Conference Proceedings of COVID-19 Pandemic and Public Health System, Vol. 1, Issue 1, 2021, pp. 1-11

ISSN 2827-7104
DOI: https:/doi.org/10.32789/covidcon.2021.1001

From Bad to Worse? Impact of COVID-19 Pandemic on Mental Health of Young Adults in Turkey

Nuray Karaman[1], Ferhat Karaman[2]

[1]*Usak University, nuray.karaman@usak.edu.tr*
[2]*Usak University, ferhat.karaman@usak.edu.tr*

FROM BAD TO WORSE? IMPACT OF COVID-19 PANDEMIC ON MENTAL HEALTH OF YOUNG ADULTS IN TURKEY

Abstract: The main aim was to evaluate the prevalence and severity of anxiety and depressive symptoms before and during the COVID-19 pandemic among young adults in Turkey. We also aimed at identifying the social and psychological correlates of pandemic-related anxiety and depression. Anxiety and depression symptoms in the 1720 participants were investigated using web-based survey versions of the Generalized Anxiety Disorder 7-item and Patient Health Questionnaire-9 scales and data on the social and psychological measures and socio-demographic data were also collected. The proportion of subjects screening positive for anxiety increased from 18.5% to 53.5%; for depression increased from 30.2% to 71.6%. After taking social and psychological factors into account, social media use and, COVID-19-related concerns, and gender were the strongest predictors of anxiety and depression during the pandemic. Although the findings of the current study may be prone to sampling and recall bias due to retrospective assessments through self-report measures, strikingly high anxiety and depressive levels require an immediate response aimed at reducing and treating the mental health risks that young adults face. The psychological burden of the COVID-19 pandemic has the potential to overwhelm fragile mental health care systems around the world.

Keywords: Anxiety, COVID-19, depression, health system, mental health, young adults

Introduction

On 11 March 2020, the Ministry of Health confirmed the first COVID-19 case in Turkey and as of 20 August 2021, Turkey's total number of cases was over 6 million with 53,891 deaths. To stop the spread of coronavirus, the Turkish government imposed some unprecedented measures including lockdowns, school closures, voluntary home isolation, restriction of social gatherings and public events, travel restrictions, public transit system closures. The COVID-19 pandemic itself, these restrictions and other COVID-19 related problems such as fear, uncertainty, separation and bereavement, social disturbances, and economic loss all pose an important threat to people's mental health and can result in serious mental health disorders, such as anxiety and depression.

There is a rapidly increasing number of publications on mental health in the pandemic. Many of them are statements or comments and reports alarming that the COVID-19 pandemic can rise the prevalence and severity of mental health problems. So far, there are only a few empirical studies that compared mental health before and during the pandemic. For example, Pierce and colleagues (2020) conducted a secondary data analysis from a national longitudinal probability sample survey of the UK population and showed that mental health has significantly worsened in the UK after pandemic lockdown.

Using secondary data, Twenge and Joiner (2020) also showed that compared to a national mental health survey data from 2018, mental distress was much higher in a nationally representative sample of the U.S. adult population in April 2020, providing evidence that severe mental illness has become strikingly more common especially among young U.S. adult population during the COVID-19 pandemic. In addition to these second data analyses, empirical comparison of within-subjects is needed to examine the changes in young adults' mental health outcomes that are potentially attributable to the COVID-19 pandemic.

In the current study, we collected data from a very large sample (N = 1720) of young adults in Turkey, which is an underrepresented society in the literature on mental health and the COVID-19 pandemic. We aimed at investigating the prevalence and severity of anxiety and depressive symptoms among young adults in Turkey before and during the pandemic. Further, we investigated the demographic (age, gender, marital status, place of residence, lockdown status, accompanying chronic disease, COVID-19 symptoms), social (social media use, social communication), and psychological (preventive behaviors, perceived risk, COVID-19 related stressors, COVID-19 conspiracy beliefs) correlates of anxiety and depressive symptoms among young adults in Turkey during the pandemic.

Methods

Cross-sectional online survey

This survey-based study was conducted online. Participation was voluntary and an informed-consent form was given to all participants at the beginning of the online survey. Participants who had been previously diagnosed with a psychological or cognitive disorder were excluded from the data. Incomplete questionnaires were also excluded. This study has been reviewed and approved by the Institutional Review Board of Uşak University, Institute of Social Sciences and Humanities (IRB#2020-64).

Measures

In this study, the sociodemographic form, the GAD-7, and PHQ-9 scales were administrated and data on preventive behaviors, perceived risk, COVID-19 related stressors, COVID-19 conspiracy beliefs, social media use, and social communication were also collected.

Socio-demographic form

In the beginning, each participant completed a socio-demographic questionnaire including questions on age, gender (female, male and other), occupational status, education level, place of residence, accompanying chronic disease, lockdown status, COVID-19 symptoms so far.

Generalized Anxiety Disorder 7-item (GAD-7) scale

To assess participants' anxiety, we used a 7-item Generalized Anxiety Disorder Scale (GAD-7) (total score range, 0-21) which was developed by Spitzer and colleagues (2006) and adapted to Turkish by Kokan and colleagues (2011). GAD-7 is one of the most widely used instruments for the detection and screening of generalized anxiety disorders. Participants were asked to retrospectively indicate how often they were bothered by each symptom two weeks before the spread of the COVID-19 pandemic in Turkey and over the last two weeks. Response options for the GAD-7 scale were "0=not at all", "1=several days", "2=more than half the days", and "3=nearly every day". The cut-off score of 10 or greater may indicate a clinically significant condition. A total anxiety score of 0-4 refers to minimal or no anxiety, 5-9 refers to mild anxiety, 10-14 refers to moderate anxiety, and 15-21 refers to severe anxiety (Löwe *et al.* 2008). The Cronbach's α for GAD-7 before and during the COVID-19 pandemic were .89 and .92, respectively.

Patient Health Questionnaire-9 (PHQ-9)

Depression of the participants was assessed by the Turkish adaptation of a 9-item patient health questionnaire (Sarı *et al.* 2016) (PHQ-9, total score range 0-27), which is one of the most frequently used tools for detecting and screening depression (Kroenke *et al.* 2001). Subjects were asked to retrospectively indicate how often they were bothered by each symptom two weeks before the spread of the COVID-19 pandemic in Turkey and over the last

two weeks. A total depression score of 0-4 refers to minimal or no depression, 5-9 refers to mild depression, 10-14 refers to moderate depression, 15-19 refers to moderately severe depression, and 20-27 refers to severe depression (Löwe *et al.* 2008). The cut-off score of 10 or greater may indicate a clinically significant condition. The Cronbach's α for the PHQ-9 before and during the COVID-19 pandemic were .78 and .84, respectively.

Other social and psychological measures

The other measures comprised a structured questionnaire packet that inquired information about preventive behaviors (An example survey item was "When I am outside, I pay attention to social distancing", Cronbach's α =.75), perceived risk (An example survey item was "I think the coronavirus is dangerous.", Cronbach's α =.93) (Oh *et al.* 2020), COVID-19 related stressors (An example item was "I think the Covid-19 outbreak will have a negative impact on my financial situation, Cronbach's α =.56), COVID-19 conspiracy beliefs (An example survey item was "Coronavirus was intentionally developed in a lab and spread around the world by a government", Cronbach's α =.64), social media use (An example survey item was "I post on my social media accounts.", Cronbach's α =.81), and social communication (An example survey item was "I video-chat with my family and friends", Cronbach's α =.77).

Data analysis

We presented the descriptive data as numbers (N) and percentages (%) or as mean values (M) and standard deviations (SD). Repeated measures analysis of variance (ANOVA) was performed to explore the effect within-subject factor (before vs. during the COVID-19 pandemic) and between-subject factor (male vs. female) on participants' anxiety and depression levels. Also, McMenar's and Friedman's chi-square tests were used to explore the within-subject changes in the prevalence and severity of anxiety and depression symptoms. Bivariate Pearson's correlations were employed to examine the psychological correlates of current GAD-7 and PHQ-9 scale scores. Multiple linear regression analyses were performed to explore the associations of anxiety and depression (dependent variables) with sociodemographic, social, and psychological factors (independent variables), with a *p*-value of less than .05 being considered significant. Data analyses were performed using IBM SPSS Statistics 26.0. The figures were created with the RainCloudPlots Package in R (Allen *et al.* 2018), which shows a combination of individual data points, box. and violin plots.

Results

Participants' characteristics

By utilizing convenience and snowball sampling, a total of 1720 Turkish individuals from 72 of 81 cities in Turkey participated in the study. The sample comprised 1155 females (67%), 565 males (33%) aged 18 to 35 years (M_{age}= 23.08, SD_{age} = 5.79). The majority of the participants were single (92.6%), college students (68.5%), living in urban areas (87.6%). Overall, 1090 participants have imposed a regional or national lockdown during the pandemic (63.4%). 337 participants had a chronic disease (19.6%) and 65 participants had COVID-19 symptoms (3.8%) (see Table 1).

Univariate analysis of participants' characteristics and clinical features

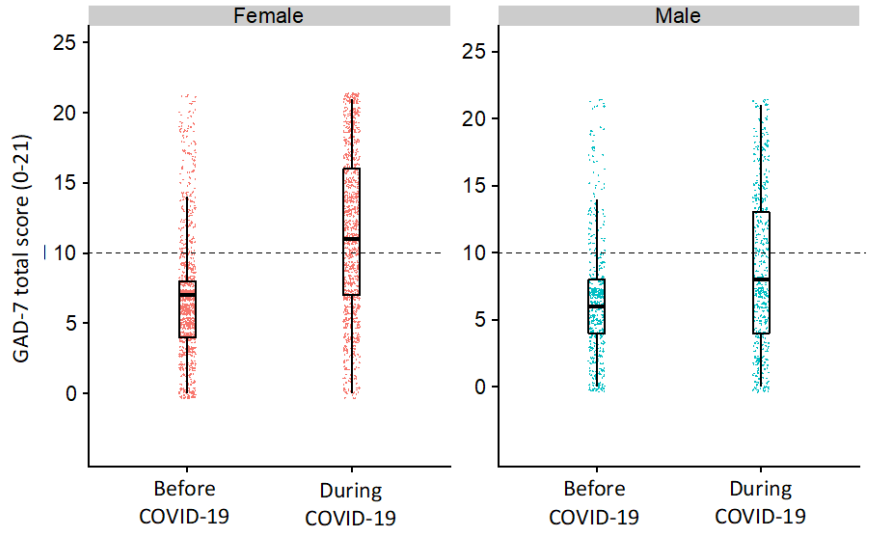
We analyzed the differences in anxiety and depression levels during the pandemic between the subgroups (i.e., gender, marital status, education level, living area, lockdown status, accompanying chronic diseases, and COVID-19 symptoms). Anxiety and depression levels scores were significantly higher for females, unmarried participants, particpants with high school and undergraduate degrees, participants with chronic diseases. However, anxiety and depression scores did not differ with regard to participants' living areas (rural vs urban). Although participants'

anxiety and depression scores statistically differed based on their lockdown status, the effect sizes were small (see Table 1).

Table 1: Univariate analysis of participants' characteristics and clinical features

Variables	N (%)	Anxiety					Depression				
		M	*SD*	*F*/*t*-value	*p*-value	*Cohen's d*	*M*	*SD*	*F*/*t*-value	*p*-value	*Cohen's d*
Gender				8.26	<.001	.42			8.91	<.001	.47
Female	1155 (67.2%)	11.39	5.75				14.72	6.11			
Male	565 (32.8%)	8.94	5.84				11.90	6.27			
Marital status				6.39	<.001	.59			8.50	<.001	.78
Unmarried	1593 (92.6%)	10.84	5.88				14.15	6.25			
Married	127 (7.4%)	7.40	5.08				9.31	5.16			
Education				6.61	<.001	–			8.16	<.001	–
High school	1178 (68.5%)	10.86	5.92				14.12	6.28			
Associate degree	143 (8.3%)	10.12	5.98				13.73	6.39			
Undergraduate	312 (18.1%)	10.79	5.69				13.81	6.18			
Master's degree	48 (2.8%)	6.79	5.36				9.98	5.85			
Doctorate	37 (2.2%)	6.97	3.89				8.62	4.32			
Living area				-.59	.55	.04			.50	.62	-.04
Rural	214 (12.4%)	10.77	5.63				13.55	6.39			
Urban	1506 (87.6%)	10.56	5.93				13.82	6.29			
Lockdown status				3.06	.002	.15			4.35	<.001	.22
Yes	1090 (63.4%)	10.91	5.92				14.29	6.30			
No	630 (36.6%)	10.01	5.80				12.93	6.21			
Chronic diseases				6.99	<.001	.42			6.44	<.001	.39
Yes	337 (19.6%)	12.57	5.83				15.75	6.36			
No	1383 (80.4%)	10.10	5.81				13.31	6.19			
COVID symptoms so far				5.61	<.001	.71			6.03	<.001	.76
Yes	65 (3.8%)	14.57	6.62				18.37	6.21			
No	1655(96.2%)	10.43	5.85				13.61	6.24			

A repeated-measures ANOVA revealed that anxiety and depression levels increased significantly from prior to during the pandemic with females demontsrating significantly higher anxiety and depression levels than males at both measures (see Figure 1). We also found significant interactions as well, F (1, 1718) = 66.79, p < .001 for GAD-7 and F (1, 1718) = 95.07, p < .001 for PHQ-9.



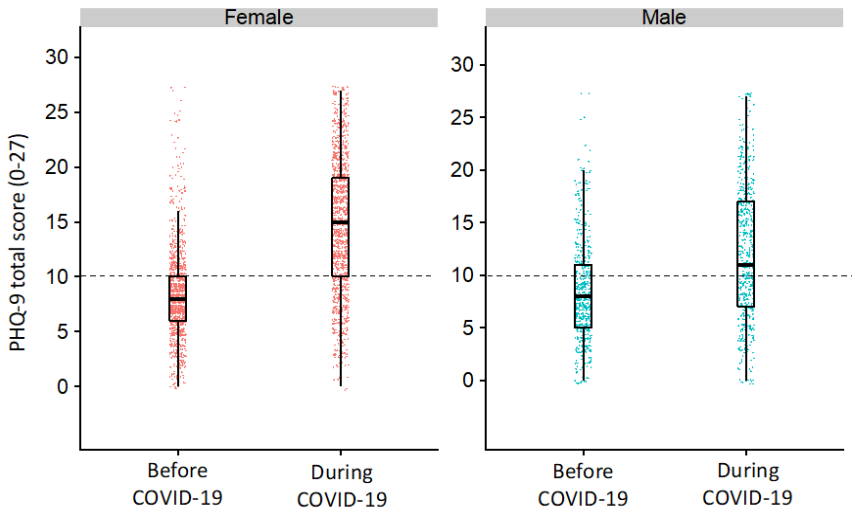


Figure 1: Raincloud plots depict the comparative analysis of anxiety (top row) and depression levels (bottom row) before and during the pandemic based on gender.

Prevalence and severity of anxiety and depressive symptoms before and during the pandemic

The proportion of positive screens for anxiety (GAD-7 ≥ 10) raised from 18.5 % to 53.5 % during the pandemic, X 2M (1) = 566.146, p < .001. A Friedman's chi-square test revealed a significant difference in the severity categories of anxiety symptoms between before the pandemic (no anxiety: 27.4 %; mild anxiety: 54.1 %; moderate anxiety 11.5 %; severe anxiety 7 %) and during the pandemic (no anxiety: 16.6 %; mild anxiety: 29.9 %; moderate anxiety: 26 %; severe anxiety: 27.5 %), X 2F (1) = 674.053, p < .001.

However, the proportion of positive screens for depression (PHQ-9 ≥ 10) increased from 30.2 % to 71.6 % during the pandemic, X 2F (1) = 642.166, p < .001. Again, a Friedman's chi-square test revealed a significant difference on the severity categories of depression symptoms between before the pandemic (no depression: 14.4 %; mild depression: 55.3 %; moderate depression: 22.4 %; moderately severe depression: 5.4 %; severe depression: 2.4 %) and during the pandemic (no depression: 6.7 %; mild depression: 21.7 %; moderate depression: 25.9 %; moderately severe depression: 25.2 %; severe depression: 20.4 %), X 2F (1) = 886.716, p < .001.

Table 2: Prevalence and severity of anxiety and depressive symptoms before and during the pandemic

	Overall		Male		Female		Statistics		
	N	%	N	%	N	%	*X*	*df*	*p*
Anxiety Symptoms									
No anxiety	285	16.6	143	25.3	142	12.3	62.42	3	<.001
Mild anxiety	515	29.9	184	32.6	331	28.7			
Moderate anxiety	447	26.0	124	21.9	323	28.0			
Severe anxiety	473	27.5	114	20.2	359	31.1			
Total	1720	100	565	100	1155	100			
Depressive Symptoms									
No depression	116	6.7	70	12.4	46	4.0	81.61	4	<.001
Mild depression	373	21.7	158	28.0	215	18.6			
Moderate depression	446	25.9	137	24.2	309	26.8			
Moderately severe depression	434	25.2	127	22.5	307	26.6			
Severe Depression	351	20.4	73	12.9	278	24.1			
Total	1720	100	565	100	1155	100			

Social and psychological correlates of anxiety and depressive symptoms during the pandemic

Anxiety were positively correlated with pandemic-related stressors, $r = .219$, $p < .001$, perceived risk, $r = .094$, $p < .001$, and COVID-19 conspiracy beliefs, $r = .085$, $p < .001$. Depression were also positively correlated with pandemic-related stressors, $r = .230$, $p < .001$, and perceived risk, $r = .094$, $p < .001$. COVID-19 pandemic conspiracy beliefs, $r = .059$, $p = .014$, were positively correlated with depression, but the magnitude of the correlation is relatively weak. However, the level of preventive measures was unrelated to either anxiety or depression (see Table 3).

Table 3: Social and psychological correlates of anxiety and depressive symptoms during the pandemic.

		1		2		3		4		5		6		7		8
1. Anxiety	Pearson's r	–														
	p value	–														
2. Depression	Pearson's r	.763	***	–												
	p value	<.001		–												
3. Social media use	Pearson's r	.236	***	.250	***	–										
	p value	<.001		<.001		–										
4. Social Communication	Pearson's r	-.008		-.008		.415	***	–								
	p value	.744		.888		<.001		–								
5. Preventive Behaviors	Pearson's r	-.031		-.034		.076	**	.071	**	–						
	p value	.206		.153		.002		.003		–						
6. Perceived Risk	Pearson's r	.094	***	.094	***	.182	***	.146	***	.184	***	–				
	p value	<.001		<.001		<.001		<.001		<.001		–				
7. COVID-19-related concerns	Pearson's r	.219	***	.230	***	.215	***	.189	***	.113	***	.580	***	–		
	p value	<.001		<.001		<.001		<.001		<.001		<.001		–		
8. COVID-19 conspiracy beliefs	Pearson's r	.085	***	.059	*	.032		.006		-.003		.099	***	.127	***	–
	p value	<.001		.014		.191		.790		.895		<.001		<.001		–
Descriptives	*M*	10.58		13.79		3.76		3.86		6.48		4.38		3.29		3.22
	SD	5.89		6.30		1.04		.93		.652		1.03		.79		1.01

Note. N for all correlations are 1720.
*p<.05, **p<.01, ***p<.001

Predictors of anxiety and depressive symptoms during the pandemic

We carried out a multiple regression analysis to examine whether sociodemographic, social, and psychological factors could significantly predict participants' anxiety and depression. The results of the regression analysis revealed that the model explained 17.9 % of the variance and that the model was a significant predictor of anxiety, F (13,1706) = 28.560, $p < .001$. Further examination of the beta weights on each predictor indicated that age, gender, accompanying chronic diseases, COVID-19 symptoms, social media use, social communication, preventive behaviors, perceived risk, COVID-related concerns, and COVID-19 conspiracy beliefs were significant predictors of anxiety. The strongest predictor of anxiety was social media use ($\beta = .204$), followed by COVID-19-related concerns ($\beta = .204$), and gender ($\beta = -.138$), and the weakest predictor was COVID-19 conspiracy belief ($\beta = -.046$). The

For the depression, the linear combination of sociodemographic, social and psychological factors accounted for 20.5 % of variance of depression, (F (13,1706) = 33.798, $p < .001$). The significant predictors of depression were age, gender, marital status, chronic diseases, COVID-19 symptoms, social media use, social communication, preventive behaviors, perceived risk, and COVID-related concerns. The strongest predictor of anxiety was social media use ($\beta = .212$), followed by COVID-19-related concerns ($\beta = .211$), and gender ($\beta = -.148$), and the weakest predictor was perceived risk ($\beta = -.062$) (see Table 4).

Table 4: Multiple linear regression analysis predicting anxiety and depression during the pandemic

Model	Anxiety					Depression				
	Unstandardized Coefficients		Standardized Coefficients			Unstandardized Coefficients		Standardized Coefficients		
	B	*SE*	*β*	*t*	*p*	*B*	*SE*	*β*	*t*	*p*
Age	-.109	.034	-.107	-3.201	.001	-.124	.036	-.114	-3.453	.001
Gender	-1.735	.291	-.138	-5.957	<.001	-1.979	.306	-.148	-6.459	<.001
Marital status	-1.042	.694	-.046	-1.501	.133	-2.092	.730	-.087	-2.865	.004
Education level	.079	.155	.014	.506	.613	.110	.163	.018	.674	.500
Lockdown status	-.006	.276	-.001	-.022	.982	-.267	.291	-.020	-.916	.360
Chronic diseases	-1.909	.331	-.129	-5.768	<.001	-1.835	.348	-.116	-5.269	<.001
COVID-19 symptoms	-2.493	.687	-.081	-3.627	<.001	-2.934	.723	-.089	-4.056	<.001
Social media use	1.159	.142	.204	8.181	<.001	1.287	.149	.212	8.638	<.001
Social communication	-.745	.156	-.117	-4.781	<.001	-.808	.164	-.119	-4.928	<.001
Preventive behaviors	-.617	.207	-.068	-2.984	.003	-.704	.217	-.073	-3.240	.001
Perceived risk	-.325	.157	-.057	-2.067	.039	-.381	.165	-.062	-2.307	.021
COVID-19-related concerns	1.476	.205	.198	7.199	<.001	1.679	.216	.211	7.781	<.001
COVID-19 conspiracy beliefs	.268	.129	.046	2.075	.038	.098	.136	.016	.725	.469

Discussion

Global public health emergency crises such as pandemics impose a psychological burden on people, which can be expressed as anxiety and depression (SARS: Loh *et al.* 2005; Leppin and Aro, 2009; Main *et al.* 2011; Mihashi *et al.* 2009; MERS: Lee *et al.* 2018, Kim et al., 2018). However, the impact of the COVID-19 pandemic, on societal and individual psychologies is not very well understood, so far. Further, we know very little regarding the widespread serious psychological problems and their associated risks. The main goal of the current study was to investigate the prevalence and severity of anxiety and depressive symptoms before and during the pandemic among young adults in Turkey. We also aimed at identifying the social and psychological correlates and main predictors of anxiety and depression during the pandemic.

In the current study, we reported the results from 1720 young adults who completed an online survey. There are three major findings of this study. First, this pandemic seems to have a major impact on the mental health of young adults in Turkey. We found substantially and concerningly elevated anxiety and depression symptoms. For example, the rate of participants who screened positive for anxiety and depression increased significantly to 53.5% and 71.6% respectively. These proportions are comparable to Chinese college students' anxiety (53%) and depression levels (60%) that were reported in a recent study by Zhou and colleagues (2020). Importantly, the prevalence rate of participants with severe anxiety (GAD-7 score ≥ 15) and participants with severe depression PHQ-9 score ≥ 20) increased from 7% to 27.5% for anxiety and from 2.4% to 20.4% for depression, indicating that the COVID-19 pandemic has a staggering effect on the mental health of young adults in Turkey. Further, the within-subjects' comparison of anxiety and depression scores before and during the pandemic provides support for our finding that the elevation in the symptoms of anxiety and depression was indeed related to the COVID-19 pandemic.

Second, women had higher levels of anxiety and depressive symptoms compared to men, indicating that the psychological impact of the COVID-19 pandemic may be stronger on women. Prior research also demonstrated that post-traumatic stress disorder, general anxiety disorder, depressive disorders are more common among

women during the pandemics (Liu *et al*. 2020; Alexander *et al.* 2007). Women were three times more likely than males to suffer from anxiety disorders during the COVID-19 pandemic (Wang et al. 2020). Thus, the greater levels of anxiety and depression among women in this study are not surprising given the previous findings and our current understanding.

Third, when taking social and psychological factors into account, social media use, COVID-19 related concerns, and gender were found to be the most significant risk factors for both anxiety and depression during the pandemic. Especially, time more participants spend on social media and excessive exposure to COVID-19 related news via social media appears to have a negative impact, which may lead to serious mental health problems. This finding is in line with the results of a recent study that found that consumption of disaster-related social media was strongly linked to poor mental health (Zhao and Zhou 2020).

Despite the importance of our findings, there were a number of important limitations to this study. First, since we only concentrated on young adults in this study, our findings may not be generalized to the general population. Second, several other characteristics such as coping strategies and personality traits that may have impacted the study outcomes were not included and measured in the current study. Third, imprecise random sampling and self-assessments via online surveys may have impaired the reliability of our results. Although the participants with pre-existing mental disorders were excluded from the study, participants' interest in mental health may have increased their likelihood of participating in the study. Thus, this limitation may have brought sampling bias into the study, as well as incorrectly inflating the depression and anxiety rates. However, note that this is a common limitation in the majority of COVID-19's mental health surveys that uses an online convenience sampling strategy. Forth, retrospective self-reports in both measures may have posed a risk for recall bias. Fifth, although the cut-off values for screening anxiety and depressive symptoms were determined based on similar previous studies, they may still not be compatible with a clinical diagnostic interview for anxiety and depressive disorders.

Conclusion

In conclusion, although the findings of the current study may be prone to recall bias and sampling bias due to retrospective assessments through self-report measures, strikingly high levels of anxiety and depressive symptoms require an immediate response aimed at reducing and treating the mental health risks that young adults face. Thus, monitoring vulnerable young individuals is of paramount importance. Mental health care, social and psychological support should be available to these vulnerable populations during pandemics.

References

Alexander, J.L., Dennerstein, L., Kotz, K. and Richardson, G., 2007. Women, anxiety and mood: a review of nomenclature, comorbidity and epidemiology. *Expert review of neurotherapeutics,* 7(sup1), pp.S45-S58.

Allen, M., Poggiali, D., Whitaker, K., Marshall, T.R. and Kievit, R.A., 2019. Raincloud plots: a multi-platform tool for robust data visualization. *Welcome open research*, 4.

IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp

Kim, H.C., Yoo, S.Y., Lee, B.H., Lee, S.H. and Shin, H.S., 2018. Psychiatric findings in suspected and confirmed Middle East respiratory syndrome patients quarantined in hospital: a retrospective chart analysis. *Psychiatry investigation*, 15(4), p.355.

Konkan, R., Şenormanci, Ö., Güçlü, O., Aydin, E. and Sungur, M.Z., 2013. Yaygın Anksiyete Bozukluğu-7 (YAB-7) Testi Türkçe Uyarlaması, Geçerlik ve Güvenirliği. *Archives of Neuropsychiatry/Noropsikiatri Arsivi,* 50(1).

Kroenke, K., Spitzer, R.L. and Williams, J.B., 2001. The PHQ-9: validity of a brief depression severity measure. *Journal of general internal medicine*, 16(9), pp.606-613.

Lee, S.M., Kang, W.S., Cho, A.R., Kim, T. and Park, J.K., 2018. Psychological impact of the 2015 MERS outbreak on hospital workers and quarantined hemodialysis patients. *Comprehensive psychiatry,* 87, pp.123-127.

Leppin, A. and Aro, A.R., 2009. Risk perceptions related to SARS and avian influenza: theoretical foundations of current empirical research. *International journal of behavioral medicine,* 16(1), pp.7-29.

Liu, S., Yang, L., Zhang, C., Xiang, Y.T., Liu, Z., Hu, S. and Zhang, B., 2020. Online mental health services in China during the COVID-19 outbreak. *The Lancet Psychiatry*, 7(4), pp.e17-e18.

Loh, L.C., Ali, A.M., Ang, T.H. and Chelliah, A., 2005. Impact of a spreading epidemic on medical students. The Malaysian journal of medical sciences: MJMS, 12(2), p.43.

Löwe, B., Decker, O., Müller, S., Brähler, E., Schellberg, D., Herzog, W. and Herzberg, P.Y., 2008. Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population. *Medical care,* pp.266-274.

Main, A., Zhou, Q., Ma, Y., Luecken, L.J. and Liu, X., 2011. Relations of SARS-related stressors and coping to Chinese college students' psychological adjustment during the 2003 Beijing SARS epidemic. *Journal of counseling psychology,* 58(3), p.410.

Mihashi, M., Otsubo, Y., Yinjuan, X., Nagatomi, K., Hoshiko, M. and Ishitake, T., 2009. Predictive factors of psychological disorder development during recovery following SARS outbreak. *Health Psychology,* 28(1), p.91.

Pierce, M., McManus, S., Jessop, C., John, A., Hotopf, M., Ford, T., Hatch, S., Wessely, S. and Abel, K.M., 2020. Says who? The significance of sampling in mental health surveys during COVID-19. *The Lancet Psychiatry*, 7(7), pp.567-568.

Sari, Y.E., Kokoglu, B., Balcioglu, H., Bilge, U., Colak, E. and Unluoglu, I., 2016. Turkish reliability of the patient health questionnaire-9. *Biomedical Research-India,* 27, pp.S460-S462.

Spitzer, R.L., Kroenke, K., Williams, J.B. and Löwe, B., 2006. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of internal medicine,* 166(10), pp.1092-1097.

Twenge, J.M. and Joiner, T.E., 2020. US Census Bureau-assessed prevalence of anxiety and depressive symptoms in 2019 and during the 2020 COVID-19 pandemic. *Depression and anxiety,* 37(10), pp.954-956.

Wang, Y., Di, Y., Ye, J. and Wei, W., 2021. Study on the public psychological states and its related factors during the outbreak of coronavirus disease 2019 (COVID-19) in some regions of China. *Psychology, health & medicine*, 26(1), pp.13-22.

Zhao, N. and Zhou, G., 2020. Social media use and mental health during the COVID-19 pandemic: Moderator role of disaster stressor and mediator role of negative affect. *Applied Psychology: Health and Well-Being*, 12(4), pp.1019-1038.

Appendix