DOI: https://doi.org/10.53350/pjmhs202317844

ORIGINAL ARTICLE

Prevalence of Stress and Anxiety among university students during COVID-19 pandemic

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ABSTRACT

Aim: To determine the level of stress and anxiety in university students during COVID-19 pandemic
Methodology: A web based cross sectional survey was conducted from November 2020 to January 2021. Undergraduate students of either gender, aged 18-25 years, were included in the study. Sample size was calculated by using open Epitools online calculator and raised through non-probability snowball sampling technique. E-questionnaire was designed by using Google Form. Informed written consent was attached to e-survey. Semi structured questionnaire was used to take demographic data, for stress and anxiety; PSS-10 and GAD-7 were used. Data was analyzed by SPSS 26.
Results: Out of 656 responses, 97(14.8%) were males and 559 (85.2%) were females. Most students reported moderate to high level of stress 603(91.92%) and anxiety 571(87.04%) .Higher prevalence of perceived stress and anxiety was found in age group of 20-23 years and associated with various factors including living with family, daily internet use of >8hrs, and not involved in any physical activity. Regarding Coorelation of anxiety with with GPA was (r=0.105, p=0.007) and physical exercise was (r=0.107, p=0.005). However coorelation of stress with GPA was (r=0.115, p=0.003) and physical exercise was (r=0.085, p=0.030).
Conclusion: Majority participants showed moderate to severe level of stress and anxiety, which was more in females. Various factors including age group of 21-23 years, living with family, screen time> 8 hours and lack of physical activity were more prevalent among university students during the Covid-19 pandemic.
Keywords: Anxiety, Covid-19, Stress, Physical Inactivity

INTRODUCTION

The World health organization officially declared the deadly, infectious (COVID-19) Coronavirus disease as a pandemic on March,11,2020. Covid-19 is categorized under the pathology of acute respiratory syndrome coronavirus 2 or SARS-CoV-2 as this novel virus holds the genetic code of RNA beta coronavirus. This virus arose from the Wuhan city of China in December 2019 and spread all over and documented 114,090 deaths globally on April,12,2020. On January 30, 2020, the World Health Organization announced the global outbreak of the (COVID-19) a public health emergency and pandemic. The rapid outbreak and significant morbidity and mortality of this pandemic has led to major global health crises[1].

Pakistan experienced the first wave of Coronavirus in May 2020 with a daily increase of deaths in mid-June. Several countries, including Pakistan, implemented strict lockdown to limit and flatten the curve of SARS-CoV-2 (COVID-19). Under the influence of this public health emergency several countries including Pakistan implemented national strict lockdown comprises of social distancing by suspension of local, public and international transport, bans on crowded places like parks, shopping malls, offices, business hubs, large gatherings, closure of all schools, colleges and higher education institutes including universities to break the chain of viral disease and decrease the mortality rate[2].

Worldwide all the higher education institutions including Pakistan, have closed their institutes to reduce the rapid spread of deadly virus infection. An international survey including higher education institutes conducted by the International Association of Universities (IAU), identified that more than 90% of universities have replaced the face-to-face on-campus classroom teaching process to distant learning /teaching [3].The national lockdown has replaced the face to face on-campus classroom learning to distant learning and teaching in terms of online classes via online streaming, video lectures to ensure the continuous delivery of education. However, the practical and clinical courses that require supervision, clinical skills, and clinical rotations are compromised in these online classes[4].

Before the outbreak of this pandemic, the mental health of the young generation is already a hot topic of global concern as the high-income country such as France also reported a high rate of suicide among individuals aged 15 to 25 years[5]. Mental health is categorized as a most essential parameter for healthy and good quality of life. It accounts for 16% of the global burden of diseases in which depression is the fourth leading cause of disease while anxiety is the ninth leading cause of disability among the young population[6].There are multiple causative agents including health status, genetics, a socioeconomic status that may contribute to the pathophysiology of various mental disorders. It is also found that COVID-19 has a worse impact on the general population than SARS[7].

It is further supported by a study conducted by Nelson et al in which higher level of anxiety and other mental disorders were found among the general population[8]. Multiple studies cited the evidence of increased mental distress, psychological symptoms, and sleep disturbances in the general population and in the university students due to the outbreak of COVD-19 induced lockdown[9,10]. Studies revealed that during this nation-wise lockdown, risk factors that can facilitate the mental health problem and disorders such as anxiety, uncertainty, stress, insomnia, suicidal ideation, and depression are more prevalent.

Depression, stress, and anxiety negatively affect the students are most prevalent among the young generation. Anxiety disorders are common among medical undergraduates and require mental health care[11].The study was conducted in China including 194 different cities of China in which 53.8% of participants responded to the moderate or severe impact of a pandemic on their mental health. Another study in China using the DASS-21 scale rated that 53.8% of individuals presented with moderate to severe symptoms of anxiety. A systematic review on mental health revealed the high rate of stress, anxiety, and psychological and mental distress symptoms in various populations affected by the pandemic[12]. Pandemic has impacted all the South Asian countries,

Received on 28-04-2023
Accepted on 08-07-2023

including Pakistan. The Impact of pandemic including suspension of on-campus classes and stay-at-home orders may play a major role in facilitating or worsening the symptoms of stress and anxiety or mental illness. Such circumstances negatively affect the mental well-being of medical undergraduates[13].

If the mental illness is left untreated or undiagnosed, it may negatively impact the quality of life which leads to detrimental effects on cognition, memory, and learning capabilities of medical students. Hence American Academy of Child and Adolescent Psychiatry (AACAP) suggests the timely screening of the young population for mental problems[14]. A sedentary lifestyle, cessation of extracurricular activities, and increased length of time spent online to internet browsing may lead to a vicious cycle that can easily trigger stress and insomnia and may reduce cognitive capabilities [15].Literature also revealed a higher level of mental illness among females and undergraduate students than graduate students [16, 17].Cao et al. observed the prevalence of anxiety among the college students and found that 3.6% of participants presented moderate to severe anxiety disorders[18]. A recent study reported 7% symptoms of post-traumatic stress disorder, particularly in women after the COVD 19 outbreak. Simultaneously, those with any preexisting mental illness could be more prone to negative physiological health in the context of the recent COVID-19 epidemic[19.20].

It has recently been noted that fear of deadly COVID-19 is highly associated with stress and anxiety and mildly associated with depression. While various studies also showed the close association of anxiety and depression as both behave as a predictor of each other [21]. Uncontrolled spread of the epidemic, strict lock-down, and closure of face to face teaching systems accelerate the psychological impact on the general population as well on students[22].

Due to the prevailing condition of COVID-19 the current study was conducted to find out the prevalence of stress and anxiety among university students of Rawalpindi and Islamabad. Therefore, this study also aims to find factors related to stress and anxiety during pandemic.

METHODS

The web-based cross-sectional survey was conducted from November 2020 to January 2021.After approval from the institutional review board of university. The sample size was calculated by using Epitool online calculator while assuming student population to be 20,000 at 95% confidence level and standard error 5%[23]. Students enrolled in different universities of Rawalpindi and Islamabad were the target population of study. E-questionnaire was designed by using Google Form and distributed among students. An informed consent was attached to the e-survey form and each student consented to participate after reading the consent form. The sample was recruited by using snowball sampling technique. The students were asked to share the questionnaire with their friends and classmates by using institutional and personal Facebook, WhatsApp, and Messenger.

E- Questionnaire consists of 3 sections. The first section inquired about demographic information, second and third section evaluated stress and anxiety by using Perceived stress scale (PSS-10) and Generalized Anxiety Disorder (GAD-7) respectively. The survey took approximately 15-20 minutes to complete.

Perceived stress scale (PSS-10): PSS-10 was used to determine the level of perceived stress among students. The scale comprised of 10 items, answered on 5- point Likert scale, 0=never, 1=almost never, 2=often, 3= often, and 4= very often. Reverse scoring of four positively items i.e., question 4,5,7,8 in to 0=4, 1=3, 2=2, 3=1, & 4=0 was done, then computing all the scale items of PSS-10 scale score.

The total score of scale ranges from 0 to 40 of which level of stress in the current study was categorized as 0-13 = low stress, 14-25= moderate stress and 26-40 =high perceived stress. The Cronbach's alpha of PSS-10 was 0.90 in this study.

Generalized Anxiety Disorder (GAD-7): GAD-7 was used to evaluate the level of anxiety. The GAD-7 consists of seven items answered on four-point Likert scale in which 0=Not at all, 1= several days, 2= over half of the days and 3=Nearly every day. Total score was computed by adding all scale items. The anxiety level in the study was categorized as none-minimal = 0-4, mild = 5-9, moderate=10-14 and severe= 15-21 respectively. The Cronbach's alpha of GAD-7 was 0.86 in this study[24].

Statistical analysis is done by using SPSS 26. A descriptive analysis was done for demographic characteristics results and presented as frequencies and percentages. Mean and standard deviations were calculated for each item of PSS-10 and GAD-7 and total score was computed for each scale. Additional reliability Analysis was carried out for the scales used in the study with Cronbach's Alpha >0.70 considering standard. An independent sample test was carried out to find out the level of stress and anxiety among male and female participants. Chi-square and cross tabulation were used to find the prevalence of stress and anxiety in demographic characteristics. Pearson product-moment correlation coefficient was used to examine associations between anxiety and stress with demographic variables. A p-value of <0.05 is considered statistically significant.

RESULTS

Out of 656 received responses from the participants, 97 (14.8%) were males and 559 (85.2%) were females. Most study participants 344(52.4%) were in the age group of 21-23 years. Among the study year of the study population, most of the students 195(29.7%) were from 3rd year and 180(27.4%) were from the 2nd year. Regarding academic performance of students 311(47.4%) had scored point average (GPA) of 3.0-3.5 and 149(22.7%) were with 2.5-3.0 GPA. Most of study participants 309 (47.1%) lived with family during the lockdown. Moreover 248 (37.8%) participants were using the internet daily for more than 8 hours and 412 (62.8%) were not involved in any physical exercise during lockdown. Detail description of study participants were mentioned in (Table 1).

Out of the total 656 participants, 603 (91.92%) were found with severe to moderate stress symptoms (Figure 1). Females (79.57%) had higher stress symptoms as compared with the male (12.34%), additionally students in the 20-23 age group (48.17%) and students in 3rd year (26.98%) showed higher stress than other age groups and academic years. Stress was also prevalent among the students with no physical exercise (59.29%), living with family (42.68%), daily internet use of > 8hrs. (33.53%) and had a point average of GPA 3.0-3.5 (42.98%). Among anxiety 571(87.04%) university students had mild to severe anxiety symptoms (Figure 2). Females (75.00%) had higher stress symptoms as compared with the male (12.04%), whereas students in the 20-23 age group (48.40%) and students in 3rd academic year (27.13%) showed higher stress than other age groups and academic years. Like stress, anxiety was prevalent with no physical exercise (55.03%). Furthermore, university students living with families 40.01%, with daily internet use of > 8hrs. (32.62%) and grade point average of 3.0-3.5 (41.01%) also showed higher anxiety symptoms (Table 2).

The overall mean score for PSS scale was 20.64 ±5.1 (Table 3). PSS score among male participants was 18.32±5.8 and in females score was 20.87±4.9. The results of study also showed significant difference between male and female level of stress, and female students recorded greater means of stress. (p=0.006). Additionally, the mean score for GAD-7 score reported by all study participants was 10.41±4.8 Moreover, study results also demonstrate that mean score of GAD-7 among females was 10.60±5.0 which was higher as compared to males 8.27±4.6 (p-value 0.012). (Table 4).

Results of current study showed for anxiety, weak and positive significant associations was found between age (r=0.089, p=0.022), academic year (r=.103, p=0.008), GPA (r=0.105, p=0.007) and physical exercise (r=0.107, p=0.005).Additionally

negative non-significant associations were found with accommodation (r=-0.002, p=0.950) and daily internet use r=-0.50,p=0.200).However for perceived stress weak and positive significant associations was found between GPA (r=0.115,p=0.003) and physical exercise (r=0.085, p=0.030).There was also weak ,positive non-significant association of stress was found between age (r=0.038, p=0.335), academic year (r=0.061, p=0.120), and daily internet use (r=0.045, p=0.254). Negative weak non-significant associations were found with accommodation (r=-0.014, p=0.724).

Table 1: Demographic characteristics of participants (*n*=656)

Variables	n (%)
Gender	
Male	97 (14.8)
Female	559 (85.2)
Age	
18-20 years	284 (43.3)
21-23 years	344 (52.4)
24-26 years	28 (4.3)
Year	
1st year	84 (12.8)
2nd year	180 (27.4)
3rd year	195 (29.7)
4th year	128 (19.5)
5th year	69 (10.5)
GPA	
3.5-4.0	144 (22.0)
3.0-3.5	311 (47.4)
2.5-3.0	149 (22.7)
2.0-2.5	52 (7.9)
Accommodation	
With family	309(47.1)
University hostel with friends	225 (34.3)
Living Alone	122 (18.6)
Physical exercise	
Yes	244(37.2)
No	412 (62.8)
Daily internet use	
>8 hrs.	248 (37.8)
6-8 hrs.	225 (34.3)
4-6 hrs.	94 (14.3)
<4 hrs.	89 (13.6)

Figure 1: Level of Perceived Stress (PSS-10) among students

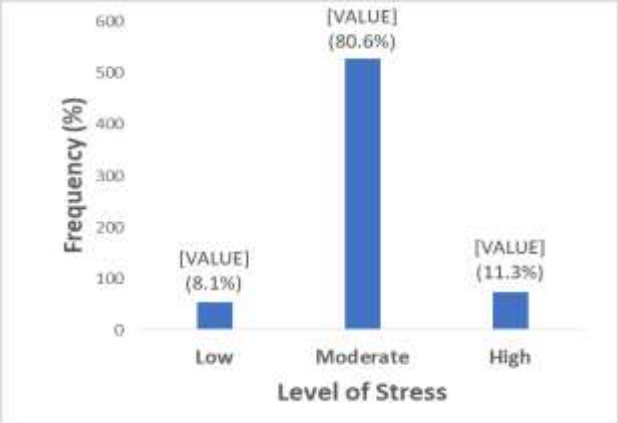

Figure 2: Generalized Anxiety Disorder (GAD-7) among students

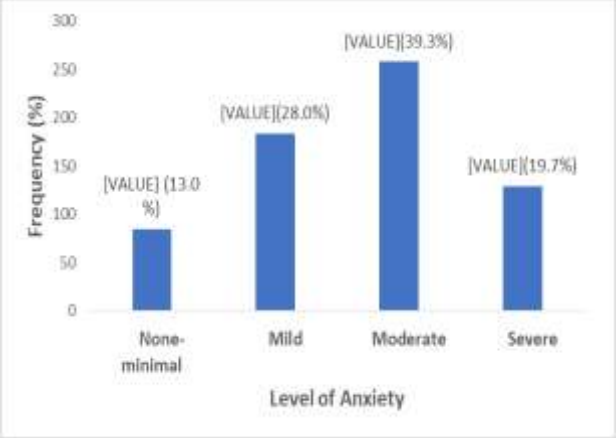

Table 2: Perceived stress and anxiety in relation to demographic variables

Variable	Perceived stress				Anxiety				
	Low	Moderate	High	X^2, p-value	None-minimal	Mild	Moderate	Severe	X^2, p-value
Gender									
Male	16(16.5)	67(69.1)	14(14.4)	12.27, 0.002***	18(18.6)	27(27.8)	38(39.2)	14(14.4)	4.34, 0.018***
Female	37(6.6)	462(82.6)	60(10.7)		67(12.0)	157(28.1)	220(39.4)	115(20.6)	
Age									
18-20	23(8.1)	234(82.4)	27(9.5)	1.69, 0.792	48(16.9)	83(29.2)	106(37.3)	47(16.5)	10.89, 0.082
21-23	28(8.1)	273(79.4)	43(127)		33(9.6)	92(26.7)	141(41.0)	78(22.7)	
24-26	2(7.1)	22(78.6)	4(14.3)		4(14.3)	9(32.1)	11(39.3)	4(14.3)	
Year									
1st year	7(8.3)	70(83.3)	7(8.3)	8.46, 0.390	26(31.0)	22(26.2)	20(23.8)	16(19.0)	34.61 0.001***
2nd year	15(8.3)	145(80.6)	20(11.1)		20(11.1)	57(31.7)	69(38.3)	34(18.9)	
3rd year	18(9.2)	155(79.5)	22(11.3)		17(8.7)	54(27.7)	87(44.6)	37(19.0)	
4th year	10(7.8)	107(83.6)	11(8.6)		13(10.2)	31(24.2)	57(44.5)	27 (21.1)	
5th year	3(4.3)	52(75.4)	14(20.3)		9(13.0)	20(29.0)	25(36.2)	15(21.7)	
GPA									
3.5-4.0	11(7.6)	125(86.8)	8(5.6)	14.08, 0.029***	25(17.4)	42(29.2)	56(38.9)	21(14.6)	10.06, 0.345
3.0-3.5	29(9.3)	251(80.7)	31(10.0)		42(13.5)	90(28.9)	119(38.3)	60(19.3)	
2.5-3.0	10(6.7)	114(76.5)	25(16.8)		12(8.1)	38(25.5)	64(43.0)	35(23.5)	
2.0-2.5	3(5.8)	39(75.0)	10(19.2)		6(11.5)	14(26.9)	19(36.5)	13(25.0)	
Accommodation									
With family	29(9.4)	239(77.3)	41(13.3)	15, 0.386	46(14.9)	75(24.3)	123(39.8)	65(21.0)	15.72, 0.015***
In hostel with friends	16(7.1)	187(83.1)	22(9.8)		21(9.3)	83(36.9)	80(35.6)	41(18.2)	
Living alone	8(6.6)	103(84.4)	11(9.0)		18(14.8)	26(21.3)	55(45.1)	23(18.9)	
Physical exercise									
Yes	30(12.3)	188(77.0)	26(10.7)	9.30, 0.010***	34(13.9)	73(29.9)	86(35.2)	51(20.9)	2.72, 0.037***
No	23(5.6)	341(82.8)	48(11.7)		51(12.4)	111(26.9)	172(41.7)	78(18.9)	
Daily internet use									
>8 hours	28(11.3)	190(76.6)	30(12.1)	10.15, 0.118	34(13.7)	72(29.0)	97(39.1)	45(18.1)	15.20, 0.085
6-8 hours	17(7.6)	181(80.4)	27(12.0)		17(7.6)	60(26.7)	93(41.3)	55(24.4)	
4-6 hours	4(4.3)	84(89.4)	6(6.4)		18(19.1)	25(26.6)	37(39.4)	14(14.9)	
< 4 hours	4(4.5)	74(83.1)	11(12.4)		16(18.0)	27(30.3)	31(43.8)	15(16.9)	

Table 3: Mean score for each of PSS-10 scale items

S.No	PSS items	Mean (SD)
1	In the last month, how often have you been upset because of something that happened unexpectedly?	2.13 (0.9)
2	In the last month, how often have you felt that you were unable to control the important things in your life?	1.85 (1.0)
3	In the last month, how often have you felt nervous and stressed?	2.11 (0.9)
4	In the past month, how often have you dealt successfully with irritating life hassles?	1.86 (1.0)
5	In the past month, how often have you felt that you were effectively coping with important changes that were occurring in your life?	2.22 (0.9)
6	In the past month, how often have you felt confident about your ability to handle your personal problems?	1.98 (0.9)
7	In the last month, how often have you been able to control irritations in your life?	1.89 (1.0)
8	In the past month, how often have you found that you could not cope with all the things that you needed to do?	2.18 (1.0)
9	In the past month, how often have you been able to control irritations in your life?	2.38 (1.0)
10	In the past month, how often have you felt that you were on top of things?	2.06 (1.0)
	Overall PSS scores	20.64 (5.1)

Table 4: Mean score for each of GAD-7 scale items

S.No	GAD 7 Items	Mean (SD)
1	Over the last 2 weeks, how often you feel nervous, anxious, or on edge	1.29 (0.9)
2	Over the last 2 weeks, how often not being able to stop or control worrying	1.46 (0.9)
3	Over the last 2 weeks, how often you have worrying too much about different things	1.68 (0.9)
4	Over the last 2 weeks, how often you have trouble relaxing	1.45 (0.9)
5	Over the last 2 weeks, how often you are being so restless that it's hard to sit still	1.39 (1.0)
6	Over the last 2 weeks, how often you become easily annoyed or irritable	1.60 (0.9)
7	Over the last 2 weeks, how often you feel afraid as if something awful might	1.53 (1.0)
	Overall GAD 7 score	10.41 (4.8)

DISCUSSION

The results of our web based cross sectional study among university indicated that 91.92% showed moderate to severe level of stress and 87.04% students had reported mild to severe anxiety symptoms during COVID-19 pandemic. A study conducted in Bangladesh by Md. Akhtarul Islam et al also depicted the 87.7%, mild to severe anxiety symptoms among university students during the COVID-19[25]. Jungmin Lee et al in their work mentioned that 88% and 44% of university students during COVID-19 had moderate to severe stress & anxiety respectively.[26] Another study Shaher H. Hamaideh at al identified moderate to high prevalence of (78.7%) depression, (67.9%) anxiety and (58.7%) stress among students they also mentioned typically high levels were during home-quarantine[27]. Another study found the prevalence rate of stress 32.5% , anxiety 27.7% and depression 21.12% among university students during pandemic[28]. In Polish university 65.0% students showed mild to severe anxiety and 56% showed high perceived level of stress.[29]. A survey conducted by Mathilde M.Husky et al on university students of France found that during confinement mostly students felt increased anxiety and moderate to severe stress[30]. The results of recent survey conducted by Dimitrios Kavvadas et al on Greek University Students at two different times in a year stated high prevalence of depression , anxiety and stress were found during pandemic. They also mentioned that participant's receiving psychiatric treatment had increased levels stress, anxiety and depression during the 2nd year of the pandemic.[31] A study conducted by on Wudneh Simegn et al showed 46.3% depression , 52% anxiety, and 28.6% stress symptoms among Ethiopian university students during COVID-19[32].

In the current study females have higher mean scores and experienced more anxiety and stress as compared to male counterparts. These findings were consistent with the previous literature. Studies conducted by Jungmin Lee et al[26], BijoyChhetriM. Tech et al [33] , Shaher H. Hamaideh et al[27], Imran Aslan et al[34], Aleksandra M Rogowska et al[29], Dimitrios Kavvadas et al[31]. Hasan Saeed Alamri 1, Wudneh Simegn et al[32] found that during COVID-19 pandemic females were more vulnerable to had stress and anxiety. Results also showed that prevalence of stress and anxiety was higher in the 20-30 age group, living with families, third year of study, internet use of more than 8 hrs. and lack of physical exercise. The study findings were consistent with the work done by Md. Akhtarul Islam et in which they mentioned that during pandemic anxiety and depression were higher in early twenties, students living with their families, having no physical exercise.[25] In another study done by Marielle Wathelet, MD identified increased risk of perceived stress and anxiety among 2nd and 3rd year of study however students with higher year of study showed less symptoms.[5] Matthew H. E. M. Browning et al exhibited in their study that younger students (i.e., 18 to 24 years old, female gender and spending more than 8 hours on screens) are at high risk of psychological symptoms during Covid 19 pandemic as compared to older students[35]. The work done by Md. Saiful Islam and colleagues found higher prevalence and significant association of female gender, lack of physical exercise, nuclear families, and daily use of internet of more than 6 hrs. were linked to higher scores of depression, anxiety and stress[36].

The results of the current study showed that both stress and anxiety were significantly and positively associated with GPA and physical exercise ($p<0.05$), however anxiety was also linked with age and academic year ($p<0.05$). Shaher H. Hamaideh et al in their study found significant association of stress with the GPA, smoking,and illness[27]. Heba Bakr Khoshaim et al found similar findings that higher anxiety levels were also associated with the age, gender and level of education[37].

The current study had few limitations. Firstly, the methodology involves an online survey-based questionnaire, so the respondents had not been met face to face. Results of study was generalized as this current study was only based on voluntary participation and number of female university students were more as compared to male counterpart. In future longitudinal studies must be carried out to find the relation of depression, anxiety and stress levels with psychological well-being, and coping strategies. As well as students of other health care professions, and other cities of Pakistan who were under lock down for long time must be considered.

CONCLUSION

The prevalence of anxiety and stress was moderate to severe among undergraduate university students of Rawalpindi and Islamabad, this may be due to pandemic crisis and strict restrictions was implemented in twin cities during that time. The results also demonstrated anxiety and stress levels was predominant in females and various factors including age group of 21-23 years, living with family, screen time more than 8 hours and lack of physical activity were more prevalent among university students during COVID-19 pandemic.

The current study findings can be used to formulate effective screening techniques at private and government universities to develop interventions that can improve mental health of students. Such strategies will help in reduction of unnecessary stress and anxiety in students and to build up a psychological resilience during pandemic or other public health crises in the future.

Disclosure: The authors declared no conflict of interest. No funding was received for this study.

Authors Contributions:

Hafsah Arshad, Kinza Anwar: Substantial contributions to the conception or design of the work, or the acquisition, analysis, or interpretation of data for the work

Hafsah Gul Khattak, Ayesha Sana, Nimra Batool: Drafting of the work or revising it critically for important intellectual content

Syed Shumaim Ali, Dr. Asad Ejaz: Literature Search

Hafsah Arshad: Final approval of the version to be published

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This article may be cited as: Arshad H, Anwar K, Khattak HG, Batool N, Farhat B, Sana A, Ali SS, Ejaz A: Prevalence of stress and anxiety among university students during COVID-19 pandemic. Pak J Med Health Sci, 2023; 17(8): 44-48.