CLINICAL STUDY

Depression and anxiety among College Students in Slovakia – Comparison of the Year 2018 and during COVID-19 pandemic

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ABSTRACT
OBJECTIVES: The study aimed to estimate the prevalence of depression and anxiety among university students during the peak of COVID-19 pandemic in the Slovak Republic in December 2020. The secondary goal was to compare results with a study from 2018 at the same university.
METHODS: A web-based cross-sectional study was administered at the Comenius University in Bratislava. The final sample consisted of 1,786 participants (approx. 80 % females) with the mean age and standard deviation of M=21.15 and SD=3.53. An online battery of self-report measures of depression, anxiety, perceived stress, loneliness, and resilience was administered.
RESULTS: The prevalence rates of moderately severe to-severe depression and anxiety were 34.3 % and 20.1 %, respectively. Depression and anxiety were associated with younger age, higher perception of stress, higher loneliness, and lower resilience. In comparison with 2018, we found a two-fold increase in depression and anxiety. The increase was present across most of the depression and anxiety symptoms.
CONCLUSION: The result of the study revealed elevated rates of depression and anxiety during the second wave of COVID-19 pandemic in Slovakia. Various demographic and psychological factors were associated with more severe depression and anxiety among university students. Some subgroups of students are at the higher risk of mental health problems *(Tab. 4, Ref. 26)*. Text in PDF *www.elis.sk*
KEY WORDS: depression, anxiety, college students, COVID-19, pandemics.

Introduction

College students are a population that is at increased risk of the onset of mental illnesses. A large-scale World Health Organization survey (1) found that approximately 75 % of all mental disorders are manifested for the first time during early adulthood. Depression and various anxiety disorders are among the most prevalent disorders. These conditions posit enormous challenges from the public health perspective (2). Mental disorders starting at early adulthood create a significant burden on individuals and their families and often lead to functional impairment across domains spanning from interpersonal to vocational functioning. In addition, students with preexisting mental health problems face substantial challenges in their study performance, leading to lower annual grades and a higher risk of school dropout (3, 4). Our previous study (5) found that moderately severe to-severe depression and anxiety were present in 16.4 % and 9.3 % of Slovak students, respectively. Students reporting higher rates of depression showed lower satisfaction in their interpersonal relationships, lower life satisfaction, sparse social network, and overall lower social functioning. The global pandemic has been one of the leading stressors in young people around the world. Students entering the university or being at the end of their studies have faced challenges associated with adaptation to a new environment or preparing themselves for life after graduation.

Many studies spanning from Asia, to Europe and America found the detrimental effect on mental health in the general population, with young people identified to be significantly at higher risk. Lockdowns, quarantine measures, and social distancing help reduce the spread of infection but simultaneously lead to an increase in psychological distress. These findings are very robust and are confirmed by cross-sectional and longitudinal studies (6–9). Younger age, female gender, student status, lower educational attainment, loss of income, and preexisting mental health conditions were identified as the risk factors during the COVID-19 pandemic (10–13). Conversely, resilience, active coping styles, optimism, mindfulness (14, 15), regular physical activity, and maintaining social contacts (10, 16) are considered protective factors.

The situation during the pandemic in the Slovak Republic had some specific features. The country successfully maintained

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low numbers of infected and severely ill during the first wave of pandemic in spring 2020. We gathered data (17) on mental health status during this period by asking students who provided consent to contact them in the study from 2018 (5). We compared the mental status of a subsample of 235 students in 2018 and April 2020. We did not find an increase in depression, anxiety, or subclinical psychotic symptoms. This might be explained by the success of quarantine measures that prevented the rapid spreading of CO-VID-19 and very low death rates. The second wave starting in the fall of 2020 was very intensive in the Slovak Republic, with a sharply steeping number of confirmed cases, including severe ones and a high number of causalities from late November 2020 to January 2021.

The aims of the current analysis are threefold. Firstly, to evaluate the prevalence of depression and anxiety among college students during December 2020 in the Slovak Republic. The secondary aim is to analyze factors associated with higher levels of depression and anxiety. Finally, the third aim is to compare the prevalence rates of depression and anxiety with those in 2018 on the overall severity and item level.

Materials and methods

Sample

Data were collected during the period of 4th–27th of December 2020. The sample comes from the cross-sectional online survey at the Comenius University in Bratislava. The majority of students received the information about the research through their university e-mails. The study was also promoted via social media at the Comenius University. The completion of the survey was voluntary. We did not provide reimbursement to participants. The complete data on predetermined measures (PHQ-9 and GAD-7) were obtained from 1,786 participants. At the time of the survey, the Comenius University in Bratislava enrolled approximately 23,000 students (internal and external study, undergraduate, graduate, and Ph.D. programs).

Measures

Covid-19-related measures

We measured COVID-19-related variables. Firstly, we asked whether the participants or their close persons were infected with SARS-CoV2. Then, on a scale from 0 to 10, we measured their subjective worry over COVID-19, where higher numbers indicated a more intensive fear. The last question was aimed at reflecting COVID-19-related coping skills in comparison with others. We used a 5-point Likert scale where 1 means worse than most people and 5 means much better than most people.

Depression

Patient's Health Questionnaire (PHQ-9) (18) is a short depression severity measure evaluating 9 depressive symptoms during the past 2 weeks. The latter 9 items can be scored from 0 (not at all) to 3 (nearly every day). Thus, a total score can range from 0 to 27. The cut-off score of 10 is considered clinically significant and represents a moderate severity of depressive symptoms.

Anxiety

Generalized Anxiety Disorder 7 (GAD-7) (19) is a short measure for assessing the severity of anxiety symptoms during the past two weeks. There are 7 items that can be scored from 0 (not at all) to 3 (nearly every day), and the total score can range from 0 to 21. The cut-off score of 10 is considered clinically significant and represents a moderate severity of anxiety symptoms.

Resilience

Brief Resilience Scale (BRS) (20) is a 6-item self-report scale for assessing the ability to bounce back or recover from stress. Six items can be scored from 1 (strongly disagree) to 5 (strongly agree), ranging from 6 to 30. Higher scores represent an increase in the ability to bounce back or recover from stress.

Stress

Perceived Stress Scale (PSS) –- short (21) is a 4-item self-evaluation scale for measuring the perception of stress. Four items can be scored from 0 (never) to 4 (very often), and the total score can range from 0 to 16. Higher scores represent an increased perception of stressful situations in one's life.

Loneliness

Brief Loneliness Scale (22) is a 3-item self-evaluation scale for measuring overall loneliness. Three items can be scored from 1 (hardly ever) to 3 (often). The total score can range from 3 to 9, with higher scores indicating an increased perception of loneliness.

Ethical aspects

The study was approved by the Ethical Review Board of the Faculty of Arts, Comenius University in Bratislava. The survey was anonymous. Before filling in the questionnaires, the participants confirmed their participation via online consent. At the end of the survey, the information about available mental health care facilities was provided to all participants.

Statistical Procedures

All statistical procedures were done using the program SPSS (v. 20). Firstly, descriptive statistics were used for estimating the prevalence of depression and anxiety. The strength of relationships was evaluated with the Pearson correlations. Finally, separate multiple linear regression models were estimated for depression and anxiety based on demographic and psychopathological variables.

Results

Sample characteristics

The final sample consisted of 1,786 participants. Approximately 80% of the sample were females. The mean age and statistic deviation were $M = 21.15$ and $SD = 3.53$. All relevant demographic variables, including partner status, study degree, are presented in Table 1.

According to the survey, 18.6 % of the sample reported being diagnosed with mental health problems. The most common were

Tab. 1. Demographic characteristics of the sample.

	%/ M and SD
Sex	
Male	20%
Female	79.6%
Not reported	0.4%
Age	M=22.15, SD=3.53
Partner status	
Single	47.8%
Single with partner	48.2%
Married	3.1%
Divorced	0.3%
Other	0.5%
Study degree	
Bachelor's degree	61.8%
Master's degree	34.8%
Ph.D. degree	3.4%
Ever diagnosed with mental illness	18.6%

Tab. 3. Final regression models.

	Anxiety		Depression	
	Beta	p	Beta	p
Sex	0.015	0.435	−0.006	0.735
Age	−0.063	0.001	−0.051	0.005
COVID-19 coping	−0.065	0.002	−0.019	0.335
Being infected	−0.001	0.955	0.011	0.550
Infected – close person	0.059	0.003	0.029	0.122
Loneliness	0.150	<0.001	0.180	<0.001
Perceived stress	0.448	<0.001	0.541	<0.001
Resilience	−0.171	<0.001	−0,102	<0.001

Beta – standardized coefficients

anxiety disorders (11.6 %) and depression (9.6 %). The participants often reported being diagnosed with several disorders (comorbidity). A proportion of the sample, namely 9.7 % are currently in the care for mental health problems (psychotherapy and/or psychopharmacological treatment).

Prevalence of depression and anxiety during COVID-19 pandemic

Using standard cut-off score > 9 points for PHQ-9 and GAD-7, the proportion of students scoring above this threshold was 60.9 % for depression and 43.3 % for anxiety. When applying more stringent criteria defining a severe intensity of symptoms (>14 points), the prevalence rates dropped to 34.3 % for depression and 20.1 % for anxiety. Thus, both depression and anxiety were simultaneously identified in 39.5 % or 16.5 % of students depending on the utilized cut-off scores.

COVID-19 and subjective mental health

As stated by the participants, 8 % of them reported having been infected with SARS-Cov2 and 43.1 % of the sample reported having a close person infected. When evaluating their overall mental health, 6.7 % of participants rated their overall mental health as very bad, 29.8 % as rather bad, 32.3 % as average, 22.5 % as rather good, and 8.7 % as very good. When compared to the situation before the COVID-19 pandemic, 1.2 % of participants reported their mental health to be substantially improved, 5.8 % as slightly improved, 20.8 % without change, 49.7 % as slightly worse, and 22.3% as significantly worse.

The fear of COVID-19 was negatively associated with the ability to cope with the situation (r=−0.490, p <0.01), higher depression, anxiety, loneliness, perceived stress (r is in range of 0.252–0.333), and lower resilience (r=−0.254, p <0.01). Being infected and having a close person being infected were independent factors of psychopathology measures. The only negligible association was found with perceived stress. As expected, depression and anxiety were moderately-to-strongly associated with the perceived stress, loneliness, and resilience. The exact correlation coefficients are presented in Table 2.

Two regression models were fitted to the data. Sex and age were included in models to control for demographic confounding, while perceived stress, loneliness, and resilience as dependent variables were used in the prediction of depression and anxiety. From COVID-19-related variables, we included three variables, namely the facts of being infected, and having a close person infected, as well as perception of COVID-19-related coping skills.

Summaries for both models are displayed in Table 3. As to depression, the final model explained 52.1 % of variability, with younger age (β=−0.051, p=0.005), loneliness (β=0.180, p< 0.001), perceived stress (β=0.541, p <0.001), and resilience (β= −0.102, p <0.001) as independent predictors explaining variability above and beyond other predictors.

Tab. 2. Associations between COVID-19-related variables and psychopathology.

	1	2	3	4	5	6	7	8	9
COVID-19 Fear	–								
COVID-19 Coping	−0.490**	–							
Being infected	0.001	−0.015	–						
Close person	0.041	0.018	0.268**	–					
Depression	0.252**	−0.284**	0.008	0.000	(0.874)				
Anxiety	0.333**	−0.310**	0.007	0.025	0.750**	(0.901)			
Loneliness	0.273**	−0.332**	−0.013	−0.008	0.500**	0.473**	(0.714)		
Perceived stress	0.260**	−0.346**	−0.034	−0.066*	0.690**	0.639**	0.499**	(0.745)	
Resilience	−0.254**	0.294**	0.045	0.026	−0.458**	−0.491**	−0.399**	−0.514**	(0.830)

**. Correlation is significant at the 0.01 level (2-tailed).
Where applicable, reliabilities are displayed on the diagonal line in parentheses.

Tab. 4. Symptom level comparison between 2018 and 2020.

PHQ – 9		2018	2020	GAD - 7		2018	2020
Anhedonia	Not at all	20%	10%	Nervous, anxious, on the	Not at all	33%	15%
	Several days	52%	38%	edge	Several days	41%	38%
	More than half days	15%	23%		More than half days	14%	24%
	Nearly every day	13%	29%		Nearly every day	11%	23%
Depressed mood	Not at all	34%	17%	Stop worrying	Not at all	34%	22%
	Several days	43%	41%		Several days	35%	33%
	More than half days	12%	21%		More than half days	16%	23%
	Nearly every day	12%	21%		Nearly every day	14%	23%
Sleep problems	Not at all	31%	16%	Worry too much	Not at all	34%	24%
	Several days	40%	29%		Several days	35%	35%
	More than half days	16%	23%		More than half days	19%	20%
	Nearly every day	13%	33%		Nearly every day	12%	21%
Low energy, tiredness	Not at all	11%	6%	Trouble relaxing	Not at all	32%	18%
	Several days	48%	31%		Several days	38%	36%
	More than half days	23%	27%		More than half days	17%	21%
	Nearly every day	18%	37%		Nearly every day	12%	25%
Appetite	Not at all	39%	24%	Restlessness	Not at all	69%	50%
	Several days	32%	34%		Several days	20%	30%
	More than half days	18%	20%		More than half days	8%	10%
	Nearly every day	11%	22%		Nearly every day	4%	10%
Self-worth	Not at all	33%	23%	Easily annoyed or irritable	Not at all	34%	19%
	Several days	36%	33%		Several days	43%	41%
	More than half days	16%	20%		More than half days	15%	23%
	Nearly every day	15%	24%		Nearly every day	8%	17%
Concentration	Not at all	47%	31%	Feeling afraid that	Not at all	58%	41%
	Several days	32%	32%	something might happen	Several days	26%	36%
	More than half days	13%	19%		More than half days	9%	13%
	Nearly every day	8%	19%		Nearly every day	7%	11%
Inhibition/agitation	Not at all	74%	65%				
	Several days	17%	23%				
	More than half days	6%	7%				
	Nearly every day	3%	5%				
Suicidal thoughts	Not at all	75%	68%				
	Several days	16%	20%				
	More than half days	5%	6%				
	Nearly every day	4%	6%				

The model with anxiety as a dependent variable explained 47.1 % of variability with younger age ($\beta=-0.063$, $p=0.001$), COVID-19 coping skills ($\beta=-0.065$, $p=0.002$), having close person infected ($\beta=-0.059$, $p=0.003$), loneliness ($\beta=0.150$, $p<0.001$), perceived stress ($\beta=0.448$, $p<0.001$), and low resilience ($\beta=-0.171$, $p<0.001$) as independent predictors explaining variability above and beyond other predictors.

Standardized residuals for both regression models were examined for normality. Based on the skewness and kurtosis, we found no violation of normality, suggesting that models fitted the data well.

Comparison of years 2018 and 2020

Overall mean scores for depression and anxiety increased from September 2018 to COVID-19 pandemic. For depression, the mean score and standard deviation in 2018 were 8.54 and 5.81, respectively. During the period of higher intensity of the COVID-19 pandemic, the mean score and standard deviation were 11.97 and 6.35, respectively. For anxiety, scores change from M=6.41 and SD=5.16 to M=9.04 and SD=5.64. Table 4 displays frequencies for responses on individual PHQ-9 and GAD-7 items, which provided fine-grained assessment of symptoms that drove the changes in mean scores. We found that the increase in prevalence was robust across the majority of depression and anxiety symptoms.

Discussion

Our study revealed a higher prevalence of more severe symptoms of depression (34.3 %) and anxiety (20.1 %) during the peak of the second wave of COVID-19 pandemic among Slovak university students. The prevalence of depression was higher than that of anxiety, while the conditions often co-occurred, and both were significantly associated with perceived stress, loneliness, and resilience.

When compared with the results of our study from 2018, we found a two-fold increase in the prevalence of moderate-to-severe symptoms of depression and anxiety. There were also robust changes in the level of symptoms. As to depression, we found an increase in almost all symptoms, including the core ones, namely depressive mood and anhedonia. When less stringent criteria were

applied, the prevalence rates of depression and anxiety were extremely high, suggesting that more criteria are sensitive albeit at higher risk of false-positive outcomes. Without the intention of downplaying the severity of the observed results, the measuring of depression and anxiety at the peak of the pandemic might lead to an inflation of identified cases. During the period of the worsening of the epidemiological situation, low mood, anhedonia, and perception of loneliness were more common even among people with no previous mental health problems. Longitudinal studies are an essential source of information about the temporal dynamics of mental health changes. The exhaustive study from the USA found that a sharp increase in anxiety was present during the increase in infection rates. Later on, the prevalence dropped back but it was still higher than in the period before the pandemic (6). Several studies found that the pandemic was also associated with an elevation of suicidal ideation. We also identified a slight increase in the prevalence of suicidal thoughts (25 % vs 32 %). Uncertainty related to the pandemic, social isolation, low social support, limited access to mental health treatments, and economic problems combined with vulnerabilities such as pre-existing psychiatric conditions, low resiliency, high COVID-19 prevalence, and death of a close person might exacerbate psychiatric problems or lead to the onset of very new problems. The need to cope with them might posit a risk of suicidal ideation and behavior (23, 24).

The results of this study should be interpreted with caution due to several important limitations. Firstly, despite the large sample size, our sampling methods were vulnerable to potential sampling bias. Demographic variables across samples were comparable. Despite that, the sample was representative neither of all students at the Comenius University nor of all university students in the Slovak Republic. The second limitation is related to the self-report nature of our methods. Although PHQ-9 and GAD-7 are considered gold standard measures, their specificities are lower when compared to structured clinical interviews as Mini-International Neuropsychiatric Interview (25). Our previous study (5) found that the cut-off score at 15 points in PHQ-9 was in better agreement with the DSM-5 algorithm than the standard cut-off score of 10 points. High specificity at 15 points was also found in another study (26). Using lower cut-off scores in this context might bring about the problem with specificity despite very high sensitivity for identifying people with general psychological distress. Therefore, we suggest interpreting the results more as a prevalence of elevated symptoms than as having a mental illness.

Repeated or long-term monitoring of the prevalence and incidence of mental health status is important for planning and decision-making in the field of young people mental health. The second reason is that monitoring and early intervention might prevent risk of chronicity, especially associated with depression, anxiety, and addiction-related symptoms.

Conclusions

The study revealed that increased depressive and anxiety symptoms were highly prevalent among college students in the middle of the second wave of COVID-19 pandemic in Slovakia. Higher distress was associated with lower age, having lower resilience, and higher perception of stress. In comparison with 2018, we found a two-fold higher prevalence of both depression and anxiety. Therefore, the longitudinal stability of elevated psychological distress among college students needs to be at the center of university policymakers to prevent chronification of problems.

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