

Mental Health during the First-Wave of the COVID-19 Pandemic: Examining Perceived Stress among Qatar University Students

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Abstract

Introduction: The COVID-19 pandemic had a global impact on many different levels including but not limited to economic, morbidity, social... and mental health. Hence, a lot of focus was given to research mental health aspect of the pandemic especially among young adults and university students. Accordingly, this study aimed to assess whether or not students at the Qatar University perceived stress significantly experienced an increase in mental health signs and symptoms such as depression and anxiety during the COVID-19 pandemic. **Methods:** This cross-sectional study using a web-based survey was conducted among the Qatar University students, using three questionnaires: 1) Sociodemographic questionnaire; 2) Perceived Stress Scale (PSS, to assess perceived stress); and the 3) DASS-21 (to assess symptoms of depression, anxiety and stress). **Results:** Our results show that perceived stress was a predictor of anxiety, depression and stress following the first wave of COVID-19 pandemic among University students in Qatar. There were no significant differences in the mean scores of depression, anxiety, stress or PSS score between genders, different nationalities, having children, and the university year. Similarly having mental health issues, having a family member with mental health issue, testing positive for COVID-19 and eating habits did not correlate with any of the mental health outcomes (depression, stress, perceived stress and anxiety); only lack of exercise was significantly correlated with depression and anxiety. **Conclusion:** In conclusion, this study sheds light on the effect of perceived stress on depression, anxiety and stress among university students during the COVID-19 pandemic. It also supports the evidence that University students had high levels of mental health issues during the pandemic and therefore there is a need to develop awareness along with inter-

ventions to promote mental wellbeing.

Keywords

COVID-19, Mental Health, Stress, Anxiety, Depression, University Students

1. Introduction

The coronavirus infectious disease 2019, also known as COVID-19, broke out in Wuhan, China on December 31, 2019 (WHO, 2020d). This virus primarily affects the respiratory system. The morbidity rate varies from country to country and among different age groups (WHO, 2020c). The WHO has declared COVID-19 a pandemic on March 11, 2020 (WHO, 2020d). In the week of 21-27 June 2021, worldwide the total number of individuals infected with COVID-19 exceeded 180 million with the death rate almost reaching 4 million (WHO, 2020b). The mainstream research focuses on the areas that support physical health and is regarded as protective factors for the community. This includes studies on vaccines, treatments, and epidemiological studies. However, the number of studies regarding the psychological impact of the pandemic is limited (Lunn et al., 2020), even though this area of research is imperative to study in order to understand the disease as a whole. This is confirmed in literature during different crises and outbreaks, such as the Ebola outbreak (Van Bortel et al., 2016) and the SARS epidemic (Chen, Chang, Lin, & Chen, 2009), which showed that such situations can have a serious an impact on the mental health (Liu et al., 2012) that might last for 3 years (Liu et al., 2012).

This pandemic has led to the implementation of necessary precautionary measures to such as self-isolation, quarantine, closure of schools and universities, shift to remote work and other major changes in the daily lives of the general public. Previous literature shows that social isolation by itself affects the mental wellbeing of individuals (Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015). This effect, such as depressive symptoms, might last up to three years after the quarantine (Liu et al., 2012). In addition, people in the community have to deal with the crisis either as healthcare workers, patients or “family members of patients or healthcare workers” (Sim, Huak Chan, Chong, Chua, & Wen Soon, 2010). Other factors that might affect mental wellbeing, include loss of freedom and boredom (Liu et al., 2012), and loss of routine (Lyall et al., 2018). Stigma against those quarantined was also seen in previous outbreaks even after recovery (Lee, Chan, Chau, Kwok, & Kleinman, 2005). All of these have been shown to have a direct effect on the mental health of individuals. Furthermore, Zolezzi, Bensmail, Zahrah, Khaled and El-Gaili (2017) showed that among university students, the stigma associated with mental illness was high among Qatar University students.

Xiang et al. (2020) reported that it is important that mental health status and

treatment plans be provided not only to patients but also to their family members. Wang, Pan et al. (2020) conducted a study at the beginning of February 2020 that assessed the psychological impact of the COVID-19 in the epicenter of the pandemic in China. They tested participants from different cities in China starting with students and then using the snowballing technique the rest of the population. The results showed that more than half of the participants had their mental health affected by the pandemic. Moderate to severe anxiety symptoms (28.8%) were more common than depressive symptoms (16.5%). High-stress levels were also common among 8% of the sample. It is noteworthy, that most of the participants were worried (more than 70%) about their family members contracting COVID-19. It is not clear whether self-isolation, quarantine or the news were reasons for such a high impact on mental health. However, in this study, more than 80% of the sample spent 20 - 24 hours at home. It is interesting that students were also experiencing the effects of the crisis because signs and symptoms such as stress, anxiety and depression symptoms were common in this subsample.

Qiu et al. (2020) conducted the first nationwide large survey to assess the psychological impact of COVID-19 on the population. The results showed that females were at a higher risk of developing psychological distress as compared to men. Although, older adults are at a higher risk of being affected severely by COVID-19 physiological, yet younger adults between 18 and 30 years old were equally likely to experience psychological distress. The authors explained the following results by mentioning that this age group has more access to social media. Similarly, educated people were more distressed as were migrant workers. These predictive factors must be taken into consideration when developing a plan to prevent impact on the mental health of the community.

If we look back at the effect of the SARS epidemic in 2003 on the mental health of community it affected, we see a similar pattern. A study that followed up with over 415 individuals in 2003 following the SARS outbreak showed that having current or a previous mental illness can increase the risk of experiencing psychological side effects due to an outbreak (Sim et al., 2010). This was common, especially in young adults.

The effects of COVID-19 pandemic on students have been widely reported and there were even cases of suicide-related to COVID-19 and other pandemics (Lathabhavan & Griffiths, 2020; Sher, 2020). The lockdown affected students more than workers (Marelli et al., 2021).

Students were experiencing an external threat which in this case was the COVID-19 virus along with the situational stressors that resulted from the first wave of the pandemic. Stress built up as an adaptation of these external threats. However, perceived stress—ability to cope along with how threatening the external stressors were believed to be—might explain much of the impact one's mental health. We usually expect that stress on its own can predict mental health issues. However, several studies have shown that this was mediated by perceived stress (Liu, Lithopoulos, Zhang, Garcia-Barrera, & Rhodes, 2021; Pedrozo-Pupo,

Pedrozo-Cortés, & Campo-Arias, 2020). In other words, it matters more how much the individual perceives stress than how much actual stress they are in. Limcaoco, Mateos, Fernandez and Roncero (2020) showed that perceived stress was higher during COVID-19 pandemic similar to the SARS outbreak in 2003. As such, to successfully understand the implications of the COVID-19 pandemic, perceived stress on the students should be assessed in relation to mental health outcomes/illnesses (such as depression, anxiety, etc.).

2. Study Aims

In addition to scholastic stress, students in 2020 experienced additional stress caused by the COVID-19 pandemic. However, studies showed that perceived stress was mediating the impact of the stress on individuals' mental health (Liu et al., 2021). Our study aimed to assess whether university students perceived stress significantly experienced an increase in mental health signs and symptoms such as depression and anxiety during the COVID-19 pandemic. Based on previous research, we hypothesized that only students who report higher perceived stress would have a higher risk of depression, stress, or anxiety. In addition, stigma might be high among students would correlate with worse mental health outcomes. We report effects of exercise, leaving the house, worry, having family member tested positive or was a frontline worker as those might also mediate the mental health outcomes within our sample. Finally, we measure the common coping strategies of the students in dealing with the first wave of COVID-19 pandemic.

Qatar is one of the affected countries by COVID-19 (WHO, 2020a). The first case of COVID-19 was reported on February 29 2020. On April 14 2020, the number of cases of COVID-19 in Qatar was 3428 with 7 confirmed deaths. The Government Communication Office (2020a) announced the closure of schools and university on March 10, 2020. However, teaching continued online. Self-quarantine was advised by health care professionals in the state and going out should be restricted to the grocery shop, pharmacy or clinic, only if necessary (The Government Communication Office, 2020b). Qatar University is the only public university in Qatar. In 2020, the number of students registered in this university was 22,461, 78% of those were females. The university includes 66% nationals while 34% are Arabs and non-Arab immigrants¹. Qatar University is a leading institution of academic and research in the GCC region². It provides high-quality programs and hosts ten colleges—Arts and Sciences, Business and Economics, Education, Engineering, Law, Sharia and Islamic studies, Pharmacy, Health Sciences, Medicine and Dental Medicine. This study was done on a sample of students studying at Qatar University during a period when students were still studying remotely and finalizing their Spring 2020 semester which ended on May 19, 2020.

¹[https://library.qu.edu.qa/static_file/qu/offices%20and%20departments/Chief%20of%20Strategy%20and%20Development/documents/Fact%20book%202019-20%20\(EN\).pdf](https://library.qu.edu.qa/static_file/qu/offices%20and%20departments/Chief%20of%20Strategy%20and%20Development/documents/Fact%20book%202019-20%20(EN).pdf)

²<https://www.timeshighereducation.com/world-university-rankings/qatar-university>

3. Methodology

Upon getting approval from the Institutional Review Board (IRB) at Qatar University, a cross sectional web-based survey was conducted among the Qatar University students, using three questionnaires:

- 1) Sociodemographic questionnaire;
- 2) Perceived Stress Scale (to assess perceived stress);
- 3) DASS-21 (to assess symptoms of depression, anxiety and stress).

None of the questionnaires contained any personally identifiable data, and every possible measure was taken to ensure the confidentiality and privacy of the participants. Data was collected between May 22, 2020 and June 18, 2020.

3.1. Measures

The survey tool was available in both English and Arabic, and the participants had a choice to decide which language they were more comfortable to answer the questionnaire in.

Socio-demographics

This section covers three topics: general information and psychiatric history, pandemic related questions, and preventative/predictive factors for increased psychological distress. In the first part, the participants were asked to record their age, gender, marital status, household size, immigration, year in university, whether they have children, history of psychiatric illness and family history of psychiatric illness. The second part included questions regarding the pandemic. First, they reported if any family member tested positive for COVID-19. To protect them from sharing this information, participants have a “not to disclose” option. Then, they were asked about how worried they are about contracting the virus. This was based on the methods devised by Wang, Pan et al. (2020) which showed that these items were significantly correlated with psychological distress. The final part of the socio-demographic collected information about exercise routines, how often they left the house, eating habits, worry because of scholastic requirements, job-related worry and other coping strategies.

DASS-21

This measure is widely used to assess depression, anxiety and stress. It was developed by (Loving & Lovibond, 1995) and adapted to a shorter version (DASS-21). The latter includes 21 items rated on a scale of 0 to 3. It includes three subscales: depression, anxiety and stress. Each subscale contains 7 items. For each subscale, the final score is calculated by adding all items and multiplying by 2. It is important to note that the scores could be categorized into normal, mild, moderate, severe, extremely severe. They assess the symptoms of each of these during the past week. The Arabic version of the DASS-21 was translated and validated across cultures with good psychometric properties (Moussa, Lovibond, Laube, & Megahead, 2017).

Perceived Stress Questionnaire

This is a common scale that is used to measure perceived stress and is known

as Cohen Perceived Stress Scale (PSS) (Cohen, Kamarck, & Mermelstein, 1983). It is made up of 10 items and adapted to be used in different samples ranging from healthy to vulnerable population. The PSS has been translated and validated in Arabic language (Chaaya, Osman, Naassan, & Mahfoud, 2010).

Stigma

Since there are no known measures of stigma towards COVID-19, we adapted two close-ended questions to measure this construct based on the several stigma measures regarding mental illness. The first question was “Will you be ashamed to mention that someone from your family or you have contracted the virus?”. The second was “Do you think people will make fun of you if you contract the virus?”. The choices for both questions were “Yes”, “No”, “I don’t know”. These questions were translated into Arabic.

3.2. Statistical Analysis

First, we described the sociodemographic of the sample along with the items related to eating habits, exercise, mental illness history, family history of mental illness and current living conditions (homebound or leaving the house). The percentages and mean and standard deviations were calculated. Second, we presented the percentages, mean and standard deviations of the PSS, DASS-21 subscales. For the worry and coping items the mean and standard deviations were calculated. Third, we tested if there were significant differences on the different scales (DASS-21 subscale and PSS) and the sociodemographic variables, current lifestyle related items and COVID-related general questions using t-tests (for variables with category analysis) and Pearson’s correlation (for variables with scale). Finally, regression analysis was carried out to test to what extent the variables significantly correlated with depression, anxiety and stress, predicted those outcomes. We ran three different regression analyses with each of the subscales of DASS-21 as an outcome variable. Statistical analysis was conducted using the Statistical Package for the Social Sciences, version 27 and all tests considered at a significance level of $p < 0.05$ (two tailed).

4. Results

Our sample included 394 students who answered the online questionnaire. Out of these, 253 completed the PSS and DASS-21 questionnaires. Only those 253 participants were included in the analysis. In general, the response rate was about 2%. **Table 1** provides the sociodemographic of the sample. The number of females was more than that of the males. The mean age was 22.93 (SD = 5.08). The number of students who were Qataris was more than that of non-Qataris. In addition, only about 12% of the sample had children. **Table 1** also provides the percentage of students on different items relating to current and past history of mental illness, eating habits, exercise, stigma and being homebound. Most of the students did not have any mental health issues (58.9%); however, a large number (27.7%) had left this question missing. In addition, many of the students (58.5%)

Table 1. Sociodemographic, habits and COVID related general questions

	Category	n	Percent
Gender	Male	38	15 %
	Female	207	81.8%
	Missing	8	3.2 %
Nationality	Qatari	131	51.8%
	Non-Qatari	108	42.7%
	Missing	14	5.5%
University level	Foundation/Undergraduate	217	85.8%
	Masters/Doctorate	18	7.1%
	Other/Missing	18	7.1%
Having children		30	11.9%
	Missing	10	4.0%
Have mental health issues		27	10.7%
	Missing/Don't know	77	27.7%
Family member suffer from mental health issues		50	19.8%
	Missing/Don't know	55	21.7%
Family member working as a frontline healthcare worker during this COVID-19 pandemic		50	19.8%
	Missing/Don't know	26	10.3%
Family members test positive for COVID-19		44	17.4%
	Missing/Don't know	41	16.2%
Went out of the house in the past week	Didn't leave the house	124	49.0%
	Once last week	77	30.4%
	2 - 4 times last week or more	42	16.6%
	Don't know/Missing	10	4%
Exercise	Never	108	42.7%
	1 - 2 times	82	32.4%
	3 times	26	10.3%
	4 or more	30	11.9%
	Missing/Don't know	7	2.8%
Eating Habits	Habits did not change	86	34%
	Habits became better	68	29.9%
	Habits became worse	92	36.4%

Continued

	Missing	7	2.8%
Be ashamed to mention that someone from family or you have contracted the virus		9	3.6%
	Missing/Don't know	24	9.5%
Think that people will make fun of you if you contract the virus		14	5.5%
	Missing/Don't know	42	16.6%

mentioned that their family did not have any mental health issue. Only 19.8% had family that worked as frontline healthcare workers, while 17.4% mentioned that they or someone from their family tested positive for COVID-19. Around half of the students (49%) stayed at home during the last week. The eating habits of the participants were split into three main groups, those who stayed similar to their old habits (34%), those who had worse eating habits during the pandemic (36.4%) and those who improved their eating habits (29.9%). Around 43% failed to exercise during the last week, while 54.6% exercised at least 1 time during the past week.

Interestingly, reporting of being worried about feeling shame if infected with COVID-19 was very rare in this sample (3.6%). More so, only 5.5% reported that they are worried others would make fun of them if they were tested positive for COVID-19. The majority of the students in this sample reported moderate to high-perceived stress (81.9%). The DASS-21 scale showed that 62.8% were at least reported to have mild depression and 52.6% were anxious. Similarly, 51% were in the normal range of stress. The coping strategies selected were mainly being busy with other activities, religious/spiritual coping mechanisms and avoidance. **Table 2** provides the descriptive statistics of the PSS, DASS-21 scale and worry related items. The mean on anxiety was the lowest ($M = 10.57$, $SD = 9.72$), while stress was highest ($M = 17.13$, $SD = 11.86$).

There were no significant differences on the mean scores of depression, anxiety, stress or PSS score between males and females ($p > 0.05$). There were no significant differences on the mental health outcomes of the participants when comparing the nationality, having children, and the university year ($p > 0.05$). While having mental health issues, having a family member with mental health issue, testing positive for COVID-19 and eating habits did not correlate with any of the mental health outcomes (depression, stress, perceived stress and anxiety), only lack of exercise was significantly correlated with depression and anxiety ($p < 0.05$).

Students who were more worried about upcoming scholarly work were more likely to be more depressed ($r = 0.35$, $p < 0.01$), more anxious ($r = 0.28$, $p < 0.01$) and more stressed ($r = 0.41$, $p < 0.001$) than their peers. Similarly the students who thought that the current pandemic might have an effect on their career were more worried, more depressed, more anxious and more stressed. The correlation

Table 2. DASS-21, PSS, worry and coping items descriptive.

	Category	n	Percent	Mean	SD
Worried about getting infected with COVID-19				3.25	1.19
The extent to which the pandemic outbreak (COVID-19) changed your life?				3.98	0.998
Worried about upcoming exams and/or assignments, projects...etc.?				3.98	1.24
Worried that the current crisis may have an effect on your career				3.74	1.32
Perceived Stress Scale				21.28	8.21
	Low Perceived Stress	46	18.2%		
	Moderate Perceived stress	136	53.8%		
	High perceived stress	71	28.1%		
Depression (DASS-21)				16.08	11.78
	Normal	94	37.2%		
	Mild-Moderate	74	29.2%		
	Severe-Extremely Severe	85	33.6%		
Anxiety (DASS-21)				10.57	9.72
	Normal	120	47.4%		
	Mild-Moderate	72	28.5%		
	Severe-Extremely Severe	61	24.1%		
Stress (DASS-21)				17.13	11.86
	Normal	129	51.0%		
	Mild-Moderate	53	20.9%		
	Severe-Extremely Severe	85	33.6%		
Coping strategies during pandemic (select all that apply)					
	Religious/Spiritual	134	53%		
	Busy with different activities	148	58.5%		
	Reaching out to others	78	30.8%		
	Humor	90	35.6%		
	Avoidance	142	56%		
	Others	30	11.9%		

with depression ($r = 0.36$), anxiety ($r = 0.26$) and stress ($r = 0.40$) was significant ($p < 0.01$). More so, those who scored higher on the extent to which the pandemic changed their life were more likely to score significantly higher on depression ($r = 0.30$), anxiety ($r = 0.19$) and stress ($r = 0.37$), ($p < 0.01$). There was a significant correlation between PSS and depression ($r = 0.76$, $p < 0.001$), PSS and anxiety ($r = 0.62$, $p < 0.001$) and PSS and stress ($r = 0.77$, $p < 0.001$). More so, the older the student the less likely they were depressed ($r = -0.17$, $p < 0.05$) and anxious ($r = -0.16$, $p < 0.05$). However, there was no significant difference between age and stress subscale in the DASS-21.

Only the variables that were significant with the outcome (DASS-21 subscales) main were included in the main analyses. The multivariate analysis is shown in **Table 3**. The regression analysis with depression as the main outcome was significant ($F(6, 232) = 26.56, p < 0.05$). The equation predicted 40.7% of the variance. The main predictor was perceived stress scale and being worried about being infected. When the outcome was the score on anxiety subscale in the DASS-21, only perceived stress was significant. Here also, the equation was significant, $F(6, 232) = 57.63, p < 0.05$. The adjusted R-squared was 59.8%. The final analysis was also significant with stress being explained by the perceived stress scale and having pandemic changes one's life. The regression analysis with stress as the outcome variable was significant, $F(6, 232) = 61.23, p < 0.05$ with 60.3% of the variance being explained in the equation.

The regression analysis with depression as the main outcome was significant ($F(6, 232) = 26.56, p < 0.05$). The equation predicted 40.7% of the variance. The main predictor was perceived stress scale and being worried about being infected. When the outcome was the score on anxiety subscale in the DASS-21, only the perceived stress was significant. Here also, the equation was significant, $F(6, 232) = 57.63, p < 0.05$. The adjusted R-squared was 59.8%. The final analysis was also significant with stress being explained by the perceived stress scale and having pandemic change ones' life. The regression analysis with stress as the outcome variable was significant, $F(6, 232) = 61.23, p < 0.05$ with 60.3% of the variance being explained in the equation.

5. Discussion

The COVID-19 pandemic had a global impact on many different levels including but not limited to economic, morbidity, social... and mental health. The different age groups and populations were impacted differently by it. In this article, we focused on a sample of university students. This specific subgroup faced stress that was unlike that of other groups. However, it is also known that while stress would be a predictor of negative mental health outcomes; perceived stress

Table 3. Multivariate regression analysis.

	Depression β	Anxiety β	Stress β
Perceived Stress Scale	0.612***	0.737***	0.695***
Age	-0.084	-0.065	-0.029
How worried are you about getting COVID-19 infection?	0.113*	0.032	0.053
To what extent do you think the pandemic outbreak (COVID-19) changed your life?	-0.29	0.066	0.126*
How worried are you about upcoming exams and/or assignments, projects...etc.?	-0.001	-0.025	0.044
How worried are you that the current crisis may have an effect on your career?	-0.021	0.016	0.000

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

might on its own be a major predictor. The aim of this study was to assess whether perceived stress was related to mental health problems in university students in Qatar. In a sample composed of Qatar University students who were mostly undergraduates and stayed home for the past week, our results showed that perceived stress was indeed a predictor of anxiety, depression and stress following the first wave of COVID-19 pandemic in Qatar. This was similar to the findings in many different countries and among students worldwide (Kibbey, Fedorenko, & Farris, 2021; Wang et al., 2020). Our main finding is that perceived stress and being worried about getting infected with COVID-19 were main predictors of high level of depression. In addition, perceived stress alone was a major predictor factor of higher levels of anxiety. Stress was not only explained by how much student's perceived stress but also by the extent to which the pandemic changed their lives. This showed the impact of perceived stress on the mental wellness of university students during the pandemic.

Some socio-demographic variables studied were unrelated to the different mental health outcomes while others were. Age was negatively correlated with depression and anxiety. In other words, younger students scored higher on these scales. When we controlled for perceived stress, age was no longer a significant predictor of depression and anxiety. Even though other studies have shown that females were reported more anxiety and negative mental health outcomes (Aslan, Ochnik, & Cinar, 2020; Baloch et al., 2021; Hoyt, Cohen, Dull, Maker Castro, & Yazdani, 2021), in this study there were no differences in males and females on depression, anxiety and stress. However, the number of males was relatively low. The reason behind that is related to the fact that the ratio females to males in Qatar University is around 70:30. Hence, further investigation is needed on the effect of gender on mental illness among this population.

A global study showed that students were mainly concerned about their academic workload and future career (Aristovnik, Keržič, Ravšelj, Tomažević, & Umek, 2020). Our results were in line with this large-scale study. Qatar University students scored high on being worried about their career but more worried about their academic workload particularly assignments, exams and projects. Hence, there needs are need to provide additional academic support to students during the pandemic and establish a mental wellness program in order to support university students during this long pandemic.

A qualitative study among Lebanese students showed that stigma of being affected by the COVID-19 pandemic was a common theme among the stressors in this group of students (Fawaz, Al Nakhal, & Itani, 2021). The outcome of our study in Qatar showed that the majority were not worried about stigma regarding COVID-19. In China, a study on college students showed that having a family member infected with COVID-19 virus was a predictor of increased anxiety (Cao et al., 2020). Our study showed otherwise, anxiety was not predicted by being infected or having a family member infected. The reason might be because the study showed that stigma associated with COVID-19 was not a major factor in mental wellness of students. In addition, at the time of data collection, the

number of deaths associated with COVID-19 was relatively low in Qatar. Kleiman, Yeager, Grove, Kellerman and Kim (2020) showed that when the number of new COVID-19 cases and deaths were high, students were more likely to be anxious. Hence, these two reasons might lessen the impact of being infected or having a family member sick with this virus on the students' mental illness.

Finally the results of this study showed that students who were inactive were more prone to having worse mental health and this was also evident in a study in Turkey exploring stress among students (Aslan et al., 2020). Similarly, Rogowska et al. (2020) showed that students who were more active were two times less likely to suffer from anxiety and depression. COVID-19 specific worries were indeed associated with worse mental health among students (Elmer, Mepham, & Stadtfeld, 2020; Tasso, Hisli Sahin, & San Roman, 2021). The results of this study also confirm this. COVID-19 related worries correspond to higher levels of depression among Qatar University students. It is noteworthy that this study was based on sample of convenience and hence can limit generalizability of the data.

Based on our results practical implications should be implemented in the student population in Qatar and abroad. The mental health of students needs to be monitored across the different waves of COVID-19 pandemic and other pandemics as well. In the future, it is imperative to consider perceived stress when developing interventions in student population. This might give researches, counselors and health care managers a better understanding on the mental health of individuals during the pandemic. In addition, students with higher perceived stress could be the focus of therapies, mindfulness or other preventative measures for a better health care outcome.

6. Conclusion

In conclusion, this study adds to the literature on the effect of perceived stress on depression, anxiety and stress among university students during the COVID-19 pandemic. It also supports the evidence that students had high levels of mental health issues during the pandemic and therefore need to be attended to. It is crucial to create awareness about the psychological impact of the COVID-19 pandemic among students in order to take a proactive approach to address the issues to reduce psychological distress and ensure optimum mental wellbeing. This will allow for the implementation of specific interventions either remotely or face-to-face that can prevent the short and long-term effects of the pandemic and subsequent isolation measures.

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Authors' Contributions

All authors meet criteria for authorship. All authors approved this version of the article for publication.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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List of Abbreviations

COVID-19	Severe Acute Respiratory Syndrome Coronavirus 2-2019
IRB	Institutional Review Board
PSS	Perceived Stress Scale
QU	Qatar University
WHO	World Health Organization