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Conference Paper

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Provided in Cooperation with:

University American College Skopje

Suggested Citation: Filipovska, Angela; Peshevska, Dimitrinka Jordanova; Misoska, Ana Tomovska (2022) : Experiences of stress and anxiety related to COVID-19 preoccupation and COVID-19 difficulties among university students in North Macedonia, University American College Skopje, Skopje, pp. 128-136,
<https://doi.org/10.5281/zenodo.7643602>

This Version is available at:

<https://hdl.handle.net/10419/302845>

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Experiences of Stress and Anxiety related to COVID-19 Preoccupation and COVID-19 Difficulties among University Students in North Macedonia

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ABSTRACT

COVID-19 was identified as a major public health threat to the entire population including adolescents with serious implications for their psychological well-being and mental health. The aim of the current study is to investigate the association between the COVID-19 preoccupation and difficulties among university students and their mental health (anxiety and stress levels) using the biopsychosocial theoretical framework for analysis. The method was to take a convenient sample of 160 university students (61.3 per cent female and 38.7 per cent male) between the ages of 18 and 24 using an online data collection form in the period September to November 2021. The instruments used were: a COVID-19 preoccupation scale; a COVID-19 difficulties scale, anxiety and stress scales from the DASS instrument. The study findings demonstrated a significant statistically positive correlation between anxiety and preoccupation with COVID-19, difficulties from COVID-19, stress and being female. There is a statistically significant negative correlation with living in an urban setting. Stress is also statistically significantly positively correlated with a preoccupation with COVID-19, difficulties from COVID-19 anxiety, and being female. There is negative statistically significant correlation with living in an urban setting. The regression model statistically significantly predicted 37 per cent of the variance of the variable anxiety ($F=17.71$, $p<.05$). Experienced difficulties from COVID-19 make a significant statistically positive predictor of anxiety ($\beta=.516$, $p<0.05$), whilst living in an urban setting is a statistically negative predictor of anxiety ($\beta=-.153$, $p<0.05$). The second regression model was created for stress and it predicted 40 per cent of variance ($F=22.44$, $p<.05$). Experienced difficulties from COVID-19 provides a statistically significant positive predictor of anxiety ($\beta=.61$, $p<0.05$), as well as being female ($\beta=.15$, $p<0.05$) whilst living in an urban setting is a statistically negative predictor of anxiety ($\beta=-.132$, $p<0.05$). The conclusion, based on the study findings and increased mental difficulties claimed by the students in the post-COVID period suggest the need for setting up preventive programs and intervention for students.

KEYWORDS: *stress, anxiety, COVID-19 difficulties, COVID-19 preoccupation, students*

INTRODUCTION

The Coronavirus Disease or COVID-19 has developed into a major threat to the entire world with dreadful consequences to people's health (Chakraborty and Maity, 2020). This virus has also had an immense impact on people's emotional, social and psychological well-being (Yasmin et al. 2020). Because of the serious health risks, the emotional and psychological implications of this disease have been seriously neglected. Although adolescents have been recognized as a group with lower levels of vulnerability towards the COVID-19 infections, they still have been on the receiving end of uncertainties, stress and anxiety (de Miranda et al. 2020). The measures put in place to minimize the spread of the virus have had a deteriorating effect on their mental health (Wong et al., 2020). Mental health disorders are present at a high prevalence among young adults, accompanied with an inability or increased difficulty of functioning in social, school and work settings (Gustavson et al., 2018). Knowing this, early identification as well as treatment would be crucial, in order to reduce the adverse effects of this pandemic on young adults.

The biopsychosocial model is seen as one of the best theoretical approaches that can be associated with the coronavirus state. Proposed by George Engel in the 1970s, it is still a connecting bridge between clinical and health perspectives as it suggests that a person's health is impacted not only by their biological, but also by their psychological and social features (Adler, 2009; Bolton and Gillett, 2019). One's health is determined by the inter-relationship of biological mechanisms, psychological processes and social influences. As long as all of these components have a steady balance and none of them is compromised, we can affirm that a person's health is at a stable level (Bolton and Gillett, 2019). The COVID-19 pandemic not only affects our physical health, but also has implications to both social and psychological well-being.

A large number of relevant studies show that anxiety symptoms, as well as stress are closely tied to the emergence of the novel coronavirus. The results indicate an increased prevalence and severity of anxiety, depression and stress for the adolescent population. Anxiety symptoms have been reported with higher prevalence compared to non-pandemic times, ranging between 20 per cent and 45 per cent. Giallonardo and colleagues (2020) have hypothesized that young people mainly experience anxiety due to the inability to see their friends and the inability to engage in social activities. When comparing anxiety levels associated with COVID-19, it was found that anxiety levels of adolescents (29.27per cent) are significantly higher than those of children (23.87per cent) (Duan et al., 2020). This means that adolescents have a better understanding of the consequences of the virus, making them more exposed to the anxiety accompanying it.

As females tend to be more involved in the support process than males, they are also more likely to experience both positive and negative effects of close social relationships. Women are more likely to be the ones providing social support, hence, it is expected for them to also report higher levels of anxiety and depression (Turner, 1994). Magson and colleagues (2020) noted that women were manifesting more anxiety and depression symptoms compared to men. Smirni et al. (2020) conducted a research study that showed female anxiety total scale scores placed significantly higher than those of males. These results indicate that women tend to worry more about their well-being and health, as well as the health of their closest family and friends. Pieh et al. (2020) found that young women between the age of 18 and 35, who are unemployed and come from low-income environments tend to be at risk for exhibiting high levels of anxiety. Khan et al. (2020) discovered college students displayed an increased prevalence of anxiety symptoms (24.9per cent), depression, burnout and stress during the time of the COVID-

19 pandemic. These findings were also backed by Husky et al. (2020). Their sample was composed of French University students who reported moderate to severe stress levels, along with increased anxiety. With the educational system adapted to online classes, a rise in stress and habits that increase stress levels has been noted among students (Yasmin et al 2020). E-exams are also closely tied to student stress. 32per cent of the surveyed university students disclosed an increase in stress levels when taking online exams, compared to on-site exams (Elsalem et al., 2020). ark and colleagues conducted research in 2020 that reveals the American adult population reports high levels of COVID-induced stress and concerns. This type of stress is related to decreased abilities to overcome challenges, setbacks and uncertainties (Yildirim and Solmaz, 2022). Kar et al. (2021) state that stress is the most prevalent mental health disturbance experienced in the COVID-19 pandemic, present in 34,1per cent of the responses. Lakhan et al. (2020) reviewed scientific articles in order to determine the prevalence of Depression, Anxiety and Stress in COVID-19 times. The studies reviewed included a combined total of 113,285 participants, of which, 53per cent reported experiencing higher stress than before the start of the pandemic.

It is noted that more and more young people feel the repercussions of the pandemic and the containment measures that were set in place. Young adults have perceived an increase in anxiety and stress in performing day-to-day tasks. The presence of preventive measures and the inability to return to life as in pre-COVID times has caused a great portion of the young population to reduce social contact and communication with their peers, family and friends, which can lead to an escalation of fear and worry in this group. University students experience additional pressures in keeping up with tasks and reading material. The extra work they are required to complete is often seen as an additional strain, which can contribute to an overall deteriorarion in mental health in this population. (Fawaz and Samaha, 2021)

The aim of the current study was to investigate the association between COVID-19 pre-occupation and difficulties among university students and their mental health (anxiety and stress levels) and to explore if COVID-19 Preoccupation, COVID-19 Difficulties are predictors for anxiety and stress among university students.

It is hypothesized that there is a positive correlation between the anxiety and stress levels with COVID-19 Preoccupation, and COVID-19 Difficulties. The second hypothesis presumes that COVID-19 Preoccupation and COVID-19 Difficulties are significant predictors of stress and anxiety in the study sample. It is also hypothesized that being female is a predictor for both stress and anxiety due to COVID-19 Preoccupation and COVID-19 Difficulties.

MATERIALS AND METHODS

Study design

The current study is a cross-sectional study done on a sample of University students.

Sample and study participants

The survey was conducted online using Google forms. Before the participants began filling out the survey, they were presented with the survey's purpose and goals. Once they had consented, they were able to continue with filling out the items. Convenient and snowball sampling methods were employed to collect the data. The targeted population

were young adults aged between 18 and 24 years of age. Around 610 students from North Macedonia were invited to fill out the survey, out of which, 160 or 26per cent had fully completed the questionnaire and comprised the sample for this research paper. Out of the 160 participants, 98 (61.3per cent) were female and 61 (38.7per cent) were male. The majority of the respondents' were aged between 18 and 20 years old (52.2per cent) and those identifying with Macedonian ethnicity (98.8per cent). A total of 150 of the respondents reported they live in urban settings and most of them live with their families (85.6per cent).

Measurements

The instruments used in the study were the DASS anxiety and stress subscales, and the COVID-19 Preoccupation and Covid-19 Difficulties instruments. The Anxiety variable was measured using 14 items from the DASS Anxiety Subscale, designed to measure the anxiety level of the participants. The Stress variable was measured using 7 items from the DASS Stress Subscale. The Depression Anxiety Stress Scale (DASS) is a self-rated instrument that measures the depression, anxiety and stress states of the participant over the past 2 weeks (Lovibond and Lovibond, 1995). It comprises 3 subscales: Depression, Anxiety and Stress. DASS is measured on a range from "0" (Did not apply to me at all) to "3" (Applied to me very much, or most of the time). From this scale a short (21-item) and a long (42-item) versions exist. For this research, the long version was utilized. A lower score on the scale represents a lower level of anxiety and lower level of stress respectively, whereas a higher score indicates a higher anxiety and stress level.

Furthermore, COVID-19 Preoccupation (Schiff et al., 2020) was composed of 8 items and assessed the level of preoccupation the participant is experiencing as a result of the COVID-19 pandemic. The scores range between 1 and 5, where a lower score showed lower preoccupation level and a higher score indicated a higher level of preoccupation. Finally, the COVID-19 Difficulties (Schiff et al., 2020) variable consisted of 7 items. Each question contained one difficulty associated with COVID-19 and the participants were to rate the intensity of the difficulty experienced. For the COVID-19 Difficulties variable scores ranged from 1 to 4, where a lower score indicated less difficulty sustained and higher score meant more difficulty was endured.

All scales showed good reliability measured as internal consistency using Cronbach Alpha model, as can be seen in Table 1.

Table 1. Reliability Statistics: Cronbach's Alpha score for the scales

Scales	Number of items	Cronbach's Alpha values
Anxiety Scale	14	.919
Stress	7	.896
COVID-19 Preoccupation	8	.888
COVID-19 Difficulties	7	.806

In addition, the instrument comprised 9 demographic questions related to gender, age, ethnicity, the University that students are enrolled at, the year of study, a urban/rural setting, and living arrangements (living alone, with family or other arrangements).

Results

The descriptive statistics show that Anxiety variable scores varied between 0 and 42. The mean (M) Anxiety score of the respondents was 11.35, showing moderate anxiety levels, while the Standard Deviation (SD) is presented as 9.924. The Stress variable has a mean of 7.54 and a standard deviation of 5.9. The COVID-19 Preoccupation variable scores varied between 1 and 5, with the mean being 3.19 and the Standard Deviation holding a score of 1.04. Finally, for the COVID-19 Difficulties variable it has been noted the score variation to be between 1 and 4, with a mean score of 2.29 and Standard Deviation of 0.79.

Table 2. Descriptive Statistics of the scales

	Mean	Std. Deviation	Minimum	Maximum	N
Anxiety	11.3500	9.92373	0	42	160
Stress	7.5438	5.89728	0	21	160
COVID-19 Preoccupation	3.1938	1.04543	1	5	160
COVID-19 Difficulties	2.2937	.79082	1	4	160

To explore the link between the variables of the study and test the research hypothesis a correlation matrix was created and two regression models were tested. Prior to the statistical tests three dummy variables were created. The gender dummy had female as the default score, the place of living had urban setting as a default score and living arrangements had living with others as default score. The correlation matrix (Table 3) shows a positive statistically significant correlation between anxiety and preoccupation with COVID-19, difficulties from COVID-19, stress and being female. There is negative statistically significant correlation with living in an urban setting. Stress is also statically significantly positively correlated with preoccupation with COVID-19, difficulties from COVID-19, anxiety and being female. There is negative statistically significant correlation with living in an urban setting.

Table 3. Correlation matrix

	Anxiety	COVID-19 Preoccupation	COVID-19 Difficulties	Stress	Gender	Place	Living Arrangement
Anxiety	1	.344**	.58**	.849**	.254**	-.202*	.087
COVID-19 Preoccupation	.344**	1	.4**	.233**	.322**	-.203*	-.043
COVID-19 Difficulties	.58**	.4**	1	.617**	.201**	-.54	.049
Stress	.849**	.233**	.617**	1		-.156*	.068
Gender	.254**	.322**	.201**	.253**	1	-.046	.003
Place	-.202*	-.203*	-.54	-.156*	-.046	1	-.032
Living Arrangement	.087	-.043	.049	.068	.003	-.032	1

** p<0.01; * p<0.05

The first regression model was tested for the variable Anxiety. The predictor variables entered in the model were: COVID-19 Preoccupations; COVID-19 Difficulties; dummy for Gender, dummy for Place of living and dummy for Living Arrangements. The results show that the regression model statistically significantly predicts 37per cent ($R^2=.37$) of the variance of the variable Anxiety ($F=17.71$, $p<.05$). As shown in Table 4 Experienced difficulties from COVID-19 is a statistically significant positive predictor of anxiety ($\beta=.516$, $p<.05$), whilst living in an urban setting is a statistically negative predictor of anxiety ($\beta=-.153$, $p<.05$).

Table 4. Regression model for Anxiety

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
(Constant)	-2.723	4.004		-.68	.498
COVID-19 Preoccupation	.675	.692	.071	.976	.331
COVID-19 Difficulties	6.478	.867	.516	7.471	.000
Gender	2.433	1.355	.120	1.796	.074
Place	-6.244	2.63	-.153	-2.734	.019
Living Arrangement	1.659	1.783	.059	.931	.354

The second regression model was executed for Stress as an outcome variable. The predictors were the same as in the first model: COVID-19 Preoccupations; COVID-19 Difficulties; dummy for Gender, dummy for Place of living and dummy for Living Arrangements. The model predicted 40per cent ($R^2=.4$) of the variance ($F=22.44$, $p<.05$) the variable Stress. Experienced difficulties from COVID-19 is statistically significant positive predictor of anxiety ($\beta=.61$, $p<.05$), as well as being female ($\beta=.15$, $p<.05$) whilst living in an urban setting is a statistically negative predictor of anxiety ($\beta=-.132$, $p<.05$), as shown in Table 5.

Table 5. Regression model for Stress

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
(Constant)	-.370	2,318		-.16	.873
COVID-19 Preoccupation	-.47	.4	-.083	-1.173	.242
COVID-19 Difficulties	4.55	.502	.61	9.066	.000
Gender	1.814	.784	.150	2.314	.022
Place	-3.914	1.523	-.132	-2.908	.038
Living Arrangement	1.006	1.032	.060	.975	.331

DISCUSSION

The study findings indicated that COVID-19 preoccupation and COVID-19 difficulties are relevant factors that have statistically significant positive association with increased levels of stress and anxiety among university students in North Macedonia. The students that have reported higher levels of preoccupation and difficulties with COVID-19, have also statistically significant higher levels with both anxiety and stress. Respectively with these findings, we can conclude that the results confirm the first hypotheses. Similar results have been obtained by several other studies conducted among university students revealing higher levels of anxiety and stress (Cao et al. 2020; Zimmermann et al. 2020). Another multi-country study shows that students reported worries regarding their academic occupations as well as anxiety and stress (Browning et al. 2021). Analysis by Elmer et al. (2020) suggests that COVID-19 specific worries and isolation are linked with a negative mental health impact. The study results also found that anxiety and stress levels were associated with each other during the COVID-19 pandemic, and these results are in line with other studies (Durbas et al. 2021). The correlation analysis demonstrates a statistically significant negative correlation between anxiety and stress with living in an urban setting, similarly with the finding of Durbas et al. (2021), where students from rural settings had significantly higher anxiety and stress scores compared to students from urban settings. This might be explained by the regulation and adaptation of stress and anxiety of students living in urban settings on one side, and as well that students from rural settings might come from households with lower socio-economic circumstances that influence higher levels of stress and anxiety.

In our study we found that higher scores on both stress and anxiety are more prevalent among female students than among males, findings that are confirmed with other research findings (Durbas et al., 2021; Shah et al., 2021). Being female increases the risk of both stress and anxiety (Shamsuddin et al., 2013; Beiter et al., 2015). The results of Elmer and colleagues (2020) also found that female students appeared to have worse mental health in comparison with males. Higher stress scores among females were reported also by studies carried out by Bayram and Bilgel (2008) and Noorbala et al. (2001) who informed that social difficulties, anxiety and stress caused by the environment are relevant factors for mental problems among women.

The regression model analysis predicts that difficulties experienced from COVID-19 are a statistically significant positive predictor of anxiety as in other studies (Browning et al., 2021; Cao et al. 2020; Zimmermann et al. 2020), whilst living in an urban setting is a statistically negative predictor of anxiety, findings that correspond with the study of Durbas et al. (2021). Another study also confirmed that COVID-19 specific worries are linked with mental health difficulties (Elmer et al., 2020). The second regression model performed for stress as an outcome variable, revealed that difficulties experienced from COVID-19 and being female are statistically significant positive predictor of anxiety, similar with other study findings (Noorbala et al., 2001; Bayram and Bilgel, 2008) who demonstrate that being female increases the risk for anxiety and living in a rural setting is increasing the risk for having anxiety symptoms in students (Durbas et al., 2021).

When we try to see the results through the lens of the Biopsychosocial model (Borrell-Carrió et al. 2004), we can validate the paradigm that health is not only an absence of illness, but that it also depend on many other factors that affect us at different levels of influence. COVID-19 is not just a serious infectious disease affecting physical health, but is also harmful for mental health, psychological and social well-being. One of the factors that are important predictors for mental health (stress) on an individual level is being

female. Experiencing difficulties from COVID-19 is a statistically significant positive predictor of anxiety and stress as well on individual level. Place of living as a factor on the community level also has an impact on mental health both on anxiety and stress.

The study had some strengths and some limitations. The main strength of this study is that this is one of the first studies conducted on the students' sample exploring the relationships between COVID-19 and mental health in North Macedonia. One of the study limitations is that a convenient sampling method for data gathering was applied, and similarly most of the students coming from the same university. Another limitation is inclusion criterion as the participants in the study are included only based on their personal interest in participating.

CONCLUSION

Our cross-sectional study found that being female, living in rural settings and experiencing COVID-19 difficulties were risk factors that increase the likelihood of having higher anxiety problems among university students in North Macedonia. In the actual study we found that being a female, experiencing difficulties from COVID-19 and living in rural settings are significant predictors for stress among students. Anxiety and stress levels are related to each other and were high among university students during the COVID-19 pandemic.

As a result of the study's findings, the importance of exploring the situation of mental health among university students and identifying the risk factors for stress and anxiety was understood. Due to the fact that COVID-19 difficulties have been identified as an important factor for mental health among students, action needs to be taken. Different prevention programs that would address the mental health needs of students are essential. University American College Skopje, together with University St. Kliment Ohridski, Bitola have been initiated free of charge. Counseling services for the mental health of students in various forms, starting from individual counseling to group counseling for personal development have been introduced. It would be of great benefit to offer similar programs and services also in other universities in North Macedonia that could contribute to the psychological and social well-being of students.

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