Depression, Anxiety and Worry in Young Pacific Adults in New Zealand during the COVID-19 Pandemic

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Abstract

Objective

To measure symptoms of anxiety, depression and hopelessness in a sample of young Pacific adults living in Auckland, New Zealand during the 2020/2021 COVID-19 pandemic and identify protective factors.

Methods

Participants were 267 Pacific adults (58% female) who completed a survey online. Analyses included descriptive statistics, correlations, linear regression and symptom network analysis.

Results

Around 25% of the sample scored in the range for moderate to severe anxiety and 10% for moderate to severe depression on standard measures. Almost 40% indicated that they found the first lockdown very stressful and 55% noted that some members of their family found it stressful. Only 16% worried about COVID-19 and their future *quite a bit or constantly*, while another 25% worried *sometimes*. Self-compassion and Pacific Identity had moderate, negative correlations, and Worry about COVID-19 had weak positive correlations, with anxiety, depression, hopelessness and perceived stress.

Conclusion

These results suggest that, while the prevalence of depression and anxiety are quite high among this population, fostering ethnic identity and self-compassion in Pacific children and adolescents might protect against developing depression and anxiety.

Introduction

Mental Health During the Global Pandemic

This article provides an account of mental health symptoms, protective factors and worry about COVID-19 among young Pacific adults in Auckland, New Zealand in 2020-2021 using network analysis to identify how worry about COVID-19 relates to mental health symptoms and protective factors. The pandemic has increased stress and potentially the prevalence of some mental disorders - at least where this has been examined. A systematic review in August 2020 noted high levels of anxiety, depression, post-traumatic stress disorder and stress among the general population in China, Spain, Italy, Iran, US, Turkey, Nepal, and Denmark - these were generally higher than pre-pandemic rates (Xiong et al., 2020, DeFrance et al., 2021). Risk factors for psychological distress included: being female, younger (≤ 40), being unemployed, being a student, a pre-existing psychiatric condition and high exposure to social media and/or COVID-19 news. Shevlin et al. (2020) found a "modest increase" in the prevalence of mental health symptoms in a stratified sample of 2,025 UK adults during the early days of the pandemic (March 2020) - with increases in anxiety, depression and trauma symptoms compared to three previous general population surveys from 2014 – 2019. They reported a prevalence of 22.1% for depression and 21.6% for anxiety, with higher rates of anxiety in females, but no sex difference for depression. These rates were higher than their "closest comparable study" which reported 17% for depression and 13% for anxiety (p.5). Variables which predicted anxiety or depression included: younger age group, female gender, urban-dwelling, comorbid health conditions and higher perceived risk of COVID-19 infection (Shevlin et al., 2020). A meta-analysis of 66 studies involving 221,970 participants to examine the prevalence of anxiety, depression, distress and insomnia during the pandemic reported pooled prevalence rates among the general population of 29.8% for anxiety, 31.5% for depression, 31.1% for general distress, and insomnia 18.2 %. The authors noted these

rates were high for all four symptom clusters, compared with general population prevalence studies from the United States, Sweden, Turkey, Panama and China, conducted prior to the pandemic. They compared subgroups and found people with chronic (non-infectious) health conditions, people in quarantine and people with COVID-19, at higher risk of anxiety or depression than other groups (Wu et al., 2021).

Fitzpatrick et al. (2020) completed an online survey of 10,368 US adults in March 2020 and examined stressors, social vulnerability factors and social/psychological resources in relation to the prevalence of depression.. They reported high levels of distress with their average respondent scoring above the cut-off score for clinically significant depression. They also found that social and psychological resources were related to depression levels and symptoms were worse in those with high levels of COVID-19 anxiety and food insecurity. Zavlis et al. (2021) completed a network analysis of anxiety, depression and trauma symptoms in a large UK sample of adults at two points in time (March, April/May) in 2020, concluding that economic worries largely determined COVID-19 specific anxiety which was correlated with generalised anxiety disorder. Murata et al. (2021) reported an online survey of 4,909 participants including adolescents, adults and healthcare workers in the US in 2020, concluding that adolescents were significantly more at risk of anxiety, depression, sleep disorder and suicide than adults during the pandemic. They also found that 55% of those participants who had lost a loved one to COVID-19 experienced "intense grief" and the best predictor of negative outcomes was loneliness. DeFrance et al. (2021) added a fifth wave of data collection to a longitudinal study of adolescent mental health among 185 Canadian adolescents and included a measure of fear of COVID-19. They observed that lifestyle and financial factors and fear of COVID-19 were related to increased anxiety/depression, with increases in anxiety/depression greatest among adolescents with prior low levels of these disorders.

Due to its stringent lockdown measures, New Zealand (NZ) has had fewer cases of COVID-19 per capita than many countries, nevertheless there is evidence that its adult population experienced additional stressors impacting on psychological wellbeing (Baker et al., 2020). Every-Palmer et al. (2020) used a commercial survey platform to examine the mental health of a representative sample of 2,010 adult New Zealanders in April 2020. They found 30% of respondents reported moderate or severe psychological distress, 16% moderate or high anxiety, and 39% low wellbeing. Of concern, 6% reported suicidal ideation, 2% reported suicidal plans and 2% suicide attempts. These figures compare with 12-month prevalence estimates of suicide ideation, plans and attempts of 2.0%, 0.6% and 0.3% for developed countries (Borges et al., 2010). Every-Palmer et al. noted that mental health outcomes were poorer for young adults, those who had lost a job or had reduced work hours, and people with pre-existing physical or mental health conditions. Gasteiger et al. (2021) used an online survey to investigate mental wellbeing in 681 adults in May-June 2020 in NZ. They found that levels of depression and anxiety were significantly higher than population norms, although anxiety and stress were lower than those found in a UK sample using the same measures.

Mental Health in the Pacific Community in NZ

The majority (70%) of NZ's 5 million population is of European descent but Pacific peoples are one of the largest minority groups comprising approximately 8% of the population. In NZ 'Pacific peoples' is an umbrella term used to describe those who migrated from the Pacific islands, or who identify with Pacific ethnicity because of ancestry or heritage. The four largest Pacific ethnic groups are Samoan (48%), Tongan (22%), Cook Island Māori (21%), and Niuean (8%) (Stats NZ, 2020). Nearly two-thirds (64%) of the Pacific population live in Auckland, NZ's largest city. Pacific people in NZ are a youthful group with a median age of 23.4 years, compared with 37.4 years for the total population.

There is growing awareness of the need for research on the mental health of Pacific people in NZ. In 2006, the *New Zealand Mental Health Survey* found that the Pacific population of NZ carried a high burden of mental disorder, with a 12-month prevalence of 25% compared with 21% for the total population (Oakley Brown et al., 2006). A national survey of NZ secondary school children in 2012, involving 1,445 students who identified as Pacific ethnicity, reported that Pacific youth had poorer mental health and higher rates of self-harm and suicide attempts than *Pakeha* (i.e., NZ European) school students. They reported similar rates of significant depression symptoms in Pacific and NZ European students but a slightly higher rate of self-harm and an almost three times higher rate of attempted suicide in the Pacific students (Fa'alili-Fidow et al., 2016).

A recent narrative review noted that Pacific people report higher rates of generalised psychological distress, but lower rates of specific diagnoses (e.g., anxiety, depression) than the general population and concluded that the evidence base for Pacific mental health in NZ was limited (Mulder et al., 2020). Tucker-Masters and Tiatia-Seath (2017) reviewed the literature on anxiety and depression among Pacific youth in New Zealand, the Pacific Islands and the US, concluding that Pacific youth were at higher risk of anxiety and depression than other ethnic groups. However, they commented that they were forced to broaden the scope of their search to include studies of all ages and of other categories of psychological distress, because of the dearth of research on anxiety and depression in Pacific youth. Although there is some evidence that Pacific youth may be at higher risk for psychological distress, there is limited evidence on the nature of that distress in terms of specific diagnostic categories.

The Pacific Islands Families Study

Since 2000, Auckland University of Technology's Pacific Islands Families (PIF) Study has followed the physical and psychosocial development of 1,398 Pacific children, recruited

following birth at Middlemore Hospital, South Auckland (Paterson et al., 2008). Core measures included child behaviour, acculturation, depression, growth and development, producing more than 110 academic articles and technical reports (Paterson et al., 2017, Tautolo et al., 2015) https://phrc.aut.ac.nz/. Previous PIF Study research has established associations between individual, maternal, cultural, and sociodemographic variables, with symptoms of depression in Pacific children and their parents. Clinically relevant depression was reported in 7% of this cohort at age 9 and depression has been assessed every two to three years since (Paterson et al., 2014), although anxiety has not been a focus until now.

Pacific people in NZ have been particularly affected by the pandemic representing 22.6% of all cases (Ministry of Health/Manatu Hauora, 2021). A survey of 500 Pacific people in South Auckland, three months after a COVID-19 cluster occurred, reported that 20% of Pacific households had lost half or more of their income, 13% had a member who had lost their job and 38% struggled to pay for basic household costs (Colmar Brunton Research, 2021). Moreover, 28% of those who tried to access mental health support during the lockdown or subsequent restrictions felt they could not get this support.

The present study comprises part of a larger study of depression and inflammation biomarkers among the PIF Study cohort at the age of 20. In the present research we examined levels of anxiety, depression, hopelessness, worry about COVID-19 and two potential protective factors (cultural identity, self-compassion) among the cohort during the global pandemic. There is growing evidence that cultural identity is important for well-being among Pacific people and may serve as a buffer against stress. There is also evidence that self-compassion, by reducing self-criticism, is a protective factor for anxiety and depression. However, to our knowledge, self-compassion has not been studied in young Pacific adults previously (Manuela and Anae, 2017, Manuela and Sibley, 2013, Egan et al., 2021).

Method

Participants

Participants were 267 Pacific adults (42% Male, 58% Female) born in Auckland, NZ in 2000 (see Table 1) of whom 14 (5.2%) were aged 19 years, 252 (94.4%) were aged 20 and 1 was 21 on the day of questionnaire completion. Participants had self-identified at age 17 as Samoan 122 (45.7%), Tongan 59 (22.1%), Cook Islands Māori 41 (15.4%), Māori 11 (4.1%), Niuean 12 (4.5%), Pakeha (NZ European) 9 (3.4%), Fijian 3 (1.1%), Tokelauan 3 (1.1%), Other European 3 (1.1%), Declined to answer 1 (.4%) and Missing 3 (1.1%). Participants who identified with more than one ethnic group were asked to indicate which group they identified with the most. Of the 267 participants 30 (11.2%) had no qualifications, 181 (67.8%) had a secondary school qualification, 37 (13.9%) had an undergraduate tertiary qualification, 1 (0.4%) had a postgraduate tertiary qualification, 13 (4.9%) had other (e.g., trade) qualifications and 5 (1.9%) were missing. Participants received an information sheet about the study before giving informed consent digitally. Ethical approval was obtained from the Auckland University of Technology Ethics Committee on 13.01.20 (Application 19 /364).

Measures:

1. Beck Anxiety Inventory (BAI). The BAI is a self-report questionnaire that measures the severity of anxiety experienced in the past seven days. It comprises 21 items representing different symptoms of anxiety, scored on a 0 – 3 Likert scale, and summed to a total score, with higher scores reflecting higher anxiety (Beck et al., 1988a,). Beck et al. (1988) reported Cronbach's α was high at 0.92. Scores are often interpreted as: 0 – 9 no/minimal anxiety, 10 – 18 mild/moderate, 19 - 29 moderate/severe and 30 – 63 severe (Julian, 2011).

2. Beck Depression Inventory – II Fast Screen (BDI-FS). The BDI-FS is a short version of the 21-item Beck Depression Inventory – II (Beck et al., 1988b). The BDI-FS was developed

as a rapid screening tool for depression that is particularly useful for detecting depression in health settings.(Beck et al., 2000). It has been shown to be reliable and valid with diverse health conditions and a general community sample (Elben et al., 2021, Kliem et al., 2014). Kliem et al. (2014) reported a Cronbach's α of 0.84.. This scale is composed of seven items, scored on a 0 – 3 response scale, and summed to a total score, with higher scores (range from 0 – 21) representing more severe depression. The BDI-FS manual suggests the following scores as interpretive guidelines: 0 – 3 minimal, 4 – 8 mild, 9 – 12 moderate and 13 – 21 severe depression.

3. Beck Hopelessness Scale (BHS). The BHS is a self-report scale comprising 20 true/false (1 or 0) items measuring three different components of hopelessness: feelings about the future, loss of motivation and expectations (Beck et al., 1974). The 20 items are summed to yield a total score from 0 – 20, with higher scores representing greater hopelessness/pessimism about the future. The test developers reported Cronbach's α = 0.93 (Beck et al., 1974).

4. Self-Compassion Scale – Short Form (SCS-SF). The SCS-SF is a 12-item scale to assess self-compassion, a protective factor against depression (Van Dam et al., 2011, Raes and al., 2011). The items are scored from 1 (Almost never) to 5 (Almost always) and summed with six items reverse scored. Items can be scored as six (two-item) subscales and a total scale - in each case the score is taken from the mean item score for the subscale and full scale. Internal consistency is high with Cronbach's α ≥ 0.86 in three Dutch and English samples (Raes et al., 2011). We used a total score based on just 11 items due to a typographical error in one item.

5. Perceived Stress Scale (PSS). The PSS is a widely used 10-item scale that asks participants about stress-related thoughts and feelings over the last month. The PSS items are scored on a 0 – 4 Likert scale (four items are reverse scored) and summed to a total score, with higher

scores representing greater perceived stress (Cohen et al., 1983). The test developers reported Cronbach's α ranging from 0.84 – 0.86.

6. The Pacific Identity and Wellbeing Scale (PIWBS). The PIWBS is a 31-item scale with subscales that represent different dimensions of Pacific identity and wellbeing that include: Perceived Familial Wellbeing, Perceived Societal Wellbeing, Pacific Connectedness and Belonging, Religious Centrality and Embeddedness and Group Membership Evaluation. The test developers reported Cronbach's α for the factors underpinning its five subscales ranged from 0.79 – 0.90 (Manuela and Sibley, 2013). Items are scored on a seven-point Likert scale, from 1 = Strongly disagree to 7 = Strongly agree, with higher scores reflecting greater Pacific identity and wellbeing.

7. COVID-19 questions. Seven questions concerning COVID-19 and its effects on the participant's family and their personal well-being (CE1 - CE7), and seven questions concerning specific COVID-19 related worries (CW1 - CW7), were included (see Tables 1 and 2 for wording). The seven questions on COVID-19 and effects on family and friends were written for this study based upon the situation in NZ around August/September 2020. These questions were all binary (YES/NO) except for CE7, which read "In the past seven days did you worry about COVID-19 and your future?" and was answered on a five-point scale (1 = Not at all to 5 = Constantly). The seven questions about specific worries related to COVID-19 (CW1 - CW7) were drawn from the World Health Organisation (WHO) *Survey Tool and Guidance: Rapid, simple, flexible behavioural insights on COVID-19* (World Health Organization Regional Office for Europe, 2020). These questions were all phrased as "At the moment how much do you worry about X?" and answered on a 1 (I did not worry at all) to 7 (I worried a lot) scale.

Data Collection

Data were collected from 10.09.2020 – 24.03.2021 and captured online using REDCAP software then downloaded into an EXCEL file for checking and cleaning before analysis. The psychometric analyses (1 – 3 below) were completed using IBM SPSS v.25 and the network analysis (analysis 4) was completed using JASP version 0.14.1 (Team, 2020). JASP is open-source software which incorporates the *mgm*, *bootnet* and *glasso* packages contained within the R statistical software (R Core Team, 2020, Haslbeck and Waldorp, 2020, Epskamp et al., 2018, Friedman et al., 2008).

Statistical Analyses

1. Descriptive statistics for the 14 Covid questions were calculated. For the categorical questions about personal experience and effects of COVID-19 we calculated frequencies (CE1 – CE6) and percentages (CE7). For the questions about the nature of COVID-19 worries which had a 1 – 7 response scale we calculated range, minimum, maximum, mean and standard deviation (CW1 - CW7). Descriptive statistics were calculated for the total scores on the BAI, BDI-FS, BHS, SCS-SF, PSS, and PIWBS. These included range, minimum, maximum, mean, standard deviation, skewness and kurtosis. Decile frequency scores were calculated for the BAI, BDI-FS, BHS, SCS-SF, PSS, PIWBS and question CE7 *In the past week how much did you worry about COVID-19 and your future?* A score on the BDI-FS $\geq$ 4 was defined as indicating clinically significant symptoms of depression. Neitzer et al. (2012) recommended a cut-off score of $\geq$ 4 for detecting depression in medical patients.

2. Internal consistency of the six questionnaires (BAI, BDI-FS, BHS, PSS, SCS, PIWS) was checked using the raw Cronbach's α.. For the BHS which has dichotomous items we calculated the Kuder-Richardson formula 20 (KR-20) and corrected split-half reliability (Magnusson, 1966).

3. We completed univariate linear regressions for the BAI, BHS, PSS, SCS and PIWS as predictors of depression (BDI-FS). Then we completed a multiple linear regression entering all the significant univariate predictors simultaneously with a significance level $p < 0.05$. As the descriptive statistics indicated some skewness in the distributions of some of these measures (see Table 3), we calculated bootstrapped confidence intervals, specifying a 95% percentile confidence interval with 1,000 bootstrap samples using case re-sampling with replacement from the dataset.

4. Network analysis of partial correlation relationships, among the six variables included in the multiple regression model, using EBICglasso was undertaken. The networks were estimated using graphical LASSO, which limits the number of spurious edges by shrinking small edge weights to zero (Tibirshani 1996), using a penalty parameter, lambda. The value of lambda was selected by minimizing the Extended Bayesian Information Criterion (Foygel and Drton (2010), which further penalizes complexity using a hyperparameter gamma, which was set at 0.5. For network visualisation the "Spring" layout was adopted. "Spring" places nodes with more and stronger associations more centrally in the network using the force directed Fruchterman-Reingold algorithm (Fruchterman and Reingold, 1991). Centrality measures provide further information on network nodes, such as 'betweenness' (how often a node acts as a connecting point based on the number of paths through that node to other nodes), 'closeness' (how close a node is to other nodes using the average weight of the paths from that node) and "degree" (the sum of all weights from that node or strength) (Montazeri et al., 2020). We tested the stability of the order of the network centrality indices using the correlation stability coefficient (CS coefficient) a bootstrapping procedure that measures how the correlation between the original network value and the bootstrapped sample value decreases with smaller samples. To interpret centrality differences, the CS coefficient should

be 0.25 or higher and preferably above 0.5 (Epskamp et al., 2018). Accuracy of edges was tested using 500 non-parametric bootstrap resamples.

Results

1. Descriptive statistics

Table 1 reports descriptive frequencies of the participants' responses to the seven questions about COVID-19 and its effects. While most participants (65%) had either had a COVID-19 test or someone in their family had, only 5 (2%) had been diagnosed or had a family member with a positive diagnosis. Just over a third (34%) reported financial hardship in their household as a direct result of COVID-19. Almost 40% indicated they found the first lockdown very stressful and 55% noted that some members of their family found it stressful. Only 16% worried about COVID-19 and their future *quite a bit* or *constantly*, while another 25% worried *sometimes*. A majority (57%) felt confident about how the Government had been dealing with the pandemic although 35% were unsure and 9% not confident. Table 2 presents descriptive statistics for the seven questions that asked *how much* participants worried about specific possible effects of COVID-19. The four most frequent topics for worry were losing someone you love, small companies running out of business, economic recession and restricted access to food supplies.

The descriptive statistics for the total scores of the six standardised questionnaires, along with the single question about how much they worried about COVID-19 and their future, are presented in Table 3. Table 4 provides decile frequency scores for these measures. The mean score for the BDI-FS of 4.35 suggested quite a high prevalence of depressive symptoms. Inspection of Table 4 shows that 40% of the sample scored at or above 4 on the BDI-FS. However, this is mostly people in the mild range with only 10% scoring in the moderate –

severe range. Inspection of Table 3 shows the mean score for the BAI is 12.34. Table 4 shows

that 25% of the sample scored in the range reflecting moderate or severe anxiety.

Table 1.

Response Frequencies to Questions About COVID-19 and its Effects (CE1 - CE7)

Question	Responses		
	Yes	No	Unsure
CE1. Have you or any member of your family living in Auckland ever had a test for COVID-19?	172 (64.7%)	94 (35.3%)	
CE2. Have you or any member of your family living in Auckland ever been diagnosed as having COVID-19?	5 (1.9%)	261 (98.1%)	
CE3. Has your family/household experienced financial hardship as a direct result of COVID-19? e.g., job loss, business closing, unable to pay rent.	90 (34%)	175 (66%)	
CE4. Did you find life at home during the first lockdown period was very stressful for you personally?	106 (39.8%)	160 (60.2%)	
CE5. Did you find life at home during the first lockdown period (Level 4 and Level 3) was very stressful for some members of your family or close friends?	147 (55.3%)	119 (44.7%)	
CE6. Do you feel confident in the way that the Government has been dealing with the COVID-19 pandemic?	150 (56.6%)	23 (8.7%)	92 (34.7%)

	Not at all	Occasionally	Sometimes	Quite a bit	Constantly
CE7. In the past seven days did you worry about COVID-19 and your future?	97 (36.9%)	59 (22.4%)	66 (25.1%)	31 (11.8%)	10 (3.8%)

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Table 2.

Descriptive Statistics for Questions About Specific COVID-19 Related Worries (CW1-

CW7) Ranked in Ascending Order

At the moment or in the past week how much did you worry about…	*n*	Range	Min	Max	*M*	*SD*
CW3… schools remain closed for a long time?	264	6	0	6	2.20	1.96
CW2… health system being overloaded?	266	6	0	6	2.58	1.98
CW7… becoming unemployed?	266	6	0	6	2.86	2.40
CW6… restricted access to food supplies?	266	6	0	6	2.89	2.08
CW5… economic recession?	266	6	0	6	2.91	1.88
CW4… small companies running out of business?	266	6	0	6	3.02	1.98
CW1… losing someone you love?	267	6	0	6	3.04	2.25

Questions are ranked by their mean score in ascending order - a higher mean score

represents a higher rate of worry.

Table 3.

Descriptive Statistics of BAI, BDI-FS, BHS, SCS-SF, PSS, PIWBS and Worry about COVID-19

Question (CE7)

	n *	Range	Min	Max	M	SD	Skewness	Kurtosis
Beck Anxiety Inventory	249	52	0	52	12.34	11.22	1.19	.98
Beck Depression Inventory – Fast Screen	264	20	0	20	4.35	4.01	1.20	1.41
Beck Hopelessness Scale	253	20	0	20	5.08	4.53	1.27	1.10
Self-Compassion Scale-Short Form	259	44	16	60	38.87	7.52	-.12	.47
Perceived Stress Scale	261	40	0	40	18.44	7.74	.05	-.06
Pacific Identity and Wellbeing Scale	245	174	43	217	164.22	29.33	-.68	.41
Worry about COVID-19 and your future in past 7 days	263	4	0	4	1.23	1.18	.55	-.72

* Min: Minimum; Max: Maximum; *M*: Mean; *SD*: Standard Deviation

Table 4.

Decile scores of BAI, BDI-FS, BHS, SCS-SF, PSS, PIWBS and Worry about COVID-19 Question (CE7)*

Percentiles	BAI	BDI-FS	BHS	SCS-SF	PSS	PIWBS	CE7
10	1.0	0.0	1.0	30.0	8.0	124.0	0.0
20	3.0	1.0	1.0	33.0	12.0	136.2	0.0
25	4.0	1.0	2.0	34.0	13.5	144.5	0.0
30	4.0	2.0	2.0	36.0	14.6	150.0	0.0
40	6.0	3.0	3.0	37.0	17.0	160.4	1.0
50	9.0	3.0	4.0	39.0	19.0	169.0	1.0
60	12.0	4.0	5.0	41.0	20.0	177.0	2.0
70	15.0	6.0	6.0	43.0	22.0	184.0	2.0
75	18.0	6.0	7.0	44.0	24.0	188.0	2.0
80	22.0	7.0	8.2	45.0	25.0	191.0	2.0
90	29.0	10.0	12.0	48.0	28.8	199.0	3.0

BAI: Beck Anxiety Inventory; BDI-FS: Beck Depression Inventory- Fast Screen; BHS: Beck Hopelessness Scale; SCS-SF: Self-Compassion Scale-Short Form; PSS: Perceived Stress Scale; PIWBS: Pacific Identity and Wellbeing Scale; CE7: Worry about COVID-19 and your future in past 7 days

* *N* ranges 245 – 264 depending on missing data.

2. Internal Consistency of Questionnaire Measures and Inter-correlations

Cronbach's alpha for the five questionnaires were as follows (n = 245 – 264): BDI-FS (0.86), BAI (0.94), PSS (0.90), PIWBS (0.94), SCS (0.78). KR-20 for the BHS was 0.86 and split-half reliability was 0.88. Table 5 presents the Spearman correlations among these scales and the COVID-19 question (CE-7). Table 5 indicates that anxiety (BAI), depression (BDI-FS) and hopelessness (BHS) had moderate, positive intercorrelations while worry about COVID-19 had a low positive correlation with each of these distress measures. In contrast, self-compassion (SCS) and Pacific identity/wellbeing (PIWS) both had low-moderate, negative correlations with the three indices of distress (BAI, BDI-FS, BHS) and with perceived stress (PSS) and were positively correlated with each other. Both had a low, negative correlation with worry about COVID-19.

3. Univariate and Multivariate Linear Regressions

Results of the univariate linear regression analyses are presented in Table 6. All six scores of *BAI, BHS, SCS-SF, PSS, PIWBS and Worry about COVID-19* entered individually accounted for a significant amount of variance in depression (p < 0.01). Results of the subsequent multiple regression entering all six variables simultaneously are presented in Table 7. Inspection of Table 7 shows that four variables (Hopelessness, Anxiety, Perceived Stress and Pacific Identity) contributed a significant proportion of variance to the model with an adjusted R^2 of 0.67 for the model. Worry about COVID-19 and Anxiety were not significant predictors in the bootstrapped multiple regression model.

4. Network Analysis of Seven Variables Included in Final Regression Model

Results of the network analysis including all seven variables are presented in Figure 1. The three centrality indices for all seven nodes (i.e., scores) are presented in Figure 2. Inspection of Figure 1 supports the findings from the multiple regression and clarified the key

relationships among the scales. Depression is central in this network with strong positive edges to hopelessness and anxiety and a negative edge connecting it to self-compassion. Anxiety and hopelessness themselves were linked by a relatively weak edge. Perceived stress was also central in the network, with strong positive edges connecting it to depression and anxiety and a strong negative edge with self-compassion, but no edge connecting it directly to hopelessness. Of note, both the potential 'protective factors' in the model, Pacific identity/wellbeing and self-compassion, have negative edges connecting them to depression, anxiety and hopelessness and only a very weak positive edge between themselves. There was a strong negative relationship between self-compassion and perceived stress. Finally, worrying about COVID-19 had low positive edges connecting to anxiety, depression and perceived stress, which suggested its influence was exerted by small effects on several different psychological domains. Results of bootstrapping to test the accuracy of network edges and stability of centrality indices are available in online Supplementary Material.

Table 5.

Pairwise Pearson correlation matrix of BAI, BDI-FS, BHS, SCS-SF, PSS, PIWBS and worry about COVID-19 (CE7)

	BAI	BDI-FS	BHS	SCS	PSS	PIWBS
Beck Anxiety Inventory						
Beck Depression Inventory – II Fast Screen	.57**					
Beck Hopelessness Scale	.42**	.70**				
Self-Compassion Scale-Short Form	-.53**	-.64**	-.58**			
Perceived Stress Scale	.59**	.68**	.51**	-.66**		
Pacific Identity and Wellbeing Scale	-.38**	-.45**	-.45**	.35**	-.27**	
Worry about COVID-19 past 7 days	.28**	.31**	.17*	-.21**	.31**	-.13*

Table 6.

Univariate Linear Regressions of Five Questionnaires and COVID-19 Worry Question on Dependent Variable Depression (BDI-FS)

Predictor	R^2	Beta	Beta (95% CIs)[a]	$p <$
Worry about COVID-19 past 7 days	.09	1.04	.59, 1.46	.001
Beck Hopelessness Scale	.47	.59	.516, .665	.001
Beck Anxiety Inventory	.32	.18	.15, .21	.001
Perceived Stress Scale	.46	.35	.31, .40	.001
Pacific Identity and Wellbeing Scale	.18	-.06	-.07, -.04	.001
Self-Compassion Scale-Short Form	.40	-.33	-.37, -.29	.001

[a] 95% percentage CIs based upon 1000 sampling with replacement bootstrapped samples

Table 7.

Multiple Linear Regression of Five Questionnaires and COVID-19 Worry Question on

Dependent Variable Depression (BDI-FS) (N = 207)

Predictor	Beta	Beta (95% CIs) [a]	Std. ß	$p =$
Worry about COVID-19 past 7 days	.19	-.10, .47	.06	.20
Beck Hopelessness Scale	.30	.20, .38	.35	.001
Beck Anxiety Inventory	.04	-.00, .09	.12	.07
Perceived Stress Scale	.14	.08, .20	.29	.001
Pacific Identity and Wellbeing Scale	-.02	-.03, -.00	-.12	.01
Self-Compassion Scale-Short Form	-.07	-.14, -.03	-.14	.01

Model $R^2 = .68$, Adjusted $R^2 = .67$

[a] 95% percentage CIs based upon 1000 sampling with replacement bootstrapped samples

Figure 1. Network of Depression, Anxiety, Hopelessness, Perceived Stress, Pacific Identity,

Self-Compassion and COVID-19 Worry
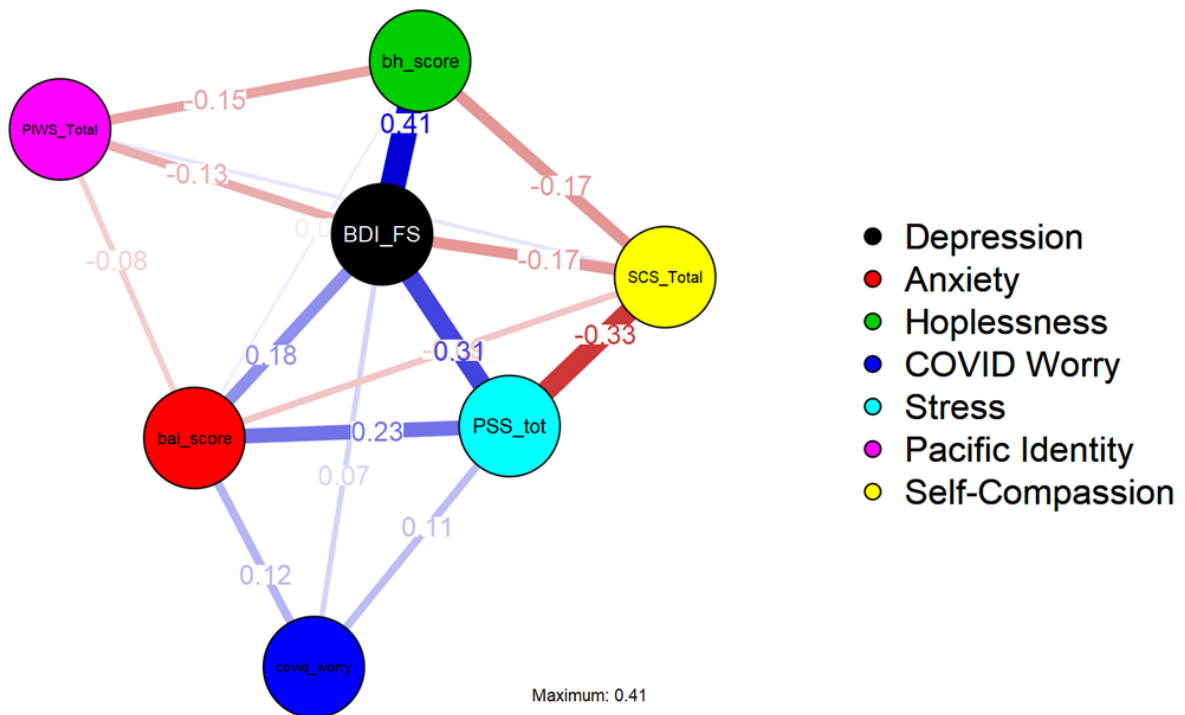
Figure 2. Centrality Indices for the Network Nodes
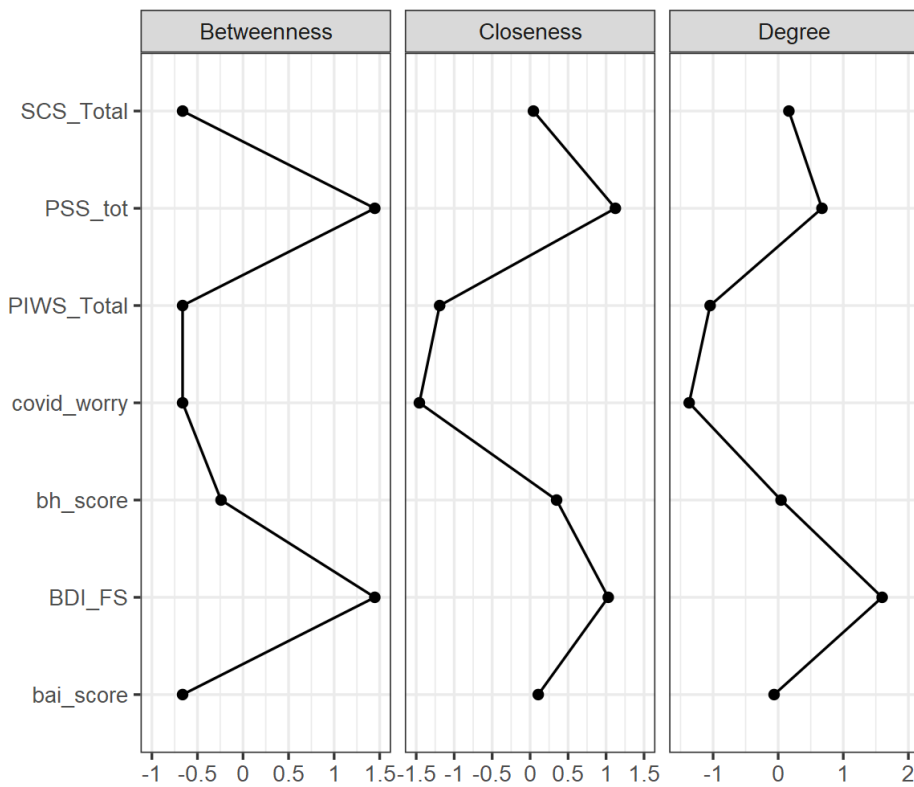
Discussion

We examined levels of anxiety, depression, hopelessness, perceived stress, self-compassion and Pacific identity/wellbeing, in young Pacific adults in Auckland, New Zealand during the 2020 – 2021 pandemic. Depressive symptoms were common with 40% of the sample scoring at or above the cut-off for clinically significant symptoms of depression. However, this was mostly in the mild range (30%) with about 10% of scores in the moderate/severe range. Anxiety was common with 25% of the sample in the range considered indicative of moderate to severe anxiety. There were moderate positive correlations between anxiety, depression, hopelessness and stress, and these indices of distress were each negatively correlated with self-compassion and Pacific identity/wellbeing. Worrying about COVID-19 had small positive correlations with anxiety, depression, hopelessness and stress and small negative correlations with self-compassion and Pacific identity/wellbeing. Regression analyses showed that anxiety, hopelessness, perceived stress, self-compassion and Pacific identity/wellbeing together played a major role in determining the severity of depression accounting for 67% of variance in BDI-FS scores. Network analysis indicated that the two protective factors, after removing the effects of other variables through partial correlations, may help to alleviate stress and hopelessness. Self-compassion had a direct, negative relationship with depression but also had negative edges connecting to anxiety, perceived stress and hopelessness which all had edges connecting them to depression. Pacific identity and wellbeing had a negative edge connecting it to depression directly and negative edges connecting it to hopelessness and anxiety but interestingly was not directly connected to perceived stress. COVID worry, on the other hand, appears not to play a central role due to stress being possibly alleviated through a strong interaction with self-compassion.

These results suggest that while the prevalence of depression and anxiety are high among this population, fostering ethnic identity and self-compassion in Pacific children and adolescents, might protect against developing anxiety or depression. Admittedly, the present study is cross-sectional and it is not possible to infer causality. Moreover, the relationships could be bidirectional. For example, a young Pacific person with limited sense of cultural identity becomes depressed and withdraws socially, increasing their cultural alienation, and compounding their low mood. However, until such longitudinal studies exist, both cultural identity and self-compassion are potentially modifiable and could serve as targets for intervention at individual and community levels. Manuela and Anae (2017) reviewed ethnic identity and well-being among Pacific youth, concluding that ethnic identity can be a protective factor providing individuals with coping resources which mitigate against negative experiences which might otherwise impair well-being. A systematic review of Pacific mental health in NZ also highlighted the importance of building 'mental health literacy' among Pacific communities.(Kapeli et al., 2020). Our results add to a growing body of evidence suggesting that policy makers need to consider targeting not just individual or family risk factors for anxiety and depression but also societal factors that will foster confident and positive ethnic identity and communities (e.g., Stirling et al., 2015).

Self-compassion is another potential target for prevention and intervention with Pacific youth. A meta-analysis of self-compassion in the prevention and treatment of anxiety and depression in young people noted 'clear evidence that higher self-compassion is associated with lower anxiety and depression in young people' (Egan et al., 2021). That study included results from 34 articles which nearly all used the SCS to measure self-compassion reporting a pooled r = -0.49 between self-compassion and anxiety and pooled r = -0.50 for depression. This is comparable with the correlations with self-compassion found in the present study of -

0.53 and -0.64 for anxiety and depression respectively. There is evidence that self-compassion can be enhanced in people experiencing psychological distress although the evidence is not clear if specific self-compassion oriented therapies are more effective than standard psychological interventions (Wilson et al., 2019). It also needs to be explored to what extent self-compassion interventions are culturally appropriate for Pacific people (Taylor, 2019).

The pandemic-related issues that participants worried about most (in descending order) were losing someone they loved, small companies running out of business, economic recession, restricted access to food supplies, becoming unemployed, the health system being overloaded, and schools being closed for a long time. Only 15.6% of the sample worried quite a lot or constantly about COVID-19 and their future during the past seven days. Moreover, worry about COVID-19 had only a small correlation with anxiety, depression and stress. This might reflect the fact that in 2020 COVID-19 was well managed in NZ. Auckland enjoyed life with no restrictions after late August 2020, apart from two brief lockdowns in 2021, until the arrival of the Delta strain in August 2021(NZ Government, 2021). Admittedly. participants who are not consciously aware of worrying about COVID-19 might still be affected by social strain resulting from COVID-19 e.g., financial pressures. In other words, as shown in Figure 1, while worry about the COVID-19 virus is real, it appears to be the implications of COVID-19 that have effects on depression, anxiety, hopelessness and stress in this cohort.

Limitations

The present study has several limitations. In particular, the cross-sectional, correlational nature of the study prevents conclusions about the direction of causality of relationships between variables. Moreover, the associations with COVID worry were small and should be interpreted cautiously. Another limitation is that data were collected in NZ in 2020 – 2021

during the COVID-19 pandemic. The levels of anxiety, stress and depression might have been unusually high and not representative of this cohort under more typical circumstances. It is worth mentioning in this regard that during the second lockdown in NZ in 2020 the Pacific community in Auckland was particularly affected with a large cluster of cases in South Auckland (https://www.rnz.co.nz/news/national/423714/covid-19-pacific-health-leader-warns-of-potential-for-wildfire-spread-in-pacific-community). Consequently, it is important that these data are not viewed as normative or reference scores for interpreting individual test results. Without previous data on the mental health of these participants it is difficult to estimate how much effect the pandemic has had on this cohort. The cohort has also been assessed at younger ages for depression and we intend to examine the longitudinal perspective in a subsequent paper.

Conclusion

The prevalence of depression and anxiety was high among young Pacific adults in NZ. However, these findings were collected during the COVID-19 pandemic and longitudinal data are needed to determine how stable they are. Notwithstanding this caveat, they provide a valuable snapshot or profile of indicators of distress among a vulnerable group in a time of great uncertainty. Importantly, given the backdrop of the pandemic, our study also highlights the potential protective benefits of fostering ethnic identity and building self-compassion among our Pacific young people.

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