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Mental health status of healthcare versus other essential workers in Australia amidst the COVID-19 pandemic: Initial results from the collate project

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ABSTRACT

The novel coronavirus (COVID-19) has necessitated many healthcare workers operating on the frontlines. Another segment of the population whose mental well-being is being tested are the 'other essential workers' (e.g. supermarket workers). The current study aimed to compare the mental health of healthcare versus other essential workers in the early stages of the COVID-19 outbreak. The COVID-19 and you: mental health in Australia now survey (COLLATE) project is a nationwide online mental health survey launched on 1 April 2020, aimed at identifying key mental health concerns. Adults currently living in Australia were invited to take part, and non-discriminative snowball sampling was employed. Participants were partitioned into healthcare workers (HCW; $n=905$), other essential workers (OEW; $n=810$), and the general population (GNP; $n=3443$). Across all groups, top COVID-19 related concerns were primarily associated with the health and well-being of loved ones. In terms of current levels of depression, anxiety, stress and quality of life, HCWs fared the best, and OEWs fared the worst (with the GNP falling in between). In the face of this medical crisis, Australian HCWs seem to be managing their mental health relatively well, but more supports need to be devoted to OEWs to safeguard their mental well-being.

1. Introduction

An outbreak of a novel coronavirus (COVID-19) was first reported in Wuhan, China in December 2019, and has since spread to most countries around the world. Presentation of this contagious disease can range from asymptomatic to fatal, with key symptoms primarily being respiratory, involving shortness of breath and impaired lung function, but possibly extending to cardiac, gastrointestinal or neurological manifestations (Aghagholi et al., 2020; Baig, 2020; Henry et al., 2020). The World Health Organisation (WHO) declared this a Public Health Emergency of International Concern (PHEIC) at the end January 2020 (WHO, 2020), and as of 1 May 2020, the global toll stood at 3,303,850 infected and 233,813 deceased (Schiffmann, 2020). Within Australia, widespread government

restrictions involving strict 'social distancing' measures have kept numbers relatively dampened at 6,784 infected and 89 deceased by 3 May 2020 (Department of Health, 2020). Though we have been relatively successful in 'flattening the curve' (i.e. keeping caseloads at a manageable level for the healthcare system), such severe curtailment of social freedoms has however, come at high psychological (and economic) costs. A recent nationwide COVID-19 related mental health survey revealed that Australians were experiencing significantly elevated levels of negative emotions, with those who are young, female, or having a pre-existing mental health condition at increased risk (Rossell et al., 2021). There are two further segments of people who are likely facing heightened psychological distress, and deserving of increased attention and mental health supports.

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The first group is healthcare workers (HCWs), many of whom are at the frontlines of the COVID-19 outbreak. These comprise doctors, nurses and other medical personnel in contact with persons suspected or confirmed to be infected with the disease, but can also include pharmacists, aged care workers, laboratory technicians, admission/ward clerks and so on. These latter individuals may not be directly involved in providing assessment or treatment, but operate in similarly stressful clinical settings, and are at heightened risk of being infected due to their work situation. For these people, a profound psychological dilemma exists between meeting their professional obligations versus self-preservation and the protection of loved ones against exposure to this potentially fatal virus (Perrin et al., 2009; Robertson et al., 2004). These concerns are overlaid on already amplified rates of psychological stress and burnout commonly reported by HCWs (e.g. Krisberg, 2018).

Existing research has documented the short- and long-term adverse outcomes reported by HCWs during the previous severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS) outbreaks. Accordingly, 17.3% of a cohort of HCWs developed significant mental health symptoms (Lu et al., 2006). In another sample, 5% were diagnosed with acute stress disorder, and 20% reported stigmatisation and community rejection (Bai et al., 2004). A separate study identified discrimination, fears of infecting others (especially family members; more so than being self-infected), and other health problems as predominant concerns (Ho et al., 2005). These worries were also positively correlated with post-traumatic stress symptoms (in infected HCWs). Elevated stress levels were recorded in one study, but not more so than observed in the general population (Chua et al., 2004). In the long-term, HCWs reported increased post-traumatic stress, psychological distress and burnout (Maunder et al., 2006). Similar findings were uncovered following the MERS outbreak (e.g. Khalid et al., 2016; Lee et al., 2018).

During the current COVID-19 pandemic, studies have specifically examined psychological impacts on HCWs. Frontline Chinese medical workers were significantly more fearful, anxious and depressed (Lu et al., 2020) compared to non-medical (administrative) staff working at the same institution. An online survey likewise demonstrated that Chinese medical workers had higher prevalence and severity of depression, anxiety, insomnia, and obsessive-compulsive symptoms relative to their non-medical counterparts (Zhang et al., 2020).

The second group of vital workers whose mental health may be adversely affected are the 'other essential workers' (OEWs). This term refers to personnel employed in non-healthcare occupations, but whose services are considered indispensable for the smooth continuation of daily life for the majority of our population. In Australia, these individuals have been asked to attend their place of employment to perform ongoing work despite the government restrictions. Examples of these jobs range widely, and include non-medical first responders (e.g. police, firefighters), logistics and transport workers (e.g. truck, tram or delivery drivers), as well as retail (e.g. supermarket workers) and hospitality (offering takeaway) staff. Although these workers are at somewhat higher risk of being infected with COVID-19, their mental health has not been examined in previous pandemic research.

The current study aimed to compare the mental health status of HCWs versus OEWs in Australia during the early 'lockdown' stages of the COVID-19 outbreak. First, our objective was to characterise the top five primary concerns endorsed by these two groups relative to the rest of the general population. Second, we hypothesised that these two groups would report significantly heightened negative emotions (i.e. depression, anxiety and stress symptoms) compared to the general population. Given the increased risks experienced by HCWs and OEWs, it would also be worthwhile to compare how they fared relative to each other. Third, we explored possible differences in positive affect and quality of life amongst these groups. This latter goal was intended to offer a more balanced perspective regarding the mental health status of these workers.

2. Methods

The Covid-19 and you: mental health in Australia now survey (COLLATE) project was launched on 1 April 2020, as a nationwide mental health survey aimed at identifying and tracking key mental health concerns across the Australian population amidst unfolding of the COVID-19 pandemic. This project has been described elsewhere (Tan et al., 2020), but in brief, comprises a series of anonymous, online surveys, activated for 72 hours at the start of each month, followed by four annual surveys thereafter. Members of the general public residing in Australia, aged 18 years or older were invited to complete the survey via social media advertising and other online networks, participant registries held by Swinburne University of Technology as well as non-discriminative snowball sampling stemming from these initial recruitment methods. The study received ethics approval from the Swinburne University Human Research Ethics Committee (#20202917-4107), and complied with the Declaration of Helsinki.

Three broad areas were examined: i) sociodemographic information, ii) primary concerns, and iii) emotional experiences and quality of life. The data presented relate to wave 1 (April 2020) of the survey, and only measures addressing current aims are described. Basic sociodemographic information included age, sex and employment. Related to this, respondents were asked to indicate whether they were "A healthcare professional (e.g. doctor, nurse, allied health professional, aged care worker)" or "A non-healthcare related frontline worker (e.g. police)" or "A person with an essential occupation that requires them to leave home (e.g. supermarket worker)". Those who endorsed the first option were assigned to the HCW group ($n=905$), and those who endorsed the second or third options were assigned to the OEW group ($n=810$); all other respondents were designated as the general population (GNP; $n=3443$; see Table A in Supplementary materials for a broad breakdown of HCW and OEW occupations by field).

Participants were asked to identify their top current concerns relating to the COVID-19 outbreak, based on a list of pre-generated options. In terms of emotional experiences, the Depression Anxiety Stress Scales (DASS-21; Lovibond and Lovibond, 1995) was employed, comprising a 21-item self-report measure, rated on four-point Likert scales (0-3), to generate three subscales (depression, anxiety, stress). The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) encompassed two 10-item subscales assessing momentary positive and negative affect, rated on five-point Likert scales (1-5), and the European Health Interview Surveys - Quality of Life (EUROHIS-QoL; da Rocha et al., 2012) is an abbreviated index measuring quality of life across eight principal domains, rated on five-point Likert scales (1-5).

Statistical analyses were conducted using SPSS (v.26), and involved chi-squared tests of independence for categorical variables, with adjusted residuals ($AdjR>2.5$ used to identify important associations. Data transformations were performed for the DASS, PANAS, and EUROHIS-QoL to fulfil normality and homoscedasticity assumptions. Group-wise comparisons employed analyses of variance (ANOVAs) using general linear models, controlling for age, sex, and state of residence. Owing to multiple comparisons, a stringent alpha level of .01 was set for statistical significance.

3. Results

Sociodemographic information and COVID-19 related lifestyle changes by group are shown in Table 1. Most respondents were from the younger (18-34 years old) and middle (35-49 years old) age groups. OEWs were overrepresented by younger respondents ($AdjR=3.5$), and underrepresented by older respondents (50+ years old; $AdjR=3.3$). The majority of respondents were female, especially in HCWs ($AdjR=5.8$). Respondents also largely hailed from Victoria, followed by New South Wales (NSW; Australia's two most populous states), with HCWs overrepresented in NSW ($AdjR=6.4$) and underrepresented in Victoria ($AdjR=3.8$); whereas OEWs were overrepresented in Northern Territory

Table 1
Sociodemographic information as well as COVID-19 related lifestyle changes by group.

| | Percentage endorsed (%) | | | Statistics χ^2 | Significance | Effect size (V) |
|---|-------------------------|-------------|--------------|------------------------|--------------|-----------------|
| | HCW (n=905) | OEW (n=810) | GNP (n=3443) | | | |
| Age (years) | | | | 23.6 | <.001 | .48 |
| 18-34 | 41.4 | 46.9 | 40.0 | | | |
| 35-49 | 37.3 | 33.7 | 34.4 | | | |
| 50 upwards | 21.2 | 19.4 | 25.6 | | | |
| Sex | | | | 41.8 | <.001 | .064 |
| Male | 11.8 | 16.0 | 19.1 | | | |
| Female | 87.7 | 81.5 | 78.9 | | | |
| Self-described | 0.4 | 2.5 | 1.9 | | | |
| State of residence | | | | 66.7 | <.001 | .080 |
| Australian Capital Territory (ACT) | 1.0 | 1.9 | 1.6 | | | |
| New South Wales (NSW) | 26.0 | 19.3 | 16.4 | | | |
| Northern Territory (NT) | 1.1 | 1.6 | 0.5 | | | |
| Queensland (QLD) | 6.9 | 6.2 | 6.7 | | | |
| South Australia (SA) | 2.3 | 3.0 | 2.6 | | | |
| Tasmania (TAS) | 2.1 | 4.7 | 3.8 | | | |
| Victoria (VIC) | 57.2 | 60.1 | 64.9 | | | |
| Western Australia (WA) | 3.4 | 3.3 | 3.4 | | | |
| Exercise behaviours | | | | 18.7 | .017 | .043 |
| A lot more | 6.2 | 4.7 | 6.4 | | | |
| A little more | 27.7 | 27.7 | 29.8 | | | |
| No change (or do not typically exercise) | 22.8 | 25.9 | 20.1 | | | |
| A little less | 23.8 | 21.1 | 22.0 | | | |
| A lot less | 19.9 | 20.6 | 21.7 | | | |
| Sleep patterns | | | | 35.1 | <.001 | .058 |
| A lot more | 7.0 | 8.3 | 9.1 | | | |
| A little more | 16.8 | 19.2 | 21.9 | | | |
| No change | 28.3 | 23.7 | 26.7 | | | |
| A little less | 34.0 | 31.0 | 29.9 | | | |
| A lot less | 13.9 | 17.8 | 12.4 | | | |
| Alcohol consumption | | | | 10.4 | .236 | .032 |
| A lot more | 5.1 | 6.0 | 6.1 | | | |
| A little more | 27.0 | 24.3 | 25.2 | | | |
| No change | 55.6 | 56.3 | 55.9 | | | |
| A little less | 8.0 | 6.1 | 7.9 | | | |
| A lot less | 4.4 | 6.8 | 5.5 | | | |
| Impact of government restrictions on mental health | | | | 7.7 | .464 | .027 |
| Very positively | 3.4 | 4.7 | 4.6 | | | |
| Somewhat positively | 20.4 | 18.4 | 18.6 | | | |
| Not at all | 16.7 | 15.1 | 16.7 | | | |
| Somewhat negatively | 51.2 | 52.2 | 50.0 | | | |
| Very negatively | 8.3 | 9.5 | 10.0 | | | |
| Anticipated time to lifting of government restrictions | | | | 26.4 | .001 | .051 |
| Less than 3 months | 4.0 | 5.3 | 4.1 | | | |
| Less than 6 months | 24.2 | 28.6 | 27.9 | | | |
| Less than 12 months | 42.3 | 38.4 | 38.5 | | | |
| More than 12 months | 21.6 | 17.3 | 17.8 | | | |
| No idea | 7.9 | 10.4 | 11.8 | | | |

Note. On 31 March 2020, Australia was at Stage 3 COVID-19 restrictions, where residents were legally mandated to stay at home, except to shop for food and other essential supplies, for medical care and caregiving, to exercise, or for work or education (if unable to do so remotely). Wave 1 of the COLLATE study was launched on the following day, 1 April 2020. Statistics refer to chi-squared tests for independence, with significance set at $p < .01$ and effect size Cramer's V: .06=small, .17=medium, .29=large.

Table 2
Top five current concerns relating to COVID-19 by group.

| | Healthcare workers (n=905) | | | | Other essential workers (n=810) | | | | General population (n=3443) | | | |
|---|----------------------------|----------------------|-----|------|---------------------------------|----------------------|-----|------|-----------------------------|----------------------|------|------|
| | Mean rank | Mean rating ± StdDev | n | % | Mean rank | Mean rating ± StdDev | n | % | Mean rank | Mean rating ± StdDev | n | % |
| Loved one dying from | 1 | 6.60±3.99 | 732 | 80.9 | 1 | 6.63±4.04 | 653 | 80.6 | 1 | 6.56±4.03 | 2754 | 80.0 |
| Implications for health and well-being of family/loved ones | 2 | 5.48±3.18 | 762 | 84.2 | 3 | 5.44±3.11 | 690 | 85.2 | 2 | 5.36±3.17 | 2886 | 83.8 |
| Loved one catching COVID-19 | 3 | 5.41±3.88 | 669 | 73.9 | 24 | 5.81±3.84 | 614 | 75.8 | 3 | 5.35±3.91 | 2496 | 72.5 |
| Implications for health and well-being of self | 4 | 3.57±3.30 | 584 | 64.5 | - | 3.74±3.26 | 565 | 69.8 | 4 | 3.51±3.32 | 2204 | 64.0 |
| Implications for health and well-being of society | - | 3.81±3.20 | 651 | 71.9 | 5 | - | - | - | 5 | 3.43±3.24 | 2262 | 65.7 |
| Catching COVID-19 myself | 5 | - | - | - | - | 3.51±3.55 | 492 | 60.7 | - | - | - | - |

Note. For current concerns relating to COVID-19, rankings from 1 (greatest concern) to 5 (least concern) were computed (0 was assigned to options that were not endorsed). StdDev=standard deviation.

(AdjR=2.8). In terms of lifestyle changes, only small variations were reported in exercise behaviours and sleep patterns across all groups, though a fraction of OEWs (AdjR=3.9) was getting a lot less sleep. Slightly more than half of all groups reported no change in alcohol consumption, but acknowledged negative mental health impacts owing to existing government restrictions. Most anticipated lifting of these restrictions within 12 months.

The top five current concerns relating to COVID-19 by group are shown in Table 2. The top three HCW concerns were identical in content and order of importance to the GNP, namely *loved one dying from COVID-19, implications for the health and well-being of family/loved ones*, and *loved one catching COVID-19*. The only difference lay in ordering of the fourth and fifth concerns which were swapped, such that the GNP prioritised *implications for the health and well-being of self*, whereas HCWs prioritised *implications for the health and well-being of society*. Relative to the GNP, the top four OEW concerns were similar in content, but with ordering of the second and third concerns swapped. Notably, OEWs identified a fifth concern (not ranked within the top five current concerns by the other two groups) relating to *oneself catching COVID-19*.

Group-wise comparisons on emotional experiences and quality of life are shown in Table 3. OEWs and the GNP reported significantly higher levels of depression than HCWs. Similarly, OEWs showed significantly higher rates of anxiety than the GNP, who in turn was significantly more anxious than HCWs. Furthermore, OEWs were significantly more stressed than HCWs. OEWs also reported significantly poorer overall quality of life relative to HCWs and the GNP (who did not differ from each other). When specific life domains were assessed, OEWs and the GNP rated their activities of daily living, self-satisfaction and finances as significantly poorer than HCWs. No significant group differences were uncovered for positive or negative affect, or satisfaction with other life domains.

4. Discussion

Our study aimed to document the top five current concerns as well as emotional experiences and quality of life in Australian HCWs and OEWs amidst the COVID-19 pandemic. Across each group, similar themes were

nominated for the top COVID-19 related concerns, and were primarily associated with the health and well-being of loved ones. HCWs also expressed concerns for the welfare of broader society (beyond oneself), likely illustrating an altruistic nature shaping their career choice. OEWs were notably concerned about being infected with COVID-19, possibly indicating inadequate training, coupled with insufficient safety protocols (e.g. lack of personal protective equipment and/or social distancing procedures) in their work environments, thereby leaving them feeling vulnerable and at risk of falling ill.

HCWs and OEWs respectively fared the best and worst in assessments of their current emotional experiences and quality of life, with the GNP falling in between. There were some significant demographic (i.e. age, sex, state of residence) and lifestyle (i.e. sleep patterns, anticipated time to lifting of government restrictions) differences amongst our groups, and it may be possible that these factors somewhat influenced the observed mental health outcomes. Yet we controlled for the extraneous effects of age, sex and state of residence during our statistical analyses. Reported poorer sleep in OEWs could however, have contributed towards heightened negative emotions and lower perceived life satisfaction amidst the COVID-19 outbreak. Notably, though a significant proportion of HCWs believed some form of government restrictions would endure for more than 12 months, this expectation did not seem to adversely impact their mental health. Compared to the GNP, HCWs reported better mental health in terms of significantly lower depression and anxiety, and higher satisfaction with life domains involving activities of daily living, self and finances. These results are further buttressed by an absence of significant group differences on positive and negative affect; our pattern of results was less likely to be due to variations in momentary affect which tend to fluctuate throughout the day.

This contrasts with our hypothesis as well as findings from the existing pair of Chinese studies (Lu et al., 2020; Zhang et al., 2020). Given it may be logically inferred that psychological experiences could differ considerably, depending on time of sampling and work context, we can offer two possible explanations for our findings. First, our initial wave of data collection occurred early in the COVID-19 outbreak in Australia, when the number of active cases was low. Second, our healthcare system was better prepared in that it heeded lessons drawn from earlier affected nations, by ensuring that medical staff, special

Table 3
Emotional experiences and quality of life relating to COVID-19 by group.

| | Estimated marginal mean ± standard error | | | Statistics | | | |
|---|--|--|--|------------|-------------------|----------------------------------|-----------------|
| | Healthcare worker (HCW; n=879-905) | Other essential worker (OEW; n=789-810) | General population (GNP; n=3328-3443) | F | Signifi- cance | Effect size (η ²) | Group contrasts |
| Emotional experiences (DASS-21, α=.942; PANAS, α=.903) | | | | | | | |
| Depression | 2.82±0.09 | 3.30±0.08 | 3.24±0.07 | 32.9 | <.001 | .013 | HCW<OEW≈GNP |
| Anxiety | 2.06±0.08 | 2.50±0.08 | 2.30±0.07 | 20.6 | <.001 | .008 | HCW<GNP<OEW |
| Stress | 3.38±0.07 | 3.59±0.07 | 3.48±0.06 | 5.7 | .003 | .002 | |
| Positive affect | 3.08±0.02 | 3.07±0.02 | 3.09±0.02 | 0.6 | .549 | <.001 | HCW<OEW |
| Negative affect | 2.96±0.02 | 3.00±0.02 | 2.98±0.02 | 0.7 | .501 | <.001 | - |
| Quality of life (EUROHIS-QoL, α=.869) | | | | | | | |
| Life (in general) | 16.53±0.22 | 15.96±0.23 | 16.28±0.11 | 1.6 | .192 | .001 | OEW<HCW≈GNP |
| Health | 13.01±0.23 | 12.17±0.24 | 12.51±0.18 | 3.3 | .036 | .001 | - |
| Energy levels | 13.22±0.23 | 12.77±0.24 | 12.86±0.12 | 1.2 | .295 | <.001 | - |
| Activities of daily living | 15.31±0.24 | 13.96±0.25 | 13.92±0.12 | 13.6 | <.001 | .005 | OEW≈GNP<HCW |
| Self-satisfaction | 12.90±0.22 | 11.31±0.23 | 11.55±0.11 | 17.1 | <.001 | .007 | OEW≈GNP<HCW |
| Personal relationships | 14.64±0.24 | 14.08±0.25 | 14.13±0.12 | 1.9 | .143 | .001 | - |
| Finances | 16.95±0.26 | 15.80±0.27 | 15.94±0.13 | 6.7 | .001 | .003 | OEW≈GNP<HCW |
| Conditions of living | 17.37±0.24 | 16.76±0.25 | 17.17±0.12 | 1.6 | .196 | .001 | - |

Note. DASS-21=Depression Anxiety Stress Scales (three seven-item subscales assessing negative emotions, rated on four-point Likert scales ranging from 0-3, with higher scores indicating greater psychopathology); PANAS=Positive and Negative Affect Schedule (two 10-item subscales assessing positive and negative affect, rated on five-point Likert scales ranging from 1-5, with higher scores indicating stronger emotional experiences); EUROHIS-QoL=European Health Interview Surveys - Quality of Life (eight-item measure assessing quality of life, rated on five-point Likert scales ranging from 1-5, with higher scores indicating greater levels of satisfaction). Data transformations involved square root, logarithm, and square respectively for DASS, PANAS and EUROHIS-QoL. Statistics involved multivariate analyses of variance, with significance set at p<.01 and effect size partial η²: .01=small, .06=medium, .14=large. Only significant group contrasts are shown, and missing data was managed by case-wise deletion for each measure.

facilities and safety processes were in place. These factors jointly meant that the Australian healthcare system was not overwhelmed, and the care and numbers of COVID-19-affected patients were under control. All of this likely contributed to the relatively favourable mental health status observed in our HCW cohort. In the previous SARS outbreak, it is concerning to note infections were highly concentrated in HCWs (up to 20%; Bai et al., 2004). If our situation were to change, and HCW infections started to escalate (as shown in other COVID-19 affected countries), the potential mental health impacts for HCWs would need to be monitored more closely.

In line with our hypothesis, OEWs reported significantly greater anxiety and poorer quality of life relative to the general population. They fared worse relative to HCWs in terms of significantly elevated stress and dissatisfaction with specific life domains. The latter finding could be attributed to the uncertainties of undertaking a risky occupation offering limited job stability and financial incentives (e.g. delivery driver) during these challenging times. The important message thus relates to inadequate training and protections put in place for OEWs, who have been asked to continue operating. In contrast, health-related services are seemingly aware of the importance of having an adequate supply of protective and other safety apparel, but also conveying timely information in a sensitive manner, and to provide psychological support, where needed, to manage the mental health of employees (Perrin et al., 2009). In previous pandemics, HCWs have cited satisfactory preparedness and systematic training, including a clear understanding of relevant risks involved (e.g. Chua et al., 2004). These recommendations will need to be translated to OEW industries to ensure these vital personnel are also given appropriate safeguards to preserve their physical and mental welfare.

The current study had several limitations. Our cohort comprised a convenience sample, meaning that we did not capture a representative distribution of respondents across groups. Importantly, HCWs caught up in the crux of responding to the outbreak may not have been adequately represented. Related to this, the nature of our collected data precluded further analysis of HCWs working in high versus low-risk environments (nb. workers in high-risk units have reported greater distress, which conversely decreased with increasing numbers of patients treated; Lu et al., 2020; Styra et al., 2008). However, we were able to achieve robust participant numbers, and our swift data collection ensured a timely mental health snapshot during the rapidly evolving COVID-19 outbreak. Our study design will also enable longitudinal tracking moving forward, as the situation continues to unfold (Tan et al., 2020). Notably, our focus on OEWs should help to draw much-needed attention and mental health supports toward this crucial, but clearly overlooked and vulnerable, group. It is critical to ensure that various segments of the population have ongoing access to support that is tailored to their mental health needs during these challenging times.

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Author contributions

SLR conceived of the project; all authors finalised the design, obtained ethics approval, engaged in data collection and interpretation of findings. WLT prepared the first draft of the manuscript. All authors provided intellectual and editorial input, and agreed to its final form. DM conducted the data analyses, in consultation with the other authors. The authors had full access to all data employed.

Data sharing

The data analysis scripts and results files used for this paper are

available for review on request by qualified researchers-scientists. All requests for future use of the dataset require a concept proposal describing the purpose of data access, appropriate ethical approval, and provision for data security. Ensuing publications will be undertaken on a collaborative basis.

Declaration of Competing Interest

The authors have declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

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Supplementary materials

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