Mental Health in Students at the University of Cape Town: Exploring the Impact of the Covid-19 Pandemic

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Abstract

Students face a multitude of stressors in the university environment, particularly in South Africa, showcased by high rates of mental illness compared to the general population, as well as year-on-year increases in prevalence rates found in recent studies on South African university students. In addition to the academic, financial and general life stressors, students in South Africa are exposed to ongoing high levels of traumatic stressors. The coronavirus pandemic (Covid-19) has brought an additional stressor, which not only causes physical illness, but has been found to cause psychological distress. Therefore, university students are expected to exhibit high levels of psychological distress due to their existing vulnerability, and further because of Covid-19 related stress. The study investigated various indices of psychological distress and exposure to Covid-related stressors in 300 undergraduate university students. We administered the Beck Depression Inventory-II, Beck Anxiety Inventory, the Kessler-10 scale, the Posttraumatic Stress Disorder Checklist for the DSM-5, and the Pandemic Stress Questionnaire. As anticipated, our analyses show that students displayed concerning levels of distress, with 41.10% presenting with PTSD symptoms, 57.7% with depressive symptoms, 62% with general psychological distress, and 68.8% with anxiety symptoms. Our simple regressions showed that all four measures of psychological distress were significantly predicted by the severity of Covid-19 stressors, suggesting that Covid-19 stress may be exacerbating mental illness risk factors among an already vulnerable population. The findings of this study could potentially assist in expanding the knowledge based of Covid-19 and mental health disorders, as well as help improve student health.

Key words: Anxiety, Covid-19 pandemic, depression, university students

Globally, there has been a significant increase in prevalence rates of mental health disorders over time, with depression and anxiety disorders being the most common among the general population (Kessler et al., 2009; Lépine & Briley, 2011; Stein et al., 2008). Although mental disorders adversely impact the broader population, the added vulnerability in students is concerning. The prevalence of mental health disorders among university students has been growing rapidly (Auerbach et al., 2018; Rousseau et al., 2020). Furthermore, according to emerging literature, the Covid-19 pandemic has triggered and exacerbated existing mental health disorders, even being likened by some researchers to a traumatic event (see e.g., Bridgland et al., 2021). Studies conducted thus far have focused on the impact of the pandemic on the general population with far less attention paid to students despite their vulnerability to mental health disorders (Cao et al., 2020).

Mental Health in the General Population

Numerous studies have shown an increase in common mental health disorders over time (anxiety, mood, and substance use) with a global lifetime prevalence ranging from 18.1% to 36.9% (Kessler et al., 2009, 2015; Vos et al., 2012). Anxiety disorders were found to be the most prevalent category, with an estimated lifetime prevalence of 16% across countries (Kessler et al., 2009, 2015). Similarly, South African data from the same period found anxiety as the most prevalent disorder contributing 15.8% to common disorders (Stein et al., 2008). In the global survey, major depressive disorder (depression) was found to be the second common mood disorder with a lifetime prevalence rate ranging from 4.33% to 36.9% (Vos et al., 2012). Additionally, depression is expected to be the most prevalent disorder by 2030, contributing significantly to the global disease burden (Lépine & Briley, 2011). Although mental disorders are highly prevalent in the general population, students are more vulnerable to developing these mental disorders.

Mental Health Among Students

Mental disorders have been identified as a significant contributor to the burden of diseases amongst the younger population and have thus been labelled as the chronic disease of the youth (Insel & Fenton, 2005; McGorry et al., 2008). Most students, whom are between the ages of 18 and 25, are more vulnerable to mental health disorders. According to McGorry et al. (2011), these ages are a sensitive period for the onset of mental disorders. In a study conducted among a sample of medical students at the University of Cape Town (UCT), 36.4% reported experiencing severe symptoms of depression and 45.9% of students were above the cut-off score for a provisional diagnosis of anxiety disorder (Van der Walt et al., 2020).

There are various factors that contribute to this increased vulnerability in the student population. For one, the transition to university might increase the severity of pre-existing mental health disorders amongst students and may further trigger the onset of new symptoms (Bantjes et al., 2019). Additionally, students come from diverse backgrounds, and as a result, they encounter different challenges. The main challenges students encounter include university-related financial, interpersonal, and academic stressors (Alabi et al., 2021; Mall et al., 2018). Additional stressors such as childhood adversity may also further exacerbate existing student-related stressors (Mall et al., 2018).

Sex differences in mental health problems in students have been investigated and some recurring patterns have been noted. Local studies found that female students are at a higher risk of developing mental disorders compared to male students (Bantjes et al., 2019; Mall et al., 2018; Van der Walt et al., 2020). This could be related to the discovery that females are more likely to experience childhood abuse, which is a risk factor for mental disorders (Mall et al., 2018; McGowan & Kagee, 2013). Additionally, female students are significantly more likely to be adversely affected by depression, anxiety, and other mood

disorders, while male students are much more likely to suffer from substance use disorders (Auerbach et al., 2018; Bantjes et al., 2016). These sex differences in mental disorders are consistent with findings in many other countries (Auerbach et al., 2018; Lim et al., 2018). Furthermore, depression is linked to various indices of poor mental health and in its most severe form, can result in suicidal behaviour for both female and male students (Alabi et al., 2021; Lim et al., 2018).

Depression and associated suicidality have been particularly disconcerting over the past couple of years. A study conducted with South African university students reported an increase in depression and suicidality rates over the past four years (Rousseau et al., 2020). This study found that the number of students reporting suicidality had increased from .8% in 2016 to 3.6% in 2019. Another recent study found a lifetime prevalence of 24.5% for suicide ideation, among students with depression and anxiety, highlighting the significance of screening for mental illnesses (Alabi et al., 2021). In addition to depression and anxiety, feelings of isolation, substance use, sexual abuse, and financial stress were found to be risk factors for suicide amongst students (Alabi et al., 2021; Bantjes et al., 2016).

Moreover, studies have found that socioeconomic status is a significant risk factor for developing mental disorders. For example, Mungai and Bayat (2019) report that individuals with a lower socioeconomic status in their South African sample, were more likely to present with a mental disorder. Similarly, another study found that financial stress is a common challenge, which contributes to students' stressors and thus significantly impacts their mental well-being (Pretorius & Blaauw, 2020). Findings from these studies highlight that students from low and middle-income countries, such as South Africa, are at higher risk of being affected by mental health problems. The unequal access to mental health services and high exposure to traumatic events are a likely explanation for this tendency (Bantjes et al., 2016; Padmanabhanunni, 2020).

Violence and Traumatic Stress Disorders

South Africa's political history of Apartheid was characterised by oppression, torture, and mass violence. Despite the political emancipation, South Africa continues to have high levels of crime and violence (Statistics South Africa, 2018). Crimes that mainly take place in South Africa are contact crimes, which include sexual offences, thefts, murder, and physical assault (South African Police Service, 2020). In a survey, 68% of South Africans reported that they felt unsafe walking at night (Statistics South Africa, 2018). Furthermore, they expressed constant fear of being robbed, assaulted, and abused. South Africans are continuously exposed to traumatic events, as crime and violence are a feature of everyday life (Eagle & Kaminer, 2013). Atwoli et al. (2013) found that 70% of the South African population have at least had one experience of a potentially traumatic event. In addition to the yearly increase in mental disorder prevalence amongst university students, South Africa's context of daily exposure to traumatic events, places students at an even higher risk of developing mental disorders. Their vulnerability has been further exacerbated by Covid-19.

The Impact of Covid-19 on Mental Health

With the first outbreak being reported in Wuhan, China in December 2019, Covid-19 quickly became a global pandemic (Wang & Zhao, 2020). The pandemic has led to the closure of companies, schools, institutions and public areas, effectively confining individuals to their homes thus, disrupting daily routines. Moreover, the Covid-19 pandemic has become a major health crisis (Islam et al., 2020a). However, emerging research shows that Covid-19 does not only impact physical health, but also has a negative impact on mental health. The pandemic has introduced new life stressors such as fear of infection, financial loss, social isolation, and inadequate supplies, all of which are risk factors for psychological distress (Cao et al., 2020). Supporting studies in China have found that approximately 25% of the general population displayed anxiety and depressive symptoms in the first month of the

pandemic (Wang & Zhao, 2020). Additionally, the Covid-19 pandemic is perceived to be a traumatic stressor event, which is associated with PTSD-like symptoms (e.g., heightened arousal, intrusive thoughts and images and nightmares; Bridgland et al., 2021; Lahav, 2020; Taylor et al., 2020).

University students have been identified as being vulnerable to psychological disorders, with reports prior to the pandemic illustrating that they displayed high rates of anxiety, depression, and suicide ideation (Bantjes et al., 2016; Rousseau et al., 2020). Studies have shown that these rates of mental disorders have increased in prevalence and severity as the pandemic has created more stressors, in addition to the academic and developmental stressors that they generally experience (Faisal et al., 2021; Fruehwirth et al., 2021). Islam et al.'s (2020b) study found that 66% of their undergraduate sample experienced moderate to severe anxiety and depressive symptoms after the outbreak, which was an increase of 30% in comparison to a pre-covid study (Alim et al., 2015). Similarly, in a large British sample (N = 69,054), 16% of students displayed severe depressive symptoms and 8% reported having suicidal thoughts (Wathelet et al., 2020). Furthermore, studies continue to show that female students, even during the pandemic were still more likely to display significantly higher levels of depression, stress and anxiety in comparison to male students (Essadek & Rabeyron, 2020; Lee et al., 2021). Students have mainly expressed fear over future employment, anxiety around transitioning to online learning, and educational expenses as common stressors in relation to the pandemic (Husky et al., 2020; Wang & Zhao, 2020). In addition, university students have reported an increase in perceived stress and have indicated that they are unable to cope with life and academic demands, which is becoming an increasing concern, as this is likely to affect their academic performance (Savage et al., 2020).

Rationale, Aims, and Hypotheses

Students are vulnerable to developing mental health disorders, with increases in mental health disorders evident in university students globally. These increases have mainly been observed in symptoms of depression, anxiety and suicidal ideation (Van der Walt et al., 2020). This is of great concern as mental health disorders negatively impact academic performance and achievement. South African students are a particularly vulnerable population given that the prevalence of mental health disorders is expected to worsen in students who live in contexts of high exposure to daily traumatic events. Moreover, the Covid-19 pandemic has likely exacerbated these existent mental health issues in university students given the additional stressors they bring. To date, findings on the implications of Covid-19 on the mental health of students have largely been based on international samples, as this is where the first cases were reported. There is a need for studies to be conducted in developing countries, particularly South Africa, where students are more likely to display extreme increases in mental disorders due to the exposure to additional stressors and daily traumatic events experienced by the average South African.

Hence, this study has two aims. Firstly, the study aims to explore and describe the prevalence of psychological distress among a sample of undergraduate students at a South African university (i.e., UCT). Our first hypothesis was therefore that this sample will exhibit high rates of psychological distress. The second objective was to investigate the relationship between Covid-19 exposure and psychological distress. We hypothesised that the degree of Covid-19 exposure would be positively correlated with psychological distress, and that Covid-19 exposure would predict psychological distress.

Methods

Design and Setting

A cross-sectional study was conducted to explore the prevalence of mental health issues amongst students during the pandemic. Degree of exposure to Covid-19 was measured. Other variables of interest were measures of symptoms of depression, anxiety, and PTSD, as well as a measure of general psychological distress. This study was administered online using electronic questionnaires on the SurveyMonkey platform.

Participants

This study utilised convenience sampling to recruit participants, using UCT's Department of Psychology Student Research Participation Programme (SRPP). Students were invited to participate in this study via email communication (Appendix A).

The eligibility criteria for the study were that participants had to be registered undergraduate students at UCT and aged between 18-25 years. Participation was limited to this age range because it is a peak period for the onset of mental disorders, making students a vulnerable population of interest (McGorry et al., 2011). Furthermore, this allowed for easier comparison of the study with other similar studies. The study did not make any exclusions based on race, gender, or socioeconomic status and psychiatric status. Other exclusions made were determined on a case-to-case basis.

Using the *pwr* package in R, the necessary number of participants was 84. As our study includes data from 300 participants, our analysis is more than adequately powered.

Measures

Sociodemographic Questionnaire

This questionnaire asked participants about their age, sex, and level of study (Appendix B).

Pandemic Stress Questionnaire (PSQ) – Young Adult Version

The PSQ is a recently constructed self-report instrument which measures perceived exposure to Covid-19 stress-related events and the subjective severity of these events (Appendix C; Kujawa et al., 2020). It consists of 24 items which assess six categories: general life disruption (items 1–2, and 5–7), interpersonal (items 3–4, 13, and 24), financial (items 8 and 10), education/ occupational (items 9 and 11), health-self (items 14–17, and 19), and health-others (items 20–21, and 23). Each item provides an event or experience and has a dichotomous response option of "Yes" or "No". If the respondent answers "Yes", they are directed to a 5-point Likert-type scale where they must rate the severity of the events between 1 (not at all bad) to 5 (extremely bad). The severity score was calculated by coding responses of not experiencing an event as 0. The resulting score range is from 0 to 120, with higher scores indicating more severe exposure to Covid-related stressors.

To evaluate the psychometric properties for the PSQ, the developers of the scale administered an established measure of stress, the Perceived Stress Scale (PSS), in a non-clinical American sample (N = 450; Kujawa et al., 2020). PSQ events and severity scores were moderately correlated with PSS scores (r = .41 and .42, respectively) providing support for convergent validity. PSQ events and severity were strongly correlated across time (r = .79 and .83, respectively), illustrating good test-retest reliability. Although internal consistency is not an ideal indicator of psychometric soundness because the PSQ employs a formative measurement model, Cronbach's α was acceptable for PSQ events and severity (α = .72 and .79, respectively). Notably, this scale has not been used in South Africa.

Beck Depression Inventory – Second Edition (BDI-II)

This self-report measure assesses depressive symptoms in both clinical and non-clinical samples (Appendix D; Beck et al., 1996). The BDI-II consists of 21-items, with 4 response options for each item. A score of 0 indicates no symptom presence, 1 indicates symptom presence of mild intensity, 2 indicates symptom presence of moderate intensity, 3 indicates symptom presence of severe intensity. The total score can therefore range from 0 to 63, with the following cut-off scores suggested: 0–13 classified as minimal depression, 14–19 mild depression, 20–28 moderate depression, and 29–63 severe depressive symptoms (Beck et al., 1996).

The BDI-II has demonstrated strong psychometric properties both internationally and in South Africa (e.g., Beck et al., 1996; Makhubela & Mashegoane, 2016; Steer & Clark, 1997). In a South African study this measure was found to be psychometrically sound with an internal consistency of (Cronbach's $\alpha = .90$; Kagee et al., 2014).

Beck Anxiety Inventory (BAI)

This is a self-report measure which assesses the severity of anxiety experienced in both clinical and non-clinical samples (Beck et al., 1988; Appendix E). BAI consists of 21 items, with respondents indicating how much they have been bothered by each symptom on a 4-point Likert-type scale. With a score of 0 indicating "not at all", 1 indicating "mildly, but it didn't bother me", 2 indicating "moderately, it wasn't pleasant at times", and 3 indicating "severely, it bothered me a lot" (Beck et al., 1988). The total score can be obtained by the sum of the 21 items, with the following cut-off scores suggested: 0–7 classified as minimal anxiety, 8–15 as mild anxiety, 16–25 as moderate anxiety, and 26–63 as severe anxiety (Beck et al., 1988).

The BAI has demonstrated sound psychometric properties in both clinical and non-clinical samples internationally (e.g., Beck et al., 1988; Fydrich et al., 1992). A South African

sample including both patients and students reported excellent internal consistency (Cronbach's α = .92) and test-retest reliability ranging from *r* = .44 to .71 (Steele & Edwards, 2008). These results are comparable to the initial validation study conducted by Beck et al., (1988).

Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5)

The PCL-5 is an extensively used self-report measure for PTSD (Appendix F; Weathers et al., 2013). It measures PTSD symptoms based on four clusters of symptoms found in the DSM-5: reexperiencing (items 1–5), avoidance (items 6–7), negative changes in mood and cognition (items 8–14), and hyperarousal symptoms (items 15–20; American Psychological Association [APA], 2013). This measure consists of 20 items which are scored on a 5-point Likert-type scale. Participants are required to indicate their experience of PTSD symptoms and the severity in the past month, rating their experience from 0 (not at all) to 4 (extremely). Subtotals are added to make up a total severity score, which ranges from 0 to 80, with a higher score indicating the presence of the PTSD symptoms. The suggested cut-off score is ≥ 33 (Weathers et al., 2013).

The PCL-5 has been used to assess numerous samples such as the military, fire fighters and refugees (Roberts et al., 2021). These samples have demonstrated that the PCL-5 has excellent psychometric properties as most of the samples have shown high internal consistency with Cronbach's α ranging from .70 – .95 (Bovin et al., 2016; Morrison et al., 2021). The PCL-5 has also displayed good psychometric properties in student samples (Blevins et al., 2015). In addition, it has displayed a high internal consistency in South African samples (α = .97; Kagee et al., 2021).

Kessler Psychological Distress Scale (K10)

This self-report questionnaire measures non-specific psychological distress (Appendix G; Kessler et al., 2002). It consists of 10 items. Respondents are asked how often they have experienced anxiety and depressive symptoms in the last month. Respondents must rate their responses using a 5-point Likert-type scale ranging from 1–5 (1 = none of the time, 5 = all of the time). The scores are totalled, and they range from 10 to 50. Scores that are 30 and above indicate severe distress and that the participant is likely to have a mental disorder (Andrews & Slade, 2001).

The K10 is widely recognised and utilised by the World Health Organization (WHO) to assess mental health (Van Niekerk & Van Gent, 2021). It is a reputable identifier of mental disorders and a good assessment in both clinical and non-clinical samples (Batterham et al., 2018; O'Connor et al., 2012). South African samples that have utilised the K10 have found it to be reliable with high internal consistency ($\alpha = .92$; Peltzer & Louw, 2013; Spies et al., 2009).

Procedure

This study obtained ethical clearance from the Ethics Review Committee of the Department of Psychology (reference number: PSY2021-041; Appendix H). Undergraduate students were invited to participate in the study via an email containing a link, which directed them to the SurveyMonkey website (Appendix A). Before the participants began the questionnaire, they were asked to respond to an electronic informed consent form (Appendix I). The survey was administered with the questionnaires in the following order: a demographics questionnaire, the PSQ, the BDI-II, the BAI, the PCL-5, the K10, and the debriefing form. Each questionnaire took approximately 5–10 minutes to complete, with the total survey taking 20–30 minutes. After the questionnaires were completed, participants were shown a debriefing form, which explained the purpose and the aims of the study, a

contact information list for mental health support services, and contact details of the research team for any queries (Appendix J).

Results

Data Management and Statistical Analyses

Data Management

Statistical analyses were conducted using the R Studio software package. Statistical significance was set at Cronbach's $\alpha = .05$ for all the analyses. Descriptive statistics were used to display the demographic and other sample characteristics. Test assumptions were checked before multivariate statistics were run. No outliers were excluded from the data, as extreme outliers (those that were more than 3.5 standard deviations from the mean of that measure for the total sample) comprised less than 1% of the total sample size. The single item exclusion for one of the analyses is explained in the context of that analysis.

The total number of participants who clicked on the link for the survey was 370. After removing rows with null information, respondents outside of the inclusion criteria, or who identified as non-binary, we obtained our final sample size of 300. The single student who identified as non-binary was excluded since they comprised too small of a proportion to conduct meaningful statistical analyses that incorporated a representative sample of those with similar gender identities.

Statistical Analyses

In order to test hypothesis 1, a descriptive analysis was performed to illustrate the presence and severity of distress scales. The total score for each measure of psychological distress was converted to a proportion of participants scoring in each degree of severity, based on suggested cut-off scores for minimal, mild, moderate, and severe levels of symptoms. Following this, the prevalence rate was derived by pooling the proportions of those that exhibited mild or higher levels of distress.

In order to test hypothesis 2, we computed Pearson's product-moment correlation coefficient, denoted as *r*, between scores on the Covid-19 events scale (PSQ) and each measure of psychological distress. A significance test was run for each of the correlations to determine whether they were significant. The directionality of these correlations was tested using simple linear regressions to determine with more certainty whether psychological distress was predicted by exposure to Covid-19 stressors.

As a final analysis, we conducted a principal component factor analysis on the PSQ severity scores, due to this measure being relatively new. As it is novel, the measure has not been used in many countries or with varying samples, thus a factor analysis using our sample of South African university students was a point of interest.

Sample Characteristics

Of the total sample of 300 psychology students who completed the survey, 49 (16.3%) were males and 251 (83.6%) were females. The age of students ranged from 18 to 25 years, as per the inclusion criteria. We acknowledge this unequal ratio of males: females, but upon consultation of the class lists for courses that we recruited from, we found that this is roughly in line with the sex distribution of the students in the Department of Psychology.

The study levels consisted of first- to third-year undergraduate students. Among the students included in our analyses, 147 were first years (49% of the total sample), 64 were second years (21.3% of the total sample) and 89 were third years (29.6% of the total sample). Again, we acknowledge that first years are overrepresented in the sample, but these numbers reflect the size of the classes that we recruited from, with far more students in the first-year cohort than in second and third year. This is likely due to the high incidence of dropouts among students after first year (Bantjes et al., 2019), as well as the popularity of Psychology as an elective course among first years from multiple faculties.

Descriptive Statistics

The mean for the BDI-II was 16.89 (*SD* = 11.86, with a score range of 0–58), 15.91 for the BAI (*SD* = 12.67, with a score range of 0–62), 24.98 for the K10 (*SD* = 9.41, with a score range of 10–50), 29.03 for the PCL-5 (*SD* = 19.25, with a score range of 0–76), and 30.46 for PSQ severity (*SD* = 16.58, with a score range of 0–85). Overall, there are high standard deviations, and wide ranges of scores obtained, with some participants scoring on the lowest end of the scale and others scoring near the upper bound limit on the scale. This suggests quite a lot of variability within the sample. See Table 1 for summary statistics for the total score for each of the measures used, as well as for the subscales of the PSQ.

In order to make the scores across subscales of the PSQ comparable, the average score for each subscale was converted to a percentage in relation to their total possible score. This calculation revealed that, perhaps as to be expected, the students in this sample reported being most severely distressed by educational/occupational difficulties (50.6%), closely followed by concerns about others' health (47.6%). The other subscales, in order of the level of severity of distress students experienced them with, are as follows: financial stress (21.7%), interpersonal stress (17.2%), life disruptions (16.68%), and concerns about own health (15.12%). Further, we found that 44% of the students reported experiencing financial strain, regardless of severity, 65.3% reported that their workload had increased because of Covid-19, and 52.3% reported problems with online learning. Regarding personal experiences of Covid-19 infection, 16.7% reported experiencing Covid symptoms, and 16% reported testing positive for Covid-19.

Table 1

Descriptive Statistics for the BDI-II, BAI, K10, PCL-5, PSQ, and PSQ Subscales, N = 300

				CI (95%)	
Measure	*M*	*SD*	Range	*LB*	*UB*
Depression (BDI-II)	16.89	11.86	0–58	15.55	18.24
Anxiety (BAI)	15.91	12.67	0–62	14.47	17.35
Distress (K10)	24.98	9.41	10–50	23.91	26.05
PTSD (PCL-5)	29.03	19.25	0–76	26.84	31.22
Pandemic Stress (PSQ) Severity	30.46	16.58	0–85	29.49	32.57
Life Disruption	4.71	4.15	0–17	4.37	5.21
Interpersonal Stress	4.16	3.44	0–11	3.66	4.34
Financial Stress	2.71	3.50	0–10	1.94	2.58
Educational/Occupational Difficulties	5.06	4.13	0–14	4.45	5.25
Concerns About Own Health	3.78	4.18	0–20	3.12	3.96
Concerns About Others' Health	7.14	6.57	0–21	5.80	7.08

Note. BDI-II = Beck Depression Inventory – Second Edition. BAI = Beck Anxiety Inventory. K10 = Kessler Psychological Distress Scale. PCL-5 = Posttraumatic Stress Disorder Checklist for DSM-5. *M* = mean. *SD* = standard deviation. CI = 95% confidence interval. LB = lower bound confidence interval. UB = upper bound confidence interval. The "Range" column indicates the range of scores in the sample. Whereas the possible range of scores is indicated here. BDI-II: 0–63, BAI: 0–63, K10: 10–50, PCL-5: 0–80, PSQ = 0–120, PSQ Life Disruption: 0–25, PSQ Interpersonal Stress: 0–20, PSQ Financial Stress: 0–10, PSQ Educational/Occupational Difficulties: 0–10, PSQ Concerns About Own Health: 0–25, PSQ Concerns About Others' Health: 0–15.

Sex Differences

Although on the cusp of significance, we did not find a significant sex difference for depression scores, although descriptively females (M = 17.45, SD = 11.92) scored higher than males. While the finding of higher depression scores among females is founded in literature, our findings contrast with the majority of literature which reports significant sex differences in depression (e.g., Bantjes et al., 2019; Mall et al., 2018). PSQ scores similarly did not show significant sex differences. See Table 2 for details of the differences in scores across males and females, calculated using *t*-tests.

In contrast, significant sex differences were found for anxiety ($t(82.1) = 4.5$, $p < .001$), general psychological distress ($t(72.45) = 2.22$, $p = .03$), and PTSD symptoms ($t(68.96) = 2.57$, $p = .012$), with females consistently scoring higher than males.

Table 2

Sex Differences for the BDI-II, BAI, K10, PCL-5, PSQ, and PSQ Subscales, N = 300

Measure	Males	Females	CI (95%) LB	CI (95%) UB	*t*	*p*
Depression (BDI-II)	14.04(11.28)	17.45(11.92)	-.14	6.96	1.92	.059
Anxiety (BAI)	9.73(9.99)	17.12(12.80)	4.12	10.64	4.50	<.001***
Distress (K10)	22.43(8.64)	25.47(9.48)	.31	5.78	2.22	.029*
PTSD (PCL-5)	22.71(18.75)	30.26(19.14)	1.69	13.41	2.57	.012*
Pandemic Stress (PSQ) Severity	27.57(18.60)	31.03(16.14)	-2.23	9.14	1.21	.229
Life Disruption	4.40(3.06)	4.79(4.42)	-2.10	2.90	.32	.745
Interpersonal Stress	4.80(3.19)	4.00(3.52)	-3.26	1.66	-.69	.499
Financial Stress	4.50(3.66)	2.26(3.35)	-5.00	.51	-1.76	.101
Educational/Occupational Difficulties	5.90(4.07)	4.85(4.16)	-4.16	2.05	-.73	.478
Concerns About Own Health	4.70(3.23)	3.54(4.40)	-3.76	1.44	-.94	.361
Concerns About Others' Health	9.90(5.55)	6.44(6.68)	-7.81	.88	-1.69	.110

Note. Means followed by standard deviations in paratheses are indicated under the columns for Males and Females. BDI-II = Beck Depression Inventory – Second Edition. BAI = Beck Anxiety Inventory. K10 = Kessler Psychological Distress Scale. PCL-5 = Posttraumatic Stress Disorder Checklist for DSM-5. *CI* = 95% confidence interval. *LB* = lower bound confidence interval. *UB* = upper bound confidence interval.

* $p < .05$, ** $p < .01$, *** $p < .001$

Year of Study Differences

We used ANOVAs to test whether there were differences across year of study for each of the measures of distress. See Table 3 for the results.

We found no significant differences for depression ($F(2, 297) = .005$, $p = .995$), anxiety ($F(2, 297) = 0.13$, $p = 881$), general psychological distress ($F(2, 297) = .34$, $p = .964$), nor PTSD scores ($F(2, 297) = .41$, $p = .664$) across years of study. However, as other studies have indicated (e.g., Rousseau et al., 2020), first-years were more vulnerable to psychological distress, in that 51.5% of students who displayed severe anxiety levels were in first year, and a higher proportion of first year students could be provisionally diagnosed with PTSD in comparison to second- and third-year students.

Table 3

ANOVA Results Depicting Level of Study Differences for the for the BDI-II, BAI, K10, PCL-5, PSQ, and PSQ Subscales, N = 300

Measure	*F*	*p*
Depression (BDI-II)	.00	.995
Anxiety (BAI)	.13	.880
Distress (K10)	.04	.964
PTSD (PCL-5)	.12	.884
Pandemic Stress (PSQ) Severity	3.46	.033*
Life Disruption	.35	.706
Interpersonal Stress	.45	.637
Financial Stress	1.57	.218
Educational/Occupational Difficulties	.36	.696
Concerns About Own Health	.57	.572
Concerns About Others' Health	1.93	.156

Note. BDI-II = Beck Depression Inventory – Second Edition. BAI = Beck Anxiety Inventory. K10 = Kessler Psychological Distress Scale. PCL-5 = Posttraumatic Stress Disorder Checklist for DSM-5. Degrees of freedom for all the ANOVAs were (2, 297).

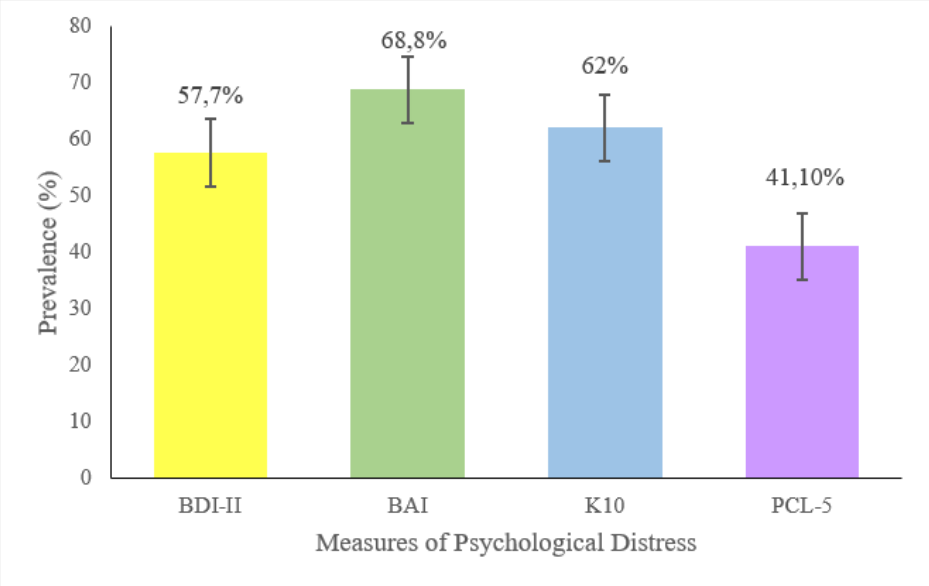
* $p < .05$, ** $p < .01$, *** $p < .001$

Hypothesis 1

A descriptive analysis was conducted to investigate the presence and severity of distress scores among students. See Figure 1 for a depiction of the prevalence rates for each measure.

Figure 1.

Prevalence Rates for Depression (BDI-II), Anxiety (BAI), General Psychological Distress (K10), and PTSD (PCL-5), N = 300



Depression

The prevalence rate for depression was 57.7% in this sample of undergraduate students, as calculated using the proportion of students who fell within the range of mild or more severe depression (i.e., a score of 14 or higher on the BDI-II). The results showed that 43.3% of the sample displayed minimal symptoms of depression, 23.3% mild symptoms of depression, 18.7% moderate symptoms of depression, and 15.7% reported experiencing severe symptoms of depression.

Anxiety

The prevalence rate for anxiety was 68.3% (calculated as the proportion of students reporting mild or more severe symptoms of anxiety), indicating concerning levels of anxiety among the students. This was the highest prevalence rate of all the measures of distress, suggesting that our sample reported anxiety as their most stressful experience. In terms of severity, 31.7% of these students scored in the minimal range, 25% scored in the mild range, 21.3% scored in the moderate range, and 22% scored in the severe range of anxiety. This suggests that students are relatively evenly spread across mild, moderate, and severe anxiety.

Psychological Distress

Our results indicate that the prevalence of psychological stress was 62%. A proportion of 38.0% of students reported that they are well, 18.0% reported experiencing moderate levels of psychological distress, while 31.3% reported experiencing severe levels of psychological distress. We propose cause for concern given that almost one third of students in this sample report severe psychological distress.

PTSD

Among the students, 41.1% were above the suggested cut-off score ≥33, and met the provisional diagnosis of PTSD. When the means of the cluster of symptoms were compared as standardised proportions, students were most likely to report negative changes in mood and cognition (M = 36.96, SD = 26.07), followed by hyperarousal (M = 36.58, SD = 25.58) and avoidance (M = 38.13, SD = 32), and least likely to report reexperiencing symptoms (M = 34.20, SD = 27.25).

Hypothesis 2

We expected to find that Covid-related distress (operationalized as exposure to and self-reported severity of distress in response to Covid-related events) would be associated

with and a predictor of various measures of psychological distress (depression, anxiety, general psychological distress, and PTSD symptoms).

Correlations between the PSQ severity score and scores on each of the distress measures are presented in Table 4. PSQ events/severity was moderately positively associated with depression (r = .38, p < .05), anxiety (r = .44, p < .05), general psychological distress (r = .39, p < .001) and PTSD (r = .46, p < .001). This suggests that in all the measures of distress, an increased severity of Covid-related experiences is correlated with a higher severity of symptoms. The strongest correlation was between PSQ severity and PTSD, suggesting that posttraumatic stress is most strongly associated with severity of Covid-19 events.

Additionally, the correlation matrix indicated strong and positive relationships between the measures. There was a significant correlation between depression and anxiety (r =.72, p < .001), psychological distress and anxiety (r =.78, p < .001), and between depression and psychological distress (r = .82, p < .001). The covariance between depression and psychological distress is strongest.

Table 4

Correlations Between BDI-II, BAI, K10, PCL-5, and PSQ Scores

Measure	BDI-II	BAI	K10	PCL-5	PSQ Severity
BDI-II	-				
BAI	.72**	-			
K10	.82**	.78***	-		
PCL-5	.73**	.71**	.79***	-	
PSQ Severity	.38**	.44**	.39***	.46***	-

Note. BDI-II = Beck Depression Inventory – Second Edition. BAI = Beck Anxiety Inventory. K10 = Kessler Psychological Distress Scale. PCL-5 = Posttraumatic Stress Disorder Checklist for DSM-5. PSQ = Pandemic Stress Questionnaire.

* p < .05, ** p < .01, *** p < .001

As a follow up to the correlations, in order to test whether we can fairly assume directionality of Covid-19 stressors as a predictor of the various measures of psychological distress, we conducted four separate simple linear regressions. The predictor variable was held constant as the severity of Covid-19 stress, while the outcome variable varied between depression, anxiety, general psychological distress, and PTSD. See Table 5 for the details of the results.

Model 1 investigated Covid-19 stressors (measured by severity scores on the PSQ) as a predictor of depression (measured by BDI-II scores). The model was significant, $F(1, 298) = 50.3$, $p < .001$, with 14% of the variance being explained. PSQ severity is a significant predictor of depression scores, a one unit increase in severity score on the PSQ is being associated with an expected .27 unit increase in BDI-II score.

Model 2 investigated Covid-19 stressors as a predictor of anxiety. This model was significant, $F(1, 298) = 69.69$, $p < .001$, with 19% of the variance being explained. More variance is explained in this model compared to when depression was the outcome. PSQ severity is a significant predictor of anxiety scores, with the β coefficient suggesting that a one unit increase in PSQ score is associated with a .33 unit expected increase in BAI score.

Model 3 investigated Covid-19 stressors as a predictor of general psychological distress. This model was significant, $F(1, 298) = 52.44$, $p < .001$, with 15% of the variance being explained. More variance is explained in this model compared to when depression was the outcome, but not as much as when anxiety is the outcome. PSQ severity is a significant predictor of general psychological distress scores, with a one unit increase in PSQ score being associated with a .22 unit expected increase in K10 score.

Model 4 investigated Covid-19 stressors as a predictor of PTSD. This model was significant, $F(1, 298) = 78.56$, $p < .001$, with 21% of the variance being explained. Therefore, the most variance is explained by this model when PTSD is the outcome. PSQ severity is a

significant predictor of PTSD scores, with a one unit increase in PSQ score being associated with .53 unit expected increase in PCL-5 score.

These models confirm the initial expectation following significant correlations between Covid-19 stress and higher psychological distress. As per the correlation coefficient magnitude comparison, PTSD is most strongly associated with Covid-19 stress, confirmed here with that model having the highest β coefficient and highest adjusted R^2.

Table 5

Regression Coefficients for Models with PSQ Scores as the Predictor for Each Measure of Psychological Distress, N = 300

Model	*B*/ β	*SE*	t	p_1	R^2	Adjusted R^2	*F*(df)	p_2
Model 1: Depression (BDI-II)					.14	.14	50.3(2, 297)	<.001***
(Intercept)	8.61	1.33	6.48	<.001***				
PSQ Severity	.27	.04	7.09	<.001***				
Model 2: Anxiety (BAI)					.19	.19	69.69(2, 297)	<.001***
(Intercept)	5.78	1.38	4.18	<.001***				
PSQ Severity	.33	.04	8.35	<.001***				
Model 3: Psychological Distress (K10)					.15	.15	52.44(2, 297)	<.001***
(Intercept)	18.29	1.05	17.41	<.001***				
PSQ Severity	.22	.03	7.24	<.001***				
Model 4: PTSD (PCL-5)					.21	.21	78.56(2, 297)	<.001***
(Intercept)	12.88	2.07	6.21	<.001***				
PSQ Severity	.53	.06	8.86	<.001***				

Note. BDI-II = Beck Depression Inventory – Second Edition. BAI = Beck Anxiety Inventory. K10 = Kessler Psychological Distress Scale. PCL-5 = Posttraumatic Stress Disorder Checklist for DSM-5. PSQ = Pandemic Stress Questionnaire. The column denoted p_1 is the significance value for the *t*-test for each coefficient, whereas p_2 refers to the significance value for ANOVA conducted on each model.

* $p < .05$, ** $p < .01$, *** $p < .001$

PSQ Factor Analysis

We conducted principal components factor analysis to explore the factor structure of this measure in our sample of South African university students. See Table 6 for the factor loadings for each item.

Early in the process, we noted that none of our participants had answered 'yes' for item 18, thus making the severity score 0 for all 300 participants. When checking the associated question for that item, that being "Have you been hospitalized as a result of Covid-19", we found that this outcome was expected since the age group of our sample (18-25 years old) is among the lowest at risk of being hospitalized for Covid-19 (Felsenstein & Hedrich, 2020). After testing the communalities with this item included, we decided to exclude it from further analyses. Therefore, the following analysis is conducted using 23 items.

When testing the assumptions for conducting a factor analysis, we found that all communalities were above the minimal threshold of .30, confirming that each of the examined items shared some common variance with the others. The calculation for the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy yielded a result above the acceptable threshold of .50 for each item, with some being above .70. Bartlett's Test of Sphericity was found to be significant, Bartlett's K^2 (B) = 392.02 (22), $p < .001$, suggesting non-sphericity, and therefore that the dataset was appropriate for factor analysis.

After looking at a scree plot as well as a parallel analysis, it was suspected that a 6-factor structure would fit the data well. We conducted the factor analysis using 4, 5, 6, and 7 factors, finding that a 6-factor structure accounted for the most variance (55%). We inspected the *r* values for this factor analysis, and found that some were above .35, thus suggesting a varimax rotation is most appropriate. This rotation confirmed that the most appropriate number of factors is 6, with the best distribution of loadings and highest amount of variance being explained. The proportion of variance explained by the rotated factor analysis is 40.9%.

Although this factor structure matches the original scale in number of factors, there were some differences in how the items clustered to create the resulting factors. The final factors were named as follows: Administrative and Financial Difficulties (items 1–2, 5, 8, 10, 12, and 17), Self-Health (items 15–17), Negative Experiences of Loved Ones (items 21–22, and 24), Interpersonal Stressors (items 3–4), Education/ Work Difficulties (items 7, 9, and 11–12), and Life Disruptions (items 6, 14, 20, and 23). See Table 6 for a description of which items loaded onto each of the factors. The points of departure for the current factors were in the subscales for Administrative and Financial Difficulties, Negative Experiences of Loved Ones, and Life Disruptions. In the current interpretation of the factor structures, instead of having Financial Stressors as a distinct scale, we found that financial stress and difficulties with completing administrative tasks and responsibilities were clustered together on one factor. Further, instead of the original subscale of Concern for Others' Health, we found that the occurrence of negative events in the most extreme sense (contracting the virus, being hospitalized, or dying as a result of the virus) clustered onto a factor that we called Severe Negative Experiences of Loved Ones. The last point of distinction from the original scale is in the Life Disruptions subscale, which is named in the same way as the original subscale but includes life disruptions for one's own life as well as loved ones, ranging from inconveniences such as postponing important events to oneself or loved ones experiencing symptoms of Covid and having to isolate as a result.

Table 6

Factor Loadings for the Varimax Rotated Factor Analysis on the PSQ

Item number and associated question	Administrative and Financial Difficulties	Self-Health	Negative Experiences of Loved Ones	Interpersonal Stressors	Education/ Work Difficulties	Life Disruptions
1: I had difficulty obtaining basic supplies because of the pandemic.	.377	-	-	-	-	-
2: I had to move unexpectedly because of the pandemic.	.310	-	-	-	-	-
3: I was separated from family, friends, or others close to me because of the pandemic.	-	-	-	.774	-	-
4: I was unable to be with close family, friends, or partners because of the pandemic.	-	-	-	.565	-	-
5: I had problems with important documents and administration tasks because of COVID-19.	.221	-	-	-	-	-
6: I had to cancel or postpone important events because of the coronavirus pandemic	-	-	-	-	-	.275
7: I had to take on additional responsibilities caring for others due to the pandemic.	-	-	-	-	.292	-
8: I experienced significant financial strain due to the pandemic	.716	-	-	-	-	-
9: My workload increased substantially because of the pandemic.	-	-	-	-	.630	-
10: Someone I rely on for financial support temporarily or permanently lost a job or had their work hours greatly reduced because of the pandemic.	.667	-	-	-	-	-
11: I was unable to complete important requirements for my education or professional goals due to the coronavirus pandemic	-	-	-	-	.381	-
12: I had problems with online courses and/or remote work	-	-	-	-	.561	-
13: I had conflicts or arguments with my family members due to coronavirus.	.312	-	-	-	-	-
14: I had symptoms of COVID-19 but was unable to get tested.	-	-	-	-	-	.488
15: I was tested for COVID-19.	-	.860	-	-	-	-
16: I was diagnosed with COVID-19.	-	.729	-	-	-	-
17: I had difficulty accessing or paying for physical or mental health care for myself or my dependents due to the pandemic.	.520	-	-	-	-	-
19: I was quarantined for 2 weeks + due to possible exposure to COVID-19 or travel.	-	.480	-	-	-	-
20: Someone close to me had symptoms of COVID-19 but was unable to get tested.	-	-	-	-	-	.453
21: Someone close to me was diagnosed with COVID-19.	-	-	.557	-	-	-
22: Someone close to me was hospitalized due to COVID-19.	-	-	.817	-	-	-
23: Someone close to me was quarantined for 2 weeks + due to possible exposure to COVID-19 or international travel.	-	-	-	-	-	.471
24: Someone close to me died from COVID-19.	-	-	.716	-	-	-

Note. The factor loadings are indicated for each item under the factor that the loading was highest for. Item 18 is removed from this table as it was not included in the factor analysis.

Discussion

The study explored the prevalence of psychological distress during the pandemic, amongst South African undergraduate students. In addition, the study investigated whether severity of Covid-19 stressors predicted higher rates of psychological distress. Results showed that students reported high rates of psychological distress in all the measured domains, and that this distress was able to be predicted by Covid-19 related stressors.

Hypothesis 1

In confirmation of our hypothesis, we found high prevalence rates of depression, anxiety, general distress, and PTSD symptoms, with anxiety being most prevalent. These findings are consistent with studies that have shown that this age group, particularly students, are vulnerable to psychological symptoms (Mall et al., 2018; McGorry et al., 2011). The results are supported by the findings of a study conducted among medical students at UCT (Van der Walt et al., 2020). The prevalence rates for depression and anxiety were found to be 36.4% and 45.9% respectively in that study. As was the case in our study, the highest prevalence among the measures of distress in that study was for anxiety disorders. Further mirroring our results, but this time on an international scale, similar patterns were observed in a World Mental Health (WMH) survey, which reported anxiety as the one of the most common disorders among college students, with a prevalence rate ranging from 18.5% to 35%, across all the countries (Kessler et al., 2015). Overall, these results confirm that anxiety is the most common disorder found amongst university students, in South Africa and internationally.

The high prevalence rates of psychological distress where in contrast to a German study which found that more than three quarters of the undergraduate sample reported good mental health (Voltmer et al., 2021). In that study, the unexpected findings were attributed to the fact that the majority of the sample were located in a rural area where infection rates are

lower than urban areas. As a result, it was speculated that anxieties surrounding the impact of pandemic on life and education are minimal. Our sample of students are from a university situated in one of the hotspots for Covid-19 infections, and are perhaps therefore more exposed to the pandemic, and to rules and regulations that come along with these adjustments (Statista, October 24, 2021). For example, South Africa is globally renowned for having implemented one of the strictest lockdown responses in the world (Haider et al., 2020). Therefore, students in our sample were exposed to blanket lockdown restrictions, as well as sudden changes in learning methods and demands, possibly explaining the large discrepancy in psychological distress compared to this German sample.

In relation to psychological distress and sex, our data showed that females students were significantly more likely to exhibit higher levels of anxiety, general psychological distress, and PTSD, in comparison to male students. Similar results were found in South African samples, which reported that female students are more likely to adversely experience depression, anxiety, in comparison to male students, who are mainly affected by substance use related disorders (Auerbach et al., 2018; Bantjes et al., 2016). Additionally, these findings were observed globally as well (Lim et al., 2018). However, we did not find the expected sex differences in depression at an inferential level.

Regarding level of study, first year students were expected to display higher levels of distress in comparison to second- and third-year students. First year students are considered to be particularly vulnerable to mental disorders due to the challenging transition to university, whereby pre-existing mental health issues may be exacerbated, or new disorders may be triggered (Bantjes et al., 2019). However, there was no significant difference between the level of study, across all the measures of distress. While previous international and local studies have observed this level-of-study effect in pre-Covid samples, our findings are in line with an American study by Kecojevic et al. (2020) who also collected data during Covid-19

and similarly did not find year-of-study differences. A possible explanation is that the pandemic pervasively affected students, perhaps evening out the expected disparities. This may be because all students were subject to the same conditions of online learning, and COVID-related stressors in other subscales, which do not discriminate across age or year of study. An alternative explanation is that third year students may be exhibiting similar levels of distress as other years of study due to anticipation of graduation and job prospects, especially under Covid-19 conditions. These stressors were reported in another American student sample (Lee et al., 2021).

Moreover, the current study found high and strong positive relationships between psychological distress and anxiety, anxiety and depression, with the strongest relationship being between depression and psychological distress. This pattern is consistent with a globally representative study conducted across 24 countries, which reported a lifetime comorbidity between depression and anxiety among students, for example (Kessler et al., 2015).

The prevalence rates for psychological distress in our findings were far higher than prevalence rates observed in western countries during the pandemic. In a similar study conducted by Cao et al. (2020), which utilised in a Chinese undergraduate sample, they found a prevalence rate of 44% for anxiety and 36% depression, which are lower in comparison to our study. In another study that was conducted in five western countries, their prevalence rate was 13.2% for PTSD, in comparison to our study's prevalence rate of 41.1%. The high levels of psychological distress observed in our study, particularly in PTSD, could be explained by the fact South African students are exposed to daily traumatic stressors due to the high rates of crime and violence, which is an addition to the life stressors students generally experience globally (Eagle & Kaminer, 2013). As a result of these additional stressors, South African

students are more likely to exhibit even higher levels of anxiety, depression and PTSD during the pandemic.

Hypothesis 2

For the second hypothesis, we predicted that high exposure to Covid-19 related stressors would correlate with and predict higher levels of distress. We were able to confirm this hypothesis, with clear relationships between severity of Covid-19 experiences and levels of distress, further solidified by significant regression models of this relationship.

In terms of the experience of Covid-19, our findings suggested only a small proportion of students experienced Covid-19 symptoms and an even smaller proportion have tested positive for Covid-19. Furthermore, the lower rates of concern being for their own health, compared to high rates of concern for others' health, aligns with the status of our sample as students, since their age protects them from concern for their own health in terms of experiencing the virus to a life-threatening degree. These findings support Covid-19 literature that have found that the younger population (aged 18–40) are at a lower risk of contracting Covid-19 and are more likely to experience less severe symptoms in comparison to older people (Felsenstein & Hedrich, 2020). This arguably left students more likely to be concerned about their loved ones' safety.

In contrast, almost half of the students reported experiencing financial strain as a consequence of the pandemic, with 12.3% of these students reporting their situation was 'very bad'. In addition, on top of the pre-existing expectation of high stress associated with university workload only being exacerbated by Covid-19 measures, more than half the sample stated that they had difficulties with remote learning. Of those, 15% of students expressed that their educational difficulties were 'very bad'. This is consistent with similar studies that have found that the pandemic has introduced additional life stressors, with common Covid-related stressor amongst students surrounding finances for education and,

fear of infection and the effect the pandemic will have on their education (Cao et al., 2020; Wang & Zhao, 2020). Similarly, students were perhaps among the most displaced during the pandemic, both in terms of geographical location (e.g., moving out of student residences back to their family home where their work environment may be less suitable for learning) and in terms of the nature of their studies, which were abruptly shifted to online learning, which undoubtedly poses new challenges and trials to students (Cao et al., 2020).

Furthermore, the current study found that PSQ severity highly predicted the other measures (depression, anxiety, general psychological distress, and PTSD). The most robust prediction was between PSQ severity and PTSD, suggesting that posttraumatic stress is mostly associated with severity of Covid-19 events. Our results seem to suggest that students are vulnerable to exhibiting PTSD symptoms in connection with pandemic-related traumatic stressors. These findings are supported by both South African and international studies, which have recognized and likened the Covid-19 pandemic to a traumatic stressor (Bridgland et al., 2021; Islam et al., 2020b; Taylor et al., 2020). Therefore, our hypothesis confirms that the Covid-19 pandemic is likely to increase mental health disorders in university students. This is above and beyond the already fragile state of student mental health as a result of university-related stressors, expounded by the high potential for exposure to traumatic stress in South Africa (Bantjes et al., 2016). Thus, Covid-19 has negative implications on mental well-being, particularly in students. Of note, Covid-19 has been framed as a *continuous* traumatic stressor for the general population as well as students (Lahav, 2020), which would be an interesting avenue to explore further, given our finding of high rates of PTSD in our sample, and a strong association between Covid-19 exposure and PTSD symptoms.

Limitations and Recommendations

This study has indeed made significant contributions to our understanding of the impact of Covid-19 related stressors on the mental health of students. However, we acknowledge some limitations and areas for improvement or further research.

Firstly, this is a cross-sectional study, and thus we cannot determine causal effect relationship in the measures (Van der Walt et al., 2020). Future studies would benefit from conducting the study as longitudinal research, to explore the impact of Covid-19 on students' mental health over a period of time. Secondly, no information was obtained pertaining psychological treatment and therapies. As a result, the study was not able to determine if the psychological distress observed in the findings, were pre-existing or if they were triggered by the Covid-19-related stressors. Thirdly, the study used PSQ questionnaire which is a recently constructed measure with no psychometric properties, particularly within the South African context. Therefore, we cannot be certain of cross-cultural validity. Additionally, stressors in the pandemic evolve as the situation evolves, thus the stressors in this measure may not encompass new stressors such as stressors related to re-entering face-to-face. Therefore, we recommend further research that aims to account for contextual differences.

Conclusion

Despite the limitations, the study findings revealed significant associations between the severity of Covid-related stress and all the psychological distress measures. Our study highlights that university students are vulnerable to psychological distress, depicted here with anxiety, depression, general psychological distress, and PTSD, each of which showed concerning prevalence rates. In addition to existing pressure upon students, our findings show that that events associated with Covid-19 are significant clear stressors for students, illustrated in significant predictive power of psychological distress outcomes. In addition, Covid-19 is arguably confirmed to be a traumatic event, as Covid-related stressors were

highly correlated with PTSD symptoms in students. Furthermore, the most prevalent disorder amongst the students was anxiety. Our results showed that students expressed anxieties in relation to finances, and most poignantly, in education.

With the Covid-19 pandemic being an ongoing event, in addition to the concerning levels of psychological distress that were observed in the study, it is important for institutions to establish and implement interventions to mitigate the impact the pandemic has on mental wellbeing. In addition, support services could be implemented to reduce Covid-19 related anxieties amongst students. The findings of this study could potentially assist in expanding the knowledge based of Covid-19 and mental health disorders, as well as help improve student health.

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Appendix A

Study Invitation

Dear students,

We would like to invite you to participate in an online study that will investigate the current mental health state of undergraduate students and how the Covid-19 pandemic has impacted their mental health.

If you decide to participate in the study, you will be required to complete a survey which should take approximately **20-30 minutes**. We would prefer you to complete the experiment on a laptop or desktop computer. However, you can use another device (e.g., smartphone or tablet). Once you have completed the study, you will be sent a debriefing with more information on the nature of the research topic.

To participate in this study, you must be between **18 and 25 years**. Participating in this study will earn you 1 SRPP point.

This study has been approved by the Research Ethics Committee of the Psychology department. You will be asked to provide informed consent before answering any questions or taking part in any tasks. All information that you provide will be kept strictly confidential and secure. If any aspect of the study makes you feel uncomfortable at any point, you can withdraw from the study without any penalty.

If you have read the above and would like to participate in the survey, please click on the link below: https://www.surveymonkey.com/r/WYCHCFQ.

Please contact Chuma Busakhawe (bskchu001@myuct.ac.za) and Natalie Ndabambi (ndbnat002@myuct.ac.za) if you have questions regarding participation in the study.

Appendix B

Sociodemographic Questionnaire

DIRECTIONS: Please answer each question as accurately as possible by circling the correct answer or filling in the space provided.

1. What age range do you fall into?

- Under 18 years old
- 18–25 years old
- Above 25 years old

2. What is your sex?

- Female
- Male
- Other (please specify) _____

3. What is your current academic year of study?

- First year
- Second year
- Third year
- Other (please specify) _____

5. Which psychology would you like us to allocate your SRPP point to?

_____

6. Please provide your student number

_____

Appendix C

Pandemic Stress Questionnaire (PSQ) – Young Adult Version

Instructions: Below is a list of events related to the pandemic that may or may not have happened to you. Please decide whether you have had each of these experiences as a result of the recent coronavirus pandemic. For each event which has happened, please decide how bad it was when it happened to you. When rating how bad each event was when it happened, please consider how much of a negative impact it had on your life, how often the event occurred, and how long it was a problem for you.

	EVENTS RELATED TO THE CORONAVIRUS PANDEMIC: did this happen to you?	
1	I had difficulty obtaining basic supplies because of the coronavirus pandemic (e.g., food, medicine, toilet paper). *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
2	I had to move unexpectedly because of the coronavirus pandemic. *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
3	I was unexpectedly separated from family, friends, or others close to me because of the coronavirus pandemic (e.g., due to moves or travel restrictions). *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
4	I was unable to be with close family, friends, or partners because of the coronavirus pandemic. *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
5	I had problems with my visa or the Student and Exchange Visitor Information System because of the coronavirus pandemic (e.g., unable to renew). *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
6	I had to cancel or postpone important events because of the coronavirus pandemic (e.g., events for a club, sporting events, major celebrations). *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
7	I had to take on additional responsibilities caring for others (e.g., children, other family members) due to the coronavirus pandemic. *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No

8	I experienced significant financial strain due to the pandemic (e.g., due to travel, purchasing supplies, paying for housing). *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
9	My workload increased substantially because of the coronavirus pandemic. *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
10	Someone I rely on for financial support (e.g. parent) temporarily or permanently lost a job or had their work hours greatly reduced because of the coronavirus pandemic. *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
11	I was unable to complete important requirements for my education or professional goals due to the coronavirus pandemic (e.g., coursework, thesis). *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
12	I had problems with online courses and/or remote work (e.g., slow connection, no computer or internet access, major differences in time zone). *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
13	I had conflicts or arguments with my family members due to coronavirus (e.g., conflicts about living arrangements, shared work space, schedule expectations). *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
14	I had symptoms of COVID-19 (e.g., cough, fever, trouble breathing) but was unable to get tested. *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
15	I was tested for COVID-19. *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
16	I was diagnosed with COVID-19. *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
17	I had difficulty accessing or paying for physical or mental health care for myself or my dependents due to the coronavirus pandemic. *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No

18	I was hospitalized due to COVID-19 *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
19	I was quarantined for 2 weeks or longer due to possible exposure to COVID-19 or due to international travel. *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
20	Someone close to me had symptoms of COVID-19 (e.g., cough, fever, trouble breathing) but was unable to get tested. *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
21	Someone close to me was diagnosed with COVID-19. *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
22	Someone close to me was hospitalized due to COVID-19 *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
23	Someone close to me was quarantined for 2 weeks or longer due to possible exposure to COVID-19 or due to international travel. *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No
24	Someone close to me died from COVID-19. *If yes: How bad was this event?* *1 - not at all bad 2 - slightly bad 3 - somewhat bad 4 - very bad 5 - extremely bad*	Yes/No

Appendix D

Beck Depression Inventory – Second Edition (BDI-11)

INSTRUCTIONS: You will be asked to read 21 groups of descriptions. Please choose the statement from each set of descriptions that most accurately describes your feelings and thoughts in the past 2 weeks, including today. If you find that more than one statement applies to you, please choose the one that is the most applicable.

Item 1: Sadness
0 I do not feel sad.
1 I feel sad much of the time.
2 I am sad all of the time.
3 I am so sad or unhappy that I can't stand it.

Item 2: Pessimism
0 I am not discouraged about my future.
1 I feel more discouraged about my future than I used to be.
2 I do not expect things to work out for me.
3 I feel my future is hopeless and will only get worse

Item 3: Past Failure
0 I do not feel like a failure
1 I have failed more than I should have.
2 As I look back, I see a lot of failures.
3 I feel I am a total failure as a person.

Item 4: Loss of Pleasure
0 I get as much pleasure as I ever did from the things I enjoy.
1 I don't enjoy things as much as I used to.
2 I get very little pleasure from the things I used to enjoy.
3 I can't get any pleasure from the things I used to enjoy.

Item 5: Guilty Feelings
0 I don't feel particularly guilty.
1 I feel guilty over many things I have done or should have done
2 I feel quite guilty most of the time.
3 I feel guilty all of the time.

Item 6: Punishment Feelings
0 I don't feel I am being punished.
1 I feel I may be punished.
2 I expect to be punished.
3 I feel I am being punished.

Item 7: Self-Dislike
0 I feel the same about myself as ever.
1 I have lost confidence in myself.
2 I am disappointed in myself.
3 I dislike myself.

Item 8: Self-Criticism
0 I don't criticise or blame myself more than usual.
1 I am more critical of myself than I used to be.
2 I criticise myself for all my faults.
3 I blame myself for everything bad that happens.

Item 9: Suicidal Thoughts or Wishes
0 I don't have any thoughts of killing myself.
1 I have thoughts of killing myself, but I would not carry them out.
2 I would like to kill myself.
3 I would kill myself if I had the chance.

Item 10: Crying
0 I don't cry any more than I used to.
1 I cry more than I used to.
2 I cry over every little thing.
3 I feel like crying, but I can't.

Item 11: Agitation
0 I am no more restless or wound up than usual.
1 I feel more restless or wound up than usual.
2 I am so restless or agitated that it's hard to stay still.
3 I am so restless or agitated that I have to keep moving or doing something.

Item 12: Loss of Interest
0 I have not lost interest in other people or activities.
1 I am less interested in other people or things than before.
2 I have lost most of my interest in other people or things.
3 It's hard to get interested in anything.

Item 13: Indecisiveness
0 I make decisions as well as ever.
1 I find it more difficult to make decisions than usual.
2 I have much greater difficulty in making decisions than I used to.
3 I have trouble making any decisions.

Item 14: Worthlessness
0 I do not feel I am worthless.
1 I don't consider myself as worthwhile and useful as I used to be.
2 I feel more worthless as compared to other people.
3 I feel utterly worthless.

Item 15: Loss of Energy
0 I have as much energy as ever.
1 I have less energy than I used to have.
2 I don't have enough energy to do very much.
3 I don't have enough energy to do anything.

Item 16: Changes in Sleeping Pattern
0 I have not experienced any change in my sleeping pattern.
1a I sleep somewhat more than usual.
1b I sleep somewhat less than usual.
2a I sleep a lot more than usual.
2b I sleep a lot less than usual.
3a I sleep most of the day.
3b I wake up 1-2 hours early and can't get back to sleep.

Item 17: Irritability
0 I am no more irritable than usual.
1 I am more irritable than usual.
2 I am much more irritable than usual.
3 I am irritable all the time.

Item 18: Changes in Appetite
0 I have not experienced any changes in my appetite
1a My appetite is somewhat less than usual.
1b My appetite is somewhat more than usual.
2a My appetite is much less than usual.
2b My appetite is much more than usual.
3a I have no appetite at all.
3b I crave food all the time.

Item 19: Concentration Difficulty
0 I can concentrate as well as ever.
1 I can't concentrate as well as usual.
2 It's hard to keep my mind on anything for very long.
3 I find I can't concentrate on anything.

Item 20: Tiredness or Fatigue
0 I am no more tired or fatigued than usual.
1 I get more tired or fatigued more easily than usual.
2 I am too tired or fatigued to do a lot of the things I used to do.
3 I am too tired or fatigued to do most things I used to do.

Item 21: Loss of Interest in Sex
0 I have not noticed any recent change in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost interest in sex completely.

Appendix E

Beck Anxiety Inventory (BAI)

INSTRUCTIONS: Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by choosing the number in the corresponding space in the column next to each symptom.

	Not at all	**Mildly, but it didn't bother me much**	**Moderately – it wasn't pleasant at times**	**Severely – it bothered me a lot**
Numbness or tingling	0	1	2	3
Feeling hot	0	1	2	3
Wobbliness in legs	0	1	2	3
Unable to relax	0	1	2	3
Fear of worst happening	0	1	2	3
Dizzy or lightheaded	0	1	2	3
Heart pounding / racing	0	1	2	3
Unsteady	0	1	2	3
Terrified or afraid	0	1	2	3
Nervous	0	1	2	3
Feeling of choking	0	1	2	3
Hands trembling	0	1	2	3
Shaky / unsteady	0	1	2	3
Fear of losing control	0	1	2	3
Difficulty in breathing	0	1	2	3
Fear of dying	0	1	2	3
Scared	0	1	2	3
Indigestion	0	1	2	3
Faint / lightheaded	0	1	2	3
Face flushed	0	1	2	3
Hot / cold sweats	0	1	2	3

Appendix F

Posttraumatic Stress Disorder Checklist for DSM-5

INSTRUCTIONS: Below is a list of problems that people sometimes have in response to a very stressful experience. Please read each problem carefully and then circle one of the numbers to the right to indicate how much you have been bothered by that problem in the past month.

In the past month, how much were you bothered?	**Not bad at all**	**Slightly Bad**	**Somewhat Bad**	**Very Bad**	**Extremely Bad**
1. Repeated, disturbing, and unwanted memories of the stressful experience?	1	2	3	4	5
2. Repeated, disturbing dreams of the stressful experience?	1	2	3	4	5
3. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?	1	2	3	4	5
4. Feeling very upset when something reminded you of the stressful experience?	1	2	3	4	5
5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?	1	2	3	4	5
6. Avoiding memories, thoughts, or feelings related to the stressful experience?	1	2	3	4	5
7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?	1	2	3	4	5
8. Trouble remembering important parts of the stressful experience?	1	2	3	4	5
9. Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?	1	2	3	4	5
10. Blaming yourself or someone else for the stressful experience or what happened after it?	1	2	3	4	5
11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?	1	2	3	4	5
12. Loss of interest in activities that you used to enjoy?	1	2	3	4	5
13. Feeling distant or cut off from other people?	1	2	3	4	5
14. Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?	1	2	3	4	5
15. Irritable behaviour, angry outbursts, or acting aggressively?	1	2	3	4	5
16. Taking too many risks or doing things that could cause you harm?	1	2	3	4	5
17. Being “superalert” or watchful or on guard?	1	2	3	4	5
18. Feeling jumpy or easily startled?	1	2	3	4	5
19. Having difficulty concentrating?	1	2	3	4	5
20. Trouble falling or staying asleep?	1	2	3	4	5

Appendix G

Kessler Psychological Distress Scale (K10)

INSTRUCTIONS: These questions concern how you have been feeling over the past 30 days. Please choose below each question that best represents how you have been.

1. During the last 30 days, about how often did you feel tired out for no good reason?				
1.None of the time	2. A little of the time	3.Some of the time	3.Most of the time	4.All of the time.
2. During the last 30 days, about how often did you feel nervous?				
1.None of the time	2.A little of the time	3.Some of the time	3.Most of the time	4.All of the time.
3. During the last 30 days, about how often did you feel so nervous that nothing could calm you down?				
1.None of the time	2.A little of the time	3.Some of the time	3.Most of the time	4.All of the time.
4. During the last 30 days, about how often did you feel hopeless?				
1.None of the time	2.A little of the time	3.Some of the time	3.Most of the time	4.All of the time.
5. During the last 30 days, about how often did you feel restless or fidgety?				
1.None of the time	2.A little of the time	3.Some of the time	3.Most of the time	4.All of the time.
6. During the last 30 days, about how often did you feel so restless you could not sit still?				
1.None of the time	2.A little of the time	3.Some of the time	3.Most of the time	4.All of the time.
7. During the last 30 days, about how often did you feel depressed?				
1.None of the time	2.A little of the time	3.Some of the time	3.Most of the time	4.All of the time.
8. During the last 30 days, about how often did you feel that everything was an effort?				
1.None of the time	2.A little of the time	3.Some of the time	3.Most of the time	4.All of the time.
9. During the last 30 days, about how often did you feel so sad that nothing could cheer you up?				
1.None of the time	2.A little of the time	3.Some of the time	3.Most of the time	4.All of the time.
10. During the last 30 days, about how often did you feel worthless?				
1.None of the time	2.A little of the time	3.Some of the time	3.Most of the time	4.All of the time.

Appendix H

Ethical Approval Letter

UNIVERSITY OF CAPE TOWN

Department of Psychology

University of Cape Town Rondebosch 7701 South Africa
Telephone (021) 650 3417
Fax No. (021) 650 4104

05 August 2021

Chuma Busakhwe and Natalie Ndabambi
Department of Psychology
University of Cape Town
Rondebosch 7701

Dear Chuma and Natalie

I am pleased to inform you that ethical clearance has been given by an Ethics Review Committee of the Faculty of Humanities for your study, *Mental Health in Students at the University of Cape Town: Exploring the Impact of the Covid-19 Pandemic*. The reference number is PSY2021-041.

I wish you all the best for your study.

Yours sincerely

Lauren Wild (PhD)
Associate Professor
Chair: Ethics Review Committee

Appendix I

Consent Form

Consent to Participate in A Research Study

Dear Participant,

Mental Health in Students at the University of Cape Town: Exploring the impact of the Covid-19 Pandemic.

Study Purpose
You are being invited to participate in a research study being conducted by researchers from the Psychology Department at the University of Cape Town. The purpose of this study is to assess the current mental health state of undergraduate students and to investigate how the Covid-19 pandemic has impacted their mental health.

Study Procedures
If you decide to participate in this study, you will complete an online survey that takes approximately 20-30 minutes. The survey includes questions about your general mental health and your experiences of the Covid-19 pandemic. All information obtained will be kept strictly confidential.

Possible Risks
Participating in the study may make you recall past events. The questions in the survey are of a sensitive nature and may be triggering, especially regarding questions around Covid-19-related loss, and thus may cause emotional distress. You will be provided with a contact list for counselling services available to you. Please do make use of these resources should you feel any emotional distress during or after participating in the study.

Possible Benefits
There are no direct benefits to you in participating in this study, but we hope that information gained from this study will help us answer important questions about how the Covid-19 pandemic has impacted the mental health of students and further help create policies that can assist students.

Voluntary Participation
Participation in this study is completely voluntary. You are free to refuse to provide responses to any question. Your decision regarding participation in this study will not affect your courses. If you decide to participate, you are free to change your mind and discontinue participation at any time without any ramifications.

Confidentiality

Information about you obtained for this study will be kept confidential. Identifying information and the consent form will be kept on a laptop that will only be accessible to the researchers, and there will be no link between the consent form and responses provided in the survey. The information obtained from the survey will not become a part of the university records in any way, nor will it be made available to anyone else. Any reports or publications about the study will not identify you or any other study participant.

Questions

Any study-related questions, problems or emergencies can be directed to the following researchers:

Natalie Ndabambi	ndbnat002@myuct.ac.za
Chuma Busakhwe	bskchu001@myuct.ac.za
Dr. Lea-Ann Pileggi	lea-ann.pileggi@uct.ac.za
Kim Rousseau	rsskim004@muyct.ac.za

Questions about your rights as a study participant, comments, or complaints about the study may be presented to the Psychology Department at the university of Cape Town by telephone: 021 650 3417 or by email: Rosalind.Adams@uct.ac.za.

I have read the above and am satisfied with my understanding of the study, its possible benefits, risks and alternatives. My questions about the study have been answered. I hereby voluntarily consent to participation in the research study as described.

* * *

_____ _____

Signature of participant Date

_____

Name of participant (printed)

Appendix J

Debriefing Form

Thank you and Debriefing

Thank you for participating in the study concerning the mental health of students at the University of Cape Town. The general purpose of this research was to determine whether covid-related stress predicts psychological distress amongst undergraduate students.

Given that the nature of the research topic is sensitive and may be triggering, especially regarding the questions about Covid-related loss and thus may cause emotional distress. We would like to provide you with the following counselling options and contacts details:

1. **SADAG UCT Student Careline**: 0800 24 25 26 free from a Telkom line or SMS 31393 for a call-me-back.
2. **UCT Student Wellness:** 021 650 1020 or book an appointment online using the link: http://www.dsa.uct.ac.za/student-wellness/appointments.
3. **South African Depression & Anxiety Group - SADAG**. (0800) 12 13 14.
4. **National Counselling Lifeline** – 0861 322 322.

Once again, we would like to thank you for your contribution to this study. If you know any friends or classmates that are eligible to participate in this study, we ask that you do not discuss it with them until after they have had the opportunity to complete the survey. Prior knowledge of questions asked during the study may invalidate the results.

If you have any questions or comments about this study, please feel free to contact the researchers: Chuma Busakhwe – bskchu001@myuct.ac.za and Natalie Ndabambi - ndbnat002@myuct.ac.za.

If you have any further questions or concerns, please contact the supervisors: Kim Rousseau-rsskim004@myuct.ac.za and Lea-Ann Pileggi Email: lea-ann.pileggi@uct.ac.za. Office: P.D. Hahn Psychology Building, Room 3.14.