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Mental health of people in Australia in the first month of COVID-19 restrictions: a national survey

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Abstract

Objectives:

1. To estimate prevalence rates of:
    a. Clinically significant symptoms of depression, generalised anxiety, thoughts of being better off dead, and irritability;
    b. High future optimism;
    c. Direct COVID-19 experiences, job loss, high worry about contracting COVID-19, and high adverse impact of the restrictions.
2. Describe relationships between experiences and outcomes.

Design: Anonymous online survey

Setting: Australia, 3rd April to 2nd May 2020.

Participants: Australian residents ≥18 years.

Main outcome measures: In previous fortnight: Patient Health Questionnaire 9 (PHQ-9) score ≥10 indicating clinically-significant depressive symptoms; Generalised Anxiety Disorder Scale 7 (GAD-7) score ≥10 indicating clinically-significant symptoms of anxiety; PHQ-9 Item 9 any thoughts of being better off dead and GAD-7 Item 6 any experiences of increased irritability. Study-specific visual analogue scale: 0 (no optimism) to 10 (very optimistic) score ≥ 8 indicating high optimism.

Results: 13,829 respondents, drawn from all States and Territories contributed complete data. Prevalence rates of PHQ-9 scores ≥10, 27.6% [95% CI 26.1;29.1]; GAD-7 score ≥10, 21.0% [19.6;22.4]; PHQ-9 Item 9 >0, 14.7% [95% CI 13.5;16.0] and GAD-7 Item 6 >0, 59.2%, [95%CI 57.6;60.7]. Optimism score ≥ 8, 28.3% [95% CI 27.1; 29.6]. People most likely to have symptoms and low optimism had lost jobs, lived alone or in poorly-resourced areas, were caring for dependent family members, members of marginalised minorities, women or young.

Conclusions and their implications: Mental health problems were at least twice as prevalent as in non-pandemic circumstances. A public health response which includes universal as well as selective and indicated clinical interventions is needed.

Key words: COVID-19, Australia, mental health, depression, anxiety, suicidal thoughts, optimism

Abstract word count: 252

The Known

No Australian national population data about mental health related to COVID-19 restrictions are available.

The New

In the first month of restrictions, clinically-significant depressive and generalised anxiety symptoms, thoughts of being better off dead or of self-harm, and irritability were at least double those in non-COVID affected populations. In addition, one in four had mild to moderate symptoms. The most vulnerable people had lost jobs, lived alone or in poorly-resourced areas, were providing care to dependent family members, were members of marginalised minorities, women or young.

The Implications

A public mental health approach which includes, universal, selective and indicated strategies in health and non-health sector is needed urgently for recovery.

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Introduction

Essential public health measures required to limit the spread of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2, resulting in COVID-19) include requirements to stay at home except for a few specified reasons, work from home unless providing an essential service, limit physical proximity, meet online and not in person, avoid visits to residential aged care facilities, limit attendance at milestone events (weddings, funerals, celebrations), cancel interstate and international travel, and accept policing of adherence to the restrictions. These measures have mental health ramifications (adverse and, potentially, beneficial) that are likely to be unevenly distributed across the population because they will interact with social and economic circumstances.

A recent Lancet position paper[1] summarised international expert opinion about research priorities for mental health. The first was to gather high-quality population-level data on the mental health effects of the COVID-19 pandemic.

The aim was to describe the mental health of people in Australia during the first month of the COVID-19 restrictions.

The specific objectives were to:

1. Establish the population prevalence rates of clinically significant symptoms of depression, generalised anxiety, thoughts of being better off dead, irritability, and high optimism about the future.
2. Estimate the prevalence rates and describe the characteristics of people reporting direct experiences of COVID-19, losing a job because of COVID-19 restrictions, being very worried about contracting COVID-19, and experiencing a high adverse impact of the restrictions.
3. Estimate the effects of experiences in Objective 2 on mental health outcomes (Objective 1).

Methods

Design, setting and participants: A short, anonymously completed, self-report survey of people living in Australia aged at least 18 years.

A sample size of 8,538 people is required to estimate the prevalence rates (Objective 1) at the precision of 1.5% taking into account design effect = 2.

Data source: A questionnaire including study-specific, fixed-response-option questions and widely used standardised psychometric instruments.

Mental health outcomes

Psychological symptoms experienced over the previous fortnight were assessed using PHQ-9 and GAD-7, and optimism about the future in a study-specific question.

i. Patient Health Questionnaire 9 (PHQ-9)

The PHQ-9[13] is an easily understood self-report 9-item scale asking respondents to endorse each depressive symptom as "0" (not experienced) to "3" (experienced nearly every day). Aggregated responses yield a scale indicative of symptom severity. Formally validated against diagnostic psychiatric interviews, a PHQ-9 score ≥10 has sensitivity of 88% and specificity of 88% for Major Depression. PHQ-9 scores of 5-9 represent mild, 10-14 moderate, 15-19 moderately severe, and ≥20 severe depressive symptoms. PHQ-9 Item 9 asks whether the respondent has experienced 'Thoughts that you would be better off dead or of hurting yourself in some way'.

ii. Generalised Anxiety Disorder Scale (GAD-7)

The GAD-7[14] is a 7-item scale assessing common symptoms of anxiety that uses same response options as PHQ-9, is easily understood and acceptable. In formal validation against psychiatric interviews a GAD-7 score ≥10 has sensitivity of 89% and specificity of 82% to detect Generalised Anxiety Disorder. Scores of 5-9 represent mild, 10-14 moderate, and 15-21 severe anxiety. Higher scores are strongly associated with functional impairment. GAD-7 Item 7 asks whether the respondent is 'Becoming irritable or easily annoyed'.

iii. Optimism about the future

Optimism about the future was assessed by a visual analogue scale from 0 (not at all optimistic) to 10 (extremely optimistic).

Experience of COVID 19 and the COVID-19 restrictions

Study-specific questions assessed:

i. Direct experience of COVID-19: whether the respondent had been diagnosed with or tested for COVID-19, or lived with or knew someone with COVID-19: yes / no.
ii. Whether a job had been lost because of COVID-19 restrictions: yes / no.
iii. Worry about contracting COVID-19: a visual analogue scale with scores from 0 (not at all worried) to 10 (extremely worried).
iv. How badly COVID-19 restrictions had affected daily life: a visual analogue scale with scores from 0 (not at all badly) to 10 (very badly).

Socio-demographic characteristics

Study-specific questions with fixed response options were used to ascertain age, postcode, gender, whether born overseas or in Australia, living circumstances, and occupation.

Data on State, urban/rural residence, and Socioeconomic Indices for Areas (SEIFA) were derived from respondent's postcode using the most recent Australian Bureau of Statistics[15] data.

Procedure: The survey was built in Qualtrics Insight Platform (Qualtrics, Provo, UT). It was available online from 3 April 2020, four days after COVID-19 restrictions were implemented, to midnight on 2 May 2020. A link to the survey was hosted on the NAME University website

and information about it was distributed widely on news and social media and through organisational and personal networks.

Data management and analysis: The outcomes were whether, in the last fortnight, the respondent had experienced:

1. Clinically significant symptoms of depression: PHQ-9 scores ≥ 10.
2. Clinically significant symptoms of anxiety: GAD-7 scores ≥ 10.
3. Any thoughts of being better off dead or self-harm: PHQ-9 item 9 score > 0
4. Becoming easily annoyed or irritable: GAD 7 item 6 score > 0
5. High optimism about the future: scores ≥ 8.

The visual analogue scales were each categorised into two groups not at all or none to moderate (0-7) and high (≥ 8)

Data were analysed in three stages.

1. Population prevalence rates and 95% CIs of the outcomes, and the experiences of COVID-19 and the restrictions were estimated, adjusting for differences in socio-demographic characteristics between the sample and the Australian population. The adjustment was made using weights for proportions of age groups, genders, SEIFA deciles, and states in the sample and the corresponding information in the population (Australian Bureau of Statistics', 2019).[15]

2. Characteristics of respondents with direct experiences of COVID-19, who had lost jobs, were very worried about contracting COVID-19, and experienced a highly adverse impact of the restrictions were examined using multiple logistic regressions that included socio-demographic characteristics.

3. Multiple logistic regression analyses were performed to examine associations between experiences and each of the outcomes, taking socio-demographic characteristics into account.

Only complete data were included in analyses, which were conducted using STATA Version 16 (StataCorp., College Station, TX). Comparisons were made with nationally representative population data generated with the same instruments with adults in Australia and other high-income nations (Table 1).

Approval to conduct the study was provided by [Institution] University Human Research Ethics Committee (2020-24080-42716)

Results

Sample characteristics

Of the 15,121 respondents who were eligible, 13,829 (91.45%) contributed complete data (Figure 1).

Respondents were drawn from all Australian states, socioeconomic positions, age groups, living situations and occupations. Similar proportions were born overseas, but more were from Victoria and fewer from New South Wales (NSW), there were more women and fewer men, and more in higher and fewer in lower socioeconomic positions than in the national population (Table 2). The weighted percentages of direct experiences of COVID19 were: 0.18% respondents [95%CI 0.09;0.38] had contracted COVID-19 and been admitted to hospital, 0.26% [95%CI 0.14;0.46] had contracted COVID-19, but not been admitted to hospital, 4.08% [95%CI 3.56;4.69] had been tested, 0.49% [0.31; 0.77] lived with someone and 11.81% [95%CI 10.83; 12.85] knew, but did not live with someone who had contracted the virus.

Experiences of COVID-19 and COVID-19 restrictions

People living in Victoria, Queensland, WA and the ACT were less likely than those in NSW to have had a direct experience of COVID-19. People in the highest socioeconomic position and those born overseas were more, and people aged at least 70 years or who were retired or who were caring for dependent relatives at home, were less likely to have had a direct experience of COVID-19. Those most likely to have lost a job because of COVID-19 restrictions were living in rural or regional areas, aged 18 to 29 years and students. ACT residents were less likely than those in other states to have lost jobs. People who were most worried about contracting COVID-19 were in the lowest socioeconomic positions, unemployed, doing unpaid work caring for children or dependent relatives, retired or did not identify as male or female. People aged 18-29 were significantly less worried than all other age groups about contracting COVID-19. Experiencing a high adverse impact from COVID-19 restrictions was most common among people living in major cities; living alone, who were unemployed or doing unpaid work caring for children or dependent relatives before the pandemic, students and women (Table 3). Victorian residents were more likely than others to experience a high adverse impact of the restrictions. Weighted population prevalence rates of these experiences are summarised in Table 4.

Prevalence rates of mental health problems and optimism about the future

The most striking finding was the very high prevalence rates of people experiencing clinically significant symptoms of depression (PHQ-9 score ≥10) and anxiety (GAD-7 score ≥10). Even mild to moderate, subthreshold symptoms of these problems were being experienced by 25% people. More than 10% had experienced thoughts of being better off dead or self-harm, and increased irritability was widespread. Simultaneously, however, on average people were more optimistic than pessimistic and nearly one in three were highly optimistic (Table 5).

Mental health problems associated with COVID-19 experiences

When other relevant factors were controlled, people who had a direct experience of COVID-19 were more likely than others to report clinically significant anxiety (Table 6). People who had lost a job and people who were very worried about contracting COVID-19 were more likely to report clinically significant symptoms of depression and anxiety, thoughts that they would be better off dead and increased irritability. They were less optimistic. Those at greatest risk of all the mental health problems were people reporting highly adverse impacts of the restrictions.

Optimism in the context of COVID-19

On average, more than half the population felt more optimistic than pessimistic. Optimism was higher among people reporting no direct experience of COVID-19, no job loss, and not finding the COVID-19 restrictions too difficult.

Discussion

These data are, to our knowledge, the first to quantify population prevalence of clinically significant symptoms of depression and anxiety among adults in Australia in month one of COVID-19 restrictions. Strengths are the very large and broadly representative sample, weighting to reflect the national population, use of standardised measures that permit comparisons with equivalent non-COVID-19 populations, and capacity to distinguish worry about contracting COVID-19 from the impacts of restrictions. Response bias was reduced by describing the study in neutral terms and making it short and easy to complete. We acknowledge the limitations that online surveys are less accessible to people who lack computer proficiency, internet access or English fluency or are in lower socioeconomic positions, and their experiences might not be represented. Recruitment fractions cannot be calculated for online surveys. We note that these data are not diagnostic, and that estimates from self-report measures are generally higher than those from clinical interviews. A short, structured survey cannot gather nuanced information about mental health problems. While thoughts of being better off dead were asked in a single question, there was no assessment of suicide intent or plans. Cross-sectional surveys identify associations, not causal relationships. Nevertheless, as the survey asked about experiences of COVID-19 restrictions, these data provide a reliable indication of the ramifications of the first month of restrictions for the mental health of the Australian population and a useful platform for planning public health and clinical service responses.

These data quantify the magnitude and severity of mental health problems in the first month of restrictions. They indicate a widespread change in usual psychological state with about a quarter of the whole population experiencing mild to moderate symptoms of depression (26.5%) or anxiety (24.5%): substantially higher than the subthreshold depressive symptoms in an American national survey (16.97%),[3] or in a systematic review of subthreshold generalised anxiety (2.2%-7.1%).[16] Further, the point prevalence of clinically significant depressive symptoms (27.6%) is six times higher than the 3.7% found using the PHQ-9 with a randomly selected population of Australian adults in 2015,[6] and two to three times higher

than equivalent point-prevalence estimates (3.3%-10.8%) from other high-income countries.[4] There is a similar difference in point prevalence of generalised anxiety symptoms (21.0% in this study, 5.9% to 10.6% in other population-based studies). There are few community point prevalence estimates of thoughts of being better off dead or of self-harm, but the 14.6% found in this survey is very much higher than the 1.8%[12] found among adults in South Australia.

Care is needed to understand the nature and respond to the very high prevalence of these problems. Rather than a pathologising framework, in our opinion they are most usefully considered as indicators of normal psychological adjustments to very abnormal circumstances, which have challenged individual adaptive capacities, and altered access to protective social supports and opportunities to participate. We had anticipated that anxiety would be the predominant experience, but these data indicate that depressive are more common than anxious states. Depression, and thoughts of being better off dead, are most likely to occur when people feel trapped, humiliated, and powerless[17-19] and have experienced loss. Disenfranchised[20,21] grief describes experiences of loss which might not be recognised, by self or others and lead to disbelief, yearning, uncertainty and sadness. Everyone experienced some loss of liberty, autonomy, and agency as everyday activities were restricted, some precluded. Privacy was lost with the close scrutiny of adherence to health behaviours, but paradoxically, enforced through required isolation. Many people lost events of lifetime significance: weddings, end-of-life support for loved ones or milestone celebrations. Occupational identity and capacity to earn an income are fundamental to adult individuality, sense of purpose and autonomy. Loss of these is profound and associated directly with demoralisation and depression. Unrecognised losses do not attract the increased social support or rituals that accompany bereavement. They can induce powerlessness, rather than the problem-solving that is needed to reduce psychological pain. Anxiety is elevated in situations of threat or invisible danger and uncertainty, in particular where definite parameters about duration and evidence underpinning specific restrictions could not be provided.

While there appears to be a whole of population increase in psychological symptoms, some groups are especially vulnerable. First, people living in the least resourced communities, including in rural areas, occupying the lowest socioeconomic positions, or who might have been unemployed prior the pandemic. Second, people who have lost a job, or opportunities to study, many of whom are young adults. Third people living alone who lack the opportunity for day to day interactions and proximity to family members. Fourth, sexual and other minority groups who are already marginalised. Finally, people whose occupation is to provide unwaged care to children or other dependent family members, most of whom are women.

The consequences of these problems for occupational and social functioning are highly relevant to national recovery. People with these difficulties are less motivated, energetic, socially engaged, confident or able to concentrate, plan, organise, trust or initiate.

These data confirm the concern being voiced about the mental health consequences of the pandemic. However, they indicate that increased mental health services should not be the only policy response. A public health approach has been essential to the effective containment of COVID-19 and a public mental health approach is needed for recovery.[22] This

would include universal interventions to meet the needs of the whole population, selective strategies for people who are experiencing psychological disability, and indicated interventions for people with specific identifiable risks.

As the mental health problems are related to the perceived risk of contracting the virus and consequences of the restrictions, some reduction is likely to be experienced as risk is lowered and restrictions lifted. However, other universal psychologically-informed, well-communicated mental health promoting strategies are also needed. Authoritarian messages and public policies were used to ensure observation of distancing and isolation restrictions. Contrasting, appreciative and empathic statements from political and civic leaders acknowledging the magnitude of individual contributions to the public good, and the social and psychological costs of these, will ameliorate some social suffering.[23,24] Social connections are predicated on trust, but everyone is suspected of having the potential to put others at risk of contracting COVID-19. Trusted relationships, which are essential to psychological wellbeing are diminished. Activities which provide regular engagement with other people offer essential opportunities to discuss life situations, experience empathy and explore solutions. Social media are proposed as an alternative to in-person meetings, but experiencing empathy is less likely in interactions on social media than those in person.[25] Clear messaging about safety of engage socially with others is needed, in particular to reassure those who live alone or who have a high fear of contracting the virus. As the restrictions were implemented, government and non-government agencies provided guidance about the benefits for mental health of maintaining routines, social connections, and exercise and the potential harms of isolation, lack of access to purposeful activities, and increased alcohol consumption. Equivalent practical guidance is needed about how to recapture agency and resume healthy social and economic participation and that these will require an adjustment period.[26,27]

More intense selective strategies in both health and non-health sectors are likely to be needed for more vulnerable groups. These data indicate that clinician-initiated assessment in primary care of depressive and anxious states and ideas of self-harm are warranted for people who have lost jobs, live alone, are providing care for dependent family members, live in the least resourced suburbs of cities and in rural areas and are women or young.

Increased access to mental health care is likely to be needed for those whose psychological symptoms are not ameliorated by universal mental health promotion strategies. Cautions are needed for widespread recommendation of telehealth consultations, which rely on a person having access to the internet, a personal device and privacy, none of which are assured for people in low socioeconomic positions who have the highest needs. Integrating mental health care into community services can reduce barriers to access.

The mental health of people who have lost jobs will benefit from employment assistance that is empathic, courteous and encouraging, and that does not rely exclusively on individual initiative to find jobs. Strengthening the psychological skills of frontline workers in agencies that provide employment services and embedding mental health workers in them is more likely to be effective than expecting people in these predicaments to attend health services.

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Table 1 Summary of comparison data

Proportion of people scoring ≥ 10 on the PHQ-9, indicating moderate to severe depressive symptoms in the prior 30 days			
Author/year	**Country**	**Participants**	**Point prevalence**
Participants randomly selected from the general community			
Patten & Schopflocher (2009)[2]	Canada	3304 people aged at least 18 years	3.3%
Shim et al. (2011)[3]	USA	10,283 people aged at least 18 years	6.9%
Johansson et al. (2013)[4]	Sweden	1329 people aged at least 18 years	10.8%
Kocalevent et al. (2013)[5]	Germany	5018 people aged at least 18 years	5.6%
Kiely & Butterworth (2015)[6]	Australia	546 people aged 32 to 35 years and 1515 aged 52 to 58 years	3.7%
Participants selected from people attending general practices			
Pirkis et al. (2009)[7]	Australia	>22,000 people aged >59 consulting a GP	8.2%
Carey et al. (2014)[8]	Australia	1004 people consulting a GP	13%
Specific population groups			
Farrer et al. (2016)[9]	Australia	611 university students	7.9%
Proportion of people scoring ≥ 10 on the GAD-7, indicating moderate to severe anxiety symptoms in the prior 30 days			
Author/year	**Country**	**Participants**	**Point prevalence**
Participants randomly selected from the general community			
Johansson et al. (2013)[4]	Sweden	1329 people aged at least 18 years	14.7% ≥8
Hinz et al (2017)[10]	Germany	9721 people aged at least 18 years	5.9% ≥ 10
Specific population groups			
Farrer et al. (2016)[9]	Australia	611 university students	17.5% ≥10
Hammarberg et al (2019)[11]	Australia	4947 women aged > 49 years from the general community responding to an online survey	10.6% ≥10
Proportion of people reporting thoughts of wanting to die, or of contemplating self-harm 'recently'			
Author/year	**Country**	**Participants**	**Point prevalence**
Participants randomly selected from the general community			
Goldney et al (2000)[12]	Australia	2501 people in South Australia aged at least 18 years	1.8%

Table 2 Socio-demographic characteristics of the study sample (N= 13,829)

	Study sample		National data* aged ≥ 18 years (%)
	Number	Percentage	
State			
New South Wales (NSW)	2,753	19.9	32.1
Victoria	6,105	44.1	26.2
Queensland	1,939	14	19.8
Western Australia (WA)	1,177	8.5	10.2
South Australia (SA)	836	6.0	7.0
Tasmania	445	3.2	2.1
Australian Capital Territory (ACT)	465	3.4	1.7
Northern Territory (NT)	109	0.8	0.9
SEIFA quintiles			
Quintile 1 (Lowest socio-economic position)	1,093	7.9	16.8
Quintile 2	1,541	11.1	17.2
Quintile 3	2,228	16.1	20.7
Quintile 4	3,038	22	20.5
Quintile 5 (Highest socio-economic position	5,929	42.9	24.8
Gender			
Female	10,434	75.5	50.9
Male	3,328	24.1	49.1
Other	67	0.5	N/A
Age group			
18-29	1,337	9.7	21.8
30-39	2,294	16.6	18.6
40-49	2,854	20.6	16.6
50-59	3,064	22.2	15.6
60-69	2,833	20.5	13.2
70 +	1,447	10.5	14.2
Living situation			
On your own	2,660	19.2	N/A
With only your partner / your partner and children / adult family members	9,630	69.6	N/A
With children and without a partner	578	4.2	N/A
In a shared house with non-family members / Other	961	6.9	N/A
Born overseas	3,150	22.8	N/A
Main occupation (before COVID-19)			
A paid job	8,330	60.2	N/A

Doing unpaid work caring for children/dependent relatives only or unemployed	1,146	8.3	N/A
Student	1,343	9.7	N/A
Retired	3,010	21.8	N/A

**Source: Australian Bureau of Statistics*[15]

Table 3: Characteristics of people in Australia with direct experiences of COVID-19, who had lost jobs because of COVID-19 restrictions, highly worried about contracting COVID-19, and experiencing a high adverse impact of COVID-19 restrictions

	Any direct experience of COVID-19	**Lost a job because of COVID-19**	**Highly worried about contracting COVID-19**	**High adverse impact of COVID-19 restrictions**
State				
New South Wales	Ref.	Ref.	Ref.	Ref.
Victoria	**0.79 [0.70; 0.89]**	1.03 [0.87; 1.21]	1.01 [0.9; 1.15]	**1.14 [1.02; 1.26]**
Queensland	**0.85 [0.72; 0.99]**	1.2 [0.97; 1.48]	0.95 [0.81; 1.11]	1.07 [0.93; 1.23]
Western Australia	**0.61 [0.49; 0.74]**	1.10 [0.86; 1.40]	**0.78 [0.64; 0.95]**	**0.83 [0.7; 0.98]**
South Australia	0.96 [0.77; 1.19]	0.85 [0.63; 1.16]	0.89 [0.72; 1.1]	0.84 [0.69; 1.01]
Tasmania	0.93 [0.69; 1.25]	0.94 [0.63; 1.39]	**0.74 [0.55; 1]**	1 [0.78; 1.29]
Australian Capital Territory	**0.62 [0.46; 0.82]**	**0.47 [0.29; 0.76]**	0.74 [0.55; 1]	**0.72 [0.56; 0.93]**
Northern Territory	0.64 [0.36; 1.12]	0.51 [0.23; 1.14]	0.63 [0.33; 1.2]	0.61 [0.35; 1.05]
Major city vs. regional/remote areas	0.98 [0.86; 1.12]	**0.82 [0.69; 0.96]**	1.05 [0.92; 1.18]	**1.28 [1.15; 1.43]**
SEIFA quintiles				
Quintile 1 (lowest socioeconomic position)	Ref.	Ref.	Ref.	Ref.
Quintile 2	1.06 [0.83; 1.35]	1 [0.74; 1.34]	**0.70 [0.57; 0.87]**	0.91 [0.76; 1.09]
Quintile 3	1.22 [0.97; 1.52]	1.22 [0.93; 1.59]	0.84 [0.69; 1.01]	0.93 [0.78; 1.1]
Quintile 4	1.19 [0.95; 1.48]	1.1 [0.84; 1.43]	**0.77 [0.64; 0.94]**	0.95 [0.8; 1.13]
Quintile 5 (highest socioeconomic position)	**1.66 [1.34; 2.05]**	1.08 [0.83; 1.42]	**0.70 [0.58; 0.84]**	0.89 [0.75; 1.05]
Gender				
Female	Ref.	Ref.	Ref.	Ref.
Male	0.92 [0.82; 1.03]	0.98 [0.85; 1.14]	**0.73 [0.65; 0.82]**	**0.89 [0.81; 0.97]**
Other	0.95 [0.49; 1.83]	1.58 [0.77; 3.24]	**1.98 [1.14; 3.43]**	1.17 [0.69; 1.97]
Age group				
18-29	Ref.	Ref.	Ref.	Ref.

30-39	0.97 [0.81; 1.17]	**0.49 [0.4; 0.6]**	**1.28 [1.03; 1.6]**	1.04 [0.88; 1.21]
40-49	0.9 [0.75; 1.08]	**0.40 [0.32; 0.49]**	**1.5 [1.21; 1.86]**	0.97 [0.83; 1.13]
50-59	0.94 [0.78; 1.13]	**0.59 [0.48; 0.72]**	**1.6 [1.29; 1.98]**	0.92 [0.78; 1.08]
60-69	0.88 [0.71; 1.09]	**0.75 [0.59; 0.94]**	**1.62 [1.28; 2.04]**	0.93 [0.78; 1.11]
70 +	**0.73 [0.55; 0.97]**	**0.57 [0.36; 0.88]**	**1.43 [1.09; 1.88]**	0.91 [0.73; 1.14]
Living situation				
On your own	Ref.	Ref.	Ref.	Ref.
With partner and/or children; with adult family members	1.12 [0.98; 1.27]	0.92 [0.78; 1.09]	0.96 [0.86; 1.08]	**0.8 [0.72; 0.88]**
With children and without a partner	0.99 [0.76; 1.28]	1.25 [0.93; 1.70]	0.96 [0.74; 1.23]	1.12 [0.91; 1.37]
Other	**1.24 [1.01; 1.53]**	1.22 [0.95; 1.56]	0.84 [0.67; 1.05]	1.02 [0.86; 1.21]
Born overseas vs. born in Australia	**1.17 [1.05; 1.31]**	1.02 [0.88; 1.18]	1.09 [0.98; 1.22]	1.02 [0.93; 1.12]
Main occupation (before COVID-19)				
A paid job	Ref.	Ref.	Ref.	Ref.
Doing unpaid work caring children/dependent relatives/unemployed	**0.67 [0.55; 0.81]**	N/A	**1.4 [1.2; 1.64]**	**1.25 [1.09; 1.44]**
Student	1.05 [0.89; 1.23]	**1.56 [1.32; 1.85]**	0.96 [0.8; 1.15]	**1.42 [1.24; 1.63]**
Retired	**0.7 [0.58; 0.83]**	**0.11 [0.08; 0.15]**	**1.27 [1.08; 1.48]**	1.05 [0.91; 1.2]

Data cell: Adjusted odds ratio [95% CI]. Bolded are statistically significant. Adjusted odds ratios were derived from the model predicting each of the four types of experiences of COVID-19 and restrictions from the all socio-demographic characteristics. Ref.: reference group.

Table 4 Experiences of COVID-19 and COVID-19 restrictions

	Prevalence*(%)	[95% CI]
Any direct experience of COVID-19: being diagnosed with, or tested for COVID-19, or knew someone diagnosed	15.3	[14.2; 16.4]
Lost a job because of COVID-19 restrictions	11.2	[10.0; 12.4]
Highly worried about contracting COVID-19 (scale score ≥ 8)	13.9	[13.1; 14.8]
High adverse impact of restrictions (scale score ≥ 8)	25.2	[23.8; 26.8]

**Post-stratification weighted by: State, SEIFA decile, gender, and age.*

Table 5 Mental health in the last two weeks

	Statistics Mean [95% CI] or *% [95% CI]*
PHQ-9: Total score	6.8 [6.6; 7.0]
Mild depressive symptoms **(**PHQ-9 score 5- 9),	*26.5 [25.1; 27.8]*
Moderate, moderately severe, or severe (clinically significant) depressive symptoms, PHQ-9 score ≥ 10)	*27.6 [26.1; 29.1]*
GAD-7: Total score	5.5 [5.3; 5.7]
Mild anxiety (GAD 7 score 5 - 9)	*24.5 [23.3; 25.8]*
Moderate, or severe anxiety (clinically significant) symptoms of anxiety, GAD-7 score ≥ 10)	*21.0 [19.6; 22.4]*
Thoughts of being better off dead or of self-harm	
Several days	*8.9 [8.1; 9.9]*
More than half the days	*3.0 [2.5; 3.6]*
Nearly every day	*2.7 [2.1; 3.4]*
Becoming easily annoyed or irritable	
Several days	*35.5 [34.0; 37.0]*
More than half the days	*14.6 [13.5; 15.7]*
Nearly every day	*9.1 [8.1; 10.3]*
Optimism about future	
Total score	6.1 [6.0; 6.2]
High optimism (score ≥ 8)	*28.3 [27.1; 29.6]*

*Post-stratification weighted by: State, SEIFA decile, gender, and age.

Table 6 Associations between experiences of COVID-19 and COVID-19 restrictions and mental health in the last two weeks (N= 13,829)

Experience of COVID-19 and restrictions	**Mental health outcome**				
	Clinically significant symptoms of depression	Clinically significant symptoms of anxiety	Thoughts of self-harm or being better off dead	Becoming easily annoyed or irritable	High optimism about the future
Any experience of COVID-19	1.06 [0.95; 1.19]	**1.15 [1.02; 1.3]**	0.99 [0.86; 1.14]	1.08 [0.98; 1.2]	0.93 [0.84; 1.03]
Job lost because of COVID-19 restrictions	**1.50 [1.31; 1.72]**	**1.22 [1.06; 1.41]**	**1.31 [1.11; 1.55]**	**1.22 [1.07; 1.40]**	**0.76 [0.66; 0.88]**
Highly worried about contracting COVID-19	**1.80 [1.61; 2.00]**	**2.57 [2.3; 2.87]**	**1.41 [1.23; 1.61]**	**1.49 [1.34; 1.65]**	**0.81 [0.72; 0.90]**
High adverse impact of restrictions	**3.15 [2.88; 3.44]**	**3.18 [2.89; 3.49]**	**2.19 [1.96; 2.45]**	**2.17 [1.98; 2.37]**	**0.67 [0.61; 0.74]**

Data cell: Adjusted odds ratio [95% CI]. Bolded are statistically significant. Adjusted odds ratios were derived from the model predicting a mental health outcome that included all of the four types of experiences of COVID-19 and restrictions along with socio-demographic characteristics (State, urban/rural, SEIFA quintile, gender, age group, living situation, born overseas, and job status).

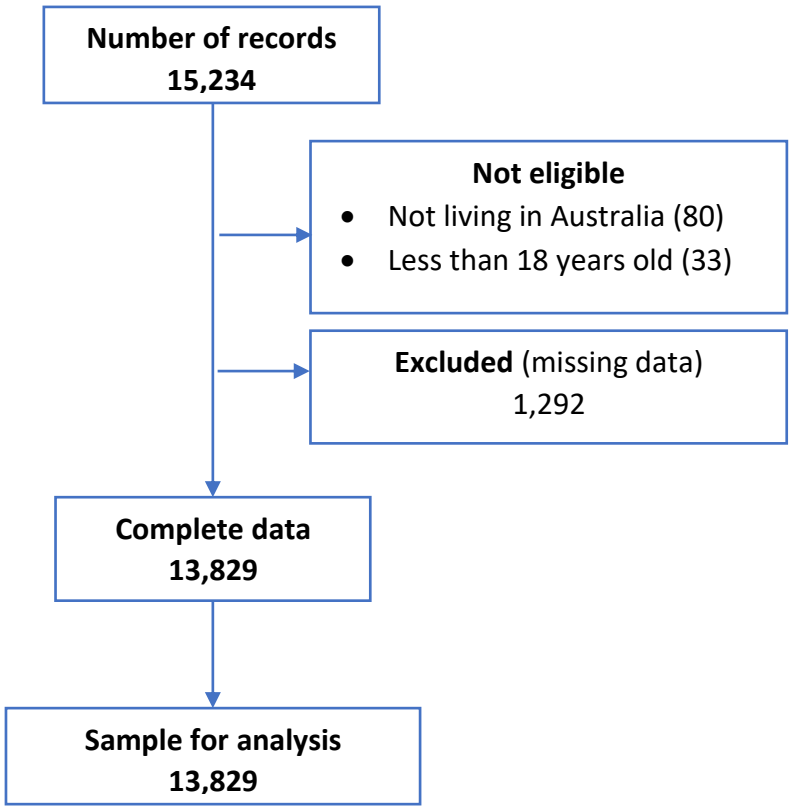

Figure 1 – Flowchart of respondents

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No.	Recommendation	Page No.	Relevant text from manuscript
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1-2	
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2	
Introduction				
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4	
Objectives	3	State specific objectives, including any prespecified hypotheses	4	
Methods				
Study design	4	Present key elements of study design early in the paper	4	
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4	
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	4	
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case		
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5-6	
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5	
Bias	9	Describe any efforts to address potential sources of bias	6	
Study size	10	Explain how the study size was arrived at	4	

Continued on next page

Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	5-6
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	6
		(*b*) Describe any methods used to examine subgroups and interactions	N/A
		(*c*) Explain how missing data were addressed	6
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	6
		(*e*) Describe any sensitivity analyses	N/A
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Fig.1
		(b) Give reasons for non-participation at each stage	Fig.1
		(c) Consider use of a flow diagram	Fig.1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 2
		(b) Indicate number of participants with missing data for each variable of interest	N/A
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	
		Cross-sectional study—Report numbers of outcome events or summary measures	Table 5
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Tables 3&6
		(*b*) Report category boundaries when continuous variables were categorized	5-6
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A

Continued on next page

Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	6
Discussion			
Key results	18	Summarise key results with reference to study objectives	8
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	8
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	8
Generalisability	21	Discuss the generalisability (external validity) of the study results	8
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Acknowledgments

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.