

“How COVID-19 Has Impacted Stress and Anxiety Levels in Male and Female College Students”

An Honors Thesis

by

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Abstract

The COVID-19 pandemic has had adverse effects on almost everyone, of all ages, races, genders, etc. It has been linked to an increase in mental health issues across the globe. This study aims to look at the impacts that the COVID-19 pandemic has had on stress and anxiety levels in male and female college students and compare the two genders. It is hypothesized that both genders will have an increase of stress and anxiety levels during the COVID-19 pandemic. It is also hypothesized that females will have significantly higher levels of stress and anxiety than males before and during the COVID-19 pandemic. The data used in this study will be collected through an online survey. The survey will consist of the *Perceived Stress Scale* (PSS) and the *General Anxiety Disorder-7* (GAD-7) to retrospectively measure stress and anxiety levels before COVID-19 and during COVID-19. Along with these questions to measure mental health symptoms, the survey also gathered information about the different COVID-19 factors that have influenced mental health. Results show that both genders have had an increase of stress and anxiety during the COVID-19 pandemic. Results also support the hypothesis that females had more of an increase in stress and anxiety than males before and during the COVID-19 pandemic. It is recognized that not all college students identify as either male or female, but this study only focuses on these two genders. This study provides evidence that mental health among college students during the COVID-19 pandemic was a cause for concern.

Keywords: COVID-19, college students, stress, anxiety, gender

COVID-19's Impact on College Students' Mental Health

How has the COVID-19 pandemic affected the mental health of college students? College students are already stressed out and anxious about their course load and grades. Adding the COVID-19 pandemic on top of that would likely negatively impact their mental health as well. The COVID-19 pandemic has forced many college campuses to conduct their classes online, instead of in person. This change may have been difficult for many, possibly most. Other factors that can negatively affect the mental health of college students include finances, relationships, isolation, etc. COVID-19 does not discriminate against who it affects, it can be spread to anyone. But there can be different mental health effects among different people, specifically across gender. There could be assumptions made that females' mental health has suffered the most from the pandemic or there could be assumptions that males have suffered more than females in terms of mental health. But female and male college students can, and do, experience anxiety and stress from the same and different factors. This occurs in general times and during the COVID-19 pandemic. Regarding anxiety and stress before and during COVID-19, it is hypothesized that the participants' reports during the pandemic will have significantly higher reports of anxiety and stress than they did before the pandemic. It is hypothesized that males and females will have significantly different scores on their anxiety and stress levels before and during the COVID-19 pandemic, with females predicted to have greater levels.

For all college students attending university, COVID-19 has been exposing them to factors that may negatively impact their mental health. According to Patsali and his fellow researchers, they conducted a study that reported results that 60% of their sample reported an increase of anxiety due to COVID-19 (Patsali et al., 2020). The same study

showed that 13.46% of that sample also reported severe distress after COVID-19 (Patsali et al.). The research can support with evidence that students are at risk of developing anxiety and stress due to COVID-19.

Mental health among university students had already been an issue, but COVID-19 has increased this issue among them. Hamza et al. (2020) conducted a survey to measure the effect of COVID-19 on anxiety and stress, based on the pre-COVID-19 levels of anxiety and stress, of 733 university students. The results showed that students with preexisting anxiety had lower levels of anxiety after COVID-19 and students with no preexisting anxiety had an increase in symptoms of anxiety after COVID-19 (Hamza et al.). Just like the results of anxiety, stress levels revealed the same pattern. Students with preexisting perceived stress had a decrease in stress, and students with no preexisting symptoms of stress had an increase in symptoms after COVID-19 (Hamza et al.). This research is narrowed down to university students and their mental health pre-COVID-19 and how their mental health was impacted after COVID-19.

With the unexpected spread of the COVID-19 virus, colleges had to move their classes online for the students. Gonzalez-Ramirez et al. (2021) conducted a study to measure the impacts of transitioning from face-to-face learning to online because of the pandemic. The study included 121 college students who completed three online questionnaires about their experiences (Gonzalez et al.). The questionnaires gathered information about the students' exhaustion, efficiency, demographics, and COVID-19 related changes to their learning. Gonzalez-Ramirez and colleagues found that 59 percent of students reported that face-to-face learning was extremely effective, 32 percent reported it very effective, and nine percent reported it to be moderately effective

(Gonzalez et al.). This can support that face-to-face learning is effective in teaching students the material. In contrast to this, their study found that 27 percent of the participants reported online learning not to be effective, 34 percent said it was slightly effective, 33 percent said moderately effective, and five percent said very effective (Gonzalez et al.). The reports on how effective each learning style is can be compared to exhibit that online learning is perceived as not as effective as face-to-face learning. With COVID-19 causing schools and colleges to move to online learning, students' learning would likely have been impacted. The results of this Gonzalez-Ramirez et al.'s study showed that students reported themselves to be more exhausted and felt more cynicism while they were learning online.

The COVID-19 pandemic has impacted almost everyone in many ways, this includes the mental health and emotional well-being of college students. This was the focus of Visser and Wyk's paper. Visser and Wyk surveyed 5,074 college students using the Wellness Wheel, The *Patient Health Questionnaire for Depression and Anxiety*, the *Perceived Stress Scale*, and the *Mental Health Continuum* (Visser, & Wyk, 2021, p. 230). These scales measured the participants' mental health, emotional health, academic wellbeing, and more. The analysis of the data they collected showed that 72.8% of the participants expressed fear of getting the COVID-19 virus, 65.2% reported that COVID-19 restricted their emotional functioning, 45.6% reported that they experienced anxiety, and 35.0% reported experiences of depression during the month before the survey was taken (p. 237). Reports of the participants in this study show that during the COVID-19 pandemic they suffered emotionally and mentally from it. Females represented 66.4% of

the sample while males represented 33.6% of the sample, females were also found to be at higher risk of emotional effects during the COVID-19 pandemic than males (p.240).

Mental health can be affected by plenty of factors, one of these factors can definitely be a worldwide pandemic. The COVID-19 pandemic alone has been a crisis, but it has also influenced a mental health crisis. A survey conducted in China included 746,217 college students who were asked about their anxiety symptoms, acute stress, depressive symptoms, and their exposure to COVID-19 (Ma, et al., 2020, p.3). The data collected from this data should be able to identify any influence the pandemic had on college students' mental health. Of the 746,217 participants, 45% of them reported acute stress, depressive and anxiety symptoms (p.3). The mental health issues that are reported in this study were collected during a time when COVID-19 cases were increasing, and the students were ordered to stay at home. Further analysis of this data showed that an increase in risk for getting the virus, low social support and the female gender contribute to increased anxiety and depression symptoms among these students (p.4). The importance of this study shows that the risk of getting COVID-19 and having low support from friends and family increases mental illness symptoms for college students. Prior research that was conducted internationally showed that males and females both had an increase, this research seeks to replicate these results and extend them by looking at an American sample. Regarding anxiety and stress before and during COVID-19, it is hypothesized that the participants' reports during the pandemic will have significantly higher reports of anxiety and stress than they did before the pandemic. It is hypothesized that males and females will have significantly different scores on their anxiety and stress

levels before and during the COVID-19 pandemic, with females predicted to have greater levels.

Method

Participants

Total sample size was determined by a priori power analyses using GPower 3.1: F Test, ANOVA: repeated measures, within-between interaction; effect size $f = 0.17-0.29$ (i.e., small to medium effect); $\alpha = 0.05$; power = 0.95; number of groups = 2 (female, male); number of measures = 2 (pre, posttest); correlations among measures = 0.84; and non-sphericity correction = 1. The requisite number of participants to observe the minimum intended effect would be 40 participants total (20 per gender), but 50 participants were recruited. The sample for this research included 50 participants. Out of the 50 participants, 49 of them were current college students, the participant that was not a current college student was excluded from the data analysis. 20 participants were male, 27 were female, and two were non-binary. The data from the two non-binary students were also excluded from the data analysis. The average age of the participants was $M = 21.21$ and the standard deviation was $SD = 2.77$. Seven were freshmen, 10 were sophomores, 12 were juniors, 11 were seniors, and seven were graduate level. Informed consent was given from the participants at the beginning of the survey.

Materials

The independent variables in this study will be gender and time. Gender in this study will pertain to males and females. Time will be used in terms of before the COVID-19 outbreak and during the COVID-19 outbreak. The dependent variables that will be

used for this study are stress and anxiety. Stress will be defined as how often a thought or feeling occurred within the last month, it is measured based on the questions like how in control do you feel about your life, confidence level, nervousness, etc. Anxiety is determined by how much a symptom may bother the participant. Examples of the symptoms include nervousness, worrying, unable to relax, etc. The stress scale that will be used is the *Perceived Stress Scale* (PSS), see Appendix A. Stress will be scored on a scale of zero to four on the ten questions measuring stress, the scores for each question will be added for each participant before COVID-19 and during COVID-19. Scores were reversed on the positive questions: questions four, five, seven, and eight. The anxiety scale that will be used is the *General Anxiety Disorder-7* (GAD-7), see Appendix B. Anxiety will be scored on a scale from zero to three for the seven questions measuring anxiety. The anxiety scores will be added for each participant before COVID-19 and during COVID-19. The questions on the *Perceived Stress Scale* and the *General Anxiety Disorder-7* will be given to the participants twice, once asking them to retrospectively report their symptoms before the COVID-19 pandemic and again for their symptoms during the COVID-19 pandemic. There will also be a checklist for COVID-19 related factors that may have influenced the participant's mental health, the factors will include financial difficulties, increased social isolation, increased workload, remote learning, etc. See Appendix C for the list of factors.

Procedure

The data collected from the survey will be measured using 2x2 mixed factorial ANOVA. Participants were assigned to groups based on their self-reported gender. This study used a repeated measures design, and the participants were measured

retrospectively more than once, before and during COVID-19. The study was conducted online, using Google Forms. Informed consent was explained on the Google Forms before the participants started to fill out the survey. Debriefing was explained to the participants at the end of the survey on Google Forms. The survey took between five and ten minutes for the participants to complete. The survey was shared on the Cal U announcements emails and flyers were placed around campus to select the participants. The participants received a \$10.00 Amazon gift card once they complete the survey. Once 50 participants completed the survey the data was analyzed using a 2 x 2 mixed factorial ANOVA and independent-samples *t*-test. The alpha level of .05 was used for all statistical testing.

Results

Stress

Stress scores ranged from 6 to 38. Higher scores indicate a higher level of stress. A 2 x 2 mixed factorial ANOVA was performed on gender (between subjects: male, female) and time (within-subjects: before COVID-19, during COVID-19). The main effect for time was significant, $F(1,45) = 107.5, p < .001$. Both males and females had higher stress during the pandemic ($M = 25.90, SD = 0.81$) than before the pandemic ($M = 15.10, SD = 0.81$). The effect size $\eta^2 = 0.459$ indicating that time had a large effect on stress. The main effect of gender was not significant, $F(1,45) = 2.80, p = .101$. Males ($M = 19.40, SD = 0.888$) and females ($M = 21.50, SD = 0.889$) were not significantly different in terms of stress. The interaction between time and gender was significant, $F(1,45) = 10.7, p = .002$. Before COVID-19, females ($M = 14.50, SD = 1.12$) had higher stress than males ($M = 15.80, SD = 1.18$). Stress levels increased for both males ($M =$

23.10, $SD = 1.18$) and females ($M = 28.60$, $SD = 1.12$) during the pandemic. The effect size was $\eta^2 = 0.046$ indicating that the interaction of time and gender had a small effect on stress.

Table 1

Means and Standard Deviants for Stress in Males and Females Before and During COVID-19

Gender	RM Factor 1	Mean	SE	95% Confidence Interval	
				Lower	Upper
Female	Before COVID-19	14.5	1.12	12.3	16.7
	During COVID-19	28.6	1.12	26.4	30.8
Male	Before COVID-19	15.8	1.18	13.4	18.1
	During COVID-19	23.1	1.18	20.8	25.5

Note. Scale is a total score of stress based on 10 questions with a scale from 0 to 4.

Independent t-test: Stress

An independent-samples *t*-test was conducted to compare male and females in their stress levels before COVID-19 and their stress levels during COVID-19. There was not a significant difference $t(45) = 0.81$, $p > .05$, in scores for stress before the COVID-19 pandemic between males ($M = 15.60$, $SD = 3.63$) and females ($M = 14.30$, $SD = 6.21$). There was a significance between males ($M = 22.90$, $SD = 6.24$) and females ($M = 28.40$, $SD = 5.42$) in terms of their stress scores during the COVID-19 pandemic $t(45) = 3.22$, $p = .002$. Females had higher stress scores than males during the COVID-19 pandemic. The

effect size, estimated with Cohen's d , was 0.95. Therefore, gender had a large effect on stress levels during the COVID-19 pandemic.

Anxiety

Anxiety scores ranged from 0 to 21. Higher scores indicate a higher level of anxiety. A 2 x 2 mixed factorial ANOVA was performed on gender (between subjects: male, female) and time (within-subjects: before COVID-19, during COVID-19). The main effect for time was significant, $F(1,45) = 86.0, p < .001$. Both males and females had higher anxiety during COVID-19 ($M = 13.96, SD = 0.59$) than before the pandemic ($M = 7.89, SD = 0.59$). The effect size was $\eta^2 = 0.336$, indicating that time had a large effect on anxiety. The main effect of gender was significant $F(1,45) = 4.25, p = .05$. Females had higher levels of anxiety ($M = 11.95, SD = 0.70$) than males ($M = 9.90, SD = 0.70$). The effect size was $\eta^2 = 0.038$, indicating that gender had a small effect on anxiety. The interaction between gender and time was significant $F(1, 45) = 12.00, p < .001$. Before COVID-19, anxiety for females ($M = 7.78, SD = 0.82$) and males ($M = 8.00, SD = 0.86$) had no significant difference. Anxiety levels increased for both males ($M = 11.80, SD = 0.86$) and females ($M = 16.12, SD = 0.82$) during the pandemic, but more of an increase for females. The effect size was $\eta^2 = 0.047$, indicating that the interaction of time and gender had a small effect on anxiety.

Table 2

Means and Standard Deviants for Anxiety in Males and Females Before and During COVID-19

Gender	RM Factor 1	Mean	SE	95% Confidence Interval	
				Lower	Upper
Female	Before COVID-19	7.78	0.818	6.15	9.41
	During COVID-19	16.12	0.818	14.49	17.74
Male	Before COVID-19	8.00	0.856	6.30	9.71
	During COVID-19	11.80	0.856	10.10	13.51

Note. Scale is a total score of anxiety based on 7 questions with a scale from 0 to 3.

Independent t-test: Anxiety

An independent-samples *t*-test was conducted to compare males and females in their anxiety levels before COVID-19 and their anxiety levels during COVID-19. There was not a significant difference $t(45) = 0.18, p > .05$, in scores for anxiety before the COVID-19 pandemic between males ($M = 7.85, SD = 3.65$) and females ($M = 7.63, SD = 4.55$). There was a significance between males ($M = 11.65, SD = 4.50$) and females ($M = 15.96, SD = 3.31$) in terms of their anxiety scores during the COVID-19 pandemic $t(45) = 3.79, p < .01$. Females had higher anxiety scores than males during the COVID-19 pandemic. The effect size, estimated with Cohen's *d*, was 1.12. Therefore, gender had a large effect on anxiety levels during the COVID-19 pandemic.

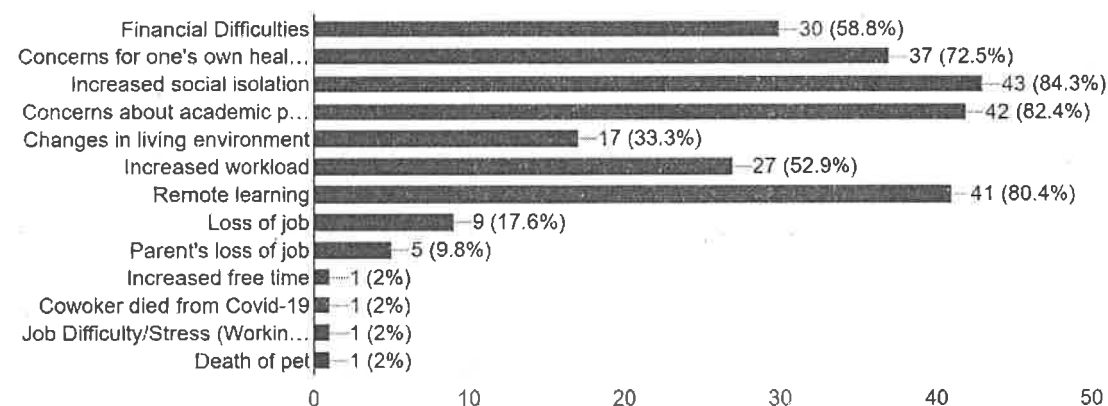
Reported COVID-19 Factors that Impacted Mental Health

Participants were asked to check which factors they feel have affected their mental health during the COVID-19 pandemic. The list included: financial difficulties, concerns for one's own health and the health of a loved one, increased social isolation, concerns about academic performance, changes in living environment, increased

workload, remoted learning, loss of job, and parent’s loss of job. They also had the option to type in other factors that they felt negatively affected their mental health. The top three reported factors were increased social isolation from 84.3 percent of the participants, concerns about academic performance from 82.4 percent of the participants, and remote learning from 80.4 percent of the participants. Other factors such as financial difficulties, concerns for one’s own health and the health of a loved one, and increased workload were reported from over half of the participants. Participants who typed in their own factors wrote, “coworker died from Covid-19”, Job Difficulty/Stress (Working from home)”, and “death of a pet.” The factors that were reported occurred from the quarantine and other requirements put in order to protect people from the coronavirus. As physical health was precedence over mental health, some of the motions put into action to stop the spread of the virus may have caused a negative effect on mental health. The factors reported by the participants in this survey may be factors that have affected the mental health of these college students, other college students, and humans in general.

Table 3

COVID-19 Factors Reported from Participants that Impacted their Mental Health



Note. This graph shows the number of responses to each factor, participants were allowed to choose multiple choices.

Discussion

It was hypothesized that stress and anxiety levels in male and female college students would be significantly higher during the COVID-19 pandemic than before the pandemic. The 2 x 2 mixed factorial ANOVA resulted in significance for the interaction between gender and time in terms of stress among the college students. Female stress scores were higher than male scores during the pandemic. There was significance in the main effect of time for both genders and their stress scores. There was a significant increase in stress scores between before and during the pandemic, with scores being higher during the pandemic. Males and females did not have a difference in stress scores during the COVID-19 pandemic. The 2 x 2 mixed factorial ANOVA performed on males and females in terms of their anxiety did result in significant differences for the interaction of gender and time. Before COVID-19, females had higher anxiety than males. Anxiety increased for both males and females during the pandemic, but females had significantly higher anxiety scores than males. The main effect of gender was significant, females overall had higher anxiety scores than males. The main effect of time was also found to be significant, with both genders having an increase of anxiety during the pandemic. The independent t-test ran on the data resulted in a significant difference between males and females in terms of their stress. Females had higher stress levels during the pandemic than males. This was also the case for anxiety results from the independent t-test. Females also had significantly higher scores of anxiety than males during the pandemic.

Previous research on this topic was not conducted in the United States at the time of this research, nor did the research specifically compare male and female college students in terms of stress and anxiety before and during the pandemic. However, there were connections between this study to their research. Hamza et al. (2020) conducted a survey in Canada to research the impacts COVID-19 has had on college students' stress and anxiety. They found that college students had higher levels of stress and anxiety during the pandemic if they had no preexisting stress or anxiety before the pandemic. They also found a decrease in stress and anxiety during the pandemic for students who did have preexisting stress or anxiety. Results for this paper both align with and differ from Hamza et al.'s results. The college student participants in this study reported their symptoms of stress and anxiety before the pandemic and during the pandemic. The results show that regardless of their preexisting symptoms, both genders had a significant increase in their stress and anxiety during the pandemic. Visser and Wyk found in South Africa that both male and female college students reported an increase in anxiety and depression during the COVID-19 pandemic (Visser, & Wyk, 2021, p. 230). In addition to this, their results showed that females were at a higher risk of emotional effects during the pandemic. In this research study, similar results were found but in terms of the participant's stress and anxiety rather than depression and anxiety. Both males and females had a significant difference in their mental health during the pandemic, with females having higher scores than males. As for the factors that could be reasons for this increase of stress and anxiety, Gonzalez-Ramirez et al. (2021) found that their participants reported that remote learning was less effective than in-person learning. In this study, 41 of the 47 participants reported remote learning to be a cause of mental

health issues during the COVID-19 pandemic. Along with remote learning, they also reported that increased social isolation and concern for their academic performance also had a negative influence on their mental health.

This study provides evidence that the mental health of college students has suffered because of the COVID-19 pandemic. The pandemic caused people to fear for their health, financials, academic performance, and many other factors because of the quarantine that resulted from the pandemic. The pandemic caused college campuses to conduct their classes remotely, which lead to increased social isolation, and concern for students' academic performance. This study brings attention to the fact that not only did the pandemic cause concern for physical health, but also mental health among college students. Since physical health was prioritized over mental health, college students' mental health suffered because of the lack of attention to this issue. College campuses could have taken action to prevent this and help their student's mental health during this time. For example, along with the COVID-19 physical requirement updates for the campus, they could have added information about how to upkeep mental health and how to receive mental health services, whether it be on-campus or off-campus. While classes were being held remotely, remote events could have been held in order for students to join anonymously and learn about tools and services that could be beneficial for their mental health as well as spread awareness for mental health.

Limitations

There are multiple possible limitations in this study. First, the participants had to self-report their own stress and anxiety levels. Participants may or may be able to score their own stress and anxiety levels accurately. Participants may not have reported their

answers truthfully in order to appear socially acceptable. This could be done for fear of reporting their mental health. Opposite of this, they may have exaggerated their symptoms while answering the stress and anxiety questions to appear as if their mental health was worse than it may have been. Related to this, the participants had to retrospectively answer questions about their stress and anxiety symptoms before COVID-19 and during COVID-19. This leaves room for inaccurate reporting due to the participants having to rely on their memory rather than their current mental health. Participants may have remembered their symptoms either worse or better than they were before and during the COVID-19 pandemic. Another point to note is the number of male participants versus the number of female participants. While recruiting participants it was discovered that male participants were more challenging to recruit than females. This resulted in more female than male participants in the data analysis. On the topic of gender, this study does not provide any data or information on any other gender other than male and female in terms of mental health during the COVID-19 pandemic. For further research, it would be beneficial to recruit participants from a diversity of genders and find results on how their mental health has been affected by the COVID-19 pandemic, and especially what factors did so.

Appendix A

PERCEIVED STRESS SCALE

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling how often you felt or thought a certain way.

Name _____ Date _____

Age _____ Gender (Circle): M F Other _____

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly? 0 1 2 3 4
2. In the last month, how often have you felt that you were unable to control the important things in your life? 0 1 2 3 4
3. In the last month, how often have you felt nervous and "stressed"? 0 1 2 3 4
4. In the last month, how often have you felt confident about your ability to handle your personal problems? 0 1 2 3 4
5. In the last month, how often have you felt that things were going your way? 0 1 2 3 4
6. In the last month, how often have you found that you could not cope with all the things that you had to do? 0 1 2 3 4
7. In the last month, how often have you been able to control irritations in your life? 0 1 2 3 4
8. In the last month, how often have you felt that you were on top of things? 0 1 2 3 4
9. In the last month, how often have you been angered because of things that were outside of your control? 0 1 2 3 4
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them? 0 1 2 3 4



Retrieved from: <http://www.mindgarden.com/documents/PerceivedStressScale.pdf>

Appendix B

GAD-7 Anxiety

Over the last two weeks, how often have you been bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious, or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid, as if something awful might happen	0	1	2	3

Column totals _____ + _____ + _____ + _____ =

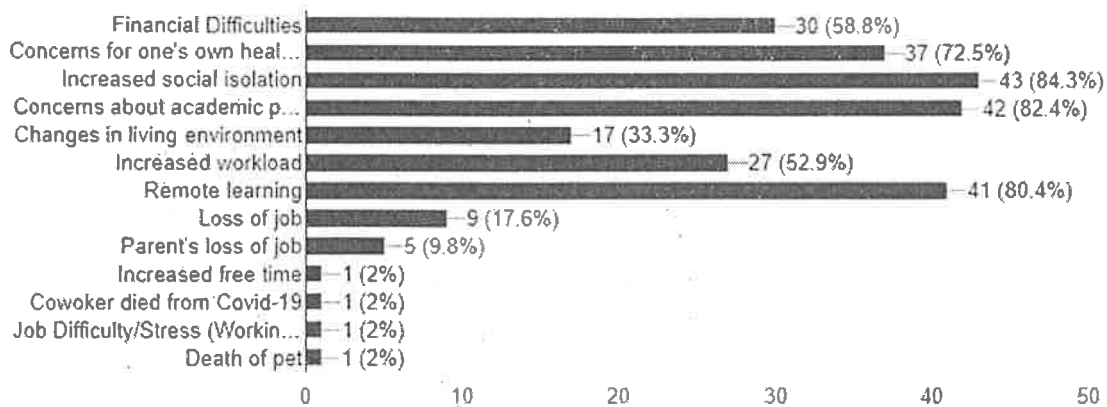
Total score _____

If you checked any problems, how difficult have they made it for you to do your work, take care of things at home, or get along with other people?			
Not difficult at all	Somewhat difficult	Very difficult	Extremely difficult
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Source: Primary Care Evaluation of Mental Disorders Patient Health Questionnaire (PRIME-MD-PHQ). The PHQ was developed by Dr. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke, and colleagues. For research information, contact Dr. Spitzer at rls2@columbia.edu. PRIME-MD is a trademark of Pfizer Inc. Copyright© 1999 Pfizer Inc. All rights reserved. Reproduced with permission.

Retrieved from: https://adaa.org/sites/default/files/GAD-7_Anxiety-updated_0.pdf

Appendix C



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