration of symptoms and functional impairment is necessary. Scores 15–19 suggest moderately severe depression, and severe depression is 20–27 points [10].

The study complied with the principles of Declaration of Helsinki, and we received an approval from the Human Research Ethics Committee within the Faculty of Medicine, Ss. Cyril and Methodius University in Skopje (No 03-2092/1). Participants in the survey were informed about the research study and gave their consent to participate.

Statistical analyses

The statistical analyses were performed using IBM SPSS Statistics, Version 21.0 (IBM Corp., Armonk, NY, USA). Categorical variables were expressed as the percentage of individuals, and the differences in the frequencies among the groups were calculated with the contingency coefficient and the χ^2 tests. Since the distribution of the values of all ordinal variables (age; ISI; PHQ-9 depression score) differed significantly from normality (Shapiro–Wilk’s test, $p < 0.001$, Figure 1a–c), these results were expressed as

median and interquartile range (IQR, reported as values of Q1–Q3). The Kruskal–Wallis F-test (followed by Mann–Whitney U-tests) was used to compare the differences in the central tendencies among the groups. The bivariate statistical analyses were performed using non-parametric correlation with Spearman’s ρ -coefficient. In all cases, the level of statistical significance was defined as $p < 0.05$ (marked as *), i.e., $p < 0.001$ for highly significant (***)

RESULTS

The study was completed by 355 participants, response rate was 76%, the study group was characterized by dominantly female participants (83.4%), with an age range 18–36 years (median of 21; 20–23 interquartile range). Most of the respondents lived in a family accommodation with equal to or more than four members (42.5%), or less than four members (35.2%) (Table 1).

Table 1. Descriptive statistics of the study participants (n = 355)

Variable	Frequency ^a / median (Q1–Q3) ^b
Age	21 (20–23)
Sex	
male	16.6%
female	83.4%
Type of household	
family accommodation with equal to or more than 4 members	42.5%
family accommodation with less than 4 members	35.2%
in a student dormitory	4.2%
alone in an apartment	18%
Insomnia Severity Index score	10 (5–15)
PHQ-9 Depression Score	9 (5–15)
Fear of COVID-19 infection	
not present	32.7%
mild	38.6%
moderate	21.1%
severe	7.6%
Previous infection with COVID-19	
have not been infected and have not got sick with COVID-19	55.8%
have not been infected with COVID-19, but underwent isolation	17.7%
have been infected and got sick with COVID-19	26.5%
Psychological changes and connection with COVID-19	
not related	36.9%
probably connected	47.3%
certainly connected	15.8%
Physical activity in the past months of COVID-19 pandemics	
yes	63.1%
no	36.9%
Weekly physical activity	
less than 150 minutes	69.9%
equal to or more than 150 minutes	30.1%

^aCategorical variables are expressed as percentage of individuals;

^bordinal variables are expressed as median and interquartile range (as Q1–Q3)

The analyses of distribution of frequencies have shown that variables age, ISI, and PHQ-9 scores differ significantly from normality (Shapiro–Wilk’s test $p < 0.001$). Most of our participants (207 participants, i.e., 58.6%) were

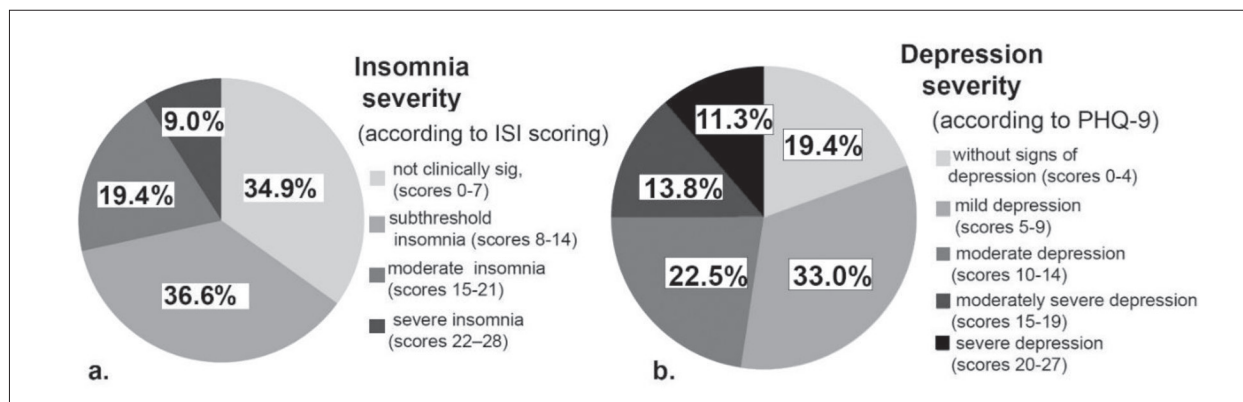


Figure 1. Insomnia (a) and depression severity (b) among the study participants

19–21 years old, characterized by subthreshold insomnia scores (maximal frequency of ISI results score was 8), and PHQ-9 scores corresponded to mild depression (maximal frequency of PHQ-9 score was 5). Concerning the connections with COVID-19, only 26.5% of the participants had been infected and had got sick with COVID-19 (most of the study participants were not infected with COVID-19 and did not undergo isolation – 55.8%); nevertheless, most of the participants answered that they had mild fear from the COVID-19 infection (38.6%). Only 15.8% of the study participants reported that their psychological changes were probably connected with COVID-19, while 47.3% stated that these changes were probably connected with COVID-19. Regarding the physical activity, most of the participants were not physically active during the previous months of COVID-19 pandemics (63.1%) or were physically active for less than 150 minutes for one week (69.9%).

After categorization of ISI scores, 34.9% of the participants were without any signs of insomnia (scores 0–7), 36.6% were expressing subthreshold insomnia (scores 8–14), and 28.4% had clinical important scores higher than 15 (i.e., 19.4% of the participants with moderate insomnia and 9% with severe insomnia) (Figure 1a).

Mild depression was detected in 33% of the participants (scores 5–9), moderate depression in 22.5% (scores 10–14), moderately severe depression was present in 13.8% (scores 15–19), and severe depressive episode was present in 11.3% (scores 20–27) of the examinees (Figure 1b).

Although our study group was mainly dominated by female participants, still the statistical tests were able to detect clear significant effects of sex on the ISI and PHQ-9 scores; namely, female participants had higher scores both for the ISI insomnia index ($U = 6989$, $*p = 0.015$; Figure 2a) and the PHQ-9 ($U = 5885$, $***p = 0.00007$; Figure 2b), suggesting that females were more susceptible to psychological changes during COVID-19 pandemics. The results were more evident for PHQ-9 depression score, where analyses of frequencies showed that only 12.5% of the female participants suffered from severe depression, while only 5.1% of the male population was characterized with severe depression (contingency coefficient = 0.206, $\chi^2 = 15.73$, $*p = 0.003$).

The type of household has shown mild effect only on the insomnia ISI score, statistically significant higher insomnia ISI scores were detected in participants who lived alone in the apartment, when compared to the participants accommodated in a family with equal to or more than four members ($U = 4600$, $*p = 0.039$; Figure 2c).

Younger participants were shown as more susceptible to both insomnia and depression; the bivariate statistical analyses revealed negative, mild, but statistically significant correlations of age with both the ISI score ($\rho = -0.208$, $***p = 0.0009$; Figure 2d) and especially the PHQ-9 depression score ($\rho = -0.264$, $***p = 4.9 \cdot 10^{-7}$; Figure 2e). From the scatters (Figures 2d–e; trend of the relation along with 95% confidence interval is shown) it can be noted that for both scores, younger participants have more diverse specter of scores, but as age increases, participants older than 26 years expressed only low scores (up to score 10 for ISI and up to score 6 for PHQ-9). Further analyses disclosed that this relation of age with ISI and PHQ-9 scores was not affected by sex, since similar correlation coefficients were assessed for both male and female participants.

A highly statistically significant, positive, and strong correlation was detected between ISI and PHQ-9 scores ($\rho = 0.646$, $p = 4.05 \cdot 10^{-43}$, Figure 2f), suggesting that during our examined cross-sectional period of the COVID-19 pandemic, depression and insomnia were mutually interrelated and interconnected. Higher ISI scores were associated with higher PHQ-9 scores and vice versa. The analyses of frequencies confirmed highly significant elevated percentage of severe insomnia in participants assessed with severe depression, when compared to the ones with absence of depression (46.9% vs. 3.1%, respectively; contingency coefficient = 0.553, $\chi^2 = 156.188$, $***p = 3.14 \times 10^{-27}$; Figure 2g).

DISCUSSION

This study confirmed a high level of insomnia and depression in students, expressed with high percentage of fear (mild was 38.6% and moderate to severe in 28.7% of the examinees), although 55.8% of the participants had not been infected, against 26.5% of them who had got sick with

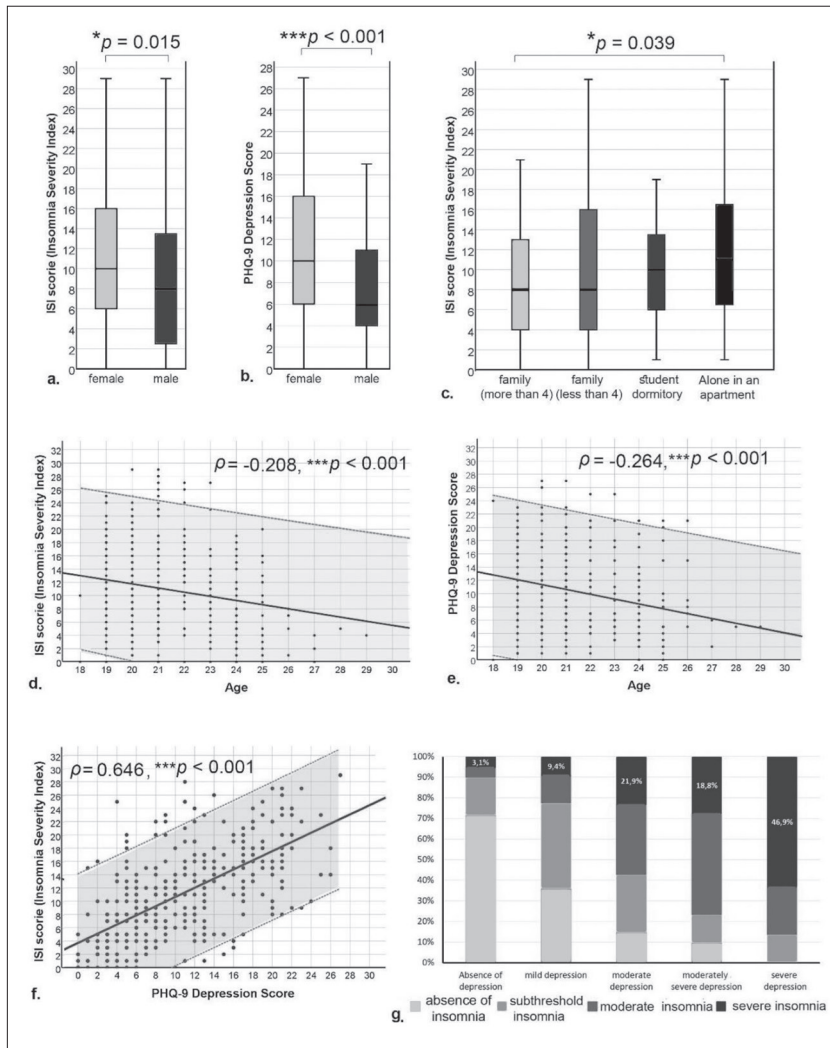


Figure 2. Effects on sex, age, and type of household on the Insomnia Severity Index (ISI) score and the PHQ-9 depression scores; mutual relations between ISI and PHQ-9; a. female participants showed significantly higher scores for the ISI index ($*p = 0.015$); results shown as median and interquartile range (IQR), depicted with boxplot; b. female participants had highly significantly elevated depression scores according to PHQ-9 ($***p = 0.0007$); results shown as median and IQR, depicted with boxplot; c. significantly higher insomnia ISI scores were detected in participants who live alone in the apartment, when compared to the participants accommodated in a family with more than four members ($*p = 0.039$); results shown as median and IQR, depicted with boxplot; d. effects of age on the ISI score; negative, mild, but statistically significant correlation of age was shown with the ISI score ($\rho = -0.208, ***p = 0.0009$); the scatter depicts the linear trend, with the 95% confidence interval; e. effects of age on the PHQ-9 score; negative, mild, but statistically highly significant correlation of age was shown with the PHQ-9 depression score ($\rho = -0.264, ***p = 4.9 \times 10^{-7}$); the scatter depicts the linear trend, with the 95% confidence interval; f. a highly statistically significant, positive, and strong correlation was detected between the ISI and the PHQ-9 scores ($\rho = 0.646, p = 4.05 \times 10^{-43}$); the scatter depicts the linear trend, with the 95% confidence interval; g. a highly significant elevated percentage of severe insomnia (46.9%) in participants assessed with severe depression, when compared to the ones with absence of depression (3.1%); $\chi^2 = 156.188, ***p = 3.14 \times 10^{-27}$; analyses based on comparison of frequencies with a contingency table

need for medical care and treatment seems indubitably warranted. Statistically significant higher insomnia ISI scores were detected in participants who lived alone in the apartment. Younger participants were more susceptible to both insomnia and depression. Highly statistically significant, positive, and strong correlation between the ISI and the PHQ-9 scores ($\rho = 0.646, p = 4.05 \cdot 10^{-43}$, Figure 3f) proved that during our examined cross-sectional period of the COVID-19 pandemic, depression and insomnia were mutually interrelated and interconnected.

Based on the U.S. Census Bureau Household Pulse Survey data, the United States Centers for Disease Control reported significant increases in symptoms of anxiety and depressive disorders among adults aged ≥ 18 years from August 19, 2020 to February 1, 2021, with the largest increases among adults aged 18–29 years and among those with less than secondary education. Across the entire study period, the frequency of anxiety and depression symptoms was positively correlated with the average number of daily COVID-19 cases [11].

The study performed before COVID-19 pandemic in Thailand showed that psychological problems associated with depression were anxiety, sleep problems, internet addiction, and loneliness [12]. One review found that students experienced moderate to extremely severe scores and depression (34%) during the first weeks of confinement and points out to females, especially adolescents, as more susceptible to psychological changes [13]. The systematic review and meta-analysis found pooled prevalence of depression of 43.3% in university students and 25% of anxiety connected with females and somatic disorders [14].

This is in line with the data by WHO, according to which it should not surprise us that COVID-19 pandemic triggered a 25%-increase in prevalence of anxiety and depression worldwide and most affected were young people and women [4]. Young people were at higher risk of developing mental health problems than adults [15]. Young respondents reported more severe insomnia symptoms, subjectively poorer sleep quality, and

COVID-19. Almost half of the examined students (47.32%) thought that the psychological changes were probably connected to the COVID-19 pandemic and 16% of them confirmed that they were certainly connected.

Clinically important depression scores were detected in 47.5% of the participants and 28.4% of the participants had clinically important insomnia scores; therefore, the

a more prevalent disruption of sleep habits (bedtime, get-up time, nap) than the elderly. On the other hand, older participants showed shorter sleep duration. Finally, the younger population displayed higher levels of depression and perceived stress [16]. Recently performed meta-analysis has shown that female participants from the general population and university students experienced a statistically significant change in depression symptoms by minimal to small amounts during the pandemic [17]. One Chinese study also reported very high rates of clinically significant insomnia (20%), acute stress (15.8%), anxiety (18.5%), and depression (24.5%). The sample was composed predominantly of females (70%), similar to our study, and insomnia was generally more prevalent among females [18]. Researchers from Serbia reported moderate to severe depression in 28.9%, anxiety in 36.9%, and stress symptoms in 38.1% of the adult population, but students had a significantly higher level of depression and stress, while older age was protective against anxiety and stress [19]. A study performed in England has shown that higher number of COVID-19 deaths was associated with increased depressive and anxiety symptoms, and they found also longitudinal association of mental health with individual level factors, like COVID-19 knowledge, COVID-19 stress, COVID-19 infection, and social support [20].

In the cross-sectional study conducted in Brazil, with participants aged 13–18 years, more than half (58.2%) had worsened their sleep quality during the pandemic. The authors found significant associations between sleep and decreased school motivation ($p = 0.005$), and between sleep and sex ($p = 0.015$). The pandemic affected more females, 25.5% reported poorer sleep quality, 67% had sleep disorders; 30.1% students reported stress and anxiety [21].

Analyzed relation and interplay between insomnia and depression severity confirmed that they are mutually interrelated and interconnected. Insomnia, anxiety, and depression were very prevalent during the pandemic. Anxiety and depression were more severe in the insomnia than in the non-insomnia group, and insomnia and mental health care were closely related [22]. The COVID-19 pandemic has resulted in numerous life changes that may be conceptualized as precipitating events for the development of insomnia symptoms [23]. ISI scores showed that one third was without signs of insomnia, but the rest expressed sub-threshold insomnia (36.62%) and clinical important scores were present in 28.45% of them. Statistically significant higher scores of insomnia were present in participants living alone. This result is in line with other studies [24]. The results indicated that insomnia is more severe in people who are female, young, and are experiencing a high degree

of threat from COVID-19. The prevalence of insomnia was highly variable between sites, but the predictors appeared to be the same everywhere. Insomnia was significantly related to mood disorders, anxiety disorders, substance use disorders, and psychotic disorders [25]. According to a study during the first COVID-19 outbreak, insomnia was more severe in females, young people and those experiencing high threat [26].

Females, physically non-active people, people who fear COVID-19, are associated with insomnia [27, 28]. Almost two-thirds (63.1%) of the examinees said that they had less than 150 minutes (69.9%) of weekly physical activity and the rest had equal to or more than 150 minutes that are recommended as minimum for good physical and mental health according to WHO. Physical activity can prevent future depression [29]. According to this meta-analysis, there is an association between physical activity and incident depression. Assuming causality, one in nine cases of depression might have been prevented if everybody in the population was active at the level of current health recommendations [30].

Our study has some limitations because the data was derived from a single center and with a small sample group that consisted mainly of females. Nevertheless, many studies have similar biases, and this can be overcome with meta-centric studies and close follow-up in the future. In addition, studies across different geographical locations with detailed and strong methodology are needed.

CONCLUSION

COVID-19 pandemic caused a serious impact on the mental health of the population, especially on young people, girls, students, those who live alone. Some of them with impaired mental health during the pandemic may have similar and more serious problems later in life. The health system has to be prepared for early diagnosis and treatment of these people.

We may consider this pandemic finished, but no one knows when a new threat will appear among the population. Therefore, support and treatment of vulnerable groups should be prepared, not only by health care services, but also by educational institutions, to provide support to students in terms of consultation and motivation. Primary and secondary interventions on the national and local levels are necessary in focusing on adolescents and youth mental health.

Conflict of interest: None declared.

REFERENCES

- Pearce M, Garcia L, Abbas A, Strain T, Schuch FB, Golubic R, et al. Association between physical activity and risk of depression: A systematic review and meta-analysis. *JAMA Psychiatry*. 2022;79(6):550–9. [DOI: 10.1001/jamapsychiatry.2022.0609] [PMID: 35416941]
- Institute of Medicine (US) Committee on Sleep Medicine and Research. *Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem*. Colten HR, Altevogt BM, editors. Washington (DC): National Academies Press (US); 2006. [DOI: 10.17226/11617] [PMID: 20669438]
- Brown LA, Hamlett GE, Zhu Y, Wiley JF, Moore TM, DiDomenico GE, et al. Worry about COVID-19 as a predictor of future insomnia. *J Sleep Res*. 2022;31(5):e13564. [DOI: 10.1111/jsr.13564] [PMID: 35165971]
- WHO. COVID-19 pandemic triggers 25% increase in prevalence of anxiety and depression worldwide. News release: March 2, 2022.
- Ganesan B, Al-Jumaily A, Fong KNK, Prasad P, Meena SK, Tong RK. Impact of Coronavirus Disease 2019 (COVID-19) outbreak quarantine, isolation, and lockdown policies on mental health and suicide. *Front Psychiatry*. 2021;12:565190. [DOI: 10.3389/fpsy.2021.565190] [PMID: 33935817]
- El Sayed S, Gomaa S, Shokry D, Kabil A, Eissa A. Sleep in post-COVID-19 recovery period and its impact on different domains of quality of life. *Egypt J Neurol Psychiatr Neurosurg*. 2021;57(1):172. [DOI: 10.1186/s41983-021-00429-7] [PMID: 34924750]
- Morin CM, Bjorvatn B, Chung F, Holzinger B, Partinen M, Penzel T, et al. Insomnia, anxiety, and depression during the COVID-19 pandemic: an international collaborative study. *Sleep Med*. 2021;87:38–45. [DOI: 10.1016/j.sleep.2021.07.035] [PMID: 34508986]
- Manchevska S, Gligoroska JP. Impact of Covid-19 related stressors on mental health in junior medical students. *Acad Med J*. 2021;1(2):100–11. [DOI: 10.53582/AMJ2112100m]
- Bastien CH, Vallières A, Morin CM. Validation of the Insomnia Severity Index as an outcome measure for insomnia research. *Sleep Med*. 2001;2(4):297–307. [DOI: 10.1016/s1389-9457(00)00065-4] [PMID: 11438246]
- Kroenke K. PHQ-9: global uptake of a depression scale. *World Psychiatry*. 2021;20(1):135–6. [DOI: 10.1002/wps.20821] [PMID: 33432739]
- Jia H, Guerin RJ, Barile JP, Okun AH, McKnight-Eily L, Blumberg SJ, et al. National and state trends in anxiety and depression severity scores among adults during the COVID-19 pandemic – United States, 2020–2021. *MMWR Morb Mortal Wkly Rep*. 2021;70(40):1427–32. [DOI: 10.15585/mmwr.mm7040e3] [PMID: 34618798]
- Phomprasith S, Karawekpanyawong N, Pinyopornpanish K, Jiraporncharoen W, Maneeton B, Phinyo P, et al. Prevalence and associated factors of depression in medical students in a Northern Thailand University: A cross-sectional study. *Healthcare (Basel)*. 2022;10(3):488. [DOI: 10.3390/healthcare10030488] [PMID: 35326966]
- Guessoum SB, Lachal J, Radjack R, Carretier E, Minassian S, Benoit L, et al. Adolescent psychiatric disorders during the COVID-19 pandemic and lockdown. *Psychiatry Res*. 2020;291:113264. [DOI: 10.1016/j.psychres.2020.113264] [PMID: 32622172]
- Yuan K, Zheng YB, Wang YJ, Sun YK, Gong YM, Huang YT, et al. A systematic review and meta-analysis on prevalence of and risk factors associated with depression, anxiety and insomnia in infectious diseases, including COVID-19: a call to action. *Mol Psychiatry*. 2022;27(8):3214–22. [DOI: 10.1038/s41380-022-01638-z] [PMID: 35668158]
- Panchal U, Salazar de Pablo G, Franco M, Moreno C, Parellada M, Arango C, et al. The impact of COVID-19 lockdown on child and adolescent mental health: systematic review. *Eur Child Adolesc Psychiatry*. 2021;1–27. [DOI: 10.1007/s00787-021-01856-w] [PMID: 34406494]
- Amicucci G, Salfi F, D'Atri A, Viselli L, Ferrara M. The differential impact of COVID-19 lockdown on sleep quality, insomnia, depression, stress, and anxiety among late adolescents and elderly in Italy. *Brain Sci*. 2021;11(10):1336. [DOI: 10.3390/brainsci11101336] [PMID: 34679402]
- Sun Y, Wu Y, Fan S, Dal Santo T, Li L, Jiang X, et al. Comparison of mental health symptoms before and during the covid-19 pandemic: evidence from a systematic review and meta-analysis of 134 cohorts. *BMJ*. 2023;380:e074224. [DOI: 10.1136/bmj-2022-074224] [PMID: 36889797]
- Morin CM, Carrier J. The acute effects of the COVID-19 pandemic on insomnia and psychological symptoms. *Sleep Med*. 2021;77:346–7. [DOI: 10.1016/j.sleep.2020.06.005] [PMID: 32595107]
- Vujčić I, Safiye T, Milikić B, Popović E, Dubljanin D, Dubljanin E, et al. Coronavirus Disease 2019 (COVID-19) epidemic and mental health status in the general adult population of Serbia: A cross-sectional study. *Int J Environ Res Public Health*. 2021;18(4):1957. [DOI: 10.3390/ijerph18041957] [PMID: 33671432]
- Bu F, Steptoe A, Fancourt D. Depressive and anxiety symptoms in adults during the COVID-19 pandemic in England: A panel data analysis over 2 years. *PLoS Med*. 2023;20(4):e1004144. [DOI: 10.1371/journal.pmed.1004144] [PMID: 37071605]
- da Silva BBL, de Melo MCF, Studart-Pereira LM. Adolescents' sleep quality during the COVID-19 pandemic. *Sleep Sci*. 2022;15(Spec 1):257–63. [DOI: 10.5935/1984-0063.20220025] [PMID: 35273776]
- Huang Y, Fietze I, Penzel T. Analysis of the correlations between insomnia and mental health during the COVID-19 pandemic in Germany. *Somnologie (Berl)*. 2022;26(2):89–97. [DOI: 10.1007/s11818-022-00347-7] [PMID: 35603014]
- Dzierzewski JM, Dautovich ND, Ravvits SG, Perez E, Soto P, Donovan EK. Insomnia symptoms during the COVID-19 pandemic: an examination of biopsychosocial moderators. *Sleep Med*. 2022;91:175–8. [DOI: 10.1016/j.sleep.2021.02.018] [PMID: 33658155]
- Bartoszek A, Walkowiak D, Bartoszek A, Kardas G. Mental well-being (depression, loneliness, insomnia, daily life fatigue) during COVID-19 related home-confinement – A study from Poland. *Int J Environ Res Public Health*. 2020;17(20):7417. [DOI: 10.3390/ijerph17207417] [PMID: 33053787]
- Aernout E, Benradia I, Hazo JB, Sy A, Askevis-Leherpeux F, Sebbane D, et al. International study of the prevalence and factors associated with insomnia in the general population. *Sleep Med*. 2021;82:186–92. [DOI: 10.1016/j.sleep.2021.03.028] [PMID: 33957414]
- Lin LY, Wang J, Ou-Yang XY, Miao Q, Chen R, Liang FX, et al. The immediate impact of the 2019 novel coronavirus (COVID-19) outbreak on subjective sleep status. *Sleep Med*. 2021;77:348–54. [DOI: 10.1016/j.sleep.2020.05.018] [PMID: 32593614]
- Hasan M, Maliha Z, Rahman A, Mamun MA. Insomnia in Bangladeshi Young Adults During the COVID-19 Pandemic: The Role of Behavioral Factors, COVID-19 Risk and Fear, and Mental Health Issues. *Sleep Vigil*. 2021;5(2):315–22. [DOI: 10.1007/s41782-021-00161-5] [PMID: 34423233]
- Lu C, Chi X, Liang K, Chen ST, Huang L, Guo T, et al. Moving More and Sitting Less as Healthy Lifestyle Behaviors are Protective Factors for Insomnia, Depression, and Anxiety Among Adolescents During the COVID-19 Pandemic. *Psychol Res Behav Manag*. 2020;13:1223–33. [DOI: 10.2147/PRBM.S284103] [PMID: 33364864]
- Do B, Kirkland C, Besenyi GM, Carissa Smock M, Lanza K. Youth physical activity and the COVID-19 pandemic: A systematic review. *Prev Med Rep*. 2022;29:101959. [DOI: 10.1016/j.pmedr.2022.101959] [PMID: 36034528]
- Pearce M, Garcia L, Abbas A, Strain T, Schuch FB, Golubic R, et al. Association Between Physical Activity and Risk of Depression: A Systematic Review and Meta-analysis. *JAMA Psychiatry*. 2022;79(6):550–9. [DOI: 10.1001/jamapsychiatry.2022.0609] [PMID: 35416941]

Депресија и несаница међу студентима током пандемије ковида 19 – студија пресека

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САЖЕТАК

Увод/Циљ У првој години пандемије ковида 19, глобална распрострањеност анксиозности и депресије повећана је за огромних 25%, саопштила је Светска здравствена организација.

Циљ студије био је да се утврди ниво депресије и несанице међу студентима у Северној Македонији током пандемије ковида 19.

Методе Ово је студија пресека међу студентима Универзитета Св. Ђирила и Методија у Скопљу током маја и јула 2021. Анонимна онлајн анкета садржала је питања за пол, године, мишљење и однос према инфекцији вирусом корона, да ли су имали било какву инфекцију/изолацију и о физичкој активности током пандемије. Користили смо скале за процену несанице (индекс озбиљности несанице – *ISI*) и депресије (упитник о здрављу болесника 9 – *PHQ-9*).

Резултати Студију је завршило 355 учесника, од којих је 28,45 одсто имало клинички важне оцене несанице и скоро половина учесника је имала клинички важне оцене депресије. Женски и млађи учесници имали су веће оцене за обе скале. Високо статистички значајна, позитивна корелација откривена је између резултата *ISI* и *PHQ-9* ($p = 0,646$, $p = 4,05 \times 10^{-43}$), што указује на то да су током испитаног пресечног периода пандемије ковида 19 депресија и несаница били међусобно повезани.

Закључак Пандемија ковида 19 изазвала је озбиљан утицај на ментално здравље становништва, посебно на младе људе, девојке, студенте и оне који живе сами. Зато треба да будемо спремни на подршку и лечење ових рањивих група, не само као здравствене службе већ и као образовне установе, да подржимо ученике кроз консултације и мотивацију.

Кључне речи: пандемија; ковид 19; адолесценти; несаница; депресија