

BMJ Open Psychological, social and financial impacts of COVID-19 on culturally and linguistically diverse communities in Sydney, Australia

Danielle Marie Muscat ¹, Julie Ayre ¹, Olivia Mac,¹ Carys Batcup ¹, Erin Cvejic ¹, Kristen Pickles ¹, Hankiz Dolan ¹, Carissa Bonner ¹, Dana Mouwad,² Dipti Zachariah,² Una Turalic,³ Yvonne Santalucia,⁴ Tingting Chen,² Gordana Vasic,² Kirsten J McCaffery ¹

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¹Sydney Health Literacy Lab, Faculty of Medicine and Health, The University of Sydney, Sydney, New South Wales, Australia

²Western Sydney Local Health District, Sydney, New South Wales, Australia

³Nepean Blue Mountains Local Health District, Sydney, New South Wales, Australia

⁴South Western Sydney Local Health District, Sydney, New South Wales, Australia

Correspondence to

Dr Danielle Marie Muscat;
danielle.muscat@sydney.edu.au

ABSTRACT

Objective To explore the psychological, social and financial outcomes of COVID-19—and the sociodemographic predictors of those outcomes—among culturally and linguistically diverse communities in Sydney, Australia.

Design Cross-sectional survey informed by the Framework for Culturally Competent Health Research conducted between March and July 2021.

Setting Participants who primarily speak a language other than English at home were recruited from Greater Western Sydney, New South Wales.

Participants 708 community members (mean age: 45.4 years (range 18–91)). 88% (n=622) were born outside of Australia, 31% (n=220) did not speak English well or at all, and 41% (n=290) had inadequate health literacy.

Outcome measures Thirteen items regarding COVID-19-related psychological, social and financial outcomes were adapted from validated scales, previous surveys or co-designed in partnership with Multicultural Health and interpreter service staff. Logistic regression models (using poststratification weighted frequencies) were used to identify sociodemographic predictors of outcomes. Surveys were available in English or translated (11 languages).

Results In this analysis, conducted prior to the 2021 COVID-19 outbreak in Sydney, 25% of the sample reported feeling nervous or stressed most/all of the time and 22% felt lonely or alone most/all of the time. A quarter of participants reported negative impacts on their spousal relationships as a result of COVID-19 and most parents reported that their children were less active (64%), had more screen time (63%) and were finding school harder (45%). Mean financial burden was 2.9/5 (95% CI 2.8 to 2.9). Regression analyses consistently showed more negative outcomes for those with comorbidities and differences across language groups.

Conclusion Culturally and linguistically diverse communities experience significant psychological, social and financial impacts of COVID-19. A whole-of-government approach is needed to support rapid co-design of culturally safe support packages in response to COVID-19 and other national health emergencies, tailored appropriately to

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ To date, this is the largest Australian survey exploring COVID-19-related psychological, social and financial outcomes, and the sociodemographic correlates of these outcomes, among people who primarily speak a language other than English.
- ⇒ This study was co-designed by researchers, multi-cultural health and interpreter service staff, in alignment with the Framework of Culturally Competent Health Research and enabled through recruitment methods that are inclusive and reduce barriers to participation (eg, translated surveys; engagement of trusted interpreters and multicultural health staff; use of multiple recruitment methods including through community events and networks).
- ⇒ To reduce survey length and burden on participants we purposefully selected a small number of items from validated measures or our previous research to explore psychological, social and financial outcomes or co-designed them specifically for this study.
- ⇒ Convenience sampling methods and self-report may have introduced recall and social desirability bias.
- ⇒ We are unable to explore changes in COVID-19-related outcomes over time.

specific language groups and accounting for pre-existing health disparities.

INTRODUCTION

The COVID-19 pandemic has not impacted all populations equally. People from racial and cultural minority groups in countries across the globe have been disproportionately affected, with higher rates of infection, greater risk of morbidity, higher critical care admissions and mortality, and poorer mental health and financial outcomes.^{1–6} Such differences reflect pre-existing health disparities and underlying social, economic and political inequalities; racial and cultural minority



communities experience a higher prevalence of comorbidities associated with poor COVID-19 outcomes (eg, cardiovascular conditions), greater social deprivation and differences in occupational and environmental risk.⁷⁻⁹ The additional burden of structural racism also impacts care seeking and quality of care.⁷

While the data tell a clear story of cultural disadvantage in the USA, Canada, the UK and several Nordic countries, there remains limited evidence of the impact of COVID-19 on culturally and linguistically diverse groups in Australia despite being one of the most culturally diverse nations worldwide. Currently, people living in Australia identify with more than 270 ancestries, with almost seven million people migrating to Australia since 1945.¹⁰ In 2020, 29.8% of Australia's population were born overseas,¹¹ a level that is higher than most countries within the Organisation for Economic Co-operation and Development.¹²

Nationally representative Australian surveys exploring the financial, social and psychological impacts of the pandemic¹³ often systematically exclude culturally and linguistically diverse populations, and there remains a lack of disaggregated data related to COVID-19. A similar trend is observed worldwide.¹⁴ Research to date (both in Australia and internationally) has also been limited in its engagement with diverse communities. This has been exacerbated by online recruitment methods (eg, via social media networks or market research companies) and English-language data collection, which tend to prohibit participation of those who speak a language other than English as their primary language.

The few studies which have been conducted have highlighted important impacts of the pandemic for our diverse communities.^{15 16} In a study of 656 refugees and asylum seekers who had arrived in Australia within the last 10 years (most commonly from Iraq (58.7%, n=385) and Syria (16.9%, n=111)), approximately one in five participants reported experiencing employment loss or decline due to COVID-19, with prevalent stressors related to COVID-19 infection including worries about being infected (66.5%), of a loved one being infected (72.1%) or infecting others (47.7%).¹⁷ Social stressors as a consequence of the pandemic were also common, including school closures (46.7%), reduced social activities (46.6%) and having to remain at home (41.3%), and these stressors predicted increased depression symptoms and disability outcomes.¹⁷

Our own Australian surveys (and others^{15 16}) have also identified some differences in financial and psychological impacts of COVID-19 among those who speak a language other than English at home compared with those for whom English is their primary language. A survey of 4362 Australians conducted in April 2020, for example, showed that participants who spoke a language other than English at home rated the financial impact of COVID-19 as higher, were more likely to feel nervous or stressed as a result of the pandemic and had greater anxiety compared with those who primarily spoke English at home.¹⁸ However, 75% of participants in this survey

were born in Australia and only 274 (6%) reported that they did not speak English as their main language at home. As such, our previous findings are limited in their ability to inform appropriate and tailored support for Australian communities that are typically understudied and underserved, such as those from different cultural and language groups.

There also remain limited data about the sociodemographic predictors of COVID-19-related psychological, social and financial outcomes in culturally and linguistically diverse communities. A myriad of sociodemographic factors put communities at increased risk for worsened COVID-19 outcomes. Language barriers, for example, are a well-established driver of inequitable outcomes in healthcare, often arising from worsened patient experience, unmet informational needs and discrimination.¹⁹ Further, the population whose main language is not English are also at greater likelihood of having lower socioeconomic status²⁰ and lower health literacy²¹ among other sociodemographic risk factors which can compound the impact of health emergencies including COVID-19.

The aims of this study were to:

1. Explore the psychological, social and financial impact of the COVID-19 pandemic on culturally and linguistically diverse communities in Greater Western Sydney in New South Wales (NSW), Australia.
2. Examine demographic factors associated with these impacts.

METHODS

Study design

This study involved a cross-sectional survey with 11 language groups.

Patient and public involvement

This study was co-designed by researchers, bilingual community members and Multicultural Health and Health Care Interpreter Service staff, and informed by the Framework for Culturally Competent Health Research²² which identifies four components of culturally competent health research. The application of this Framework to the current study is outlined in [box 1](#).

Setting

The survey was conducted from 21 March to 9 July 2021. The first case of COVID-19 in Australia was detected in January 2020; a national emergency with social distancing rules and closure of 'non-essential' services followed in March 2020. Peaks of infection occurred in March 2020, and May-June 2020, and vaccinations begun in February 2021. During the study period, daily cases in New South Wales (NSW) were very low by international standards, ranging from 0 to 46 positive cases from a population of approximately 8 million people.²³ A 'stay at home' order across Greater Sydney due to rising cases began on 23 June 2021.²⁴ On the day the survey closed the NSW daily case count was 45, and 24% of the population had received one COVID-19 vaccination.²³

Box 1 Application of the Framework for Culturally Competent Health Research²²

- ⇒ *Assemble a culturally competent team:* The research team included Multicultural Health and Health Care Interpreter Service staff and bilingual community members from eastern Sydney who have extensive experience working with culturally and linguistically diverse communities. Many share the language skills and cultural background of community members in Greater Western Sydney.
- ⇒ *Address community need:* Outcome measures for this survey study were developed in partnership with Multicultural Health and Health Care Interpreter Service staff as well as bilingual community members to ensure they addressed community needs. This included the selection of broad outcome domains (psychological, social and financial impacts) as well as individual questions. The survey was reviewed by the entire study team as well as all bilingual community members involved in data collection before implementation to ensure relevance, readability and clarity of items for community members. Multicultural Health and Health Care Interpreter Service staff also played a key role in the selection of language groups for this study. The goal was to select groups based on several variables including perceived need and size of the community in Greater Western Sydney, while allowing for diversity in regard to time since migration and English-language proficiency.
- ⇒ *Address health inequities:* Multicultural Health and Health Care Interpreter Service staff worked in partnership with researchers to influence decisions about research questions and design as well as interpretation and dissemination of findings. Findings were presented as two-page infographics and disseminated to communities through local networks, as well as in the peer-reviewed literature, demonstrating commitment to feeding back the results of the research and enhancing community trust.
- ⇒ *Address differences in power:* This study built on enduring partnerships between researchers, health services and multicultural community organisations that have spanned multiple research projects. The goal for this study and others has been to bring together a range of health staff, consumers and researchers to co-create value together from the outset, placing high value on different types of knowledge, particularly the lived experiences of community members and contextually specific knowledge of our health services partners. Wherever feasible, the goal has been to redistribute knowledge-based power and replace it with mutual learning between all participants.

Participants were recruited from Greater Western Sydney in NSW, Australia, from three adjoining regions with high cultural diversity: Western Sydney (47% of residents born overseas²⁵), South Western Sydney (43% of residents born overseas²⁶) and Nepean Blue Mountains (24% of residents born overseas²⁷).

Participants

Participants were eligible to take part if they were aged 18 years or over and spoke one of the following as their main language at home: Arabic, Assyrian, Chinese, Croatian,

Dari, Dinka, Hindi, Khmer, Samoan, Tongan, Spanish. Through iterative discussions with Multicultural Health and Health Care Interpreter Service staff in each participating Local Health District, we selected 11 language groups that would provide broad coverage across different global regions, and groups with varying average levels of English language proficiency (based on 2016 Australian census data²⁸), varying access to translated materials and varying degrees of reading skill in their main language spoken at home.

Recruitment

Participants were recruited through bilingual Multicultural Health staff and Health Care Interpreter Service staff. Multicultural Health staff recruited participants through their existing networks, community events and community champions. Health Care Interpreter Service staff recruited participants at the end of a medical appointment and via their community network. The survey was hosted online using the web-based survey platform Qualtrics. Potential participants were offered two means of taking part: completing the survey themselves online (available in English or translated), or with assistance from bilingual staff or an interpreter who read the questions to them and recorded their responses. To ensure consistency in the phrases used for assisted survey completion, translated versions of the survey were provided to all staff assisting with survey completion. Translations were completed by translators with National Accreditation Authority for Translators and Interpreters (NAATI) accreditation where possible.

Measures

This survey formed part of a larger study that examined COVID-19-related behaviour and intentions, information sources, and impacts. Survey items reported here are those which were included in the current analysis. All other items are reported elsewhere.²⁹⁻³¹

Demographic survey items relevant to this study included age, gender, education, whether born in Australia, years living in Australia, main language spoken at home, self-reported English language proficiency and a single-item health literacy screener.³² Chronic disease status was determined by asking participants to self-report if their doctor had ever told them they had had one or more of the following: respiratory disease, stroke, asthma, diabetes, chronic obstructive pulmonary disease, depression, anxiety, high blood pressure, cancer or heart disease. The socioeconomic status of the area of residence for each individual was defined based on the Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socioeconomic Advantage and Disadvantage (IRSAD³³). IRSAD aligns the statistical local area with a decile ranking, with lower scores indicating greater socioeconomic disadvantage. The IRSAD decile was not available for some participants (n=5), for example, because they had entered digits that did not correspond to a valid Australian post-code. IRSAD decile for these participants was replaced

**Table 1** Survey items related to study outcomes, including response options

Item	Response options
Psychological impacts	
Over the past week, how often have you felt ▶ nervous or 'stressed' because of COVID-19? ▶ alone or lonely because of COVID-19?	Never/some of the time/most of the time/all of the time
Social impacts	
Do you have a partner (eg, wife, husband, or someone you are in a romantic or sexual relationship with)?	Yes/no
COVID-19 has changed my relationship with my partner	Very negative effects/some negative effects/no effects/some positive effects/very positive effects
Do you have any children aged less than 18 years?	Yes/no
Since the pandemic started... ▶ I or another family member spends more time looking after my child/children ▶ My child/children are less physically active ▶ My child/children are finding school harder ▶ My child/children have more screen time ▶ My child/children spend less time with their friends	Strongly agree/somewhat agree/neither agree nor disagree/somewhat disagree/strongly disagree
Financial impacts	
Has your employment status (work) changed because of COVID-19?	Yes/no
How did your employment status (work) change because of COVID-19?	Have a new job/lost job/stood down (not working for pay, but not fired)/pay cut/reduction in hours/not working but still being paid/other
I worry about the financial problems I will have in the future as a result of the COVID-19 pandemic	Not at all/a little bit/somewhat/quite a bit/very much
I am able to meet my weekly expenses	Not at all/a little bit/somewhat/quite a bit/very much

with the median IRSAD decile for speakers of the same language in the sample. For the analysis, IRSAD deciles were re-coded into quintiles, and dichotomised (lowest quintile vs other).

Thirteen items regarding the impacts of COVID-19 were selected for this survey study in partnership with Multicultural Health and Health Care Interpreter Service staff. See [table 1](#). Items related to financial impacts were adapted from the COmprehensive Score for financial Toxicity (COST) Scale.³⁴ We adapted two items ('I worry about the financial problems I will have in the future as a result of my illness or treatment' and 'I am able to meet my monthly expenses') to be relevant to the COVID-19 context. Psychological items were taken verbatim from our previous COVID-19 work.¹⁸ Questions regarding social impacts (including impacts on relationships and children) were co-designed with Multicultural Health and Health Care Interpreter Service staff based on local information priorities. All items had fixed yes/no and Likert-type responses. Items were translated into 11 languages. The grade reading score of the 13 items (excluding response options) in English was Grade seven as assessed using the Hemingway Editor.

Analysis

Quantitative data were analysed using IBM SPSS Statistics V.24. Descriptive statistics were generated for demographic

characteristics of the analysed sample. Frequencies were weighted (using poststratification weighting) to reflect each language group's gender and age group distribution (18–29 years, 30–49 years, 50–69 years, ≥70 years) based on 2016 census data for Western Sydney, South Western Sydney and Nepean Blue Mountains' combined populations.²⁸ All frequencies presented in the results section are weighted. A single participant indicated their gender as 'other' and was unable to be included in weighted analyses. Total recruitment for the Spanish language group was low (<50), with notable gaps for some age groups. For this reason, results for this language group are not presented in the statistical analyses, but are included in total frequencies.

Survey items about psychological, financial and social impacts were re-coded to facilitate a more meaningful interpretation of the results (see tables in the Results section). A mean 'perceived financial burden' score was also calculated by averaging the two questions about financial impacts: (1) Worry about financial problems and (2) Ability to meet weekly expenses (reverse coded). Higher scores indicate greater perceived financial burden (range: 1–5). Similarly, a mean score for the impact on children was calculated by averaging questions related to four impacts: physical activity, screen time, schooling and time with friends. Higher scores indicate more negative

impacts on children (range: 1–5). Cronbach's α for this scale was 0.805, indicating a high level of internal consistency.

Unadjusted and adjusted regression analyses were then conducted to explore the predictors of COVID-19-related psychological, social and financial outcomes. Linear regression models were used to analyse perceived financial burden (averaged across two impacts) and impacts on children (averaged across four impacts). Logistic regression models were used to analyse psychological impacts (feeling lonely or alone; feeling nervous or stressed) and impact on relationships. Age group, gender, chronic illness, education, health literacy, English-language proficiency, years lived in Australia, language group and IRSAD quintile were included in each adjusted regression model. Models predicting impacts on relationships also controlled for perceived public health threat of COVID-19, perceived financial burden and psychological variables; models predicting psychological impacts controlled for perceived public health threat of COVID-19 and perceived financial burden. All regression models also controlled for whether participants completed the survey before or after 23 June, when restrictions were announced for all of Greater Sydney.²⁴ In line with recommendations, bivariable significance was not used as a criterion for variable selection in multivariable modelling.^{35 36} The significance level used to determine significant differences was 0.05.

RESULTS

Sample characteristics

We had a total of 708 respondents (442 (62.4%) self-completed, 266 (37.6%) received assistance through an interpreter). Sample characteristics are summarised in table 2. The mean age was 45.4 years (SE 0.78; range 18–91 years), and 51% of respondents were female (n=363). Most participants (88%, n=622) were born in a country other than Australia; 31% reported that they did not speak English well or at all (n=220); 29.7% had a university bachelor degree level or higher. Inadequate health literacy was identified for 41% of the sample (n=290).

Psychological impacts

Overall, 25.3% of participants reported feeling nervous or stressed most or all of the time over the past week. This ranged across language groups from 6% (n=5) for Chinese speakers to 38% (n=24) for Dinka speakers. 30.7% (n=89) of participants with inadequate health literacy and 21.4% (n=89) of participants with adequate health literacy reported feeling nervous or stressed most or all of the time. This was 21.4% for those who self-reported that they speak English well or very well, compared with 33.7% of those who speak English not well or not at all. See table 3, which also outlines further sociodemographic differences. In the multivariable regression model when sociodemographic factors were controlled for, language group (p<0.001), female gender (p=0.04), and having

Table 2 Descriptive statistics of analysed sample (n=708)

Variable	N	%
Age group, years		
18–29	147	20.7
30–49	295	41.8
50–69	193	27.3
>70	72	10.2
Gender*		
Male	344	48.6
Female	363	51.4
Language		
Assyrian	133	18.8
Croatian	121	6.2
Arabic	80	11.3
Chinese	76	10.7
Dinka	63	8.9
Khmer	63	8.9
Dari	44	6.2
Spanish†	43	6.1
Hindi	42	5.9
Samoan/Tongan	42	5.9
English language proficiency (How well do you speak English?)		
Very well/ well	487	68.9
Not well/not at all	220	31.1
Literacy in a language other than English (How well do you read in your main language?)		
Very well/ well	589	83.4
Not well/not at all	118	16.6
Health literacy‡		
Adequate	417	58.9
Inadequate	290	41.1
Highest level of education		
Less than year 12 (less than high school)	115	16.2
Year 12 (high school graduate)	133	18.9
Certificate level I to IV/advanced diploma and diploma level	249	35.3
University bachelor degree level and above	210	29.7
Years living in Australia		
5 years or less	120	16.9
6–10 years	104	14.7
More than 10 years	398	56.4
Born in Australia	85	12.0
IRSAD quintile		
1 (lowest)	224	31.7
2	140	19.8
3	125	17.7

Continued

Table 2 Continued

Variable	N	%
4	140	19.8
5 (highest)	87	12.3
Children less than 18 years	262	37.0
Interpreter assistance completing the survey	266	37.6
Total	707	

NB: Frequencies are weighted (using poststratification weighting) to reflect each language group's gender and age group distribution (18-29 years, 30-49 years, 50-69 years, ≥70 years) based on 2016 census data for Western Sydney, South Western Sydney and Nepean Blue Mountains' combined populations.²⁸

*n=1 respondent excluded from the weighted analyses included in this table; weighted frequencies have been rounded to whole numbers for clarity.

†Spanish language group had substantial gaps in recruitment across age groups.

‡Based on the Single Item Literacy Screener (SILS).³²

IRSAD, Index of Relative Socioeconomic Advantage and Disadvantage.

two or more chronic illnesses ($p<0.001$) remained significantly associated with increased nervousness or stress, as did higher perceived financial burden ($p<0.001$). See online supplemental table 1.

Overall, 22.3% of participants reported feeling alone or lonely most or all of the time. In regards to language groups, the range was from 5.6% ($n=2$) for Hindi speakers to 51.2% ($n=32$) for Khmer speakers. 27.8% ($n=81$) of participants with inadequate health literacy reported feeling alone or lonely most or all of the time; this proportion was 18.5% for participants with adequate health literacy ($n=77$). The proportion of participants who reported feeling alone or lonely most or all of the time was 18.3% for those who self-reported that they speak English well or very well, compared with 31.3% of those who speak English not well or not at all. See [table 3](#). After multivariate adjustment, having two or more chronic illnesses ($p<0.001$) and university education ($p<0.001$) remained as significant correlates of feeling lonely or alone, with statistically significant differences also observed between language groups ($p<0.001$).

Social impacts

Of the 399 participants who responded to the question regarding impacts of COVID-19 on their relationship with their partner, a quarter (25.5%) reported negative effects; 62.9% said that the pandemic had no effect and 11.7% said that it had had positive effects. We observed significant differences in reporting of negative impacts on relationships across language groups ($p<0.001$) and across age groups such that those aged <30 years had a significantly higher proportion of people reporting negative impacts compared with each other age group (30-49 years: $p<0.001$; 50-69 years: $p<0.001$; 70 years and above: $p=0.02$). Those in the most disadvantaged IRSAD quintile reported more negative impacts compared with those in

Table 3 Psychological impacts by gender, age group, health literacy, IRSAD quintile and number of comorbidities ($n=707$)*

	Nervous or stressed n (%)	Alone or lonely n (%)
Total	179 (25.3)	158 (22.3)
Gender		
Male	73 (21.3)	75 (21.8)
Female	105 (29.0)	83 (22.8)
Age group, years		
<30	31 (20.9)	30 (20.2)
30-49	65 (22.0)	52 (17.6)
50-69	58 (29.9)	44 (22.6)
70+	25 (35.0)	33 (45.5)
Health literacy		
Inadequate	89 (30.7)	81 (27.8)
Adequate	89 (21.4)	77 (18.5)
IRSAD quintile		
Lowest	61 (27.2)	44 (19.7)
Not lowest	118 (24.4)	114 (23.5)
Comorbidities†		
0	85 (20.1)	73 (17.4)
1	46 (29.5)	37 (23.7)
2	48 (36.6)	48 (36.5)
Language		
Assyrian	22 (16.9)	13 (9.5)
Croatian	40 (33.4)	50 (41.1)
Arabic	14 (17.9)	19 (23.5)
Chinese	5 (6.0)	5 (6.1)
Dinka	24 (38.0)	15 (24.4)
Khmer	36 (57.1)	32 (51.2)
Dari	14 (31.9)	8 (17.8)
Spanish†	5 (11.9)	6 (14.2)
Hindi	6 (13.4)	2 (5.6)
Samoan/Tongan	12 (29.0)	6 (14.2)
English language proficiency		
Very well/well	104 (21.4)	89 (18.3)
Not well/not at all	74 (33.7)	69 (31.3)

*n=1 respondent excluded from the weighted analyses included in this table; weighted frequencies have been rounded to whole numbers for clarity.

†Health conditions assessed included respiratory disease, asthma, chronic obstructive pulmonary disease, high blood pressure, cancer, heart disease, stroke, diabetes, depression and anxiety. IRSAD, Index of Relative Socioeconomic Advantage and Disadvantage.

higher quintiles ($p<0.01$). We also observed significant differences in reporting of negative impacts on relationships based on financial burden ($p<0.001$) and psychological variables (alone/lonely: $p<0.001$; nervous/stressed: $p<0.001$). See [table 4](#).

Table 4 Social impacts by gender, age group, health literacy, IRSAD quintile and number of comorbidities (n=707)*

	Negative impact on relationship†	More time looking after children‡	More screen time‡	Less physically active‡	Less time with friends‡	Finding school harder‡	Mean negative impact on children§
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	M (95% CI)
Total	101 (25.5)	191 (72.8)	166 (63.3)	168 (64.2)	180 (68.5)	118 (44.9)	3.5 (3.3 to 3.7)
Gender							
Male	49 (23.7)	99 (77.2)	85 (66.4)	92 (71.6)	91 (71.1)	61 (47.7)	3.6 (3.2 to 4.0)
Female	63 (27.3)	92 (68.6)	81 (60.2)	76 (57.0)	89 (66.2)	56 (42.2)	3.5 (3.3 to 3.7)
Age group, years							
<30	23 (47.7)	8 (64.8)	6 (46.1)	5 (39.7)	6 (51.0)	4 (32.0)	2.9 (2.1 to 3.8)
30–49	39 (19.7)	148 (74.1)	131 (65.6)	139 (69.5)	148 (73.7)	91 (45.5)	3.7 (3.5 to 3.8)
50–69	32 (27.2)	34 (70.2)	28 (59.0)	24 (48.9)	25 (52.4)	22 (46.7)	3.2 (2.5 to 2.9)
70+	8 (21.6)	–	–	–	–	–	–
Health literacy							
Inadequate	49 (27.8)	76 (75.7)	64 (64.4)	60 (59.3)	72 (71.6)	45 (44.7)	3.5 (3.1 to 3.9)
Adequate	53 (22.6)	114 (71.0)	101 (62.5)	108 (67.2)	107 (66.7)	72 (45.0)	3.6 (3.3 to 3.8)
IRSAD quintile							
Lowest	14 (12.8)	61 (72.8)	51 (60.9)	50 (60.0)	57 (68.0)	36 (43.3)	3.4 (3.0 to 3.9)
Not lowest	88 (30.3)	130 (72.8)	115 (64.4)	118 (66.1)	123 (68.8)	81 (45.6)	3.6 (3.4 to 3.8)
Comorbidities¶							
0	54 (23.9)	128 (69.9)	109 (59.6)	118 (64.3)	118 (64.3)	79 (43.2)	3.5 (3.2 to 3.7)
1	23 (25.8)	41 (84.9)	37 (78.4)	30 (63.2)	39 (82.6)	28 (59.3)	3.8 (3.6 to 4.0)
2	24 (29.5)	22 (71.4)	19 (61.8)	20 (64.8)	22 (72.3)	10 (32.7)	3.4 (2.7 to 4.1)
Language							
Assyrian	2 (2.7)	40 (80.4)	30 (60.4)	22 (49.5)	28 (55.5)	21 (42.5)	3.4 (3.1 to 3.6)
Croatian	40 (38.2)	33 (93.8)	34 (97.3)	32 (91.4)	34 (97.3)	22 (63.4)	4.3 (4.1 to 4.5)
Arabic	3 (6.7)	12 (69.8)	13 (73.6)	15 (87.2)	8 (49.4)	12 (72.5)	3.6 (3.2 to 4.0)
Chinese	8 (20.1)	25 (87.0)	23 (81.0)	25 (88.9)	25 (87.0)	9 (32.3)	4.1 (3.8 to 4.3)
Dinka	6 (18.9)	25 (66.3)	24 (64.7)	24 (63.3)	27 (72.9)	18 (49.5)	3.7 (3.3 to 4.1)
Khmer	8 (45.3)	16 (90.2)	10 (56.3)	15 (85.3)	17 (100.0)	13 (77.5)	4.1 (3.9 to 4.3)
Dari	10 (32.9)	17 (83.7)	8 (39.2)	6 (28.4)	14 (66.9)	3 (13.4)	2.9 (2.3 to 3.4)
Spanish	5 (16.6)	4 (20.9)	1 (3.5)	5 (23.1)	4 (20.9)	0 (0)	1.8 (0.7 to 2.9)
Hindi	5 (14.7)	7 (36.7)	9 (49.4)	12 (76.2)	8 (44.9)	4 (21.8)	3.1 (2.6 to 3.5)
Samoan/Tongan	15 (68.2)	13 (72.6)	14 (81.0)	13 (76.2)	14 (79.8)	14 (79.8)	4.1 (3.7 to 4.5)
English language proficiency							
Very well/well	65 (25.6)	144 (69.5)	123 (59.2)	133 (64.3)	135 (65.3)	89 (43.0)	3.5 (3.2 to 3.7)
Not well/not at all	37 (25.2)	47 (85.5)	43 (78.7)	35 (63.5)	44 (81.0)	29 (52.0)	3.8 (3.6 to 4.0)

*n=1 respondents excluded from the weighted analyses included in this table; weighted frequencies have been rounded to whole numbers for clarity.

†Total number of participants that responded to the question regarding the impacts of COVID-19 on their relationship with their partner=399.

‡Total number of participants reporting having children=262. Impacts on children are not reported for age group 70+ years due to small numbers.

§Composite score comprising impact on screen time, physical activity, time with friends and schooling. Scale range: 1–5. Higher scores indicate more negative impact.

¶Health conditions assessed included respiratory disease, asthma, chronic obstructive pulmonary disease, high blood pressure, cancer, heart disease, stroke, diabetes, depression and anxiety.

IRSAD, Index of Relative Socioeconomic Advantage and Disadvantage.

Of the 262 participants who reported having children aged less than 18 years, 72.8% reported spending more time looking after their children as a result of the pandemic (n=191). The majority agreed (somewhat or strongly) that COVID-19 has meant that their children spent less time with friends (68.5%), are less physically active (64.2%) and have more screen time (63.3%). Across the entire sample, 44.9% agreed that their children were finding school harder. Mean perceived negative impact on children was rated 3.5 (out of 5; 95% CI 3.3 to 3.7). In the multivariate analysis, reporting of negative impacts on children varied significantly across language groups ($p<0.001$). Reporting of negative impacts on children was significantly associated with the most disadvantaged IRSAD quintile ($p=0.02$) and with chronic illness, with participants with one ($p=0.01$) or two or more ($p<0.001$) chronic illnesses significantly more likely to report negative impacts compared with those without chronic illness. See online supplemental table 2.

Financial impacts

Overall, 38.6% of participants reported that their employment status has changed because of COVID-19. This was most commonly a reduction in hours of employment. See figure 1. In total, 63.6% of participants reported somewhat or more worry about financial problems as a result of the COVID-19 pandemic, and 53.7% reported that they were having difficulty meeting their financial expenses.

Mean perceived financial burden was 2.9 on a 5-point scale (95% CI 2.8 to 2.9). As shown in table 5 and online supplemental table 3, perceived financial burden was similar across health literacy and language proficiency categories. Financial burden differed across language groups and was highest for Khmer speakers (M=3.6; 95% CI 3.4 to 3.8) and lowest for Spanish speakers (M=2.1; 95% CI 1.7 to 2.6).

In the multivariable regression model, we also observed significant differences in mean perceived financial burden across language groups ($p<0.001$). As well as differences by language, mean perceived financial burden was significantly lower for the oldest age group compared with the youngest after controlling for other sociodemographic factors ($p<0.001$). People with one chronic illness ($p=0.01$) or two or more ($p<0.001$) reported significantly

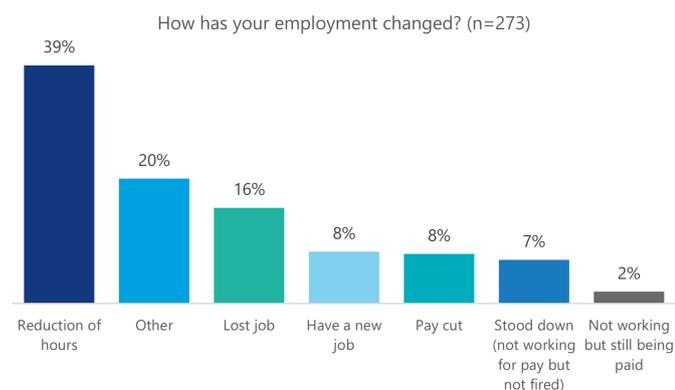


Figure 1 Change in employment.

more financial burden compared with those without chronic illness.

DISCUSSION

This is the largest Australian survey exploring COVID-19-related psychological, social and financial outcomes, and the sociodemographic predictors of those outcomes, among people who primarily speak a language other than English to be conducted to date. Even prior to the July 2021 COVID-19 outbreak in NSW, which disproportionately impacted the communities and geographical areas included in this study, we observed broad negative psychological, social and financial impacts of the pandemic. Over a quarter of the sample reported feeling nervous or stressed most or all of the time, and 22% felt lonely or alone most or all of the time. Over half worried about financial problems and reported being somewhat or less able to meet their weekly expenses. A quarter of participants reported negative impacts on their spousal relationship and the majority of participants with children under 18 years reported that even out of lockdown their children spent less time with friends as a result of the pandemic (68.5%), were less physically active (64.2%) and had more screen time (63.3%). Regression analyses consistently showed distinct patterns of COVID-19 impacts for different language groups and more negative outcomes for those living with chronic illness and comorbidities.

The impacts of COVID-19 have been explored across a number of countries with different population groups. Direct comparisons are difficult on account of varying survey items, different data collection time points, and wide-ranging case numbers, morbidity and mortality from COVID-19 across geographical contexts. However, since the beginning of the pandemic, studies have spotlighted sociodemographic disparities in outcomes worldwide³⁷ and broad impacts for culturally and linguistically diverse groups.³⁸ A cross-sectional survey among culturally and linguistically diverse communities in Greater Western Sydney (n=198) conducted earlier in the pandemic (August–September 2020), for example, similarly identified financial and social impacts, with 40% of participants indicating that their financial situation and ability to access social services were ‘worse’ as a result of COVID-19.³⁸ Our findings build on this by offering further nuance (eg, highlighting associated worry about financial problems) and elucidating a range of other impacts including additional impacts on children. Our study also uniquely showcases differences in outcomes across language groups.

In comparing our findings to Australian studies which did not specifically focus on culturally and linguistically diverse communities, we also see some similarities. Nationally representative data from the Australian Bureau of Statistics, for instance, showed that in June 2021, one in five (20%) Australians experienced high or very high levels of psychological distress in the last 4 weeks, and 28% of people 18 years and over reported feeling nervous in that survey.¹³ Previous work has also confirmed negative

Table 5 Financial impacts by gender, age group, health literacy, IRSAD quintile and number of comorbidities (n=707)*

	Employment status changed	Worried about financial problems	Unable to meet weekly expenses	Mean financial burden†
	n (%)	n (%)	n (%)	M (95% CI)
Total	273 (38.6)	450 (63.6)	380 (53.7)	2.9 (2.8 to 2.9)
Gender				
Male	139 (40.5)	128 (37.1)	80 (23.2)	2.8 (2.7 to 3.0)
Female	134 (36.8)	161 (44.2)	75 (20.8)	2.9 (2.8 to 3.0)
Age group, years				
<30	76 (51.8)	65 (44.1)	32 (21.9)	2.8 (2.6 to 3.1)
30–49	134 (45.5)	135 (45.9)	64 (21.8)	2.9 (2.8 to 3.0)
50–69	58 (30.0)	76 (39.5)	47 (24.6)	2.9 (2.8 to 3.1)
70+	5 (6.3)	12 (16.6)	11 (15.7)	2.4 (2.3 to 2.6)
Health literacy				
Inadequate	101 (35.7)	104 (35.8)	64 (21.9)	2.8 (2.7 to 3.0)
Adequate	172 (41.3)	184 (44.3)	91 (22.0)	2.9 (2.8 to 3.0)
IRSAD quintile				
Lowest	70 (31.4)	288 (40.8)	49 (21.7)	2.8 (2.7 to 3.0)
Not lowest	202 (41.9)	201 (41.6)	107 (22.1)	2.9 (2.8 to 3.0)
Comorbidities‡				
0	182 (43.1)	166 (39.5)	93 (22.0)	2.8 (2.7 to 2.9)
1	62 (39.9)	73 (47.0)	30 (19.4)	3.0 (2.8 to 3.2)
2	30 (22.6)	49 (37.4)	33 (24.8)	2.9 (2.7 to 3.0)
Language				
Assyrian	24 (18.2)	39 (29.0)	39 (29.4)	2.7 (2.6 to 2.9)
Croatian	51 (41.9)	57 (46.8)	5 (3.9)	2.7 (2.6 to 2.9)
Arabic	29 (36.1)	19 (23.7)	12 (14.8)	2.7 (2.5 to 3.0)
Chinese	20 (39.8)	14 (18.4)	21 (27.3)	2.6 (2.3 to 2.9)
Dinka	25 (40.3)	39 (62.3)	15 (24.5)	3.1 (2.8 to 3.3)
Khmer	38 (59.7)	45 (71.3)	30 (47.7)	3.6 (3.4 to 3.8)
Dari	25 (56.7)	26 (59.5)	8 (18.7)	3.4 (3.2 to 3.6)
Spanish§	13 (29.7)	9 (21.4)	6 (14.9)	2.1 (1.7 to 2.6)
Hindi	20 (48.0)	17 (40.4)	3 (7.4)	2.8 (2.6 to 2.9)
Samoan/Tongan	18 (42.8)	24 (56.3)	15 (36.9)	3.0 (2.6 to 3.5)
English language proficiency				
Very well/well	211 (43.2)	201 (41.2)	100 (20.5)	2.8 (2.7 to 2.9)
Not well/not at all	62 (28.3)	88 (39.9)	55 (25.2)	2.9 (2.8 to 3.0)

*n=1 respondent excluded from the weighted analyses included in this table; weighted frequencies have been rounded to whole numbers for clarity.

†Composite score comprising worry about financial problems and inability to meet weekly expenses. Scale range: 1–5. Higher scores indicate greater perceived financial burden.

‡Health conditions assessed included respiratory disease, asthma, chronic obstructive pulmonary disease, high blood pressure, cancer, heart disease, stroke, diabetes, depression and anxiety.

§Spanish language group had substantial gaps in recruitment across age groups.

IRSAD, Index of Relative Socioeconomic Advantage and Disadvantage.

impacts of COVID-19 on children's social connectedness and amount of screen time.^{39 40} The psychological impacts found in this study are also comparable to our national survey conducted in April 2020, at the outset of

the pandemic when stay-at-home orders had been in place for 3 weeks. In this earlier study, we found that 26% of participants reported feeling nervous or stressed most or all of the time, and 27% felt lonely or alone most or all of



the time.¹⁸ Similar proportions of negative outcomes over time may reflect a pattern of community resilience, which has been referred to elsewhere.³⁸ Alternatively, given that case numbers and community restrictions were low at the time of data collection in the current study, our findings could also reflect the inadequate COVID-19 response for culturally and linguistically diverse communities.

Implications

Our findings showcase a broad range of impacts of COVID-19 among culturally and linguistically diverse Australian communities. A multilevel, whole-of-government approach is needed to address these, with policy and sustainable infrastructure to disseminate timely, understandable and culturally appropriate information about financial, social and mental health resources and services and to co-design tailored support packages for different language groups.⁴¹ Qualitative studies have highlighted a large number of community-driven initiatives and actions that have emerged as a response to COVID-19, as well as embodied and communal ways of coping.⁴² Using a strengths-based perspective, we must acknowledge the multiple capacities and resources of our culturally and linguistically diverse communities and provide properly resourced opportunities to work directly with them to address unique challenges that they face, as identified in this study. Our findings reinforce the need to prioritise support for community members living with comorbidities who are likely to bear a disproportionate impact.

Strengths and limitations

This study was co-designed by researchers and multicultural health service staff, and enabled through recruitment methods that are inclusive and reduce barriers to participation, such as translated versions of the survey, engagement of interpreters and multicultural health staff who are trusted in their communities, and use of multiple recruitment methods (including through community events and networks). This approach wholly aligns with the Framework of Culturally Competent Health Research.²² However, practical constraints limited the number of languages we could include, and restricted data collection to three regions in Greater Sydney only. We also used convenience sampling methods.

To reduce survey length and burden on participants we purposefully selected a small number of items from validated measures or our previous research to explore psychological, social and financial impacts, or co-designed them specifically for this study. Self-report may have introduced recall and social desirability bias.

Finally, the results of this study reflect a particular point in time when there were very low numbers of community-acquired cases of COVID-19 in Australia, and for the most part, no government-imposed restrictions on movement and activities in NSW. It is likely that psychological well-being outcomes and financial and social stress worsened after the July 2021 outbreak and the imposition of

stay-at-home orders, in line with previous research.^{39 43} We are unable to explore changes in impacts over time in this study.

CONCLUSION

Culturally and linguistically diverse communities experience significant impacts of COVID-19, with distinct patterns of impacts for different language groups. We must work with communities to address unique challenges they face and tailor interventions and supports accordingly. As COVID-19 continues to disproportionately impact the most culturally and linguistically diverse communities in Sydney and worldwide, responses must too reflect the diversity of our communities through co-production and tailored support packages.

Twitter Danielle Marie Muscat @Dmuscat92, Julie Ayre @julieayre32, Olivia Mac @oliviamac_3, Erin Cvejic @ErinCvejic, Kristen Pickles @PicklesKristen, Carissa Bonner @carissa_bon and Kirsten J McCaffery @KirstenMcCaffery

Contributors DMM: formal analysis, investigation; data curation; writing—original draft; JA: conceptualisation, methodology, formal analysis, investigation; data curation; writing—review and editing; project administration; OM: formal analysis, investigation; data curation; writing—review and editing; project administration; CB: conceptualisation, methodology, investigation; writing—review and editing; project administration; EC: formal analysis, writing—review and editing; KP: conceptualisation, methodology, writing—review and editing; HD: conceptualisation, methodology, writing—review and editing; CB: conceptualisation, methodology, writing—review and editing; DM: conceptualisation, methodology, investigation; writing—review and editing; DZ: conceptualisation, methodology, investigation; writing—review and editing; UT: conceptualisation, methodology, investigation; writing—review and editing; YS: conceptualisation, methodology, investigation; writing—review and editing; TC: conceptualisation, methodology, investigation; writing—review and editing; GV: conceptualisation, methodology, investigation; writing—review and editing; KJM: conceptualisation, methodology, formal analysis, writing—review and editing; project administration, guarantor.

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ORCID iDs

Danielle Marie Muscat <http://orcid.org/0000-0001-6106-6298>
 Julie Ayre <http://orcid.org/0000-0002-5279-5189>
 Carys Batcup <http://orcid.org/0000-0003-1896-533X>
 Erin Cvejic <http://orcid.org/0000-0002-6043-6071>
 Kristen Pickles <http://orcid.org/0000-0002-1621-3217>
 Hankiz Dolan <http://orcid.org/0000-0002-3185-168X>
 Carissa Bonner <http://orcid.org/0000-0002-4797-6460>
 Kirsten J McCaffery <http://orcid.org/0000-0003-2696-5006>

REFERENCES

- Office for National Statistics [ONS]. *Coronavirus (COVID-19) related deaths by ethnic group, England and Wales: 2 March 2020 to 10 April 2020*. United Kingdom, 2020.
- Sze S, Pan D, Nevill CR, et al. Ethnicity and clinical outcomes in COVID-19: a systematic review and meta-analysis. *EClinicalMedicine* 2020;29-30:100630.
- Jaspal R, Lopes B. Discrimination and mental health outcomes in British black and South Asian people during the COVID-19 outbreak in the UK. *Ment Health Relig Cult* 2021;24:80–96.
- Lopez MH, Rainie L, Budiman A. *Financial and health impacts of COVID-19 vary widely by race and ethnicity*. Washington DC: Pew Research Center, 2020.
- Proto E, Quintana-Domeque C. COVID-19 and mental health deterioration by ethnicity and gender in the UK. *PLoS One* 2021;16:e0244419-e.
- Pan SW, Shen GC, Liu C, et al. Coronavirus stigmatization and psychological distress among Asians in the United States. *Ethn Health* 2021;26:110–25.
- Yaya S, Yeboah H, Charles CH, et al. Ethnic and racial disparities in COVID-19-related deaths: counting the trees, hiding the forest. *BMJ Glob Health* 2020;5:e002913.
- Bambra C, Riordan R, Ford J, et al. The COVID-19 pandemic and health inequalities. *J Epidemiol Community Health* 2020;121:jech-2020-214401–8.
- Kapilashrami A, Bhui K. Mental health and COVID-19: is the virus racist? *Br J Psychiatry* 2020;217:405–7.
- Australian Human Rights Commission. *Face the facts: cultural diversity Sydney, Australia*: Australian human rights Commission, 2014. Available: <https://humanrights.gov.au/our-work/education/face-facts-cultural-diversity>
- Australian Bureau of Statistics [ABS]. *Migration, Australia, 2021*ABS. Available: <https://www.abs.gov.au/statistics/people/population/migration-australia/latest-release> [Accessed 14 April 2022].
- Phillips J, Simon-Davies J. *Migration—Australian migration flows and population*. Canberra, Australia: Parliamentary Library Research Publications, 2016.
- Australian Bureau of Statistics [ABS]. *Household impacts of COVID-19 survey*. Canberra, Australia, 2021.
- Morales DR, Ali SN. COVID-19 and disparities affecting ethnic minorities. *Lancet* 2021;397:1684–5.
- Rahman MA, Hoque N, Alif SM, et al. Factors associated with psychological distress, fear and coping strategies during the COVID-19 pandemic in Australia. *Global Health* 2020;16:95.
- Biddle N, Edwards B, Gray M, et al. *Hardship, distress, and resilience: the initial impacts of COVID-19 in Australia*. Australian National University, 2020.
- Liddell BJ, O'Donnell M, Bryant RA, et al. The association between COVID-19 related stressors and mental health in refugees living in Australia. *Eur J Psychotraumatol* 2021;12:1947564.
- McCaffery KJ, Dodd RH, Cvejic E, et al. Health literacy and disparities in COVID-19-related knowledge, attitudes, beliefs and behaviours in Australia. *Public Health Res Pract* 2020;30:30342012. doi:10.17061/phrp30342012
- Yehekel A, Rawal S. Exploring the 'patient experience' of individuals with limited English proficiency: A scoping review. *J Immigr Minor Health* 2019;21:853–78.
- Chang CD. Social determinants of health and health disparities among immigrants and their children. *Curr Probl Pediatr Adolesc Health Care* 2019;49:23–30.
- Australian Bureau of Statistics [ABS]. *Health literacy, Australia, 2006*. Canberra, Australia: ABS, 2008. <https://www.abs.gov.au/ausstats/abs@.nsf/mf/4233.0>
- Woodland L, Blignault I, O'Callaghan C, et al. A framework for preferred practices in conducting culturally competent health research in a multicultural Society. *Health Res Policy Syst* 2021;19:24.
- COVID-19 in Australia. Available: <https://www.covid19data.com.au/> [Accessed 14 April 2022].
- New South Wales Health. *New COVID-19 restrictions for greater Sydney, 2021*. Available: <https://www.nsw.gov.au/media-releases/new-covid-19-restrictions-for-greater-sydney-23-june-2021> [Accessed 14 April 2022].
- Western Sydney Local Health District [WSLHD]. *About Us, 2021*. Available: <https://www.wslhd.health.nsw.gov.au/About-Us> [Accessed 14 April 2022].
- South Western Sydney Local Health District [SWSLHD] and South Western Sydney Primary Health Network. *South West Sydney: our health, 2021*. Available: <https://www.swsldh.health.nsw.gov.au/pdfs/SWS%20Our%20Health%20in%20brief.pdf> [Accessed 14 April 2022].
- Wentworth Healthcare. *Nepean Blue Mountains 2019 needs assessment, 2019*. Available: <https://www.nbmphn.com.au/Resources/About/Nepean-Blue-Mountains-Regional-Summary-2019> [Accessed 14 April 2022].
- Australian Bureau of Statistics. *2016 Census of Population and Housing [Census TableBuilder]*, 2016.
- Cornell S, Ayre J, Mac O. Collateral positives of COVID-19 for culturally and linguistically diverse communities in Western Sydney, Australia. *medRxiv* 2021:2021.10.20.21265299.
- Ayre J, Muscat DM, Mac O, et al. COVID-19 testing and vaccine willingness: cross-sectional survey in a culturally diverse community in Sydney, Australia. *medRxiv* 2021:2021.10.25.21265503.
- Ayre J, Muscat D, Mac O. Main COVID-19 information sources in a culturally and linguistically diverse community in Sydney, Australia: a cross-sectional survey. *Patient Educ Couns* 2022;S0738-3991:00142–2.
- Wallace LS, Rogers ES, Roskos SE, et al. Brief report: screening items to identify patients with limited health literacy skills. *J Gen Intern Med* 2006;21:874–7.
- [ABS] ABoS. *IRSAD Canberra, Australia ABS, 2018*. Available: <https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2033.0.55.001~2016-Main%20Features-IRSAD~20>
- de Souza JA, Yap BJ, Wroblewski K, et al. Measuring financial toxicity as a clinically relevant patient-reported outcome: the validation of the comprehensive score for financial toxicity (cost). *Cancer* 2017;123:476–84.
- Agresti A. *Categorical data analysis*. 3rd ed. ed. Chichester: Wiley, 2013.
- Harrell FE. *Regression modeling strategies: with applications to linear models, logistic and ordinal regression, and survival analysis*. Cham: Springer International Publishing AG, 2015.
- Wolf MS, Serper M, Opsasnick L, et al. Awareness, attitudes, and actions related to COVID-19 among adults with chronic conditions at the onset of the U.S. outbreak: a cross-sectional survey. *Ann Intern Med* 2020;173:100–9.
- Mude W, Meru C, Njue C, et al. A cross-sectional study of COVID-19 impacts in culturally and linguistically diverse communities in greater western Sydney, Australia. *BMC Public Health* 2021;21:1–2081.
- Australian Institute of Health and Welfare [AIHW]. *COVID-19 and the impact on young people, 2021*AIHW. Available: <https://www.aihw.gov.au/reports/children-youth/covid-19-and-young-people> [Accessed 14 April 2022].
- McArthur BA, Racine N, Browne D, et al. Recreational screen time before and during COVID-19 in school-aged children. *Acta Paediatr* 2021;110:2805–7.
- Wild A, Kunstler B, Goodwin D, et al. Communicating COVID-19 health information to culturally and linguistically diverse communities: insights from a participatory research collaboration. *Public Health Res Pract* 2021;31:3112105. doi:10.17061/phrp3112105
- Couch J, Liddy N, McDougall J. 'Our voices aren't in lockdown' — Refugee young people, challenges, and innovation during COVID-19. *JAYS* 2021;4:239–59.
- Bonner C, Cvejic E, Ayre J, et al. The psychological impact of hypertension during COVID-19 restrictions: retrospective case-control study. *JMIRx Med* 2021;2:e25610.

Supplementary Table 1. Multiple regression model of factors associated with negative psychological impacts (n=707)^a

Predictor	Nervous/Stressed				Alone/Lonely			
	Unadjusted analysis ^b		Adjusted analysis ^c		Unadjusted analysis ^b		Adjusted analysis ^c	
	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
Gender^a								
Male	Reference		Reference		Reference		Reference	
Female	1.51 (1.03 to 2.22)	0.03	1.59 (1.03 to 2.45)	0.04	1.05 (0.70 to 1.60)	0.80	1.01 (0.65 to 1.57)	0.97
Age group		0.06		0.65		<0.001		0.36
18-29	Reference		Reference		Reference		Reference	
30-49	1.07 (0.59 to 1.95)	0.82	0.76 (0.39 to 1.48)	0.42	0.84 (0.42 to 1.70)	0.63	1.54 (0.78 to 3.06)	0.22
50-69	1.62 (0.89 to 2.95)	0.12	0.99 (0.47 to 2.11)	0.99	1.16 (0.57 to 2.33)	0.68	1.41 (0.62 to 3.23)	0.42
>70	2.04 (1.00 to 4.15)	0.05	1.09 (0.41 to 2.88)	0.87	3.30 (1.53 to 7.12)	<0.001	0.93 (0.35 to 2.48)	0.88
Comorbidity^d		<0.001		0.01		<0.001		<0.001
0	Reference		Reference		Reference		Reference	
1	0.60 (0.39 to 0.94)	0.03	1.34 (0.77 to 2.32)	0.30	1.48 (0.90 to 2.44)	0.12	0.80 (0.45 to 1.44)	0.460
2+	0.44 (0.27 to 0.70)	<0.001	2.39 (1.35 to 4.24)	<0.001	2.74 (1.67 to 4.51)	<0.001	0.34 (0.18 to 0.64)	<0.001
Lowest ISRAD quintile	1.16 (0.77 to 1.74)	0.47	1.41 (0.86 to 2.31)	0.17	0.80 (0.51 to 1.24)	0.32	1.08 (0.64 to 1.84)	0.77
University education	0.47 (0.30 to 0.73)	<0.001	1.28 (0.71 to 2.32)	0.41	0.43 (0.26 to 0.74)	<0.001	1.10 (0.58 to 2.08)	<0.001
Adequate health literacy	0.62 (0.42 to 0.90)	0.01	0.68 (0.39 to 1.19)	0.18	0.59 (0.39 to 0.9)	0.01	1.17 (0.67 to 2.04)	0.57
English-language proficiency	0.54 (0.37 to 0.78)	<0.001	0.88 (0.50 to 1.57)	0.68	0.49 (0.33 to 0.74)	<0.001	0.93 (0.51 to 1.72)	0.83
Years living in Australia		0.12		0.70		0.42		0.870
5 years or less	Reference		Reference		Reference		Reference	
6 to 10 years	1.36 (0.70 to 2.64)	0.36	1.22 (0.58 to 2.53)	0.60	1.26 (0.58 to 2.72)	0.56	0.88 (0.42 to 1.84)	0.73
More than 10 years	1.27 (0.74 to 2.18)	0.38	1.19 (0.61 to 2.34)	0.61	1.22 (0.63 to 2.37)	0.56	1 (0.51 to 1.95)	0.99
Born in Australia	0.51 (0.21 to 1.26)	0.14	0.73 (0.25 to 2.18)	0.58	0.60 (0.21 to 1.70)	0.34	1.38 (0.43 to 4.39)	0.59
Language group^e	-	<0.001	-	<0.001	-	<0.001	-	<0.001
Perceived public health threat	1.15 (1.08 to 1.22)	<0.001	1.08 (0.99 to 1.18)	0.07	1.12 (1.05 to 1.20)	<0.001	0.93 (0.85 to 1.03)	0.15
Mean financial burden	1.96 (1.55 to 2.48)	<0.001	1.82 (1.42 to 2.33)	<0.001	-	-	-	-

NB: All regression models also control for date of survey completion (binary variable, before/after 23 June when restrictions in Greater Sydney were imposed).

^a n=1 respondent excluded from the weighted analyses presented in this table

^b Unadjusted analyses do not control for co-variables; statistics represent the regression of each predictor on psychological outcomes with no other co-variables included in the model.

^c Adjusted analyses control for all covariates listed in this table.

^d Health conditions assessed included respiratory disease, asthma, chronic obstructive pulmonary disease, high blood pressure, cancer, heart disease, stroke, diabetes, depression and anxiety

^e Individual comparisons for language group not presented as there is no specific contrast that is pragmatically relevant. Khmer was selected as the reference language group as this subsample was of adequate size (n>50) and had the highest proportion of people reporting negative psychological impacts.

Supplementary Table 2. Multiple regression model of factors associated with negative social impacts

Predictor	Negative impact on relationships (n=399) ^a				Negative impact on children (n=262) ^b			
	Unadjusted analysis ^c		Adjusted analysis ^d		Unadjusted analysis ^c		Adjusted analysis ^e	
	OR (95% CI)	P value	OR (95% CI)	P value	B(95%CI)	P value	B (95% CI)	P value
Gender								
Male	Reference		Reference		Reference		Reference	
Female	1.16 (0.65 to 2.09)	0.62	1.21 (0.72 to 2.03)	0.47	-0.12 (-0.54 to 0.31)	0.59	-0.17 (-0.41 to 0.08)	0.18
Age group		0.15		0.03		0.13		0.12
18-29	Reference		Reference		Reference		Reference	
30-49	0.32 (0.09 to 1.09)	0.07	0.27 (0.11 to 0.65)	<0.001	0.75 (-0.13 to 1.62)	0.10	0.70 (-0.03 to 1.43)	0.06
50-69	0.57 (0.13 to 2.41)	0.44	0.41 (0.17 to 0.98)	<0.001	0.32 (-0.78 to 1.41)	0.57	0.46 (-0.35 to 1.27)	0.26
>70	0.40 (0.07 to 2.30)	0.30	0.30 (0.11 to 0.86)	0.02	0 (-1.32 to 1.33)	1.00	0.44 (-1.40 to 2.28)	0.64
Chronic illness^f		0.63		0.70		0.15		<0.001
0	Reference		Reference		Reference		Reference	
1	0.81 (0.39 to 1.68)	0.57	1.11 (0.61 to 2.00)	0.74	0.33 (-0.02 to 0.68)	0.07	0.37 (0.09 to 0.65)	0.01
2+	1.28 (0.50 to 3.24)	0.60	1.33 (0.68 to 2.60)	0.40	-0.07 (-0.82 to 0.68)	0.85	0.76 (0.27 to 1.26)	<0.001
Lowest IRSAD quintile	0.34 (0.14 to 0.82)	0.02	0.34 (0.17 to 0.66)	<0.001	-0.17 (-0.67 to 0.33)	0.50	0.40 (0.07 to 0.72)	0.02
University education	1.87 (0.68 to 5.13)	0.23	0.50 (0.25 to 1.02)	0.06	-0.12 (-0.53 to 0.29)	0.57	-0.02 (-0.36 to 0.32)	0.91
Adequate health literacy	0.41 (0.21 to 0.81)	0.01	0.80 (0.48 to 1.35)	0.41	0.08 (-0.38 to 0.53)	0.75	0.22 (-0.08 to 0.53)	0.15
English-language proficiency	1.46 (0.66 to 3.21)	0.35	1.02 (0.61 to 1.71)	0.95	-0.31 (-0.64 to 0.02)	0.06	-0.11 (-0.41 to 0.19)	0.46
Years living in Australia		0.13		0.53		0.91		0.99
5 years or less	Reference		Reference		Reference		Reference	
6 to 10 years	1.14 (0.45 to 2.93)	0.78	1.78 (0.73 to 4.34)	0.21	0.04 (-0.64 to 0.71)	0.91	-0.09 (-0.57 to 0.39)	0.72
More than 10 years	0.47 (0.18 to 1.20)	0.12	1.01 (0.53 to 1.93)	0.98	-0.07 (-0.46 to 0.32)	0.73	-0.03 (-0.41 to 0.36)	0.89
Born in Australia	0.41 (0.08 to 2.15)	0.29	1.06 (0.34 to 3.35)	0.92	-0.34 (-1.4 to 0.72)	0.52	0 (-0.59 to 0.59)	1.00
Language group^g		<0.001		<0.001		<0.001		<0.001
Perceived public health threat	0.97 (0.85 to 1.10)	0.59	1.06 (0.99 to 1.15)	0.10	-	-	-	-
Mean financial burden	1.70 (1.14 to 2.54)	0.01	1.88 (1.38 to 2.56)	<0.001	-	-	-	-
Feeling lonely / alone	0.98 (0.40 to 2.40)	0.96	0.37 (0.21 to 0.64)	<0.001	-	-	-	-
Feeling nervous / stressed	0.33 (0.14 to 0.77)	0.01	0.29 (0.17 to 0.49)	<0.001	-	-	-	-

NB: All regression models also control for date of survey completion (binary variable, before/after 23 June when restrictions in Greater Sydney were imposed).

^a Total number of participants that responded to the question regarding the impacts of COVID-19 on their relationship with their partner

^b Total number of participants reporting having children

^c Unadjusted analyses do not control for co-variables; statistics represent the regression of each predictor on social outcomes with no other co-variables included in the model.

^d Adjusted analyses exploring factors associated with negative impacts on relationships control for all covariates listed in this table.

^e Adjusted analyses exploring factors associated with negative impacts on children do not control for perceived public health threat, financial burden or psychological outcomes (lonely/alone; nervous/stressed).

^f Health conditions assessed included respiratory disease, asthma, chronic obstructive pulmonary disease, high blood pressure, cancer, heart disease, stroke, diabetes, depression and anxiety

^g Individual comparisons for language group not presented as there is no specific contrast that is pragmatically relevant. Khmer was selected as the reference language group as this subsample was of adequate size (n>50) and had the highest proportion of people reporting negative impacts on relationships.

Supplementary Table 3. Multiple regression model of factors associated with financial burden (n=707)^a

	Unadjusted analysis ^b		Adjusted analysis ^c	
	B (95% CI)	P value	B (95% CI)	P value
Gender				
Male	Reference		Reference	
Female	0.03 (-0.15 to 0.21)	0.77	0.01 (-0.13 to 0.15)	0.89
Age group		<0.001		<0.001
18-29	Reference		Reference	
30-49	0.07 (-0.19 to 0.34)	0.58	0.08 (-0.15 to 0.32)	0.49
50-69	0.09 (-0.20 to 0.38)	0.54	0.03 (-0.22 to 0.29)	0.80
>70	-0.40 (-0.67 to -0.12)	0.01	-0.51 (-0.82 to -0.20)	<0.001
Comorbidity^d		0.14		<0.001
0	Reference		Reference	
1	0.21 (0 to 0.41)	0.05	0.26 (0.06 to 0.46)	0.01
2+	0.07 (-0.12 to 0.26)	0.48	0.35 (0.15 to 0.54)	<0.001
Lowest IRSAD quintile	-0.01 (-0.21 to 0.18)	0.91	-0.06 (-0.22 to 0.11)	0.50
University education	-0.27 (-0.46 to -0.09)	<0.001	-0.18 (-0.36 to 0.01)	0.06
Adequate health literacy	0.05 (-0.13 to 0.24)	0.56	0.14 (-0.06 to 0.33)	0.16
English-language proficiency	-0.09 (-0.25 to 0.07)	0.27	-0.12 (-0.32 to 0.08)	0.24
Years living in Australia		0.01		0.24
5 years or less	Reference		Reference	
6 to 10 years	0.14 (-0.11 to 0.38)	0.27	0.05 (-0.19 to 0.30)	0.67
More than 10 years	-0.17 (-0.37 to 0.02)	0.07	-0.12 (-0.32 to 0.09)	0.26
Born in Australia	-0.33 (-0.77 to 0.11)	0.14	-0.21 (-0.61 to 0.19)	0.31
Language group^e	-	<0.001	-	<0.001

NB: All regression models also control for date of survey completion (binary variable, before/after 23 June when restrictions in Greater Sydney were imposed).

^a n=1 respondent excluded from the weighted analyses presented in this table

^b Unadjusted analyses do not control for co-variables; statistics represent the regression of each predictor on financial burden with no other co-variables included in the model.

^c Adjusted analyses control for all covariates listed in this table.

^d Health conditions assessed included respiratory disease, asthma, chronic obstructive pulmonary disease, high blood pressure, cancer, heart disease, stroke, diabetes, depression and anxiety

^e Individual comparisons for language group not presented as there is no specific contrast that is pragmatically relevant. Khmer was selected as the reference language group as this subsample was of adequate size (n>50).

