2022

Wellbeing and social determinants of health among Australians during the COVID-19 pandemic: A mixed methods study

Heidi Green

Wellbeing and social determinants of health among Australians during the COVID-19 pandemic: A mixed methods study

Heidi Green

Supervisors:

Associate Professor Catherine MacPhail and Professor Ritin Fernandez

This thesis is submitted in fulfilment of the requirements for the conferral of the degree:

Doctor of Philosophy

University of Wollongong

School of Health and Society

October 2022

Abstract

Background

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), or COVID-19, was first identified in China in December 2019. Due to the severity and swiftness of the spread of the outbreak, the World Health Organization (WHO) declared COVID-19 a Public Health Emergency of International Concern on 30 January 2020. Subsequent public health mitigation strategies, such as lockdowns, border restrictions and social distancing, were implemented globally to combat the widespread transmission of COVID-19. The flow-on effect of the paused social and economic activity of the nationwide Australian lockdowns caused some population groups to experience unemployment, loss of income, housing instability and food insecurity. However, the impact of the public health mitigation strategies on Australians is dependent on the state of their pre-pandemic social determinants of health. 'Social determinants of health' was first coined as a term in the 1970s and refers to the conditions in an individual's environment wherein they are born, grow, live, learn, work and age. These conditions are shaped by the distribution of power, money and resources, influencing health both directly and indirectly. Furthermore, it has been established that social determinants of health can impinge on an individual's wellbeing. Wellbeing, as used in this thesis, is a multidimensional paradigm encompassing physical, psychological, financial, spiritual, occupational, social, intellectual and environmental elements that interconnect to facilitate positive wellbeing. With the emergence of a new infectious disease, and with many Australians already experiencing the negative effects of the social determinants of health, this PhD thesis explores the relationship between wellbeing and the social determinants of health among Australian adults during the COVID-19 pandemic.

Methods

An explanatory sequential mixed methods study design underpinned by the WHO Commission on Social Determinants of Health conceptual framework was used. The study was undertaken in two distinct phases: quantitative and qualitative. Phase 1— quantitative—used an online cross-sectional study design undertaken between August 2020 – October 2020 and recruited a diverse sample of 1,211 participants from across Australia. Data were analysed using descriptive and inferential statistics using Statistical Package for the Social Sciences (SPSS) version 25. All data in phase 1 were analysed prior to conducting phase 2 of the research. Phase 2—qualitative—used a descriptive qualitative study design informed by the results of phase 1. Purposeful sampling was used to identify and recruit participants from the online cross-sectional study (phase 1) who agreed to participate in an interview. Data were collected using semi-structured interviews between March 2021 – August 2021, with the interviews audio-recorded and transcribed verbatim. Data were analysed using inductive thematic analysis supported by NVivo version 12.

Results

Fundamental to a mixed methods study design, the results of each of the phases was integrated using a connection model as described by Creswell. Three key findings emerged from this thesis.

1. *Food and housing insecurity impact wellbeing:* The most significant finding of this thesis is that food and housing insecurity during the COVID-19 pandemic were high among Australians and were associated with diminished wellbeing. Difficulty accessing food was more prevalent among Australians living in lower socioeconomic areas and was amplified by reduced financial capacity and loss of

employment as a result of the pandemic. Similarly, housing insecurity was predominantly associated with Australians living in lower socioeconomic areas and almost exclusively among women. Economic vulnerability through loss of employment and income, especially among Australians in a low socioeconomic areas experiencing food- and housing-related stress, influenced their overall wellbeing.

2. ***Social capital influences the ability to cope during the pandemic:*** It was determined that those with strong social support had significantly higher wellbeing scores compared to Australians with moderate and poor social support. Additionally, social support was found to be a predictor of wellbeing; those with strong social support had better wellbeing. Australians' lived experiences of social capital during the pandemic demonstrated that 'no person is an island', with most participants voicing concerns regarding a loss of social connection. The results showed that Australians with high social capital prior to the pandemic were able to remain socially connected during the lockdown periods, resulting in a greater capacity to cope mentally during the pandemic. Australians with low social capital and social support during the pandemic resorted to drug and alcohol use as a way to cope with the loneliness and isolation of the lockdowns.

3. ***Employment and income loss are associated with low socioeconomic status:*** Economic wellbeing was influenced by employment and income loss among Australians during the pandemic. There was an association between economic wellbeing and Australians who resided in low socioeconomic areas, with those living in low socioeconomic areas having significantly higher odds of experiencing employment loss during the pandemic. Loss of employment and income during the pandemic resulted in housing and food insecurities, as

explained by participants in the qualitative study. This was particularly true for female Australians who resided in low socioeconomic areas. Those who experienced employment and income loss felt that their wellbeing substantially worsened as they were not only dealing with the uncertainties of the pandemic but were also trying to cope with challenges such as lack of finances, inability to pay bills and loss of employment.

Conclusion

This thesis provides new evidence for the relationship between Australians' wellbeing and social determinants of health during the COVID-19 pandemic. The findings demonstrate that Australians, particularly those residing in low socioeconomic areas, experienced significant food and housing insecurity, had low social capital, and were more likely to have income and employment loss that influenced their overall wellbeing during the COVID-19 pandemic. This thesis shines a light on the social determinants of health and reveals that there are social and health inequalities within Australian society that need addressing. Recommendations for public health in addressing the social determinants of health include lobbying governments to incorporate the social determinants of health in all policies, implementing strategies to address food security, and implementing public health interventions to address low social capital. Policy recommendations involve addressing housing affordability, renewing action on the United Nations Sustainable Development Goals and implementing policies to address employment and income security.

Contents

Acknowledgements

Firstly, I would like to acknowledge two strong women, my supervisors, Associate Professor Catherine MacPhail and Professor Ritin Fernandez, for their support, guidance and encouragement. You have both kept me on track, provided me with invaluable advice, believed in me when I didn't believe in myself and treated me as a colleague. Catherine, you have been instrumental in providing me with qualitative advice, challenging my thinking and empowering me to think outside the box. Ritin, you have taught me so much about statistics and reminded me that I wasn't trying to achieve a Nobel Prize, enabling me to refocus. I am immensely grateful to you both for dealing with my tears, coping with my frustrations and celebrating all the small wins along the way. You are both amazing mentors and have displayed your dedication to advancing novice researchers and your commitment to enhancing health for all. Thank you will never be enough; I could not have asked for a better supervision team, and for that, I am eternally appreciative.

I would like to also thank the participants for giving their time towards this research; without you, it would not be possible. Special thanks to those participants who readily gave of their time to be interviewed and were willing to share openly and honestly about their experiences, even if it was at times hard to do so. Your experiences were valuable in providing evidence to ensure that renewed action to address the social determinants of health in all policies can be achieved.

To my work colleagues, Sofia, Stami, Nqobile and Wendan, at the Centre for Research in Nursing and Health at St George Hospital, thank you for allowing me to vent my frustrations and for sharing the ups and downs of my PhD life. Your support has been appreciated.

Certification

I, *Heidi Green*, declare that this thesis submitted in fulfilment of the requirements for the conferral of the degree *Doctor of Philosophy*, from the University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. This document has not been submitted for qualifications at any other academic institution.

Heidi Green

14th October 2022

Abbreviations

WHO	World Health Organization
CSDH	Commission on Social Determinants of Health
CALD	Culturally and Linguistically Diverse
SARS	Severe Acute Respiratory Syndrome
MERS	Middle East Respiratory Syndrome
PHEIC	Public Health Emergency of International Concern
MPH	Master of Public Health
UOW	University of Wollongong
HDR	Higher Degree Research
CDNA	Communicable Diseases Network Australia
TGA	Therapeutic Goods Administration
SDG	Sustainable Development Goal
ABS	Australian Bureau of Statistics
ARIA+	Accessibility and Remoteness Index of Australia
SEIFA	Socio-Economic Indexes for Areas
PHAA	Public Health Association of Australia

List of Publications

Green H, Fernandez R, MacPhail C. Social media as a platform for recruitment to a national survey during the COVID-19 pandemic: feasibility and cost analysis. JMIR Formative Research 2021;5(7). Available from: https://doi.org/10.2196/28656

Green H, Fernandez R, MacPhail, C. The social determinants of health and health outcomes among adults during the COVID-19 pandemic: a systematic review. Public Health Nursing 2021;38(6):942–952. Available from: https://doi.org/10.1111/phn.12959

Green H, Fernandez R, MacPhail C. Well-being and social determinants of health among Australian adults: a national cross-sectional study. Health & Social Care in the Community 2022. Available from: https://doi.org/10.1111/hsc.13827

Green H, MacPhail C, Alananzeh I, Fernandez R. Association between economic wellbeing and ethnicity, socioeconomic status, and remoteness during the COVID-19 pandemic. Public Health Nursing 2022. Available from:
https://doi.org/10.1111/phn.13107

Green H, MacPhail C, Fernandez R. "I just wanted money for food": a qualitative study of the experiences of Australians during the COVID-19 pandemic. Perspectives in Public Health 2022. (under review).

Green H, Fernandez R, Moxham L, MacPhail C. Social capital and wellbeing among Australian adults' during the COVID-19 pandemic: a qualitative study. BMC Public Health 2022. (under review).

List of Conferences

Lord H, Fernandez R, MacPhail C. Social determinants of health during the COVID-19 pandemic: a systematic review. European Journal of Public Health 2021;31(Supplement_3):iii182. 14th European Public Health Conference; 2021 Nov 10–12; Dublin (online). Oral Presentation.

Lord H, Fernandez R, MacPhail C. Life during a pandemic in Australia: wellbeing and social determinants of health. European Journal of Public Health 2021;31(Supplement_3). 14th European Public Health Conference; 2021 Nov 11–12; Dublin (online). Poster Presentation.

Green H, Fernandez R, MacPhail C. A systematic review exploring the social determinants of health and wellbeing during the COVID-19 pandemic. Engaging Evidence 2021: Evolving approaches; 2021 Nov 11–12; Online. Poster presentation.

Green H, Fernandez R, MacPhail C. No person is an island: social vulnerabilities among Australian adults during the COVID-19 pandemic. St George and Sutherland Hospitals Annual Medical Research Symposium; 2021 Oct 21; Sydney (online). Poster Presentation.

Green H, Fernandez R, MacPhail C. A renewed call for action on the social determinants of health: economic wellbeing and ethnicity, socioeconomic status, and remoteness during the COVID-19 pandemic. Consortium of Universities for Global Health (CUGH); 2022 March 28–April 1; Online. Poster Presentation.

Green H, Fernandez R, MacPhail C. "I think my quality of life was not the best": a qualitative study of the experiences of Australians during the COVID pandemic. 15th European Public Health Conference; 2022 Nov 9–12; Berlin. Poster Presentation.

List of Tables

List of Figures

Chapter 1: Introduction

The result was that poor families were in great straits, while the rich went short of practically nothing. Thus, whereas plague by its impartial ministrations should have promoted equality among our townsfolk, it now had the opposite effect and, thanks to the habitual conflict of cupidities, exacerbated the sense of injustice rankling in men's hearts.

Albert Camus, in the 1947 novel The Plague

1.1 Introduction

As the emergence of a new infectious disease captures the world, the words of Albert Camus resonate. I question how this pandemic exposes and amplifies the underlying social and health inequalities within society. In response to this question, I immediately think about the social determinants of health and the effects on an individual's wellbeing. This chapter introduces the concept of the social determinants of health, including those within Australia. The chapter then moves on to wellbeing: how it is defined and used in this thesis. This chapter introduces the COVID-19 pandemic, which emerged at the end of 2019. Additionally, the motivation for undertaking this research is examined, as well as the significance of the research and the research objective, aim and questions. Finally, the thesis structure is outlined.

1.2 Social determinants of health

The term health equity dates to 1967 with the Whitehall study, which showed an inverse relationship between social class and health.[1] 'Social determinants of health' was first coined as a term in the 1970s with the purpose of steering away from an individual-level explanation of the causes of disease and illness.[2] Destined to be revolutionary in public health, delegates at the 1978 International Conference on Primary Health Care all agreed

to 'health for all by the year 2000'. Known as the Alma-Ata declaration, it highlighted a focus on the social determinants of health as a public health issue.[3] Indeed, the focus of the Alma-Ata was on access to health care as a basic human right, identifying that health moves beyond hospitals and doctors and includes social justice.[4] Social determinants of health were also given prominence in the mid-1980s in the health promotion movement, with the 1986 Ottawa Charter on Health Promotion acknowledging eight key components to health, including peace, shelter, education, food, income, a stable ecosystem, sustainable resources, social justice and equity—essentially, the social determinants of health.[5] The 1988–1989 Whitehall II study conducted by Michael Marmot and colleagues demonstrated an inverse relationship between employment grade and health outcomes, as well as how social support affects health.[1] In fact, the Whitehall studies were the first instance whereby health was directly associated with social status.[6] As the father and leader of the social determinants of health, Michael Marmot continued to seek evidence to support the notion that differences in health outcomes were a result of social position rather than a cause.[7]

The social determinants of health gained popularity in the 2000s and have sought to explain how differences in social conditions lead to health inequities. Access to money, resources and power at a local, national and global level influence the circumstances in which individuals are born, grow up, exist and work. These conditions are the social determinants of health.[8] The social determinants include, but are not limited to, income, employment, housing, food supply, ethnicity, social support, gender, social class and education. Concerned with the links between poverty and ill health and inspired by Michael Marmot's work on the social determinants of health, the World Health Organization (WHO) launched the Commission on the Social Determinants of Health (CSDH) in 2005 with Michael Marmot appointed chair.[7] With the aim of directing the

attention of governments to the importance of the social determinants of health, the CSDH concluded that social injustice was killing people, and it outlined three major recommendations: 1) to improve daily living conditions, 2) to address the inequitable distribution of power, resources and money, and 3) to be able to measure and understand the extent of social determinants of health issues and to be able to assess any action taken on the social determinants of health.[6] Commonly referred to as the 'causes of the causes' of health inequality, social determinants of health are the unequal conditions dependent upon dimensions of social stratification or social gradient.[9]

1.2.1 Social gradient

Morbidity and mortality have been demonstrated to rise progressively with every decrease in social class and socioeconomic status.[2] That is, health and life expectancy improve incrementally the higher an individual is on the social ladder. This inverse and graded relationship is consistently observed, including occupational and educational status, and is referred to as the social gradient.[10] This association between life expectancy and health outcomes runs throughout society whereby differences in health, disease and life expectancy are determined by inequalities related to affluence or deprivation and other features of social standing.[11] The social gradient of health arises through varying lifestyle factors, health risk behaviours, access to health care, socialisation, housing environment, psychosocial work conditions, exposure to environmental hazards and generational poverty between social classes.[12-14] Marmot has labelled the social gradient as the status syndrome—'the higher the social position, the better the health'.[14] This is demonstrated in Figure 1.
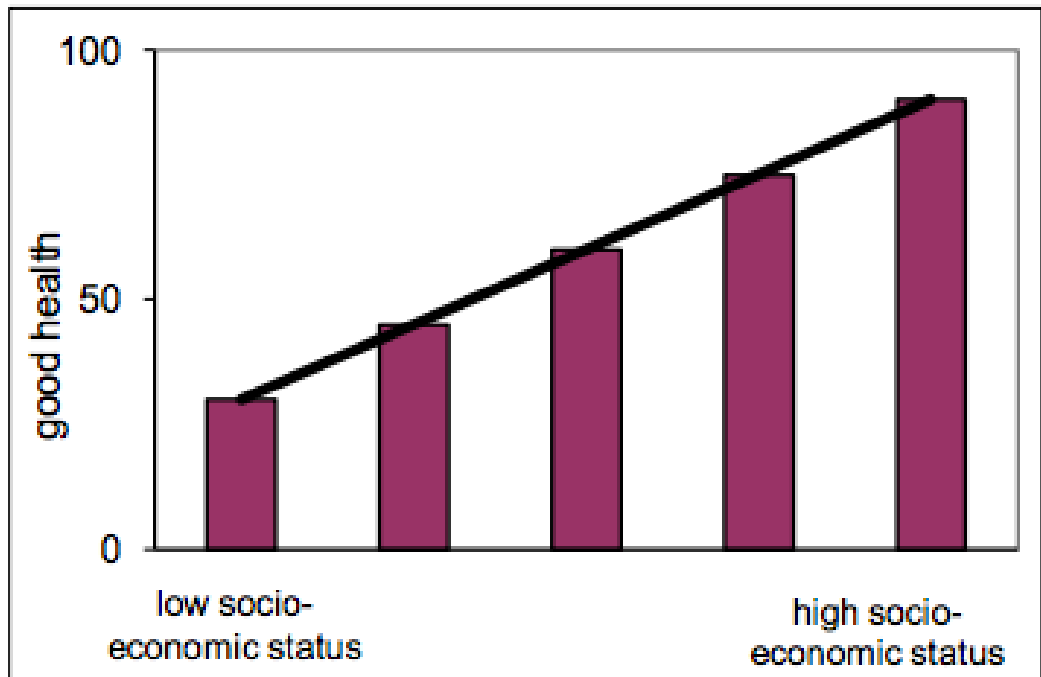
Figure 1: The social gradient

Gruba-McCallister[15]

1.2.2 Social determinants in Australia

Despite Australia claiming to be an egalitarian society, those with a lower socioeconomic status experience, on average, a greater burden of cardiovascular disease, diabetes, and chronic kidney disease, which reflects the social gradient.[16] The incidence of myocardial infarction and cerebrovascular events increases substantially with lower socioeconomic status. The incidence of myocardial infarction among males and females with the lowest socioeconomic status aged over 25 years was 1.55 and 1.71 times higher, respectively, compared to those with the highest socioeconomic status.[16] Not only is the incidence of and mortality from myocardial infarction higher among individuals within the lowest socioeconomic strata, this higher incidence is also associated with low income ($< \$300$ per week), education to a secondary level and lower, and housing tenure—those who rent compared with individuals who own a home.[16] In terms of diabetes and chronic kidney disease, the situation is not dissimilar to cardiovascular disease, with increased incidence

and associated mortality with individuals living in the lowest socioeconomic status, those with incomes of < $300 per week, those with education levels of secondary education and lower and among those who rent.[16]

There is a large disparity in health outcomes between those in major cities in Australia and those who live in regional and remote areas, the latter experiencing poorer health outcomes.[17] Geographical remoteness is associated with an increase in avoidable hospitalisations, potentially preventable diseases and higher mortality rates compared to major cities. These poor health outcomes reflect not only the low socioeconomic status of regional and remote Australia but also reveal the inequitable access to primary health care. Furthermore, regional and remote health services are generally smaller and have limited specialist services, which requires individuals to travel significant distances to gain access to specialist services.[18] Mental health issues also contribute to the growing poorer health outcomes among individuals in regional and remote areas. These issues can be exacerbated by environmental challenges, for example, extreme drought having broad implications on agriculture and family businesses.[19]

Health outcomes and access to health care are also influenced by the social determinants of health. Poorer health outcomes are experienced by Culturally and Linguistically Diverse (CALD) people in Australia, who face challenges in accessing and using health services. In Australia, CALD refers to many people and communities that have come from different countries, speak a language other than English, have many differing cultural backgrounds and have various religious beliefs.[20] In CALD communities, people have difficulty navigating the health system and face many social disadvantages, such as inadequate job skills, which limits employment opportunities.[20] The complexities of Australia's migration policies also place emphasis on regionalisation, in which many immigrants must settle in regional areas of Australia, placing additional pressure on

limited regional health services.[21] Health disparities for people from CALD communities are due to poor health literacy, cultural barriers, poor cultural competence of health care providers, contextual factors such as poor housing, affordability of health services and structural barriers including stigma, racism and reduced social support. Among CALD communities, refugees and asylum seekers are the most vulnerable.[20, 21]

Refugees have complex health needs that are shaped by factors from their country of origin, such as war and violence, poor access to health care and management of chronic diseases, exposure to communicable diseases, psychological issues including trauma, and malnutrition.[22] The complexities of health care policy for refugees are founded on the differences between refugees' and asylum seekers' entitlements. Refugees who enter Australia through the onshore humanitarian program are provided with limited access to health services.[23] Despite offshore humanitarian programs offering universal health coverage through Medicare, there are multiple barriers to accessing health care. These can include a lack of transport, the cost of health services, the poor uptake of interpreter services, resettlement issues, culture and stigma, and the affordability of medications.[24]

Along with CALD communities, the health of Aboriginal and Torres Strait Islanders is substantially impacted by the social determinants of health. Colonialism has created disparities across social, health, economic and political outcomes experienced by Aboriginal and Torres Strait Islander people and is reflected in the gap in life expectancy between the Australian Indigenous population and the non-Indigenous population.[25] Adding to the health and social disparities experienced by Indigenous Australians are policies that create and perpetuate racism and lack the recognition of cultural identity.[26] Additionally, mainstream health services do not cater to the needs of Indigenous Australians, often resorting to a biomedical model of health that excludes traditional and cultural health practices.[27]

1.3 Wellbeing

A key element of the work in this thesis is related to the wellbeing of individuals. There is growing evidence and debate in the literature regarding the contemporary notion of wellbeing. Despite this extensive research, it has been difficult to establish a simple definition due to the concept's complexity.[28, 29] While contemporary discourse often refers to the WHO definition of health as 'a state of complete physical, mental and social well-being',[30] this definition is limited and fails to demonstrate the intricacies of wellbeing.[29, 31] Individual wellbeing is multifactorial, taking into account not only a person's physical, emotional and psychological wellbeing but also incorporating career, financial and spiritual wellbeing.[29] Furthermore, wellbeing also embraces the characteristics of quality of life, including insight into life satisfaction and broader reflections on an individual's self-fulfilment.[28] Structural conditions, such as social determinants of health, can impinge on an individual's subjective wellbeing and quality of life.[29]

There is ample evidence within the literature for the use of wellbeing in public health research, and this is discussed in further detail in Chapter 2. Being a multidimensional model, the use of wellbeing within this research embraces the physical, psychological, financial, spiritual, occupational, social, intellectual and environmental elements that intersect to enable positive wellbeing.[32, 33]

1.4 Unprecedented global crisis: COVID-19

In December 2019, a large number of severe cases of unexplained pneumonia were identified in Wuhan, China.[34, 35] Epidemiological investigations revealed that it was spread by human-to-human transmission and was confirmed as a novel coronavirus (later

given the name COVID-19) similar to Severe Acute Respiratory Syndrome (SARS) and Middle Eastern Respiratory Syndrome (MERS).[35] Widespread global transmission resulted in a substantial public health response, including strict lockdowns, the quarantine of infected individuals and the implementation of preventative measures such as border screening, social distancing and travel restrictions.[36] Due to the global spread and severity of COVID-19, the WHO made the assessment on 30 January 2020 that COVID-19 was a Public Health Emergency of International Concern (PHEIC) and announced that it was a pandemic on 11 March 2020.[37] Globally, as of 3 October 2022, there have been over 615 million confirmed COVID-19 cases and over 6.5 million deaths as a direct result of COVID-19.[37] In Australia, as of 3 October 2022, there have been over 10 million confirmed COVID-19 cases and 14,853 deaths.[37] Mitigation strategies to reduce the morbidity and mortality associated with COVID-19, such as lockdowns, will have a social and economic impact.

Although epidemics and pandemics can elicit both social and economic impacts on communities, this impact can vary, with some individuals and communities more susceptible to its detrimental effects.[38, 39] Socioeconomic barriers will impede some individuals from having the financial means to practice social distancing measures as a viable option within the context of their daily lives. People employed casually or those earning low incomes may be reluctant to stay home from work due to concerns about losing their employment or not being compensated for time away from work.[40, 41] Other population groups, such as the elderly and people with a disability, may have to rely on public transportation to access services such as health and food supply and will, therefore, be further impacted by restrictions. Isolation and social distancing may exacerbate existing mental health concerns.[40] These characteristics are all influenced by the social determinants of health.

1.5 Motivation to conduct this research

I grew up in a large single-income family in a low socioeconomic area of Wollongong. My mother and father did not complete their schooling, and it was often difficult for my parents to pay bills and ensure there was enough money to place food on the table. As the eldest of five children, I was the first in my family to attend university. It was at university that I was opened to a much larger world and where I first started to contemplate the link between health and society. During my training and in my first few years as a nurse, I began to realise that people would in fact come into the hospital, be discharged and then return weeks or months later. I would question the Band-Aid approach, identifying that there were underlying causes in people's social environments that were affecting their health. It was only when I began my Master of Public Health (MPH) that I was introduced to the concept of the social determinants of health. This confirmed that what I was experiencing in my early years of nursing was indeed an actual social phenomenon. It additionally confirmed that growing up I too was affected by many social determinants of health.

Following the completion of my MPH, I began to work in fields of nursing, including human immunodeficiency virus (HIV) clinics, Hepatitis clinics and more recently, within the Public Health unit, where I felt that I could make the most difference in people's lives. It was within these clinics that social and health inequalities, as a result of the social determinants, became more apparent to me. For much of that time, I worked in South Western Sydney, a diverse area with large pockets of socioeconomic disadvantage and a large population of CALD and Aboriginal and Torres Strait Islander peoples. Daily, I saw the social determinants of health at play in the lives of people who endure poverty, are socially excluded or are housing and food insecure. It is with this experience that I knew

it was time for me to take more action on the social determinants of health; this is why I began my PhD research.

1.6 Research aim, objectives and questions

The overall aim and primary objective of this PhD research was to investigate the relationship between wellbeing and the social determinants of health among adults residing in Australia during the COVID-19 pandemic.

This research was conducted using a mixed method approach and comprised two distinct phases: 1) quantitative studies exploring the relationship between wellbeing and social determinants of health in adults residing in Australia during the COVID-19 pandemic, and 2) qualitative studies among a subset of adults who participated in the quantitative study, exploring their experiences of the social determinants of health and how these influenced their experience of COVID-19 and its impact on their wellbeing. Questions 4 and 5 have been derived based on the results of the quantitative study.

The explicit research questions used to address the overall aim of this thesis were:

1. What is the association between wellbeing and social determinants of health in the Australian adult population during the COVID-19 pandemic?

2. What are the predictors of wellbeing in the Australian adult population during the COVID-19 pandemic?

3. How has the COVID-19 pandemic impacted the financial and economic wellbeing of adult populations in Australia across socioeconomic areas?

4. What are the experiences of adult Australians of the impact of the COVID-19 pandemic on food and housing security, and what effect has this had on their wellbeing?

5. Among adult Australians, what have the impacts of COVID-19 been on their social capital, and what effect has this had on their wellbeing?

1.7 Research study overview

This study was conducted using a sequential explanatory design to explore the relationship between wellbeing and the social determinants of health among adults residing in Australia during the COVID-19 pandemic. The complex nature of diverse issues encountered within public health, such as a pandemic, indicates a need to adopt multiple perspectives through the integration of both quantitative and qualitative data.[42] Therefore, a mixed methods approach allows for a deeper understanding of the contextual factors being investigated.

1.8 Significance of the research

Despite Australia previously experiencing public health emergencies, such as the H1N1 pandemic influenza in 2009, the COVID-19 pandemic is unlike any other in recent times. Australia has not experienced any public health crisis of this magnitude since the 1918–1919 Spanish Flu epidemic towards the end of the First World War.[41] Globally, there is still much to learn about the impacts of the COVID-19 pandemic on individuals and community groups. In Australia, much is unknown regarding the relationship between social determinants of health and the wellbeing of adults. This mixed methods thesis offers several substantial public health outcomes.

Firstly, the results of this study provide robust evidence relating to the relationship between the social determinants of health and the wellbeing of Australian adults during the COVID-19 pandemic. This will contribute to the body of evidence available to policymakers.

Secondly, this research identifies the social determinants of health that have been exacerbated during the COVID-19 pandemic. An in-depth exploration of the social disparities that affect the wellbeing of adult Australians will have implications for governments, non-government organisations, public health professionals and policymakers. This research will provide insight into the wellbeing of Australian adults, contributing to an evidence-based background for the planning and implementation of culturally sensitive and socially equitable policies and practices to reduce the unequal social and economic consequences of illness.

Lastly, the findings of this research provide insight into the lived experiences of Australian adults regarding their wellbeing during the COVID-19 pandemic. It will highlight the unequal consequences experienced by adult Australians in social, economic and health terms. This, in turn, provides evidence to alter policies by considering the social determinants of health, not just for future pandemics, but to reduce health inequalities and improve health in general.

1.9 Thesis structure

This thesis is compiled in accordance with the University of Wollongong Higher Degree Research (HDR) thesis by compilation guidelines.[42] The thesis encompasses six peer-reviewed publications within eight thesis chapters (see Figure 2). The publications contained within this thesis use the structure and style required by the specific journals; however, they have been reformatted within the thesis to deliver uniformity.

While each publication acknowledges the authorship of the whole research team, the PhD candidate, as the lead researcher and first author, provided the most significant contribution to the publications. The PhD candidate and lead researcher have conducted

the literature reviews, conducted the data collection, completed data analysis and prepared all publications, managed submissions and addressed the reviewers' comments. The methodology and research design were discussed as a team but were instigated by the PhD candidate. The supervision panel provided cross-checking on the analyses and expert opinions. In adherence with the HDR thesis by compilation policy,[42] each publication contained within this thesis is substantially different in content and focus.

Chapter 1 provides the underpinnings of the social determinants of health, a background into the concept of wellbeing and the background to the COVID-19 pandemic. This chapter also outlines the research aims, questions, my motivation to conduct the research and the significance of the research.

Chapter 2 is a review of the literature and contains three parts. Part 1 outlines the social determinants of health and wellbeing, Part 2 details an overview of COVID-19 and Part 3 contains Publication 1: a systematic review of the early literature on COVID-19 and the social determinants of health.

Chapter 3 specifies the methodology and methods used in this research. It includes the conceptual framework used, along with data collection and analysis methods and ethical considerations. This chapter also contains Publication 2: describing the recruitment and data collection process for the quantitative phase of the research.

Chapters 4, 5, 6 and 7 present the quantitative and qualitative findings as a series of peer-reviewed publications. Chapter 4 presents the social determinants of health associations and predictors of wellbeing as Publication 3. Chapter 5 presents the economic wellbeing across socioeconomic areas as Publication 4. Chapter 6 presents the experiences of food and housing insecurity and their impact on wellbeing as Publication 5. Chapter 7 presents

the experiences of social capital during COVID-19 and their impact on wellbeing as Publication 6.

Chapter 8 provides the discussion and conclusion of the thesis. It includes the integration of the findings within the context of the literature, discusses the strengths and limitations of the research and offers recommendations for policy and further research.
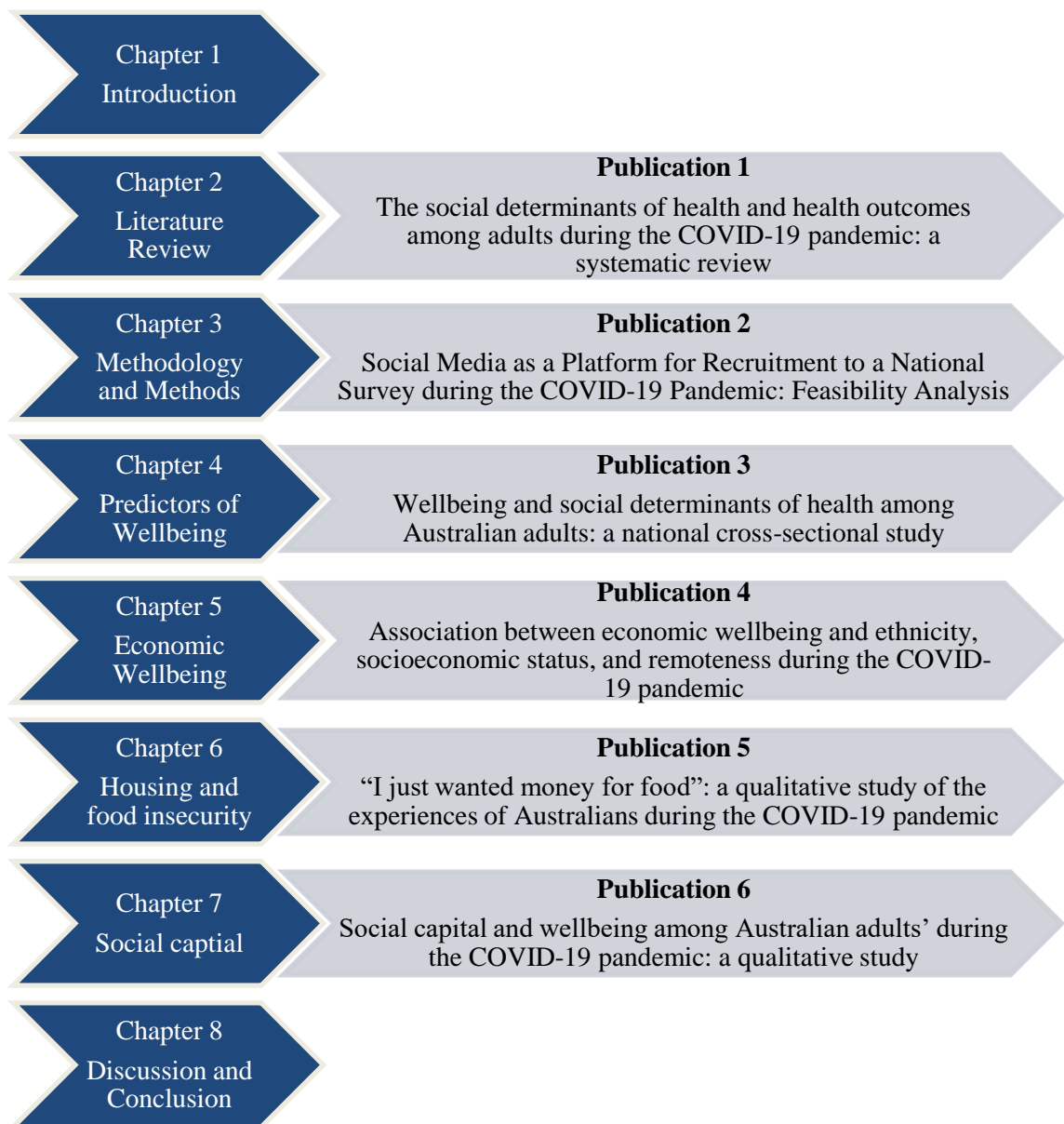
Figure 2: Thesis structure

Chapter 2: Literature Review

2.1 Chapter introduction

This chapter consists of three parts. Part 1 outlines the concepts of the social determinants of health and wellbeing. Part 2 details a broad overview of the COVID-19 pandemic, including transmission, pathophysiology, clinical characteristics and preventative measures. The purpose of the overview is to provide context for the research. Part 3 explores the association between the social determinants of health and health outcomes during the COVID-19 pandemic, which is Publication 1. Publication 1 is a peer-reviewed published systematic review of the literature on the relationship between the social determinants of health and health outcomes, such as wellbeing, mortality, susceptibility to infection and hospitalisations, among adults during the COVID-19 pandemic. The review was conducted in the early stage of the pandemic, with search limits from January 2020 to July 2020. The published version of Publication 1 and permissions can be found in Appendix 1.

2.2 Part 1: Social determinants of health and wellbeing

2.2.1 Social determinants of health

Even in the world's most affluent societies and countries, there are discrepancies in life expectancy and health outcomes between people.[14, 43] These differences in health outcomes not only highlight social injustices but also draw attention to the determinants of health.[44] The social determinants of health lead to a growing understanding of the connectedness between the social environment and health.[2] Social determinants of health have been defined as the conditions or environments in which people are born, grow, live, learn, work and age.[8] These are shaped by the distribution of power, money and resources and influence population and individual health directly and indirectly.[45] Health is a

complex phenomenon, with social determinants of health explaining the sensitivity of human health to the powerful influence of social factors.[46] Importantly, social determinants influence access to health care through geographical barriers, consequences of illness, health insurance and lack of pro-equity health policies, among others.[2, 47] The social determinants of health are the fundamental structures of social hierarchy and socially determined circumstances in which people live and grow,[48] and include factors such as gender, education, employment, social support, food security, housing, addiction and ethnicity.[43] Social determinants of health can exist together and often act in mutually reinforcing ways to compound disadvantage.[49]

The WHO definition of social determinants of health as "the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life"[30] is a widely accepted definition, with other individual researchers and organisations adopting this definition with slight variations.[50, 51] For example, the Healthy People 2030 definition of social determinants of health states that they "are the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks", demonstrating the adaption of the WHO definition.[50]

While the WHO CSDH framework is a widely acknowledged and used globally, there are various other models and frameworks used to describe and explain the elements and factors that create the causal pathway and inter-relate to the social determinants of health.[47] The Healthy People 2030 created a place-based organisation framework distinguishing five key elements of social determinants of health. These key elements prioritise social and community context; education access and quality; health care access and quality; economic stability; and neighbourhood and built environment.[50] The social-ecological model of health recognises the interplay between four features, that is,

individual (age, education and income), relationship (social circle, family, partners), community (workplaces and neighbourhoods), and societal factors (social and cultural norms, economic, education and social policies). This model uses these factors to identify the different levels that contribute to poor health, enabling a community engagement approach to recognising and approaching change within the physical and social environments.[52] The WHO CSDH framework, however, was selected to be used in this thesis due to the systematic, integrated and dynamic approach adopted. The WHO CSDH not only considers the biological mechanisms and causality, but explicitly considers the non-linear correlation and feedback that is vital when exploring the social determinants of health.[47]

Each of the elements of the social determinants of health, according to the WHO CSDH Framework, will now be discussed.

Gender is a socially constructed characteristic and is different from sex, which refers to characteristics that are biologically determined.[47] In some countries and societies, gender can be the basis for discrimination.[53] Women can suffer the health effects of discrimination through rape, domestic violence and genital mutilation.[47] Gender norms inhibit the types of employment and educational opportunities that are provided to women, reinforcing social disadvantage and, in turn, their health risks.[53] For men, socially constructed norms of masculinity, especially when they involve substance abuse and violence, can have negative influences on their own and others' health outcomes.[47]

Educational opportunities and attainment are crucial components of the social determinants of health.[48] Quality and higher education are linked to better health outcomes through people having a better knowledge of health and healthy behaviours, as well as knowledge of how and when to access health care services.[54] This is partly

explained by literacy and the development of critical thinking skills,[2] but the relationship between health and education is not completely understood. Access to education also shapes employment opportunities, placing well-educated individuals in higher demand, usually with the benefit of a higher income and employment status, which also has a further impact on socioeconomic status.[54] Education can provide people with a greater perception of personal control and intergenerational social standing due to the remuneration that can come with higher education.[55]

Employment and job security are beneficial to health and wellbeing,[43] and can have a powerful effect on health equity.[55] Employment can create a social support network leading to a healthier workforce.[43] It can also reflect social standing, which relates to health outcomes, particularly as people can afford certain privileges, such as access to better health care.[47] In contrast, employment can also have a negative effect on health through work-related stress, risky work environments or unfavourable work conditions, such as the absence of sick leave.[47] Bullying in the workplace, lack of social support and having little opportunity to use skills contribute to ill health through mental health concerns.[55] Similarly, unemployment can have severe consequences for health, specifically with regard to psychological consequences,[43] although unemployment has also been associated with more illness and an increase in premature death.[55]

Social capital, including social support, is an important social determinant of health because friendships, community connection and good social relations contribute to better health.[43, 47] Belonging to a social network makes people feel cared for, promotes their self-esteem and has a protective mechanism for health.[54] The amount of social support a person receives can vary depending on their social class and socioeconomic status, with poverty often contributing to social exclusion and isolation.[43] People with less social

cohesion are more likely to experience an increased incidence of depression, chronic diseases and premature death.[43]

Food supply and nutrition are central to health.[9] Lack of food can cause malnutrition, whereas excessive intake can contribute to a wide range of chronic diseases such as diabetes, cardiovascular disease and obesity.[54] Social class and socioeconomic status play a role in food security as they determine what foods can be purchased and consumed.[43] People on lower incomes often substitute cheaper processed foods, including takeaway meals, for fresh food,[47] which can lead to poorer health outcomes.

Housing is a basic human right and has an impact on health.[56] The direct effects of inadequate housing on health outcomes are vast, including respiratory health due to dampness, poor ventilation and inadequate temperature control.[47] Damp homes can lead to the growth of mould and other organisms, while houses that use lead in paints or lead pipes can cause lead poisoning, especially in children. Environmental issues, including electrical and physical infrastructure, can increase the risk of injuries.[56] Overcrowding can predispose people to certain diseases, such as tuberculosis or group A streptococcus, which can cause acute rheumatic fever.[56, 57] Provision of public or social housing can have positive effects on health, as it allows people on low incomes or with insecure housing to gain housing security, which in turn relieves emotional and psychological stressors.[58] Homelessness is a considerable public health concern as homeless populations disproportionately suffer from cardiovascular disease, diabetes, hepatic diseases, and HIV.[59] Homeless populations have poorer access to health care services, and when they do access health care, are often discriminated against, which in turn prevents them seeking further care.[59]

Behavioural factors or addiction (alcohol, drug and tobacco intake) are influenced by wider social conditions[43] and can have a profound impact on health. While addiction behaviour can relieve the pain of social conditions and be used to cope with emotional and psychological stressors, these can be detrimental to health.[47] Dependence on or excessive consumption of alcohol or other drugs can lead to accidents, violence, poisoning and suicide.[43] Tobacco smoking can often improve mood; however, it also places a strain on an individual's finances and can result in certain cancers and premature death.[60]

Ethnicity is considered socially constructed when referred to as a social determinant of health because the paradigms of race and ethnic differences are the basis for social division and discrimination.[47] Health status and outcomes can be poorer, especially among ethnic groups that are marginalised within a society.[54] Racial segregation produces and perpetuates social disadvantage and impacts health through stress and psychological issues.[54] Racial discrimination can affect every facet of health and wellbeing, with indigenous populations globally enduring poorer health indicators, such as morbidity, mortality, overall wellbeing and life expectancy, than their non-indigenous counterparts.[47] Additionally, inequities premised on racial discrimination cause social disadvantage and negative health impacts, leading to inequalities in poverty and where individuals can live.[47]

2.2.2 The intersection of multiple social determinants of health

The nature of the social determinants of health means that individuals can experience multiple social determinants of health, as health inequalities and disparities between individuals occur in response to unequal opportunities, resources and conditions.[61] Individuals can experience a collective of social determinants coexisting and mutually

reinforcing one other, making it difficult to determine which social determinant came first.

2.2.3 Wellbeing

While there is growing evidence within the literature that individual wellbeing is central to informing policy and monitoring welfare trends, the extent of the effectiveness of such measures is dependent upon how wellbeing is defined.[33] There is substantial ambiguity in how wellbeing is defined and used. It is perplexing that despite being a widely used term in a range of disciplines, there is no international consensus on the definition of wellbeing.[62] In the absence of a definition, many synonyms and descriptions of wellbeing are used interchangeably.[63] While many definitions have been proposed by those within social sciences, policymakers and other disciplines often refer to subjective wellbeing that focuses on the 'mental state' of an individual.[64] The application of physical, emotional, spiritual and cognitive terms to define and measure wellbeing is used simply as a substitute for mental health.[33]

The historical background of wellbeing research describes two approaches: either hedonic, which refers to the constructs of positive affect, happiness, joy and life satisfaction,[65] or eudaimonic, which encompasses positive psychological functioning.[66] Despite the differences in these two approaches, more recent wellbeing research considers that measures of wellbeing should offer insight into how people experience aspects of their lives and incorporate more than the hedonic and eudaimonic components of wellbeing.[63] Wellbeing is a multidimensional paradigm, and as such, requires a diverse approach, not simplified to life satisfaction or the pursuit of happiness.[66]

Many researchers have applied varying definitions of wellbeing based on their disciplines. McAllister[67] defines wellbeing as 'More than the absence of illness or

pathology; it has subjective (self-assessed) and objective (ascribed) dimensions; it can be measured at the level of individuals or society, it accounts for elements of life satisfaction that cannot be defined, explained or primarily influenced by economic growth.' (p. 2). While subjective wellbeing, developed by Diener[68], is defined as 'a broad category of phenomena that includes people's emotional responses, domain satisfactions, and global judgements of life satisfaction' (p. 278). Psychologist Seligman[69] proposed a new model of wellbeing labelled the flourish or PERMA model, combining the hedonic and eudaimonic components of wellbeing into one model. The flourish model by Seligman includes five elements of wellbeing: positive emotions, engagement, relationships, meaning and accomplishment (PERMA), with all five elements giving rise to human flourishing. Furthermore, social scientists Hallerod and Selden[70] developed a multidimensional model of wellbeing that describes five wellbeing arenas: health, psychosocial, social relation economy and functions to explain how the varying aspects of an individual's wellbeing are entwined together.

Wellness and quality of life are also described in the literature as terms akin to wellbeing.[33, 71] Hettler's[32] wellness model includes six dimensions: social, spiritual, physical, intellectual, emotional and occupational, and conceptualises wellness or wellbeing as the integration and balance of the six dimensions. Similarly, the WHO's quality of life framework also incorporates six elements: physical health, mental health, social health, degree of independence, living environment and quality of life, whereby there is a necessity for balance among the elements to create an optimal quality of life. According to Stoewen[71], wellness embraces eight dimensions: physical, intellectual, emotional, social, spiritual, vocational, financial and environmental, with neglect over time of one of these dimensions affecting an individual's wellbeing.

This thesis uses a combination of the definitions and key dimensions from the models described in the literature. Therefore, our definition of wellbeing is that it is a multidimensional paradigm encompassing physical, psychological, financial, spiritual, occupational, social, intellectual and environmental elements that interconnect to facilitate positive wellbeing. Working in harmony, the elements of wellbeing must be balanced to produce positive wellbeing. This definition of wellbeing comprehensively describes the key dimensions that make up wellbeing, going beyond the previously mentioned flourishing and happiness concepts of wellbeing.[69] Physical wellbeing refers to sleep, physical activity, paying attention to signs of illness, diet and nutrition.;[71] Psychological wellbeing refers to emotional awareness and regulation, mental health, dealing with conflicts, enjoyment, happiness and resilience.[69] Financial wellbeing refers to economic stability, preparedness for unexpected emergencies, ability to make informed financial decisions and invest for the future. Spiritual wellbeing refers to sense of belonging, to find purpose in life, to have a value system, and availability of resources to cope with the unexpected issues.[71] Occupational wellbeing refers to personal satisfaction from work, and appreciation of contributions made. Social wellbeing refers to development of social networks, a sense of connection, feeling valued, and interaction with community. Intellectual wellbeing refers to expanding knowledge, recognizing abilities, an open mind to encounter new ideas, and feeding creativity;[71] and lastly, Environmental wellbeing refers to living in harmony with nature, being respectful of the surroundings, limiting stressors, and having a comfortable working and living environment. While optimal wellbeing incorporates all these individual elements of wellbeing being balanced, wellbeing is often dynamic, with external and internal factors influencing overall wellbeing.[71] Figure 3 demonstrates the relationship between the elements of wellbeing.

Figure 3: Eight dimensions of wellbeing

There has been an abundance of studies conducted within the social sciences measuring the concept of wellbeing among various population groups. Much of the literature within public health focuses on mental and physical wellbeing and the use of greenspaces,[72-74] the use of leisure activities[75-77] and work–life balance.[78-80] Furthermore, other literature within public health explores sexual and social wellbeing,[81-83] wellbeing of the built environment,[84, 85] economic wellbeing[86-88] and life satisfaction,[89-91] demonstrating the usefulness of wellbeing as an independent variable within public health research. Wellbeing is an important health outcome to consider in times of great change, such as those generated during the COVID-19 global pandemic.

2.3 Part 2: The COVID-19 pandemic

Prior to 2019, novel coronaviruses had triggered two epidemics;[91] SARS, which began in 2002[92] and MERS, which began in 2012.[93] During the SARS outbreak, the case fatality rate was reported as 9%, with 8,093 cases and 774 deaths. In comparison, the MERS epidemic to date has had 2,494 cases and 858 deaths, with a case fatality rate of 34%.[94] The emergence of Severe Acute Respiratory Syndrome 2 (SARS-CoV-2), otherwise known as COVID-19, in Wuhan, China in December 2019 has generated a large-scale public health response.[95] As of 3 October 2022, globally, there have been over 615 million confirmed cases of COVID-19 and over 6.5 million deaths.[37] Despite the large number of confirmed cases, the global COVID-19 case fatality rate equates to 1.3%. To date, the mortality rate of COVID-19 seems to be lower than SARS and MERS; however, the WHO and public health experts consider COVID-19 to be more severe and widespread due to its spread beginning among international travellers.[91]

2.3.1 COVID-19 pathophysiology

As a large, enveloped, single-strand Ribonucleic Acid (RNA) virus, coronaviruses are found in humans and various other mammals, including cattle, chicken, birds and dogs, and cause respiratory, neurological and gastrointestinal disease.[96, 97] Although coronaviruses can cause widespread disease among humans, the virus is thought to be zoonotic in origin, with bats considered its natural host.[98] COVID-19 virions are approximately 60 nm to 140 nm in diameter with characteristic spikes.[97] COVID-19 primarily affects the respiratory system, with early infection targeting the nasal and bronchial epithelial cells. Viral replication continues accelerating, causing the epithelial–endothelial barrier to become compromised and creates an inflammatory response in the pulmonary capillaries during the later period of infection.[99, 100] There are three stages of

severity of COVID-19 infection. During the first stage, an infected person can develop flu-like symptoms, with some developing pneumonia that can require hospitalisation, and in some cases, intubation and ventilation.[99] The second stage is characterised by pulmonary inflammation leading to acute respiratory distress syndrome (ARDS), often with a poor clinical outcome. The final stage is fibrosis of the lung tissue.[99] As the pandemic has progressed, COVID-19 has mutated to create variants, with some deemed variants of concern because they pose an increased risk to global health.[101] Mutation of COVID-19 can change the virus' properties, potentially altering the severity of the disease, the transmissibility of the virus and the public health measures required to protect the population. The WHO, along with its international experts, continue to monitor variants to detect variants of concern.[101]

2.3.2 Mode of transmission

Transmission of COVID-19 occurs through exposure to respiratory droplets, aerosols or direct contact with an infected person. Spread can also occur through contaminated surfaces and objects.[102] The risk of transmission increases with continued exposure to an infected person. Being within 1.5 m of an infected person for a period of at least 15 minutes increases the risk, while brief exposure to a pre-symptomatic or asymptomatic contact is less likely to result in the transmission of COVID-19.[96] However, it is important to note that asymptomatically infected people have been proven to shed the virus and are, therefore, considered a potential source of infection.[98] In addition to the above-mentioned modes of transmission, a systematic review of 38 studies involving 936 neonates has demonstrated that vertical transmission of the virus is possible.[103] Vertical transmission refers to transmission of a virus from the mother to the baby during pregnancy, delivery and up to 28 days following birth. However, the prevalence of COVID-19 through vertical transmission is reported as low.[103]

2.3.3 Incubation period

Having a reliable estimate of the incubation period of an infectious disease can inform decision-making around public health measures and control, such as the duration of quarantine, surveillance and active monitoring periods for people with a high risk of exposure.[104] An incubation period refers to the time, calculated in days, from a person being exposed to the virus to the onset of symptoms.[105] With COVID-19 being an emerging virus, the initial evidence and understanding of the incubation period were limited.[106] During the early phase of the outbreak prior to extensive spread, there was a fluctuation in the mean incubation period, with some studies reporting a mean of 5.8 days,[105] and other studies reporting incubation periods of 6.38 days[107] and 4.5 days.[105] However, with more studies conducted since the emergence of COVID-19, the mean incubation period has been refined to 5–6 days.[108]

2.3.4 Infectious period

Equally important in informing public health measures and control is the infectious period or the duration of viral shedding of an infectious disease. In the early stages of the pandemic, due to the novelty of COVID-19, there was a lack of robust evidence to indicate the exact period of viral shedding and, therefore, the length of time that a person remains infectious. Studies suggested various infectious periods: 0–20 days (median 8 days),[109] 8–37 days (median 20 days),[35] 7–45 days (median 12 days),[110] and 4–51 days (median 17 days),[111] demonstrating the variability of the infectious period. As more has been learned about COVID-19, the studies have confirmed that a pre-symptomatic phase can occur 1–3 days prior to the onset of symptoms,[112] with a mean time from symptom onset to negative PCR test of 13.4 days.[113]

New variants such as Delta and Omicron have been demonstrated to have longer viral shedding and higher viral burden compared to other COVID-19 variants.[114, 115] Australia is directed by the Communicable Disease Network Australia (CDNA) Series of National Guidelines (SoNGs)[116] for recommendations on control measures, including the infectious period. The infectious periods within Australia have changed during the course of the pandemic as further data and evidence have come to light. As of 9 September 2022, Australia's approach to the infectious period is 48 hours prior to symptom onset (or a positive test for asymptomatic cases) until release from isolation.[116] Individuals can be released from isolation on day 5 after their first positive test if they have a resolution of respiratory symptoms and have had no fever for the previous 24 hours.

2.3.5 Basic reproductive number R_0

The basic reproductive number R_0 is used in epidemiology to denote the average number of new infections caused by an infected person. R_0 is used to inherently describe the transmissibility of an epidemic or pandemic.[117, 118] The threshold properties for R_0 are that if the $R_0 < 1$, then each infected person produces less than one secondary case, whereas an $R_0 > 1$ means that each infected person is expected to infect a number of individuals with the infectious disease expected to spread exponentially. In an infectious disease outbreak, the basic reproductive number is vital in the crisis response as it informs control measures.[117, 118] During the early stages of the COVID-19 pandemic, a review of 12 studies in China estimated an R_0 ranging between 1.5 and 6.68, with a mean of 3.28.[119] In Lombardy, Italy, during the early phase of the COVID-19 pandemic, the R_0 was estimated to be 2.76 to 3.25.[120] The R_0 is used by public health professionals and governments to curb the spread of the virus by determining the duration and severity of the lockdowns and quarantines.[117, 118]

2.3.6 Clinical characteristics of COVID-19

As a new infectious disease, the clinical features of COVID-19 are diverse. However, it is well established that most patients develop a fever with the addition of some respiratory symptoms, such as a cough and dyspnoea.[121-123] Similarly, a systematic review conducted in China, including 38 studies and 3,062 patients, described fever (80.4%), cough (63.1%) and fatigue (46%) as the most common clinical manifestations.[98, 123] Milder respiratory symptoms have also been reported, such as a sore throat, myalgia and rhinorrhoea.[124] Gastrointestinal symptoms have also been reported as occurring in patients infected with COVID-19, including vomiting, abdominal pain and diarrhoea.[125, 126] As more has been learned about the virus, loss of smell and taste have been demonstrated to be prevalent in approximately 50% of cases.[127] While the symptoms described seem relatively mild, the progression of COVID-19 can be rapid, with up to 20% of unvaccinated cases requiring hospitalisation.[128] Approximately 25% of all patients who require hospitalisation may need further respiratory management within an intensive care unit.[129]

2.3.7 COVID-19 spread globally

In December 2019, health authorities in China were monitoring a cluster of unexplained pneumonia cases in the Hubei province.[128] By late December 2019, the WHO was alerted to the emergence of unexplained pneumonia cases, with Chinese health authorities subsequently isolating a novel coronavirus (later called COVID-19) from patients.[130] By the end of January 2020, the novel coronavirus had been confirmed in 9,720 cases in China and included 213 deaths.[131] Most worrying was that there were also 106 cases confirmed in 19 other countries, beginning the global spread.[131] During the 1918 Spanish influenza pandemic, the virus started its spread by ship, train and foot and took months to spread globally. In comparison, in the era of globalisation and international travel, the

worldwide spread of COVID-19 was due to commercial air travel.[132] This has allowed COVID-19 to be spread rapidly across the globe, with the likelihood of contagion once the virus 'lands' in a new country dependent upon the strength of the local health systems and public health measures implemented to prevent transmission.[133] Strong infectious disease surveillance systems assist in providing vital information on the characteristics of the virus, thus, enabling the identification of population groups most susceptible to COVID-19.[134] It is important to note that COVID-19 was initially spread among international travellers who would not be associated with being negatively impacted by the social determinants of health because they tended to be among wealthier mobile populations.[135, 136] The social determinants of health became more significant once COVID-19 became more entrenched in less affluent communities and there was more domestic transmission.[135, 136]

2.3.8 Preventative measures implemented in Australia

While public health experts and countries continue to learn about COVID-19, implementation of public health interventions and measures is the national approach to minimising further transmission.[137, 138] In Australia, lockdown and other preventative measures were managed by both the Federal and individual State Governments. In mid-late March 2020, lockdown measures were progressively implemented by the Federal government restricting individuals' movement, banning gatherings, and implementation of social distancing measures. Australia's international borders were closed to all non-residents on the 20 March 2020 and all non-essential services and business were closed, including schools from 21 March 2020.[139] By 22 March 2020, the Federal government had announced its economic stimulus package to support individuals and businesses affected by the lockdowns. On 8 May 2020, the Federal government announced a three-stage plan of easing of national lockdown restrictions. Following this initial nationwide

lockdown, various states, such as Victoria and New South Wales (NSW), implemented further lockdown restrictions based on rising deaths and cases of COVID-19.[140] Melbourne, the capital city of Victoria including some regional areas of Victoria, experienced six lockdowns totalling 262 days. Whereas in NSW, Sydney the capital city of NSW and areas classified as greater Sydney (Illawarra, Central Coast and Blue Mountains), experienced two major lockdowns, with the longest lockdown commencing in August 2021 ending 107 days later.[141] Lockdowns in some states like NSW occurred by local government areas, with many regional areas experiencing multiple lockdowns during 2021.[142]

During 2020 and 2021, movement of individuals between states and territories was also restricted, these were imposed by the states/territories themselves. For example, Western Australia closed its borders to the rest of Australia and international visitors for two years, reopening its borders to visitors on 3 March 2022.[142] Similarly, Queensland restricted travellers internationally and from interstate , reopening its borders on 15 January 2022. Australia reopened its borders to international visitors on 21 February 2022, following almost two years of closure.[141, 142]

There are four main groups of preventative measures instigated within Australia: population level, individual level, vaccinations and active surveillance, which are explained below. The Swiss Cheese Model, created by James Reason in 1990[143] and displayed in Figure 4, recognises that not one single intervention for preventing the spread of COVID-19 is flawless, with the figure depicting holes in each intervention (slice of cheese) to indicate that multiple layers of protection and prevention are required to significantly reduce the overall risk.
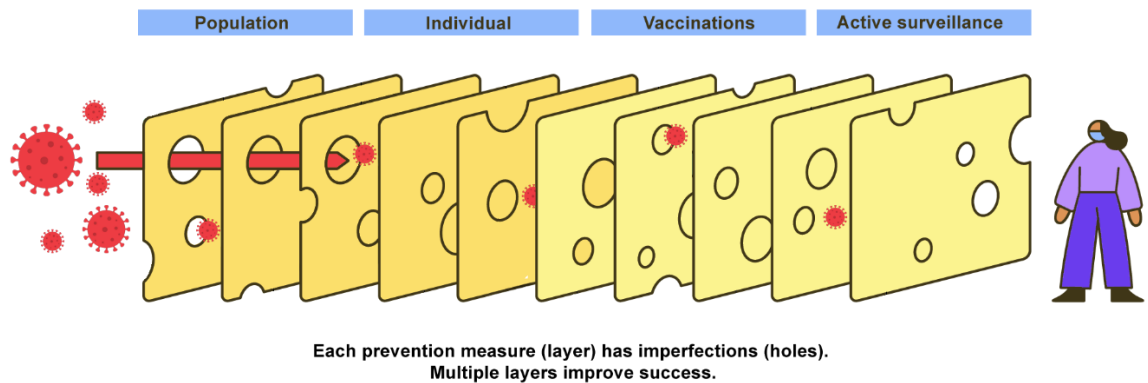
Figure 4: Swiss cheese model of COVID-19 prevention strategies

Adapted from Reason[143]

2.3.8.1 Population-level

The range of population-level preventative measures focuses on reducing the number of interactions that occur between individuals and ensuring that physical (social) distancing is used when interactions are unavoidable, such as in the workplace and on public transport.[144] Most of the measures implemented are mandated by law, including mask wearing, with fines pursued. The population-level preventative measures have included travel bans (international, interstate and intrastate), restrictions on social gatherings, lockdowns, closure of non-essential businesses such as clubs, pubs and cinemas, cafes and restaurants limited to takeaway services, employment and schooling strongly encouraged to transition to home, and temperature monitoring in health facilities.[138, 144] However, in some places in Australia, like Melbourne, continued community transmission of COVID-19 meant that strict lockdown measures were implemented, including curfews and complete lockdowns of particular communities, such as those experienced in some public housing towers.[144, 145] As new variants emerged and the spread of the virus was not able to be controlled, Greater Sydney, including the Central Coast and Illawarra, and Victoria had additional strict lockdown measures imposed to limit the spread of the virus.

2.3.8.2 Individual level

In addition to abiding by the population-level preventative strategies, individuals were recommended to implement behavioural measures to reduce their risk of spreading or becoming infected with COVID-19.[138, 144] Behavioural measures focus on personal hygiene, including regular handwashing, use of hand sanitisers, cough and sneeze etiquette, wearing masks as per Federal, State and workplace policies, getting tested for COVID-19 when unwell and remaining home when unwell.[144]

2.3.8.3 Vaccinations

The COVID-19 vaccine development was a global priority, and within less than a year, some countries had approved the use of COVID-19 vaccines for their populations. Australia's Therapeutic and Goods Administration (TGA) provisionally approved Comirnaty (Pfizer), a COVID-19 vaccine, for use in Australia on 25 January 2021 and Vaxzervia (AstraZeneca) on 15 February 2021.[146] Later, the TGA also provisionally approved Spikevax (Moderna) on 9 August 2021 and Nuvaxovid (Novavax) on 20 January 2022.[146] COVID-19 vaccines are an effective tool to reduce infection risk, preventing illness and hospitalisations.[147] Australia commenced its free COVID-19 vaccination rollout in February 2021, with individuals over the age of 5 years recommended to have two doses of a COVID-19 vaccine. Individuals over the age of 16 years are also recommended to have a booster COVID-19 vaccine, with individuals over 30 years of age approved to have a second booster vaccination.[148]

2.3.8.4 Active surveillance

An imperative component of reducing the risk of further transmission of COVID-19 is active surveillance. This is achieved by isolating confirmed and suspected cases, contact

tracing and quarantining confirmed cases' contacts who are considered high risk.[137] Active or enhanced surveillance also involves developing and revising case definitions, identifying and describing the epidemiology of COVID-19, and maintaining a case notification and surveillance system.[116]

While these public health strategies are vital to reducing the spread of COVID-19, they have an impact on people's lives: socially, economically and psychologically. This impact can be variable and often dependent on an individual's existing social determinants of health. Therefore, efforts are required to combat the negative impacts for certain population groups.

2.3.9 The intersection of COVID-19 and social determinants of health

Labelled by some in mainstream media as the 'great equaliser', there is the inaccurate assumption that all people in the world are equally affected by COVID-19, both directly and indirectly.[149] However, in reality, pandemics can exacerbate existing health inequalities (caused by the social determinants of health), with the potential for disproportionate socioeconomic effects, including job losses, partner violence, addiction behaviour, social isolation, susceptibility to COVID-19 and gaps in access to health care for some.[150, 151] Clear delineations between social groups, empirically referred to as the social gradient, are at play during COVID-19, where those in a lower social class, who are generally affected by material and social deprivation and socioeconomic disadvantage, are disproportionately affected by COVID-19.[149, 152] The vast range of strategies used to contain COVID-19 also have an adverse effect on health and wellbeing, determined by the social determinants of health. This is further discussed in Part 3: systematic review.

2.4 Part 3: Systematic review

This section presents a systematic review of the international literature on the social determinants of health and health outcomes among adults during the early stages of COVID-19 pandemic. Permission to include the publication in the thesis has been granted by John Wiley & Sons. This paper was published in Public Health Nursing (Impact Factor – 1.770) as:

Green H, Fernandez R, MacPhail C. The social determinants of health and health outcomes among adults during the COVID-19 pandemic: A systematic review. Public Health Nursing. 2021 Nov;38(6):942-52. https://doi.org/10.1111/phn.12959

2.4.1 Abstract

Objective: To synthesise the best available evidence on the relationship between the social determinants of health and health outcomes among adults during the COVID-19 pandemic.

Introduction: COVID-19 has created widespread global transmission. Rapid increase in individuals infected with COVID-19 prompted significant public health responses from governments globally. However, the social and economic impact on communities may leave some individuals more susceptible to the detrimental effects.

Methods: A three-step search strategy was used to find published and unpublished papers. Databases searched included: MEDLINE, CINAHL, EMBASE and Google Scholar. All identified citations were uploaded into Endnote X9, with duplicates removed. Methodological quality of eligible papers was assessed by two reviewers, with meta-synthesis conducted in accordance with JBI methodology.

Results: Fifteen papers were included. Three synthesized-conclusions were established a) Vulnerable populations groups, particularly those from a racial minority and those with low incomes, are more susceptible and have been disproportionately affected by COVID-19 including mortality; b) Gender inequalities and family violence have been exacerbated by COVID-19, leading to diminished wellbeing among women; and c) COVID-19 is exacerbating existing social determinants of health through loss of employment/income, disparities in social class leading to lack of access to healthcare, housing instability, homelessness and difficulties in physical distancing.

Conclusion: Reflection on social and health policies implemented are necessary to ensure that the COVID-19 pandemic doesn't exacerbate health inequalities into the future.

Keywords: Social determinants; COVID-19; pandemic; systematic review; health inequalities

ConQual Summary of Findings

Social determinants of health during the COVID-19 pandemic: a systematic review

Synthesized Conclusions	Type of research	Dependability	Credibility	ConQual score	Comments
Vulnerable populations groups, particularly those from a racial minority and those with low incomes, are more susceptible and have been disproportionately affected by COVID-19 in a range of ways including mortality.	Text and opinion papers	Moderate (downgraded one level)	Moderate (downgraded one level)	Moderate	Dependability downgraded—of eleven papers, nine papers addressed six dependability questions; and two papers addressed four dependability questions. Credibility downgraded due to mix of U and C findings (9 U + 11 C).
Gender inequalities and family violence have been exacerbated by COVID-19, leading to diminished wellbeing among women.	Text and opinion papers	Moderate (downgraded one level)	Low (downgraded two levels)	Low to Moderate	Dependability downgraded—of 4 papers, two papers addressed all six dependability questions; and two papers addressed four dependability questions. Credibility downgraded due to C findings only (7 C).

Social determinants of health during the COVID-19 pandemic: a systematic review

Synthesized Conclusions	Type of research	Dependability	Credibility	ConQual score	Comments
COVID-19 is exacerbating existing social determinants of health through loss of employment/income, disparities in social class leading to lack of access to healthcare, housing instability, homelessness and difficulties in social distancing.	Text and opinion papers	Moderate (downgraded one level)	Moderate (downgraded one level)	Moderate	Dependability downgraded—of ten papers, eight papers addressed six dependability questions; and two papers addressed four dependability questions. Credibility downgraded due to mix of U and C findings (11 U + 9 C).

U = Unequivocal; C = Credible

2.4.2 Background

The emergence of COVID-19, caused by a virus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has created widespread global transmission. Declared a PHEIC by the WHO on 30 January 2020,[153] there have been over 192 million cases of COVID-19 globally as of 23 July 2021, with more than 4 million deaths.[37] Rapid increase in individuals infected with COVID-19, along with mortality in the early phase of the pandemic, prompted significant public health responses from governments globally. The public health measures implemented during the first wave of the pandemic in countries like China, Thailand, Italy, the United Kingdom and the United States to prevent further transmission were centred on physical distancing, lockdown measures and closure of productive activities.[154-157]

While COVID-19 was initially deemed by some governments as 'the great equaliser'[158,159] public health measures implemented to reduce the transmission of COVID-19, while effective, have had unequal implications for people within communities and globally.[160] Limitations to people's social freedoms, social isolation, and the impact on countries' economies as a result of efforts to curb the spread of COVID-19 have been widespread.[155] Additionally, since the scientific communities succeeded in producing several COVID-19 vaccines, there has been inequitable vaccine distribution within and among countries, leading to what has been termed as vaccine poverty.[161]

The social, psychological, health and economic impacts of COVID-19 on communities may leave some individuals more susceptible to the detrimental effects on their health and wellbeing. Factors affecting susceptibility to COVID-19, as well as the impact of health and wellbeing outcomes, include insecure housing, limited access to health care, poverty, gender inequalities, racial segregation, food insecurity and loss of income and

employment.[162] These factors are collectively described as the social determinants of health. Social determinants of health can create health inequalities within society, and "*are the conditions in which people are born, grow, live, work and age. These circumstances are shaped by the distribution of money, power and resources at global, national and local levels*".[30] Social determinants of health can affect the prevalence, mortality, wellbeing and health outcomes and consequences of COVID-19 within communities globally.[163] The impact of COVID-19 is not homogenous, therefore there is merit in considering how the differential impacts are felt within countries, even in countries that are wealthy.

Global and national crises, including pandemics such as COVID-19, have the ability to emphasise social and health inequalities, particularly those that may be unseen or hidden prior to the pandemic.[164] For example, during the MERS epidemic those who were employed reported feeling that they had an increased risk of infection,[165] whereas generally, employment is thought to be a protective factor when examining social determinants of health. Indeed, experience from recent epidemics such as SARS, MERS and Ebola have shown that inequalities are amplified as a consequence of these infectious disease epidemics.[166] A number of public health experts have published in the literature on the consequences of COVID-19 for minority population groups, including the worsening of social determinants of health.[167-169] Certain ethnic groups, while continuing to be employed during the COVID-19 pandemic, are employed in occupations that are considered to be essential services, such as transportation and retail, leaving them without the ability to work from home.[164, 170] Furthermore, minority populations are disproportionately affected by COVID-19, including increased morbidity, hospitalisations and mortality.[168] In addition to these immediate impacts, COVID-19 is thought to have lasting impacts on health and social inequalities, with workers displaced

due to the pandemic not likely to regain employment, even after economic recovery.[166] It is therefore vital that an understanding of the relationship between the social determinants of health and health and wellbeing outcomes is generated to inform social and health policies that can address health inequalities, not just for the current pandemic, but to achieve health for all into the future.

A preliminary search of PROSPERO, MEDLINE, the Cochrane Database of Systematic Reviews and the JBI Database of Systematic Reviews and Implementation Reports was conducted and did not reveal any literature reviews, integrative reviews or systematic reviews on the topic. Therefore, the objective of this review is to synthesize the evidence exploring the relationship between the social determinants of health and health outcomes of adults during the first six months of the COVID-19 pandemic.

2.4.3 Methods

2.4.3.1 Search strategy and study selection

A three-step search strategy was employed to find both published and unpublished papers. Initially, a preliminary search of MEDLINE via OVID was undertaken to identify papers on the topic, followed by analysis of the text words contained in the titles and abstracts of the relevant papers. Secondly, specific search strategies for each of the selected databases were developed and a full search was undertaken. Databases included in the search were MEDLINE via OVID, CINAHL via EbscoHost, EMBASE via OVID, Cochrane Library (CENTRAL), PsycINFO and Google Scholar using the following search terms ("Social determinants of health OR structural determinants of health OR socioeconomic factors OR social determinants OR social class OR social support OR education OR education status OR income OR poverty OR access to health care OR food supply OR employment OR employment status OR housing stability OR Gender OR

ethnicity OR race) AND (COVID-19 OR coronavirus infection* OR Coronavirus) AND (health outcome* OR impact OR health OR wellbeing)". Finally, the reference list of all papers potentially suitable for inclusion were screened to identify any additional papers. All references were organised into EndNote V9, with all duplicate papers removed prior to screening the titles and abstracts. Two reviewers (HG, RF) screened all the titles and abstracts to exclude those papers that did not meet the inclusion criteria. Full text papers that matched the inclusion criteria were obtained and were assessed by two independent reviewers for inclusion (HG, RF). A protocol for this review was registered on PROSPERO International prospective register of systematic reviews under the registration number CRD42020214271.

2.4.3.2 Inclusion and exclusion criteria

The review considered papers (opinion, discussion and narrative) that included participants aged 18 years and over from countries in any geographical region globally. Papers published from January 2020 to July 2020 were considered for inclusion. This date range starts from when the COVID-19 pandemic was recognised by WHO as a PHEIC and ends at the first six months of the pandemic. Any paper that did not report on social determinants of health or health outcomes and wellbeing were excluded. Only papers published in the English language are included, as the authors are not fluent in any other language. No primary data collection papers were included in this review.

2.4.3.3 Methodological quality assessment

Two independent reviewers (HG, RF) critically appraised the methodological quality of each paper eligible for inclusion using the critical appraisal instruments from Joanna Briggs Institute (JBI) for text and opinion papers.[171] This instrument consists of six questions assessing the source, source field of expertise, reference to extant literature, and

congruence with literature. Using the critical appraisal instrument, each question was allocated a score (Yes = 2, No = 0, Unclear = 1), with the maximum achievable score of 12 or 100% when converted to a percentage. A score of between 0-50% was considered low quality, 50 – 70% was medium quality and any textual paper that scored 70% and over was considered high quality. However, all papers, irrespective of methodological quality, were included in the review. Any disagreements between the reviewers concerning the inclusion of a paper in the review was resolved through the use of the third reviewer (CM).

2.4.3.4 Data extraction and thematic synthesis

Data were extracted from the papers included in the review using the Joanna Briggs Institute System for the Unified Management, Assessment and Review of Information (JBI SUMARI) data extraction tool[172] by one reviewer and checked by a second reviewer. The specific data extraction included details regarding the populations' represented, social determinants of health addressed, and author's conclusions significant to the review question. Authors of the included papers were not contacted regarding request for clarification or additional data.

An extract from the text was identified to support each conclusion and used as an illustration. The extracted author's conclusions from the included papers were assigned a credibility rating in order to assess the validity (unequivocal, credible and unsupported). A rating of unequivocal (U) refers to the author's conclusions being beyond reasonable doubt, directly reported and not open to challenge; a rating of credible (C) refers to the author's conclusions being plausible, that is they could be open to interpretation; whereas a rating of unsupported (Un) refers to the author's conclusion not being supported by the text.[173]

Each authors' conclusions were grouped to generate a set of statements (categories) based on similarity of meaning. These categories were then subjected to meta-synthesis to develop comprehensive synthesized conclusions[173] and can be used as a foundation for evidence-based practice. To establish the dependability and credibility of the synthesized conclusions, each were rated using a modified ConQual approach. The JBI ConQual approach was developed for qualitative systematic reviews[173] and we have modified this approach to be used for systematic reviews of text and opinion. The modified ConQual approach enables the synthesized conclusions to be downgraded based on their credibility or dependability. The papers have a starting rank of high and can be downgraded for both dependability and credibility. Using all six questions from the critical appraisal tool, dependability is scored as: 5-6 'yes' responses—the conclusion remains high; 2-4 'yes' responses—the conclusion is downgraded one level; 0-1 'yes' responses—the conclusion is downgraded two levels. Credibility is ranked according to the assigned levels of credibility: unequivocal; equivocal and unsupported, with a synthesized conclusion consisting of all unequivocal findings remaining high, while a mixture of unequivocal and equivocal findings is downgraded one level. Credibility is downgraded two levels if the synthesized conclusion contains all equivocal findings, while a synthesized conclusion consisting of a mixture of unequivocal, equivocal and unsupported findings is downgraded three levels. If the synthesized conclusion only contains unsupported findings, then the credibility is downgraded four levels. The dependability and credibility rankings are then compiled into a modified ConQual score, which provides a level of confidence in the synthesized conclusions (Author's own).

2.4.4 Results

2.4.4.1 Search results

A search of the literature produced 1,504 potential records, after removal of duplicate papers, 1,101 papers were ascertained as potential titles for inclusion (Figure 5). Following the review of the titles and abstracts of 1,101 papers, 1,082 papers were excluded as they did not meet the inclusion criteria. The remaining 19 papers were retrieved in full text to read completely. A total of four papers did not meet the inclusion criteria and were therefore excluded from the review.

Identification of studies via databases and registers

Records identified from:
  Databases (n = 1504)
  Registers (n = 0)

Records removed *before screening*:
  Duplicate records removed (n = 403)

Records screened (n = 1101)

Records excluded (n = 1082)

Reports sought for retrieval (n = 19)

Reports not retrieved (n = 0)

Reports assessed for eligibility (n = 19)

Reports excluded:
  Did not fit inclusion criteria (n = 4)

Studies included in review (n = 15)
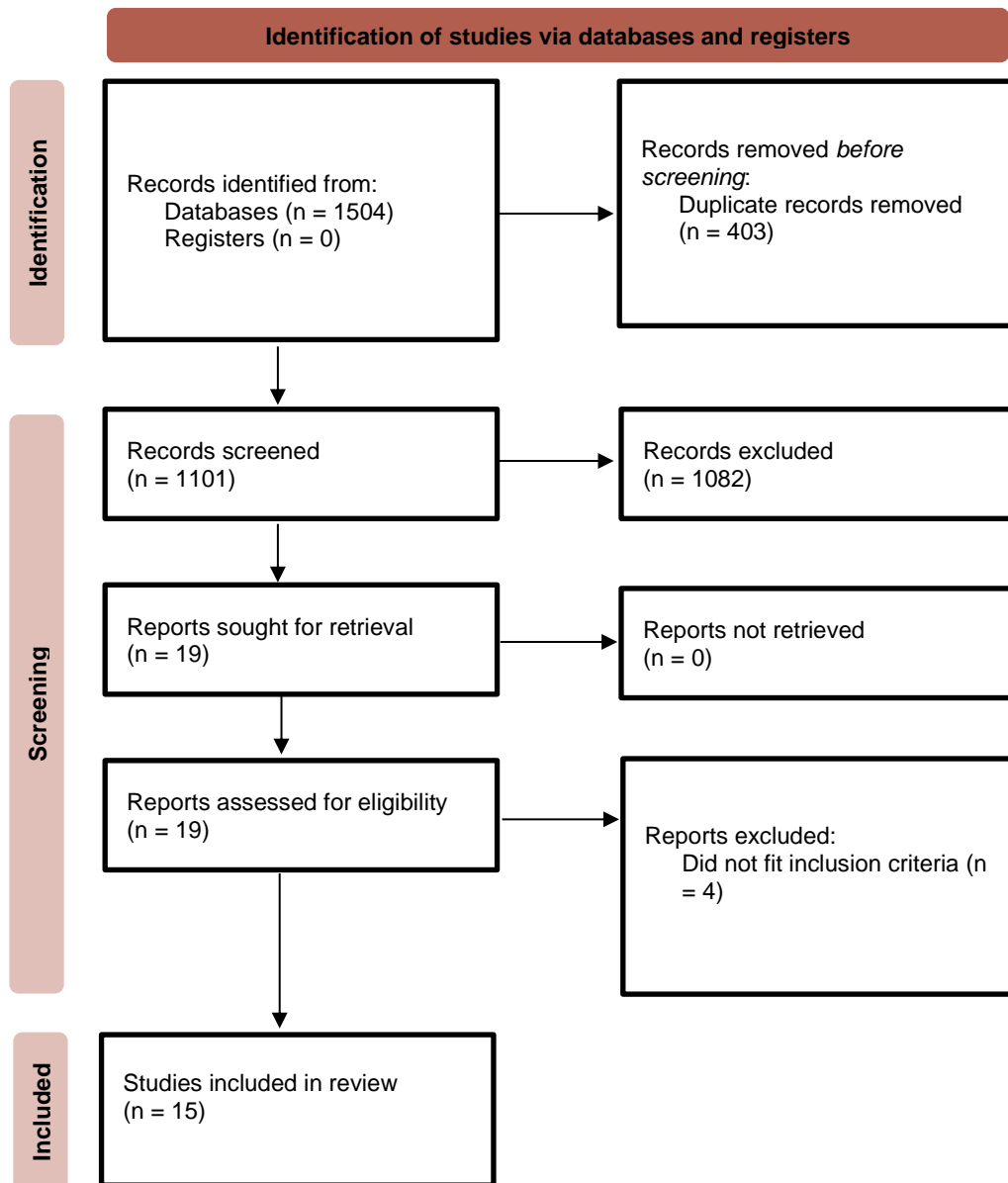
Figure 5: PRISMA Flow Diagram

Page[174]

2.4.4.2 Methodological quality

Fifteen papers were critically appraised. The methodological quality of the papers was high with all scoring 70% or more. No papers were excluded based on methodological quality. Seven papers[167, 168, 175-178] met all the appraisal criteria, while eight papers[169, 170, 179-184] did not meet all the appraisal criteria, including the lowest scoring papers[179, 183] with 83.3%. The methodological quality for each included paper is described in Table 1.

2.4.4.3 Characteristics of included papers

A total of 11 papers[169, 170, 175, 176, 179, 181-185]originated from the United States, two papers highlighted the United Kingdom experience[167, 168] and one paper each originated from Iran,[178] and Italy.[180] Nine papers explored ethnicity and racism,[167, 169, 170, 175, 176, 180, 182-185] socioeconomic status was referred to in seven papers.[167, 169, 175, 176, 178, 180, 181] Six papers examined employment and income,[168, 170, 176-178, 181] while access to healthcare was discussed in four papers.[169, 181, 182, 184] Other social determinants of health discussed in the papers were housing,[169, 177, 181, 182] food supply/security,[170, 176, 177] gender,[168, 179, 183] domestic violence.[168, 170] The types of papers included were: Commentary, Editorial essay, letter to the editor, Editorial, Opinion –Analysis and perspective paper, and Clinical practice statement. The characteristics of the included studies are further specified in Table 2.

2.4.5 Review findings

Meta-synthesis of textual data based on narrative and opinion generated three synthesized conclusions. These were derived from 47 authors' conclusions that were subsequently aggregated into six categories.

Synthesized conclusion 1 - Vulnerable populations groups, particularly those from a racial minority and those with low incomes, are more susceptible and have been disproportionately affected by COVID-19 in a range of ways including mortality.

This synthesized conclusion incorporates two categories comprising of 20 authors' conclusions. (Table 3)

Disparities in burden of disease among those from racial minorities, low income populations and other disadvantaged groups.

Current tracking of the COVID-19 cases in countries such as the United States, indicate the communities of colour or racial minority groups have been disproportionately affected,[169, 177, 183-185] with early data highlighting the disparities in hospitalisations of African Americans and Hispanic American population groups, who are overrepresented. Preliminary data from both the United Kingdom and the United States suggest that there are COVID-19 hotspots where black communities' mortality risk from COVID-19 is at least twice that of white community groups.[167, 175] A baseline of disadvantage in the most impoverished communities means they are already affected by the social determinants of health,[177, 182] and the high burden of chronic disease that plagues such population groups predisposes them to even poorer health outcomes if they are infected with COVID-19.[170, 182] Not only are racial minority and low-income populations affected with high numbers of COVID-19 cases, but they also have substantially higher mortality due to COVID-19 than any other group.[175, 177]

The inability to work from home, stockpile food supplies or obtain secure housing (homelessness) increases susceptibility and exposure to COVID-19.

Compounding disadvantaged communities' susceptibility to COVID-19 are structural drivers of health inequalities, such as racism, poverty, economic vulnerability and lack of social services.[168, 170, 177, 181, 182] The pandemic has forced many essential and low-income workers (cleaners, delivery drivers, supermarket jobs) to continue to work in frontline roles exposing them to increased risk of becoming infected with COVID-19.[170, 181] Physical distancing and an ability to work from home and quarantine have become for the privileged, with those on the lowest incomes still having to move around during the pandemic, increasing their risk for exposure to COVID-19.[168, 181] Indeed, families and communities that are financially insecure have fewer resources to stockpile food supplies,[177] this results in more frequent outings to the supermarkets increasing their

susceptibility to COVID-19 infection.[176, 177] The inability to stockpile food could also led to food insecurity with families and communities not being able to afford or source food products, often due to food being bought out by others for stockpiling.[170] The COVID-19 pandemic has also created issues for disadvantaged community members to secure housing, with many shelters at full capacity and those that are available overcrowded, with increased transmission risks of COVID-19.[177, 181] Overcrowding within low-income and ethnic minority households, due to the inability to secure housing, creates conditions that make physical distancing impossible resulting in a higher risk of exposure to COVID-19.[181, 182]

Synthesized conclusion 2: Gender inequalities and family violence have been exacerbated by COVID-19, leading to diminished wellbeing among women.

This synthesized conclusion incorporates two categories comprising of 7 authors' conclusions. (Table 3)

Gender inequalities and imbalances in loss of income and within the household.

Public health measures such as closure of schools and childcare in response to the COVID-19 pandemic have meant that dual income households have had to juggle home schooling and employment.[168, 183] For those families with the ability to work from home, school and childcare closures have added pressure and stress within the household, due to balancing paid work and schooling children.[168] This pressure is disproportionately felt by women who shoulder more responsibility for childcare in the household, leading to role conflict and affecting women's wellbeing.[179, 183] Furthermore, it has been indicated that loss of income during the pandemic will be unequal, with women most burdened with loss of income and therefore likely to fare worse than men.[168]

Increased incidence of family violence.

Family relationships during the COVID-19 pandemic have exacerbated existing tensions and created new strains, with increased concerns regarding domestic and family violence.[168, 170] Public health measures, including physical distancing and quarantine, implemented to slow the transmission of COVID-19, have placed, particularly women, at increased risk of domestic abuse.[168] This is predominantly occurring because victims cannot escape the home environment or the attention of the abuser and may have fewer resources and money due to income loss.[168, 170]

Synthesized conclusion 3: COVID-19 is exacerbating existing social determinants of health through loss of employment/income, disparities in social class leading to lack of access to healthcare, housing instability, homelessness and difficulties in physical distancing.

This synthesized conclusion incorporates two categories comprising of 20 authors' conclusions. (Table 3)

COVID-19 is exacerbating health disparities with social position directly and indirectly affecting health outcomes and difficultly in physical distancing.

COVID-19 is having significant impacts on vulnerable populations such as those in a lower social class.[167, 169, 175, 180, 181, 184] While the benefits of public health measures to curb the spread of COVID-19 are evident, those most impacted by the pandemic are disadvantaged population groups, including those in a lower socioeconomic class who may not be able to comply with simple measures such as physical distancing.[169, 181, 184] Disruption to essential services, residing in multigenerational households, and inability to work from home during the pandemic impose additional burdens on those in a lower

social class who already face barriers with existing poor health, predisposing them to worse health outcomes as a result of COVID-19.[168, 169, 175, 181] Those in a higher social class have the ability to mitigate the risks of the pandemic, through working from home and the ability to physically distance, this once again highlights that social position can influence health outcomes.[178, 179, 181]

Limited access to healthcare, particularly in regional areas, among uninsured populations, and where health systems are overwhelmed.

Geographical locations and resource allocations have left some population groups with limited access to healthcare, not only for COVID-19 testing and hospitalisation, but also for the management of existing health conditions.[169, 181, 182] In the US, the high cost of healthcare and refusal of some states to accept the Affordable Care Act has led to the closure of many regional hospitals, which has presented barriers to appropriate diagnosis and treatment of COVID-19 for some communities.[182, 184] The limited access to healthcare is predominantly seen in under-resourced communities that serve those most affected by COVID-19, which also happen to be lower socioeconomic areas.[178, 182] Furthermore, the disparity in access to healthcare during the pandemic perpetuates poverty and creates further segregation,[168, 169] leaving those most vulnerable (sick and disadvantaged) without healthcare.[184] Disruption to essential health care during the COVID-19 pandemic may leave many with worsening existing health conditions and poorer health outcomes.[168]

Table 1: Critical appraisal results

Citation	Q1	Q2	Q3	Q4	Q5	Q6	Results (%)
Shah	Y	Y	Y	Y	Y	Y	12/12 (100)
Kantamneni	Y	U	Y	Y	Y	U	10/12 (83.3)
Kinsey	Y	Y	Y	Y	Y	Y	12/12 (100)
Douglas	Y	Y	Y	Y	Y	Y	12/12 (100)
Xafis	Y	U	Y	Y	Y	Y	11/12 (91.7)
Takian	Y	Y	Y	Y	Y	Y	12/12 (100)
Gray	Y	U	Y	Y	Y	Y	11/12 (91.7)
Haynes	Y	U	Y	Y	Y	Y	11/12 (91.7)
Ali	Y	Y	Y	Y	Y	Y	12/12 (100)
Schulz	Y	Y	Y	Y	Y	Y	12/12 (100)
Baptiste	Y	Y	Y	Y	Y	Y	12/12 (100)
Betron	Y	U	Y	Y	Y	U	10/12 (83.3)
Bucciardini	Y	U	Y	Y	Y	Y	11/12 (91.7)
Van Dorn	Y	U	Y	Y	Y	Y	11/12 (91.7)
Farley	Y	U	Y	Y	Y	Y	11/12 (91.7)
Results	100%	55.6%	100%	100%	100%	93.3%	

Yes (Y) = 2, No (N) = 0, Unclear (U) = 1

Q1 Is the source of the opinion clearly identified? Q2 Does the source of opinion have standing in the field of expertise? Q3 Are the interests of the relevant population the central focus of the opinion? Q4 Is the stated position the result of an analytical process, and is there logic in the opinion expressed? Q5 Is there reference to the extant literature? Q6 Is any incongruence with the literature/sources logically defended?

Table 2: Characteristics of included studies

Author	Country	Main outcome/s
Xafis	US	• **Ethnicity and racism:** Structural racial injustice with Hispanics and African Americans disproportionately affected by COVID-19 • **Employment and income:** Increased unemployment and those in low paying jobs forced to continue working exposing them to risk of COVID-19 • **Domestic violence:** Increase domestic violence due to inability to escape the abuser • **Food supply:** food insecurity among disadvantaged population groups • **Access to health services:** Lack of access to healthcare
Douglas	UK	• **Employment and income:**3.5 million people are expected to need unemployment payments through loss of income and employment • **Gender:** Women and children to lose income and fare worse • **Domestic violence:** Increased risk of domestic violence
Takian	Iran	• **Socioeconomic status:** Political instability and COVID has widened the gap between socioeconomic groups • **Employment and income:** Low-income workers are not able to abide by the quarantine measures, while those in higher incomes are able to work and stay at home
Gray	US	• **Ethnicity and racism:** Hispanics and native and African Americans are disproportionately experience the burden of disease • **Access to healthcare:** Disadvantaged groups have less access to primary care services • **Housing:** overrepresented among essential workers and those living in overcrowded conditions
Haynes	US and UK	• **Ethnicity and racism:** Disparities in burden of disease with communities of colour disproportionately affected by COVID -19 • **Socioeconomic status and Access to health care:** Lack of health resources perpetuating poverty and segregation • **Housing:** Households are overcrowded making communities of colour more susceptible to COVID-19
Ali	UK	• **Ethnicity and racism:** Mortality risk in ethnic minority groups six times higher than white populations • lowest income households were six times less likely to work from home during COVID, three times less likely to self-isolate • **Socioeconomic status:** Higher % of people tested positive in low socioeconomic areas compared to high socioeconomic areas
Schulz	US	• **Ethnicity and racism:** African Americans account for 11% of Michigan's population but account for 32% of COVID cases and 41% of deaths • **Employment and income:** Social distancing in hard due to most African Americans working in essential services such as transport • **Food supply:** Those in low socioeconomic areas have fewer resources to stockpile supplies, meaning more frequent visits to supermarkets and at risk of food insecurity • **Housing:** Households have lost their homes and homelessness shelters are struggling to accommodate people
Betron	US	• **Gender:** Altering gender roles; Opportunity to upend men as head of the household and share caregiving roles
Bucciardini	Italy	• **Socioeconomic status:** People in lower socioeconomic areas are suffering the ill effects of COVID-19 • **Employment and income:** Loss of work and income is a major consequence of COVID-19

Author	Country	Main outcome/s
Van Dorn	US	• **Ethnicity and racism:** African Americans are disproportionately affected by COVID-19; Minority populations in the US are essential workers which don't have the privilege of staying at home • **Access to health care:** millions without healthcare access and many local and regional hospitals closed
Farley	US	• **Income:** Only 9.2% of workers with the lowest income can work from home compared to 61.5% of those with a higher income • **Housing and poverty:** Poverty, lack of savings and unstable housing increase susceptibility to COVID-19 • **Ethnicity and racism:** Minority populations is US disproportionately affected by COVID
Kantamneni	US	• **Ethnicity and racism:** Black Americans and LatinX populations are being displaced from employment during COVID-19 pandemic • **Income:** People of colour and low-income earners disproportionately affected by COVID-19 • **Gender:** Gender inequalities with women expected to balance multiple roles during the pandemic
Kinsey	US	• **Socioeconomic status:** Stockpiling foods in response to the pandemic leaves disadvantaged (lower socioeconomic) families facing food insecurity • **Employment and income:** Low-income households are required to travel around to multiple stores to find the cheapest food items which puts them at increased exposure to COVID-19 • **Food supply:** Low-income households can't afford to stockpile food
Shah	US	• **Ethnicity and racism:** Impact of COVID-19 disproportionately among populations due to structural racial injustice; Higher rates of COVID-19 among 'black' communities; Higher mortality from COVID-19 in 'black communities
Bapitise	US	• **Ethnicity and racism:** Racial minority groups are being infected with COVID-19 at higher rates than white population and are more likely to die from COVID-19 • **Socioeconomic status:** Those from a low social class are vulnerable to COVID-19 due to housing instability, food insecurity and limited access to health care.

Table 3: Supplementary material

Synthesized conclusion 1: Vulnerable populations groups, particularly those from a racial minority and those with low incomes, are more susceptible and have been disproportionately affected by COVID-19 including mortality.
Disparities in burden of disease among those from racial minorities, low income populations and other disadvantaged groups
Crosscutting consequences of worsening social determinants of health with black populations disproportionately affected with higher hospitalisations and mortality due to COVID-19 Shah (U)
Disproportionate representation of workers from low income and racial/ethnic minority backgrounds in sectors most affected by COVID-19 Kantamneni (C)
Emerging disparities in the burden of disease Ali (C)
In the face of a pandemic such as COVID-19, groups systematically disadvantaged confront the virus with a health status already compromised compared with less disadvantaged groups. For example, Hispanic Americans and African Americans have succumbed to COVID- 19 in disproportionately higher numbers than their fellow Americans Xafis (U)
Persons who identify as Black are contracting COVID-19 at higher rates and are more likely to die from it than any other race Baptise (U)
African Americans, Latino individuals, and Native Americans in the USA have experienced a disproportionate burden of COVID-19-related infections and deaths Gray (C)
The most impoverished communities, which are largely communities of color, have been hardest hit by COVID-19 Haynes (C)
COVID-19 numbers indicated that African Americans, just 11% of Michigan's population, accounted for 32% of COVID-19 cases and 41% of deaths In the United States, long histories of racism, segregation, and economic disinvestment have contributed to disproportionate levels of poverty among African Americans Schulz (U)
Part of the disproportionate impact of the COVID-19 pandemic on communities of colour has been structural factors that prevent those communities from practicing social distancing Van Dorn (C)
The inability to work from home, stockpile food supplies or obtain secure housing (homelessness) increases susceptibility and exposure to COVID-19

The complex and strategic food shopping patterns financially insecure families employ have been upended by the COVID-19 crisis Kinsey (C)
People may experience loss of income from social distancing in several ways. Although some people can work at home, many cannot, especially those in public facing roles in service industries, a group that already faces precarious employment and low income Douglas (U)
The COVID-19 pandemic has had a significant impact globally. Most affected, however, are those individuals and groups routinely disadvantaged by the social injustice Xafis (C)
The COVID-19 pandemic has either resulted in the loss of jobs, devastating poor families reliant on the income, or has forced workers to continue working at the frontline in low-paid cleaning, delivery, transport, supermarket/grocery jobs, or factory labour, often exposing workers to increased risks of contracting the disease Xafis (U)
Lower income workers (the bottom 10 percent of income) continue to move around during quarantine, while those who make more money are staying home and limiting their exposure Takian (U)
Over- representation of racial and ethnic minorities among essential workers and those living in poor and overcrowded housing conditions makes physical distancing challenging Gray (C)
Households losing their homes continue to surface at a time where rehousing is challenging and homeless shelters are struggling with the ability to accommodate appropriate social distancing practices for residents Schulz (U)
Low-income families have fewer resources with which to stockpile food, resulting in more frequent trips to grocery stores and food banks to replenish supplies, with increased opportunities for exposure Schulz (C)
Pre-existing comorbid conditions, economic insecurity, living environment, over representation in lower wage jobs or those requiring contact resulting in a higher risk for COVID-19 exposure, are all factors that adversely influence health outcomes during this pandemic Farley (C)
COVID-19 challenges for homeless populations throughout the country have only worsened but are difficult to quantify. Shelters are full, closed, or fraught with COVID-19 transmission risk due to crowded conditions Farley (C)
Only 9.2% of workers in the lowest quartile of the wage distribution can telework, compared with 61.5% of workers in the highest quartile. Social distancing is a privilege Farley (U)
Synthesized conclusion 2: Gender inequalities and family violence have been exacerbated by COVID-19, leading to diminished wellbeing among women.

Gender inequalities and imbalances in loss of income and within the household.

Role conflict and stress for women when daycares, schools, and external resources are unavailable despite still needing to engage in paid work Kantamneni (C)
The global health community also has an opportunity to engage men in addressing COVID-19 related threats to women's health and wellbeing Betron (C)
COVID-19 is an opportunity to upend the men as 'head of household' and breadwinner mentality and promote shared caregiving roles between women and men. Betron (C)
Crucially, not everyone is equally likely to lose income. Women, young people, and those who are already poor will fare worst [164] (C)
School closures may add to stress in families as parents try to home school children, often juggling this with home working. This burden may fall disproportionately on women Douglas (C)

Increased incidence of family violence

Concern has been raised about potential increases in family violence during restrictions in the UK Douglas (C)
Domestic and family violence come in many forms, and during the COVID-19 pandemic, life has become increasingly more dangerous Xafis (C)

Synthesized conclusion 3: COVID-19 is exacerbating existing social determinants of health through loss of employment/income, disparities in social class leading to lack of access to healthcare, housing instability, homelessness and difficulties in social distancing.

Pandemic is a symptom of deeper societal inequalities Ali (C)
Populations vulnerable to complications from COVID-19 also include persons who are socially at-risk such as those who may experience any kind of abuse, housing instability, substance use disorder, food insecurity and have limited access to health care Baptise (C)
Social determinants of health play a significant role in how people access and receive care, and thus require close attention to structural factors that contribute to poor health outcomes among ethnic minority people. The emergence of the COVID-19 pandemic exacerbates these issues 10-fold Baptise (U)
The COVID-19 pandemic complicates or even nullifies the complex strategies that families facing food insecurity use to feed themselves Kinsey (U)

COVID-19 will exacerbate health disparities and have profound effects on the food and financial security of many in this country for years to come Kinsey (C)
Prolonged or more restrictive social distancing measures could increase health inequalities in the short and long term Douglas (C)
The rich, however, have the potential to make a living, and through their social networks, to be more up-to-date about the latest information and recommendations on the COVID-19 pandemic and ways to mitigate its risks Takian (C)
Social distancing is difficult in impoverished communities because of overcrowding, residence in multigenerational households, and the inability to work from home Haynes (U)
Indeed, people with a more fragile social position suffer from the devastating effects of a pandemic. Once again, the pandemic is highlighting how the social position can indirectly affect health Bucciardini (C)
Pre-existing racial and health inequalities already present in US society are being exacerbated by the pandemic Van Dorn (U)
The current pandemic will impose an additional burden on vulnerable populations that already face barriers predisposing them to worse health outcomes Farley (C)
Many white-collar workers have broadband internet and computers, which enable them to easily work from home, while many from poorer neighborhoods do not have this luxury Farley (C)
The loss of work and/or income is one of the major consequences of Covid-19 Bucciardini (U)

Limited access to healthcare, particularly in regional areas, among uninsured populations, and where health systems are overwhelmed

Disruption to essential services and unwillingness healthcare setting may affect care of other conditions Douglas (C)
Limited access to primary care services and COVID-19 testing centres present additional barriers to appropriate diagnosis and treatment Gray (U)
The effects of COVID-19 on vulnerable populations highlight large disparities in resource allocation that perpetuate poverty and segregation Haynes (U)
14 US states (mostly in the south and the Plains) have refused to accept the Affordable Care Act Medicaid expansion, leaving millions of the poorest and sickest Americans without access to health care Van Dorn (U)
Factors such as resource allocation, geographic location, and public versus private hospital systems have influenced access to necessary supplies and COVID-19 testing Farley (U)

Leaving many regional and local hospitals across the US closed or in danger of closing because of the high cost of medical care and a high proportion of rural uninsured and underinsured people Van Dorn (U)
In NYC, it became clear that the most vulnerable under-resourced safety-net hospitals serving the most affected communities were quickly overloaded Farley (U)

2.4.6 Discussion

Termed by some governments as the great equaliser,[158, 166] COVID-19 is far from such, with the impact felt disproportionately among ethnic groups, the socio-economically disadvantaged and women. This review synthesises the available evidence on the relationship between the social determinants of health and health outcomes among adults during the first six months of the COVID-19 pandemic. The findings of this review highlight that there is a direct relationship between the social determinants of health and health and wellbeing outcomes among adults during the COVID-19 pandemic.

COVID-19 has brought the social determinants of health and resultant health inequalities to the forefront and demonstrated that action needs to be taken to address underlying social and health inequalities, 'the causes of the causes'.[160] Disparities among vulnerable populations including ethnic groups, low-income earners, those living in poverty and women have been demonstrated in this review. Addressing such disparities requires a collaborative approach, one that initiates widespread changes in social and health policy.[186] COVID-19 is not the great equaliser; however, COVID-19 has renewed the need to tackle the inequalities created by the social determinants of health. Large-scale global initiatives such as the United Nations (UN) Sustainable Development Goals (SDGs) are just one approach to take action on health inequalities, particularly SDG 1 no poverty, SDG 3 good health and wellbeing, SDG 5 Gender equality, SDG 10 reduce inequalities and SDG 11 sustainable cities and communities.[187]

While the direct burden of COVID-19 has impacted populations, it is the health and wellbeing outcomes beyond those attributable to the virus itself that are most alarming.

Public health actions, in collaboration with governments and public health professionals must be made to support those considered to be among vulnerable population groups.[188] As nations, we cannot afford to have inaction on the social determinants of health and the resultant health inequalities. The results of this review have demonstrated that COVID-19 has negative consequences, especially for vulnerable population groups who are already affected by social and health inequalities. COVID-19 has exacerbated existing health inequalities and provided a wakeup call to advance efforts to address health inequalities and the social determinants of health.[189]

Pandemic response and planning should take into account the social determinants of health to reduce the unequal consequences of COVID-19. Health responses including COVID-19 vaccine rollout need to take account of increased risk associated with the social determinants of health as well as inequities in access to care. Policy decisions made as a result of COVID-19 must be reflected upon to ensure that they don't damage health and create health inequalities in the future.[190] Public health professionals need to be part of the solution for addressing health inequalities and social determinants of health; this can be achieved at the individual, practice and community levels.[191] On an individual level, this may include discussing potential social challenges with patients; within an organisation or at a practice level, identifying methods to reduce barriers to accessing health care; and at a community level, partnering with community groups.[191]

2.4.7 Strengths and Limitations

This review used standardised critical appraisal instruments for the text and opinion papers. In addition, this review used a modified ConQual approach (modified from the JBI ConQual approach for qualitative reviews) to rate the dependability and credibility of the synthesized conclusions, allowing for confidence in the findings. To our

knowledge, this is the first review to use the modified ConQual approach for test and opinion systematic reviews. While the review employed robust methods, some limitations that need to be acknowledged. Firstly, although a systematic search was conducted to identify relevant papers for inclusion, some papers might have been missed during the search process. Additionally, the search was restricted to papers only published in the English language, which may have omitted papers published in any other language. This review included studies from January 2020 to July 2020 when there were no vaccines for COVID-19 available hence papers on health inequalities surrounding vaccination roll outs were not available. Further research needs to be conducted on the health inequities associated with vaccination roll outs. Finally, because the COVID-19 pandemic is a rapidly evolving situation, the evidence in the literature from the first 6 months of the epidemic was limited to predominately the US experience. However, recent evidence since the search was conducted in July 2020, demonstrates that low- and middle-income countries are reporting similar experiences as reported in this review.

2.4.8 Conclusion

Vulnerable population groups have been disproportionately impacted by COVID-19, including on health outcomes such as hospitalisations and mortality. The COVID-19 pandemic has highlighted the need for action on health inequalities and the social determinants of health if we are to ever achieve the SDGs and health for all. Public health professionals should be part of this response by developing a better understanding of the underlying causes of poor health, assisting people to access support services, improving access to care for people in hard-to-reach communities and partnering with community groups. Reflection on social and health policies implemented are necessary to ensure that the COVID-19 pandemic does not exacerbate health inequalities into the future.

Chapter 3: Methodology and Methods

3.1 Chapter introduction

The purpose of this chapter is to present and explain the methodology and conceptual framework that has been used for this thesis. This chapter also presents the research methods, including data collection, data analysis and ethical considerations. Accompanying this chapter, Publication 2, a peer-reviewed published paper, provides a comprehensive description of the quantitative data collection process.

3.1.1 Methodological approach

Public health issues are complex. While many researchers to date have used a monomethod, that is, either a quantitative or qualitative method, to assist in examining or exploring an issue, a mixed methods approach allows for a thorough understanding and investigation of the diversity, cultural influences and multiple perspectives that are incorporated in public health.[192] Contemporary mixed methods research was established in the late 1980s and has been recognised as an alternative to quantitative and qualitative research methodologies.[193] There are three distinctive mixed methods designs:

1. Convergent design (parallel or concurrent): the researcher's intent is that both qualitative and quantitative data are collected, each of the data is analysed separately, and finally, the results are merged with the purpose of comparison.[194]

2. Exploratory sequential design: the researcher's intent in using this approach is to first collect qualitative data. This design is generally used where little is known about the topic, and the population is understudied and/or hard to access. Following the initial exploration through qualitative data collection and analysis, the second phase is to use the answers derived in the qualitative analysis to build the quantitative phase. This may include developing instruments.[194]

3. Explanatory sequential design: the intent of this design is to first collect and analyse quantitative data, then collect and analyse qualitative data, with the qualitative data being used to explain the quantitative results. Weighting or attention can be given to either the quantitative or the qualitative data. In terms of analysis and interpretation of the results, an equal weight could be given to both quantitative and qualitative depending upon the scope of the research.[195]

Due to the complex nature of the public health issue being explored within this research, a quantitative methodology is unable to investigate the personal experiences and understand the views of the participants.[192] A qualitative methodology limits the generalisability to the general population.[195] Therefore, a mixed methods approach was deemed the most suitable for a robust investigation. Thus, this study was conducted using a mixed methods approach, implemented using an explanatory sequential design. This design approach includes two distinct phases: initially using the quantitative method followed by the qualitative method.[196] In this study, the quantitative data were collected and analysed first, and thereafter the qualitative data provided a description of participants' perceptions of the relationship between wellbeing and the social determinants of health during the COVID-19 pandemic. The qualitative data explored the voice of the participants' lived experiences throughout the pandemic to assist in explaining and elaborating on the quantitative results, as the survey only would not enable the exploration of lived experience.[195] In this study, the quantitative and qualitative data were collected sequentially, and equal weighting was given to the analysis and interpretation of both the quantitative and qualitative results (see Figure 6). This was influenced by the purpose of the study. The two phases, quantitative and qualitative, have been integrated through the sampling and in the interpretation of the results.[197]
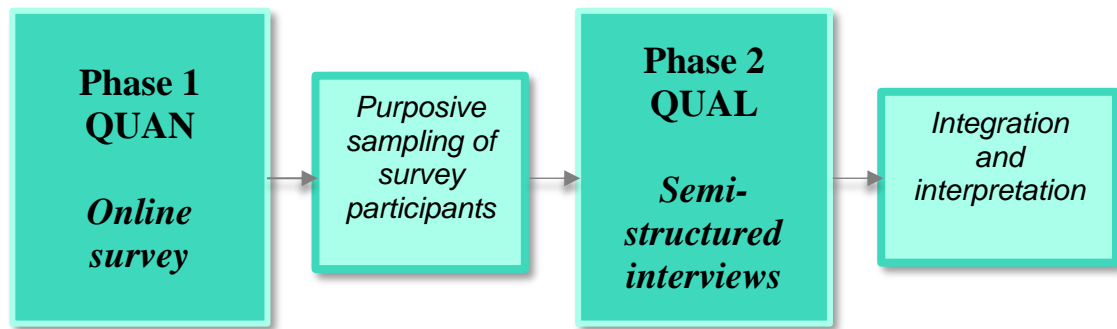
Figure 6: Explanatory sequential study design

Adapted from Ivankova[197]

3.2 Conceptual framework

The WHO's CSDH conceptual framework formed the theoretical basis for this research. This framework was developed to promote health equality in the spirit of social justice and is a public health, action-orientated framework to reduce inequalities and disparities in health across social hierarchies.[198] The social determinants framework incorporates 3 main components: 1) socio-political context, 2) structural determinants and 3) intermediary determinants.[198] These are outlined below.

3.2.1 Socio-political context

The socio-political context encompasses a wide range of aspects within the social and political environments that exert power and influence over an individual through social hierarchies and health opportunities.[47] In this context, policies, including social welfare, employment and labour policies, produce and perpetuate the social determinants of health inequalities. Government policies have the power to enact change to alter the course or experience of those who are disadvantaged or marginalised, or they have the power over individuals, continuing to dominate and oppress structurally.[47] Altering the distribution of power and having a collective response to changing social hierarchies enables the empowerment of those that are disadvantaged. This is enacted through the provision of

social safety nets, availability of resources, including health resources, policies influencing housing distribution, policies on education and discrimination and labour market policies that facilitate supply and demand.[47, 198]

3.2.2 Structural determinants

This second element in the conceptual framework refers to the interchange between political and social environments, structural mechanisms that generate social hierarchies and determine the social class or position of individuals.[47, 198] In this situation, structural determinants are aspects that are responsible for creating health disparities between social groups, including income, education level, occupation or employment status, racism and discrimination, social class, gender and ethnicity. These have been discussed in detail in Chapter 2.

3.2.3 Intermediary determinants

When referring to the down-stream factors that shape and contribute to health inequalities of exposure and vulnerability to certain health conditions, the WHO CSDH framework denotes these as intermediary determinants. The intermediary determinants result from the social determinants of health inequalities combined with individual-level influences developed through social stratification. There are four main categories of intermediary determinants described by Solar and Irwin:[47] 1) material circumstances such as housing, neighbourhood quality and financial means to buy food and clothes. 2) psychosocial circumstances, including stressors, social support, relationships and coping strategies, 3) behavioural and biological factors such as nutrition, physical activity, tobacco and alcohol consumption and 4) the health system as a social determinant, through access and cost. These elements have been discussed in more detail in Chapter 2.

Figure 7 illustrates the relationship between all three components of the WHO CSDH conceptual framework. The structural determinants consist of the social, economic and political situation in which an individual is born and lives; these determinants dictate a person's socioeconomic position. A person's socioeconomic position creates the intermediary determinants that increase or decrease the likelihood of susceptibility to health-compromising conditions and illness. The conceptual framework highlights that illness caused by poverty can circle back to the structural determinants, in that an individual can lose their income resulting in a lowering of their socioeconomic status.[48] Social determinants of health exist in everyday life, with some people already experiencing poor health; however, during a pandemic and public health crisis, a person's social determinants can be exacerbated due to that crisis. Nonetheless, this would be dependent upon their pre-pandemic social determinants of health. The experience of a pandemic such as COVID-19 can feed back to affect social, economic and political functioning. In the context of this thesis, given that the primary aim is to explore the relationship between the social determinants of health and wellbeing of Australian adults during the pandemic, the WHO CSDH will provide a comprehensive framework in which to explore the 'up-stream' and 'down-stream' factors influencing adult health and experience during COVID-19.[47]

Health is a complicated phenomenon and often requires an examination of social and political aspects, as described by the WHO CSDH framework.[47] This is particularly pertinent during an infectious disease outbreak, where the spread of the disease can be fuelled by poverty, inequalities and an unequal burden of access to health care. Social determinants of health drive the health inequalities that are observed during public health emergencies.[57] Therefore, this research focuses on the structural and intermediary

determinants of the WHO CSDH conceptual framework that are at play among Australian adults during the COVID-19 pandemic.
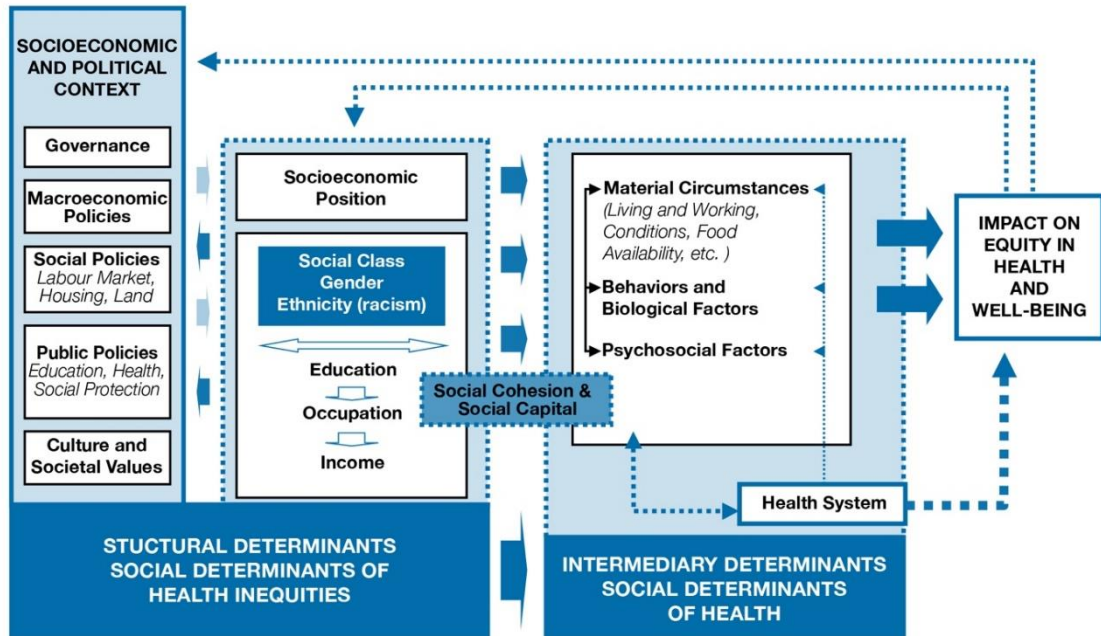
Figure 7: WHO CSDH conceptual framework
Reproduced with permission from WHO,[47] see Appendix 2

3.3 Phase 1: Quantitative phase

3.3.1 Study design

A cross-sectional online study was deemed the most appropriate method to collect data for Phase 1 of this study while addressing its aims. A cross-sectional study is considered a type of observational research method that analyses data collected at one point in time across a sample population.[199] Different from other observational studies, such as a case-control study (participants selected on the outcome) or a cohort study (participants selected on exposure), a cross-sectional study selects participants based on inclusion and exclusion criteria. Using a cross-sectional study, the researcher can study the association between exposure and outcomes in this population, estimate the prevalence of an outcome and calculate odds ratios that indicate a measure of association.[199, 200]

A cross-sectional study is a relatively economical method to reach large numbers of individuals;[201] this was particularly important as this is a national study, with large numbers and diverse geographical locations of potential participants. Additionally, cross-sectional studies are beneficial for public health monitoring, planning and evaluation,[199] which is useful, given that this research is about social determinants of health during the pandemic and a public health issue requiring careful planning and evaluation. Although the advantages of cross-sectional studies are numerous, this study design also has its limitations. Cross-sectional studies only provide a 'snapshot' in time, and therefore, if data was collected in another timeframe, the results may differ. Another limitation of a cross-sectional study is that it is often susceptible to biases, including recall and nonresponse bias.[202]

3.3.1.1 Study setting

This was an Australian national study. The recruitment of participants was undertaken to ensure geographic and socioeconomic depiction to gain diverse perspectives on the influence of the COVID-19 pandemic among Australians.

Geographic depiction was achieved by targeting a range of major city, regional and remote regions within each state in Australia using the Australian Bureau of Statistics (ABS) remoteness structure Accessibility and Remoteness Index of Australia (ARIA+). The ARIA+ is available in various formats, including as a map and an excel spreadsheet.[203] Developed in the late 1990s as a joint project by the Commonwealth Government of Australia and the Hugo Centre for Population and Migrant studies, the ARIA+ divides Australia into five remoteness classes: major cities, inner regional, outer regional, remote and very remote, based on a measure of access to services and population

size.[203, 204] The ARIA+ is widely used throughout Australia as the nationally consistent measure of geographical remoteness.[205]

Socioeconomic depiction was achieved by targeting population groups using the ABS Socio-Economic Indexes for Areas (SEIFA)'s Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) maps. The SEIFA is determined using census data (collected every five years) to compare the socioeconomic features of communities within Australia.[205] The SEIFA is used to determine funding requirements, the relationships between socioeconomic advantage and disadvantage, and a variety of outcomes such as health and education.[205] A more detailed description of the study setting is described in Publication 2.

3.3.1.2 Inclusion criteria

The inclusion criteria for the study were:

- individuals aged 18 years and over
- ability to read and understand the English language
- residing in any state or territory within Australia during the COVID-19 pandemic.

3.3.1.3 Sampling

Adults who resided in Australia during the COVID-19 pandemic were sought to participate in this study. Non-probability sampling, which is a convenience sampling method, was employed for the quantitative phase.[206] The research aimed to reach a diverse sample of adults within Australia, including different socioeconomic areas and spread across urban, regional and remote regions. This is explained in more detail in Publication 2.

3.3.1.4 Recruitment

Numerous strategies such as newspaper advertisements, random mail out of surveys and random digit dialling have been used to recruit participants in population health research.[207] However, with improved access to the internet globally, particularly through mobile phones, social media has become an active part of modern society.[208] In Australia, social media use is increasing, with 1.2 social media accounts per Australian,[209] and while there has been a concern for the digital divide, Australian household use of information technology and access to the internet was 86% in 2016–17, rising to 97% in households with children under 15 years of age.[210]

Recruitment for this study was conducted between August and October 2020. Publication 2 below outlines the social media approach used to recruit participants in the quantitative phase. Permission was not required from the publisher, JMIR publications, to include this paper in the thesis. A published version of the paper can be found in Appendix 3. This paper was published as:

Green H, Fernandez R, MacPhail C. Social media as a platform for recruitment to a national survey during the COVID-19 pandemic: feasibility and cost analysis. JMIR Formative Research 2021 Jul 6;5(7). Available from: https://doi.org/10.2196/28656

3.4 Publication 2: Social Media as a Platform for Recruitment to a National Survey during the COVID-19 Pandemic: Feasibility and Cost Analysis

3.4.1 Abstract

Background: With the improved accessibility to social media globally, health researchers are capitalising on this method to recruit participants for research studies. This has particularly been the case during COVID-19, when traditional methods of recruitment have not been able to be used. Despite this, there is limited evidence of the feasibility of social media for recruiting a national sample.

Objective: This paper describes the use of social media as a tool for recruiting a national sample of adults to an online survey during the COVID-19 pandemic.

Methods: Between August – October 2020, participants were recruited through Facebook via two advertisement campaigns into an online survey exploring the relationship between social determinants of health and wellbeing of adults during the COVID-19 pandemic. Data were analysed using SPSS version 25 and Facebook metrics auto generated in the Facebook Ads Manager. Data were weighted to match the Australian population on the basis of gender based on 2016 Australian census data.

Results: In total, 9594 people were reached nationally with the paid option and potentially 902000 people through the no cost option resulting in 1211 online survey responses. The total cost of the advertisement campaign was $649.66, resulting in an overall cost per click of $0.25 AUD.

Conclusion: Facebook is a feasible and cost-effective method of recruiting participants into an online survey, enabling recruitment of population groups considered hard to reach

or marginalised. Recruitment through Facebook facilitated diversity, with participants varying in socioeconomic status, geographical location, educational attainment, and age.

3.4.2 Introduction

Numerous strategies such as newspaper advertisements, random mail out of surveys and random digit dialling have been used to recruit participants into population health research. However, implementation of these traditional strategies in modern society has limitations due to the reduced use of landline phones and increased postage costs,[207, 211] which make these recruitment methods less feasible. Additionally, these approaches have low participation rates ranging from 7.5%[212] to 30%.[213] With improved access to the internet globally, particularly through mobile phones, social media has become an active part of modern society.[208] Public health researchers have harnessed social media and online platforms as a modality for recruitment into population health research.[214, 215] Used as more than just a method to connect with friends and family, social media platforms are increasingly used for sharing content, engaging with news content, entertainment, and receiving health information. The most popular social media platforms globally are Facebook, Twitter, YouTube and Instagram,[209] with over 4 billion users. Social media platforms enable users to connect and share information through both traditional and interactive methods, with most platforms allowing free use.[208]

According to the Australian Communications and Media Authority,[216] in 2018-19 approximately 91% of all Australians had access to the internet. In 2016-17, 80% of Australians used the internet for social networking[217] compared with 66% in 2011,[216] with an average of 1.2 social media accounts per Australian.[209] Facebook is the most popular social media platform for Australians, with approximately 93% of Australian social media

consumers using this platform, followed closely by Instagram at 73%.[216] Almost 60% of Australians use social media daily.[209]

Given the increased prevalence of daily social media use among Australians, social media platforms have been increasingly used as a viable method for recruiting participants into health research.[218] More specifically, social media platforms allow researchers to access hard to reach populations as well as targeting recruitment through the use of advertising campaigns to specific users based on gender, geographical location, interests and age.[211]Social media use has been harnessed by heath researchers to recruit participants into a range of studies including cross-sectional studies, observational studies and interventional studies,[208] particularly, due to the cost -effectiveness of this method. There is evidence in the literature that health researchers have recruited participants and delivered health behaviour interventions on a variety of topics. The success of these interventions has demonstrated the efficacy of social media as a suitable method for accessing participants.[207, 208, 219, 220] However, a substantial number of studies use a localised sample.

Our study engaged the use of social media with the purpose of generating a national sample of Australian adults to explore the relationship between the social determinants of health and wellbeing during the COVID-19 pandemic. There is currently limited evidence on the feasibility of social media for recruiting a national sample, therefore, the aim of this paper is to describe the feasibility of using social media as a tool for recruiting a national sample of adults to an online survey during the COVID-19 pandemic. Feasibility was assessed in terms of reach, time invested in recruitment, number of surveys completed, cost effectiveness and recruitment of diverse sample of participants.

3.4.3 Methods

3.4.3.1 Study overview

The research study was undertaken to investigate the relationship between social determinants of health and wellbeing in adults during the COVID-19 pandemic. Ethical approval to conduct this study was received from University of Wollongong Human Ethics Committee (2020/306). The inclusion criteria for the study were individuals aged 18 years and over with the ability to read English and residing in any state or territory within Australian. Participants were recruited using Facebook over a nine-week period between August and October 2020. Participants were required to complete an online survey comprising of 49 questions exploring social determinants of health. Participants were invited to enter a draw to win one of 10 $50 gift vouchers at the end of the survey with winners selected randomly using SPSS version 25.

3.4.3.2 Recruitment strategy

Recruitment for this study using Facebook was achieved by: 1) joining existing community noticeboard groups in Facebook *(no cost option)*, and 2) through a paid Facebook advertisement campaign *(paid option).* Both methods enabled snowball sampling where users could like, share and circulate the social media post to others.

3.4.3.3 Joining existing community noticeboard groups in Facebook (no cost option)

A specific Facebook page was created for the study using the study image. To ensure national representation, the primary author (HG) identified existing Facebook community noticeboard groups, according to Australian states and territories and secondly based on urban, regional, and remote areas. The author contacted the administrators of each individual community group for permission to join. Each week, if permitted by the

administrators, the advertisement was re-posted on each of the community noticeboard groups' page. Posting on the existing community noticeboard groups began on 20 August 2020 and ended on 14 October 2020.

3.4.3.4 Facebook advertising campaign (paid option)

To supplement the no-cost Facebook community noticeboard group approach, a paid advertisement through Facebook, which included Instagram, was designed to recruit participants. Two consecutive advertisement campaigns were set up, with the first campaign used to establish the feasibility of this strategy.

The Facebook advertisement platform, Facebook Ads Manager, was used to create paid advertisements. The features available for a payment allows the advertisement to be customised based on objective (links or clicks to a web-based survey), target audience (location, age, gender, interests and behaviours), budget and schedule.[221] Selecting the 'automatic placements' option when setting up the advertisement in Facebook Ads Manager, allowed the advertisements to run across associated services such as Instagram, Messenger and Facebook Audience Network (off-Facebook in-app advertising network for mobile applications).

The Facebook advertisements comprised of a main text (Tell us how the COVID-19 pandemic has affected your health and wellbeing. Take our survey and go in the draw to WIN 1 of 10 $50 gift vouchers), an image (study image and university logo) and display link (Figure 8).

Figure 8: Paid Facebook/Instagram Advertisements

A budget of $650 AUD was set as the maximum recruitment spend for the paid campaigns, with a daily limit of $25 AUD. The cost per click can vary depending upon the number of clicks on the advertisement and the amount of the daily budget reached.

The first campaign was set as "Engagement" (targeting people most likely to engage with the post through one of the following mechanisms: share, like and click). The target audience for the first campaign was: 1) people residing in Australia; 2) people aged 18-35 years inclusive; 3) people of all genders; and 4) people residing within certain postcodes. The primary researcher used Australian Bureau of Statistics (ABS) Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) to set the postcodes. These postcodes were used to ensure the distribution of the ad campaign targeted potential participants in both relative advantaged and disadvantaged locations. The "automatic placements" option on Facebook was used, which allows the campaign to maximise the

set budget and dissemination of the advertisement to a larger sample relevant to the inclusion criteria.[221]

Next, the "post engagement" strategy was selected enabling delivery to the people who are likely to share, like and comment on the post at the lowest cost.[221] The first Facebook advertisement campaign ran from 25 August 2020 to 1 September 2020.

The second campaign employed the same strategies as the first advertisement campaign; however, the target audience locations were identified using suburbs set by ABS's IRSAD. This was undertaken as suburbs can contain multiple postcodes thus increasing the target audience. The use of the ABS's IRSAD suburbs allowed a general representation of both advantaged and disadvantaged locations, enabling diversity in targeting potential participants. The second campaign ran from 6 September 2020 to 22 September 2020.

Throughout the recruitment period, the Facebook posts were monitored daily to ensure that any comments, including individuals opportunistically using the advertisement to promote businesses, were hidden from other Facebook users. This was undertaken to ensure potential respondents were not influenced to either participate or be discouraged from participating in the survey. Additionally, monitoring the comments and hiding them from other potential participants was conducted for ethical reasons as a way of protecting any potential participants' identities. Automatic hiding of comments is not available as an option within Facebook's delivery system and therefore had to be conducted manually.

3.4.3.5 Data analysis

Data were analysed using SPSS version 25. Post stratification weights were calculated to match the Australian population on the basis of gender, age, state or territory based on

the 2016 Australian census,[222] to account for over or under representation of certain people.

Facebook metrics were collected through Facebook Ads Manager, which auto generates the engagement activity for each advertisement campaign.[221] Summary and descriptive statistics including reach, impressions and cost per click were analysed for each campaign and for the overall campaign. 'Reached' refers to the number of people who were shown the advertisement, 'Impressions' refers to the number of times the advertisement was on-screen for the target audience and could include multiple views of the advertisement by the same individual. The 'cost per click' is derived from the total advertisement campaign spend divided by the number of clicks on the advertisement or the link.[221]

3.4.4 Results

3.4.4.1 Recruitment through Facebook (no cost option)

The primary researcher (HG) made a request to the administrators of 110 existing Facebook community noticeboard groups to join those groups. All community groups approached approved the author's request to join. Posts and reposts to the existing community noticeboard group Facebook pages were conducted 10 times over the nine-week period commencing on 21 August 2020 and the last repost made on 14 October 2020. Using this option means that no data on the individuals reached or impressions is available to researchers through Facebook Ads Manager, however the number of members in each community noticeboard group were available with a potential reach of 902000 individuals. Nationally, each community noticeboard group had on average 8205 people as members of the group, with slightly higher than the national average seen for Queensland and Australian Capital Territory, at 11097 and 12230 average members per noticeboard community group, respectively. In contrast, South Australia and Victoria had

marginally lower average members per group than the national average, with 6480 and 6287 members, respectively. Additionally, a comparison between the no cost and paid options to indicate which the most cost-effective option is not possible, as both recruitment methods sent participants to the same survey link, therefore no disaggregation between the options for the participants used to reach the survey page.

3.4.4.2 Recruitment through Facebook (paid option)

An aggregated 9594 individuals were reached with the two paid advertisement campaigns, however, there were 14232 impressions. The Facebook advertisement campaign reached 5316 (55.4%) males, 4062 (42.3%) females, and 216 (2.3%) people with uncategorised gender. Using the automatic placements option, most placements were conducted through Instagram reaching 5846 individuals, while Facebook reached 3856 individuals. The remainder of individuals were reached through Facebook Audience Network.

3.4.4.3 Strengths and Limitations of the Facebook (no cost option)

The greatest advantage in using the no cost option is that there are no monetary costs associated with recruiting participants. However, it must be noted that the researchers had to continually repost the ad to the community noticeboard groups to ensure visibility, as the post would move down a user's feed once posts had been posted by another group or member; this in turn proved to be labour intensive. Additionally, during the first few days of recruitment, responses from the no cost option were received predominately from individuals aged 35 years and above. Therefore, to supplement this approach, the paid option was used and intentionally designed to target younger potential respondents.

3.4.4.4 Strengths and Limitations of the Facebook (paid option)

The paid option allowed the researchers to specifically target younger potential respondents across not only Facebook but also Instagram, Messenger, and Facebook Audience Network. Furthermore, the paid option allows the researcher to customise the ad based on their objective and to create a specific schedule of when the ads will be seen. [219] This was particularly important to recruit a diverse national sample of participants. The drawback with using the paid option was the associated monetary costs, albeit being able to design the campaign to have a daily limit, the reach of potential participants did not guarantee actual respondents.

3.4.5 Overall response to survey

A total of 1211 individuals responded to the survey, with 100% meeting the eligibility criteria. The survey took respondents approximately nine minutes to complete. Of the 1211 who commenced the survey, 1137 (93.89%) completed it.

The number of responses varied per day among the paid and no cost options, with the highest number of responses (n=178) received on 21 August 2020 and the lowest (n=0) on 21 October 2020. In the first week the survey was live, a total of 326 responses were received, which was the most responses received over the nine-week period. Due to the no cost and paid options running concurrently for the first five weeks, using the same survey link, the numbers of participants recruited through each option are unknown. Overall response to the survey per week for the no cost and paid options are outlined in Figure 9.
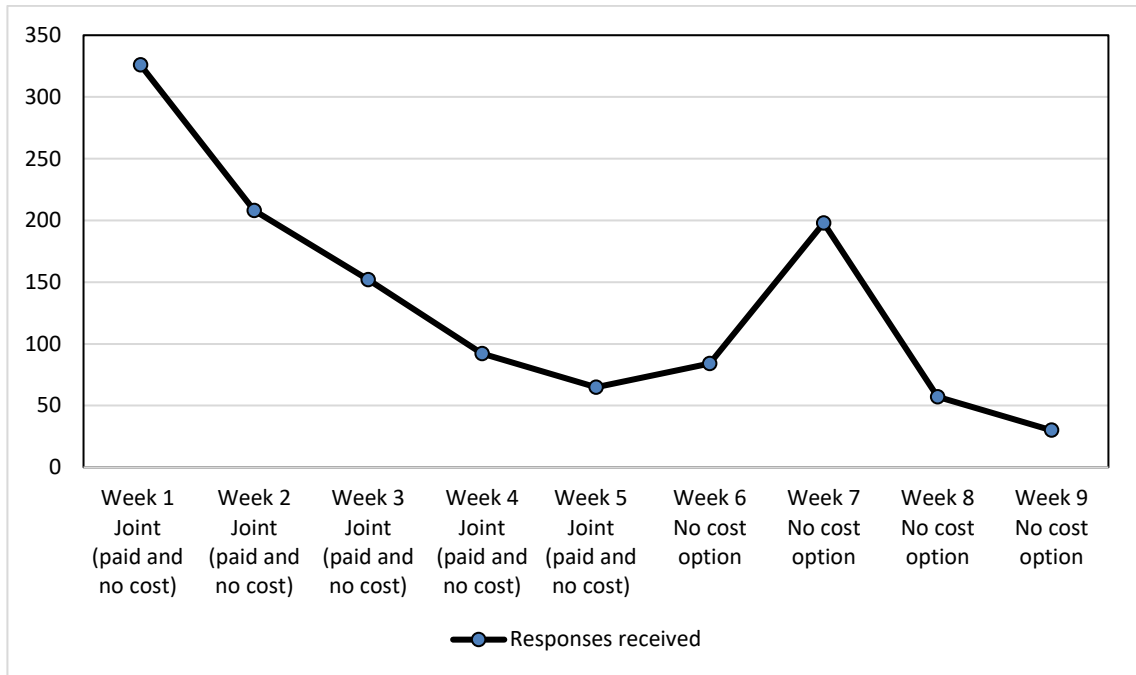
Figure 9: Overall response to the survey (no cost and paid options)

3.4.6 Cost analysis

For the paid option, the total amount spent on the Facebook advertisement campaigns was $649.66 AUD, with the average overall cost per click (per post engagement) $0.25 AUD. Individuals aged 18-24 years accounted for $419.79 AUD (64.6%) of the total advertisement budget, while individuals in the 25-34 age group accounted for $192.49 AUD (37.1%), those aged 35 years accounted for $37.38 AUD (7.6%). The majority of the advertisement spend was using Instagram, with a total spend of $598.39 AUD. Facebook advertisement total spend was $50.79, while $0.48 of the total spend was through Facebook Audience Network. The lowest cost per click day was on the 8 September 2020 at $0.16 AUD, with the highest cost per click of $0.32 AUD on 18 September 2020.

More males engaged with the Facebook advertisement campaign compared to females, with the former accounting for 60.4% ($392.35 AUD) of the total spend. Women in the 25-34 age group account for the highest cost per click at $0.28 AUD.

3.4.7 Time

Economically, Facebook advertising campaigns are a feasible method to recruit participants into a web-based survey, requiring the use of a single researcher to create, manage and maintain the recruitment strategy. The total number of hours spent by the researcher, including management of the no cost option of posting on existing community noticeboard groups within Facebook, was a total of 30 hours over the nine-week period. The benefit of using Facebook's features of selecting a target audience, and posting on existing community noticeboard groups enabled recruitment of a large sample within a short timeframe, with a relatively low cost of $649.66 AUD. The cost effectiveness and ability to recruit a large sample provides evidence to suggest that Facebook recruitment is a feasible option for public health researchers.

3.4.8 Distribution of respondents

Participants from diverse geographic, education, and employment backgrounds were recruited through these two Facebook methods. Responses were received from all states (n=6) and territories (n=2) within Australia. Based on weighted data for 1211 participants, most responses received from New South Wales (NSW) 34.4% (n = 387), whereas 0.4% (n=5) were received from the Northern Territory. Responses were received from 40.4% (n=447) participants living in locations classified as having the two lowest socioeconomic status brackets and 41.2% (n=646) participants living in locations classified as having two highest socioeconomic status brackets. Responses were received from 662 (58.8%) residents in major cities, 373 (23.1%) residents in inner or outer regional areas, and 70

(6.2%) residents in remote or very remote areas of Australia. Educational attainment varied among respondents with 36.1% (n= 406) having at least a Bachelor's degree, 20.2% (n=250) having a completed technical college, and 22.2% (n= 250) had completed years 7 to 12 high school. Responses received from those aged 25-40 years and 41-60 years was 30.2% (n=340) and 35.5% (n=400) respectively. The mean age of the respondents was 46.3±16.3 years. Responses received from females accounted for 51.7% (n=582) and that from male participants accounted for 48.3% (n=545). Unweighted data for Non-binary or Transgender population was 2.6% (n=30). Weighted and unweighted distribution of respondents are detailed in Table 4.

Table 4: Distribution of respondents (non-weighted and weighted)

	Unweighted		Weighted	
Characteristic	**N**	**%**	**N[a]**	**%[a]**
Age (years), mean (SD)	43(14.2)		46.3 (16.3)	
Age				
18-24	118	9.7	101	8.9
25-40	413	34.1	340	30.2
41-60	464	38.3	400	35.5
61-75	135	11.1	227	20.2
76+	7	0.6	59	5.2
Gender				
Woman	938	80.7	582	51.7
Man	194	16.7	545	48.3
Non-binary/Trans	30	2.6	N/A	N/A
Education				
Completed years 7 to 12 high school	240	20.7	250	22.2
Vocational	253	21.8	239	21.2
Bachelors	437	37.7	406	36.1
Postgraduate	230	19.8	230	20.9
State/Territory				
New South Wales	695	59.8	387	34.4
Victoria	181	15.6	305	27.0
Queensland	127	10.9	219	19.4

	Unweighted		Weighted	
Characteristic	**N**	**%**	**Nᵃ**	**%ᵃ**
Western Australia	91	7.8	118	10.5
South Australia	17	1.5	57	5.1
Northern Territory	19	1.6	5	0.4
Australian Capital Territory	19	1.6	18	1.6
Tasmania	13	1.1	19	1.7
Remoteness				
Major cities	709	62.1	662	58.8
Inner regional	256	22.4	224	19.9
Outer regional	112	9.8	149	13.2
Remote	20	1.8	12	1.1
Very remote	45	3.9	58	5.1
Socioeconomic Status				
Lowest (most disadvantaged)	157	13.8	188	16.6
Low	252	22.1	259	23.0
Middle	210	18.4	194	17.2
High	193	16.9	182	16.1
Highest (most advantaged)	328	28.8	282	25.1

[a] Calculated using weighted data

3.4.9 Discussion

This study reports on the feasibility of using Facebook to recruit a national sample of participants. The findings demonstrate Facebook to be an efficient and effective method to recruit both a large and diverse sample of respondents. We recruited a total of 1211 respondents, with weighted data demonstrating recruitment was representative of the Australian population. The average cost per click for the paid option was $0.25 AUD with 9594 people reached. The no cost option potentially reached 902000 people, with an average number of 8205 members in each community noticeboard group. The findings of this study have implications for public health researchers seeking to recruit through social media sites such as Facebook and contribute to the emerging evidence regarding the ability of social media to reach diverse populations groups.

Overall, the no cost and paid Facebook advertisements used in this study proved to be an effective method for recruiting a large national sample of the Australian population. Although concerns have been raised in the literature regarding the digital divide,[223] the accessibility of Facebook and Instagram, globally and nationally refutes this notion.[209] The literature confirms that social media advertisement is a viable method to recruit marginalised population groups and those considered hard to reach.[224, 225] The focus of this recruitment strategy was a diverse national sample of adults. The targeted paid advertisements for this study were achieved using the ABS's IRSAD postcode and suburbs to target a diverse audience, which proved effective, with respondents varying in socioeconomic status, remoteness, educational attainment and age. The representation of regional and remote area-based participants shows the potential benefit of using social media to recruit a segment that traditionally has been quite difficult to reach;[218] this can also be said from those from low socioeconomic backgrounds.[226] However, it must be noted that gender was not diverse in this study with participants identifying as female overrepresented. This is similar to the experience of other studies, in which male, non-binary and transgender participants are underrepresented.[227, 228] Traditionally, female participants have been overrepresented in surveys and interviews, suggested to be due to the gender differences in communication.[229] Surveys require a willingness to disclose some personal information and often having to express more socio-emotional behaviours. These are traits that are historically characterised by females and may therefore contribute to their greater participation in survey research.[229] Moreover, when engaging on the internet, female users are more likely to communicate and exchange information, whereas male users prefer to information seek.[230]

The advantage of using Facebook's paid advertisement campaigns is that it can be set to target a specific audience and set a daily cost limit. This is especially useful for

researchers who are working within limited funding arrangements. Minimising research costs and maximising recruitment opportunities can be achieved with the use of social media for population health research. Social media recruitment desirability has also increased during the COVID-19 pandemic,[231, 232] with traditional methods unable to be used to recruit participants due to the public health measures used to combat the transmission of COVID-19.

Compared with the paid advertisement, the no cost Facebook method of recruitment was time intensive, by virtue of having to contact administrators for permission to join groups and the ongoing posts and reposts to the group pages to ensure continued visibility. However, it can be said that traditional methods of participant recruitment such as mailed surveys are often more labour intensive and expensive.[233] A number of studies have been conducted comparing social media recruitment and traditional methods, suggesting that social media is more effective for cost and time.[220, 226, 234] Indeed, social media recruitment through both the paid and no cost options as demonstrated in this study, represent a cost-effective method of recruitment into a population health survey.

Surprisingly, in week 7, a total of 198 responses were received; this coincided with a long weekend in three Australian States (New South Wales, Queensland and South Australia) and one territory (Australian Capital Territory) and may have increased the response rates in this week. This suggests that targeting social media recruitment over weekends and when people have spare time, particularly during the COVID-19 pandemic when people may have been in lockdown over the long weekend, may provide a good opportunity for recruitment. Despite Victoria recommencing lockdown at the time of survey distribution, there was no evidence to suggest this affected the initial response rate, however during lockdown periods people may have had more time and opportunity to complete a survey.

3.4.10 Limitations

Although this study used robust methods, there are some limitations that need to be acknowledged. First, there is potential for bias due to exposure to the advertisement being associated with time spent on Facebook (and therefore not the same for each user), especially with the community noticeboard groups where visibility of the post depended on when potential respondents were on Facebook.

Second, the feasibility of Facebook as a recruitment tool can be impacted by Facebook's automated advertising algorithms and metrics. Facebook sets advertising algorithms to determine the most appropriate advertisements to show to a specific audience. However, this is also impacted by Facebook as a business wanting to provide the user with a good experience. The metrics used by Facebook can be difficult to comprehend, which in turn can be challenging for researchers, particularly when they are not familiar with interpreting the metrics or following previously published social media recruitment protocols.

Third, only one online survey link was established for this study, which meant that being able to track respondents from each recruitment option was impossible. Future research employing both no cost and paid options should use two separate links to enable a more robust comparison of the two options.

Despite male participants engaging with the Facebook advertisement campaigns more than women, they are underrepresented in this study. Approaches to increase male participation in online surveys needs to be explored.

Finally, further qualitative studies need to be conducted to understand why individuals choose or decline to participant in research advertised through social media.

3.4.11 Conclusion

Recruitment through social media, specifically Facebook, allowed for a cost-effective and efficient method for recruiting a national sample of participants for a web-based survey regarding the relationship between wellbeing and the social determinants of health during the COVID-19 pandemic. The diversity of participants recruited in this study, in terms of socioeconomic status, remoteness, educational attainment and age, promotes and confirms the feasibility of social media to recruit hard to reach population groups as well as a diverse sample of the national population. The benefits of using Facebook should be considered by population health researchers when implementing health research in the future.

Publication 2 has ended and the following returns to Chapter 3 methodology and methods:

3.5 Sample size calculation

Given that it is not feasible or possible to study the entire Australian population for this research, but that we would like to draw inferences from the Australian population, a select sample of this population was drawn.[235] For cross-sectional studies, the sample size calculation is conducted to estimate the average value of the quantitative variable within a population.[235] Three elements were used to calculate the sample size required for this cross-sectional study. Firstly, a margin of error and/or confidence interval. The margin of error shows the researcher how many percentage points their results will vary from the true population value.[235] For instance, a 95% confidence interval with a 3% margin of error indicates that the statistic will be within 3 percentage points of the true population value 95% of the time. The confidence interval is the estimate ± the margin of error,

typically between 1–5%.[236] Secondly is the confidence level, which is how confident a researcher can be that the calculation of a confidence interval will be reflected in the true score. The confidence level is expressed as a percentage, demonstrating how sure the researcher can be of the accuracy of their results, with most researchers opting to use a 95% confidence level.[236] The final element is the population size. The sample size was calculated using these elements within a sample size calculator. At the time of data collection, the population of Australia was estimated to be 25,499,844 people.[237] Based on the estimated Australian population size and using a 95% confidence level with a 3% margin of error, the sample size required for this survey was 1067.[236] Therefore, the targeted sample size was 1100 participants to account for missing data. Generally, within a cross-sectional study, there are two reasons for missing data: 1) missing at random: the participant misses a response to a question, and 2) missing not at random: the value of the variable that is missing is related to the reason it is missing, for example, a participant may not want to accurately respond to how many illegal drugs they consume in a week due to fear of reprisal.[238]

3.6 Survey tool

An online survey was developed using SurveyMonkey[TM][239] (see Appendix 4). A number of valid and reliable tools,[240-242] as well as investigator-developed questions based on the literature and previous surveys, were used to measure the social determinants of health and wellbeing. The survey covered both the structural and intermediary determinants of the WHO CSDH conceptual framework. The survey did not cover the first element of the WHO CSDH conceptual framework, the socio-political context, as these are the governance and policies that shape the structural determinants of health and cannot be measured at an individual level.[47] Table 5 provides a summary of the tools used.

Table 5: Summary of the survey tool

Survey Tool	
Survey elements	**Measured using**
Structural determinants	
Gender, educational attainment, ethnicity, occupation, employment status and income	Investigator-developed questions
Postcode for socioeconomic status	SEIFA IRSAD data from ABS
Intermediary determinants	
Housing security	Housing Instability Index[243]
Food security	Food Insecurity (FI) tool[241]
Access to health care	Investigator-developed questions based on the literature and previous surveys
Psychosocial and behavioural	Investigator-developed questions based on the literature and previous surveys
Material circumstances	Investigator-developed questions based on the literature and previous surveys
Crosscutting across Structural and Intermediary determinants	
Social support and social capital	Oslo social support scale (OSSO-3)[240]
Dependent Outcome	
Wellbeing	Multicultural Quality of Life Index[242]

3.6.1 Structural determinants

The survey sought information regarding structural determinants, including participants' gender, educational attainment, ethnicity, occupation, postcode, employment status and income prior to and during the COVID-19 pandemic.

Gender included Man, Woman, Transgender woman, Transgender man and non-binary. Due to the low numbers of participants answering yes to the transgender and non-binary options, these options were combined for analysis.

Education attainment was measured using six options: completed some high school, completed high school, technical college, Bachelor's degree, Master's degree and Doctoral degree.

Ethnicity was measured with 11 options based on the ABS commonly used ethnicity options and included an 'other' option enabling participants to choose another ethnicity not listed. The 11 options were African, Caucasian, East Asian, Latino/Hispanic, Pacific Islander, Middle Eastern, Aboriginal or Torres Strait Islander, Caribbean, South Asian, Mixed and Other.

Occupation was an open-ended question allowing the participants to write in their occupation.

Postcode was sought as an open-ended question and was used to determine the socioeconomic status of participants based on the SEIFA IRSAD data from the ABS.[205]

Employment status was measured by asking participants about their employment status before and during the pandemic using tick box options.

Income was measured using the seven income brackets used by the ABS and asked about income before and during the pandemic. The income brackets were under $15,000; $15,000–$29,999; $30,000–$49,999; $50,000–$74,999; $75,000–$99,999; $100,000–$150,000; and over $150,000.

3.6.2 Intermediary determinants

The survey sought to understand intermediary determinants, including participants' housing security, food security, access to health care, psychosocial behaviours, behavioural factors and material circumstances.

Housing stability questions sought to understand participants' experiences with housing stability during the COVID-19 pandemic. The questions in this section were derived from a 10-item Housing Instability Index developed by Rollins.[243] The Cronbach's alpha for

the Housing Instability index is 0.7, which reflects good internal consistency.[243] A detailed description of this tool is presented in Publication 3.

Food security questions sought to understand participants' experiences with food security during the COVID-19 pandemic. A 2-item Food Insecurity (FI) tool developed by Hager[241] was used to measure food security. The 2-item FI Screen has a sensitivity of 97% and specificity of 83%, with good convergent and predictive validity.[241] A detailed description of this tool is presented in Publication 3.

Access to health care sought information regarding the participants' chronic health conditions (selected from a list of 12 conditions reflecting the National health priority areas) and access to health care services during the pandemic. Participants were also asked about having a healthcare card, which is a card provided to Australians with low income or on government income support that allows them to access discounted medicines and bulk billing health services. A detailed description of this tool is presented in Publication 3.

Psychosocial and behavioural questions sought to understand the preventative health and wellbeing behaviours that the participants adopted during COVID-19, including coping strategies. Preventative health and wellbeing behaviours, including coping strategies, were assessed using an investigator-developed 16-item tool using a 5-point Likert scale.

Material circumstances questions sought to understand participants' ability to afford bills, transport and medications and access to health services during the COVID-19 pandemic. Questions about the ability to pay bills were investigator-developed questions using a 5-point Likert scale. These three questions were added to the 2-item FI screen. Affordability of transport and ability to obtain medications and access to health services

were also assessed through an investigator-developed 4-item question using a 5-point Likert scale.

3.6.3 Crosscutting across structural and intermediary determinants

The survey sought to understand social support and social capital, which crosscut across the structural and intermediary determinants.

Social support and social capital questions sought to understand the influence of social support and religion on a participant's life during the COVID-19 pandemic, drawing on the Oslo social support scale (OSSO-3) developed by Dalgard.[240] Duko[244] reports that the OSSO-3 scale has a Cronbach's alpha of 0.91, which reflects excellent internal consistency. A detailed description of this tool is presented in Publication 3.

3.6.4 Wellbeing

The outcome of interest in this survey was wellbeing, and this study aimed to collect information on the wellbeing of the participants during COVID-19 using the Multicultural Quality of Life Index (10 items) developed by Mezzich.[242] The 10 items in the index assessed 'Physical wellbeing', 'Psychological/emotional wellbeing', 'Self-care and independent functioning', 'Occupational functioning', 'Interpersonal functioning', 'Social emotional support', 'Community and services support', 'Personal fulfilment', 'Spiritual fulfilment' and 'Global perception of quality of life'.[242] The multicultural quality of life index reports a Cronbach's alpha of 0.92, reflecting excellent internal consistency. This index has been used extensively to measure wellbeing and quality of life for people with a variety of chronic health conditions and has been used for the general population.[245-247] While the Multicultural Quality of Life Index aligns well with other measures of wellbeing, such as the WHO-5 wellbeing tool and the Warwick-Edinburgh

Mental Wellbeing Scale,[248] this index is comprehensive, not only just measuring physical and emotional wellbeing. A detailed description of this tool is presented in Publication 3.

3.6.5 Validity and reliability of survey tools

To ensure the survey had a rigorous design and supported research integrity, meaning the data obtained in the survey was conducted in the most reliable and valid way,[249] a variety of validated tools were used. The validity and reliability of a tool is integral to enhancing the accuracy of the evaluations made.[250] The validity of a tool describes the extent to which that tool measures what it was intended to measure. There are four main types of validity: face validity, content validity, construct validity and criterion validity.[251] Face validity refers to the subjective judgement of a construct that is how it appears in terms of readability, clarity of the language used and style and formatting.[252] Content validity is an evaluation of the tool to ensure that all relevant items are included and eliminates items that are not relevant.[252] Construct validity is the degree to which the tool is capable of measuring the construct or concept and comes in two forms: 1) convergent validity tests the degree to which two factors that are expected to be related are indeed related,[251] and 2) discriminant validity tests the extent to which variable A discriminates from the other variables, or more simply, tests that those constructs that should not have a relationship actually do not have a relationship.[253] Lastly, criterion validity refers to how well the measure of one variable can predict the response of another variable, and can often be used to predict behavioural responses in another situation.[254]

Reliability is concerned with the extent to which the survey tool provides a consistent and repeatable result. Reliability is often tested and reported using Cronbach's alpha, which measures the internal consistency of a tool.[251] Developed by Lee Cronbach in 1951, the Cronbach's alpha is expressed as a number between 0 and 1. There is a large

inconsistency in the literature on what is considered an acceptable level of Cronbach's alpha; however, most agree that a Cronbach's alpha of above 0.70 is considered to demonstrate good internal consistency.[250] It has been suggested that the internal consistency of brief scales is lower than those scales with more items due to the Cronbach's alpha substantially depending on the number of items within the scale.[250] Sensitivity and specificity can be referred to as predictive validity, a component of criterion validity, and are often used in screening tests. Sensitivity is used to indicate the ability to detect a true positive, while specificity is used to detect a true negative.[255]

3.6.6 Survey response rates

Response rates of a survey are repeatedly used to measure not only the representativeness of the data but also the quality. A systematic review exploring the response rates for public health population-based web surveys reports a mean response rate of 40.5%.[256] Mailed-out surveys were traditionally used among social and health researchers to gather data on attitudes, beliefs and self-reported behaviours; however, there has been a large drop in this method due to declining response rates.[257] In the 1970s, response rates from mailed-out surveys were as high as 77%; however, in the 2010s, response rates were demonstrated to be approximately 43% and are predicted to decline to as low as 1% in the 2030s, making mailed-out surveys a less viable option for researchers.[257, 258] Growing use of global connectivity through the internet has meant that web-based surveys are an alternative option to mail-out surveys, especially due to the cost-effectiveness of this option.[258] Although, it must be noted that web-based surveys are not without issues or challenges. While they may receive a response rate of approximately 40%, web-based surveys may not be representative of the population and are subject to selection bias. In the context of this PhD thesis and the recruitment method of a web-based survey via social media, it was not possible to know the number of people reached, and a response rate was

unable to be calculated. However, it is important to note that in week 7 of this PhD study, there was an increase in response rates, which coincided with a long weekend in some Australian states.

3.6.7 Strategies to increase the response rate

The following strategies were employed within this study to increase the response rate:

Incentives are known to increase the response rate of surveys. Dillman[259] highlight a tailored design method for cross-sectional surveys, where monetary incentives are used to facilitate survey participation. This PhD thesis used lottery monetary incentives, with participants given the opportunity to enter a draw to win 1 of 10 $50 gift vouchers on completion of the survey. Incentives are ethical in research if they are reasonable, not excessive, and proportionate to the burden of the research. Ethical review committees are also responsible for ensuring the incentives are free from coercion.[118]

User-friendly survey design in that the appearance and design of surveys can influence completion rates. Therefore, to elicit increased survey completion and response rates, a range of survey design factors were included in the survey, such as differing question types, clear headings and ensuring that entire questions were visible on smartphones and tablets.[260]

3.7 Data management

Data produced from the survey was imported directly into Statistical Package for the Social Sciences (SPSS)[261] version 25. Prior to undertaking the analysis, data cleaning was undertaken to ensure quality, such as removing duplicate and irrelevant values and checking for typographical errors and completeness, which included identifying and imputing missing values.

To ensure the accuracy of the data, the primary researcher (HG) conducted data cleaning to confirm that there were no missing data.[262] Missing data can occur in surveys when participants cannot provide a response, they omitted a response in error or decide not to complete particular survey items. The absence of data can influence the results of a study and has the potential to lose statistical power. The data cleaning process was also checked by the supervisors (RF, CM). Missing data was not imputed.

3.7.1 Data storage

All electronic files and documents are stored on AARNET Cloudstor One Drive, cloud storage accessible only by the researchers on the team. This data will be stored for five years, after which time electronic data will be securely erased. This is in accordance with the Australian Code for the Responsible Conduct of Research 2007.[263]

3.8 Data analysis

A detailed description of the quantitative data analysis is presented in Publications 3 and 4.

The quantitative data collected was analysed by the primary researcher (HG) using both descriptive and inferential statistics and checked by supervisors (RF and CM). Statistical significance was set at a p-value < 0.05, and this is considered the point at which the research is scientifically important in association and effect.[264]

The following analyses were undertaken:

Post-stratification weights were calculated to match the Australian population based on gender, age, state, or territory using the 2016 Australian census data[222] to account for over- or under-representation of subpopulations. This method was used because, in cross-sectional surveys, some subpopulations are more likely than others to respond, such as a

particular gender or race, which can lead to under- or over-representation of certain subpopulation groups, introducing bias.[265] One robust solution is to apply post-stratification weights, which involves aligning the sample population with a representative population:[265] in this research, the 2016 Australian census data. This was achieved through SPSS v25, and once applied, the data were statistically adjusted to reflect the parameters of the Australian population, therefore, making the population sample more representative of the total Australian population.[265]

Descriptive statistics were used to summarise the data, including mean, frequency, standard deviation, percentage and ranges.[262] Normality of the data was checked to ensure that the data were normally distributed, meaning that most of the data is centred around the mean and tapers off at each end. If the data are normally probability distributed, then the mean, mode and median of the distribution are all equal, meaning that mean and standard deviation are only required to explain an entire data set. Ensuring the normality of the data in this study allows for the means and standard deviations to be reported and for inferential statistics to be used.

T-tests were used to calculate the differences between two means of two unrelated groups.[262]

ANOVA, or analysis of variance, was used to test the significant differences between the means of three or more groups.[262]

Pearson's correlation was used to examine the relationship between different continuous variables and the method used to measure the association between the variables of interest.[266] It is also used to demonstrate the strength of the association, where 1 indicates a strong positive relationship, – 1 indicates a strong negative relationship, and 0 indicates no relationship at all.

Multiple linear regression was used to assess the relationship between a set of two or more independent variables and one dependent variable. The independent variables used in this study were the social determinants of health, and the dependent variable was wellbeing. Multiple regression analysis in this study was performed using Bonferroni correction and used to investigate the predictors of wellbeing.[267] Bonferroni correction is used as a method to counteract type 1 errors, that is, if conducting multiple analyses on the same dependent variable, there is an increased likelihood of significance being produced by chance. Therefore, to reduce these type 1 errors, Bonferroni correction is applied.[267] When two or more independent variables within a multiple linear regression model are highly correlated, it becomes difficult to estimate the input of each variable; therefore, it is referred to as a collinearity problem. Multicollinearity, or collinearity between three or more variables, can be identified by using the Variance Inflation Factor (VIF) during the multiple linear regression analysis, whereby a $VIF > 10$ indicates multicollinearity. In this study, the VIF was used during multiple linear regression analysis to ensure there were no multicollinearity issues.

Binary logistic regression was used to measure the relationship or association between the target variable (being binary, either 0 or 1) and independent predictors. In this study, binary logistic regression was used to determine the social determinants of health associated with economic wellbeing, which included income loss, employment loss, access to superannuation and financial ability to pay for bills during the COVID-19 pandemic. Each of these variables was recoded to become dichotomous ('yes' or 'no') variables for this analysis.

It is important to note that post-stratification was not used when conducting multiple linear regression and binary logistic regression in Publications 3 and 4 based on a review of the literature[268-270] and in consultation with the university statistician. Using

unweighted data would provide unbiased, consistent and efficient parameter estimates, whereas weighted data does not provide efficient parameter estimates.[270]

3.9 Phase 2: Qualitative phase

3.9.1 Study design

The qualitative phase of this study included conducting semi-structured interviews with purposively selected participants from the online survey. The purpose of this phase was to explore the lived experiences of Australian adults' during COVID-19 and their experiences of how the social determinants of health influenced their wellbeing. A qualitative descriptive study was considered the most appropriate methodology for this research. In contrast to ethnographic or phenomenological studies, qualitative descriptive studies draw upon the general principles of naturalistic inquiry.[271] Qualitative descriptive studies examine a phenomenon in its natural state, allowing for the understanding of the perceptions and experiences of the participants in their unique context. This study design is also frequently used in mixed methods studies with qualitative data used to explain the quantitative findings.[272] This thesis used a qualitative descriptive study design whereby participants' descriptions were contextually interpreted, with thematic analysis identifying commonalities between participants and categorising them into themes that best describe their experiences.[273] The thematic analysis was conducted using Braun and Clarke's inductive thematic approach,[274] which is discussed in further detail later in this chapter in section 3.9.12 Data analysis.

3.9.2 Sample and recruitment

At the completion of the quantitative survey, participants were asked if they would be willing to participate in a subsequent interview via video conference or telephone. Due to

the geographical dispersion of the participants, face-to-face interviewing was not an option for this study. Data collection was conducted during the COVID-19 pandemic, and sporadic localised lockdowns also made face-to-face interviews impossible, even for those participants who were geographically proximate. If participants agreed, they were then invited to provide their contact details, with the assurance that this information would be kept separately from their survey responses and processed in the strictest of confidence. Potential interview participants were purposively selected from those participants who indicated their willingness to participate. The purposive sampling was conducted by an independent researcher not associated with the study. Purposive selection occurred to ensure that there was a representation of gender and age, both urban and regional areas, states and territories and socioeconomic status.

3.9.3 Strategies to maintain confidentiality and ensure rigour

The confidentiality of the participants was maintained through the following steps:

1. A study code was applied to all participants who agreed to participate in the semi-structured interviews by an independent researcher not associated with the study.

2. A copy of the study code, name, phone number and email were kept by the independent researcher in a password-protected excel file.

3. The name, email and phone numbers of all participants were then deleted from the original SPSS and excel files for all participants.

4. Purposive sampling was undertaken by the primary researcher using the study codes.

5. Selected study codes were then given to the independent researcher, who provided the primary researcher with the name, email and phone number corresponding with the selected study codes for the semi-structured interviews.

3.9.4 Purposive sampling

Purposive sampling is used extensively in qualitative research to ensure the selection of 'information-rich' participants.[275] Given that this research was particularly focused on understanding the social determinants of health, including gender, housing, social support, ethnicity and food security, this was achieved by selecting participants from the quantitative component of this mixed methods study based on a predetermined criterion of varying age, gender, remoteness, socioeconomic status and state and territory of Australia.

3.9.5 Data collection

Purposely selected potential participants were contacted through their provided email addresses and asked if they would be willing to participate in the interviews. Potential participants were provided with a participant information sheet and consent form and asked to return the consent form prior to participation in the interview. The primary researcher contacted 84 participants to take part in the semi-structured interviews, four refused to participate, and 60 did not respond. When purposively selected participants did not respond or declined to participate, they were replaced with individuals matched on the characteristics used in the original purposive sampling. A total of 20 participants were interviewed using a combination of video conferencing and telephone. Interviews were held at a mutually agreed time, with the option of video and telephone interviews provided to participants. A detailed description of the data collection and data analysis is presented in Publications 5 and 6.

3.9.6 Semi-structured interviews

Semi-structured interviews are commonly used in qualitative data collection largely due to their versatility and flexibility, allowing the researcher to improvise follow-up questions to elicit further information.[276] In this study, semi-structured interviews enabled the interviewer to provide the participant with an environment to share their experiences related to each topic or question. It also provided participants with an opportunity to share additional experiences that they felt were relevant to the topic, specifically using their own words.[277] The use of semi-structured interviews allowed for a much deeper understanding of the participants' experiences during COVID-19 than generated by the survey by investigating the 'why' of the research question.[278]

3.9.7 Development of the interview guide

A semi-structured interview guide was informed by the results of the quantitative data, extant literature and expert input.[277, 279] (see Figure 10).

3.9.8 Piloting of the interview guide

Prior to the interviews being conducted, the interview guide was reviewed by the research team and pilot-tested on two members of the public (these were not included in the study data) to assess for clarity and flow of ideas. Minimal changes were required to the gender probing question following the pilot testing.

3.9.9 Conduct of the semi-structured interviews

While video conferencing was the researcher's preferred method to conduct the interviews as it provides the benefit of verbal and non-verbal cues as prompts for discourse,[280] participants had varying degrees of internet bandwidth or had no camera

options available to them. Therefore, to accommodate the participants' needs, telephone interviews were used where video conferencing was not possible. Semi-structured interviews using the telephone have previously been used effectively among general population groups.[281] Ensuring the participants were advised to be situated in a room where they had some privacy, and the researcher also maintained the same, the interviews were conducted confidentially and free of distraction.

Can you tell me a little about yourself? What do you do?

Probes: Family life? Significant challenges in life? Significant blessings?

Can you tell me about your experiences during COVID-19?

Probes: Work from home? Children? Loss of employment? Was your life and health the same as prior to COVID-19? Biggest changes? Anything particularly distressing for you?

Can you tell me a little bit about your relationships with family and friends during COVID-19?

Probe: Affect wellbeing or quality of life? What were some of the good things? What were some of the bad things? Physical? Mental? Emotional?

Can you tell me about any challenges you may have encountered during COVID-19?

Probes: Employment? Health? Social support? Quality of Life? Gym close down? Moving to a new house? Financial? Relationship stress?

What strategies did you use to cope with any of the challenges you faced during COVID-19?

Probes: Did you have access to social support? Use alcohol/ drugs? Eat more/differently? Seek health professional support?

Can you tell me about any circumstances in your life that you believe/feel impacted on your experience of COVID-19?

Probes: Poverty, insecure/no employment, racism, food insecurity, local neighbourhood, your gender – has your experience as a man or woman or transgender or non-binary person different to that of other genders? Drugs/alcohol use? Comparison to others?

Can you tell me about accessing health care during COVID-19?

Probes: Alternative services? Challenges or difficulties? Telehealth use?

Figure 10: Interview guide and probes

3.9.10 Data saturation

Data saturation is a common strategy for determining sample size in qualitative methods.

Data saturation occurs when no additional data is being derived, that is, the researcher

observes the same concepts and data over and over,[282] indicating that saturation of the data has occurred, and no further sampling is required. The strategy used in this PhD was to ensure data saturation was achieved by using the constant comparison method developed by Glaser and Strauss and often used in Grounded Theory.[283] Once an interview was conducted it was transcribed verbatim and then read and re-read by the PhD candidate. To understand the data, the interviews were constantly compared with parts of the data and assigned codes to constantly compare the similarities and differences within the data. This consistent approach enabled the researcher to remain embedded within the data, enabling the researcher to identify when no new data was being derived.[284] Once 17 interviews had been conducted, it became apparent to the researcher that no new data was being derived. An additional three interviews were conducted to ensure data saturation had occurred.

3.9.11 Data management and storage

All interviews were audio-recorded using a digital audio recorder, with the permission of the participants, to facilitate verbatim transcription.[285] Audio recording of interviews provided the opportunity for a relaxed atmosphere and allowed an unbiased and accurate account of the interviews captured as a record. All interviews were transcribed verbatim using a transcription service. Using a reflexive approach,[286] prior to and immediately following the interviews, the researcher maintained field notes. Field notes incorporated methodological, theoretical and personal reflections, operating comparable to study data, to assist in achieving an analytical observation and an element of trustworthiness.[286]

Audio recording, verbatim transcription of interview recordings and written interview notes are important steps when preparing for qualitative data analysis. This data needs to be precise and accurately reflect the interview experience.[277] Thematic analysis demands

a rich and exact account of the data collected, therefore, requiring a comprehensive approach when transcribing interviews. This ensures that the information recorded is reflective of the original content.[274]

Semi-structured interview transcripts were imported into NVivo 12[TM],[287] with data accuracy checked against the audio recordings and the interview notes taken by the researcher shortly after conducting each interview. All hard-copy documents, including interview notes, were stored in a locked cabinet. Electronic files are stored on AARNET Cloudstor or a password-protected computer. Data was only accessible to researchers involved in this study, with only de-identified data stated in the reporting of this study. Interviews were de-identified to ensure that individuals were not linked to their data. This was achieved by using pseudonyms and removal of identifying aspects from the transcripts, such as place names. Data will be stored for a period of five years, and after such time, hard-copy documents will be shredded and electronic data will be securely erased. This is in accordance with the Australian Code for the Responsible Conduct of Research 2007.[263]

3.9.12 Data analysis

The qualitative data collected from the semi-structured interviews, as written transcripts of the audio recordings, were analysed using the thematic analysis approach as described by Braun and Clarke.[274] An inductive thematic analysis approach was used in this study, whereby the researcher derived meaning from the content in the data rather than bringing pre-conceived ideas and notions to interpret the data, which can occur using a deductive approach.[274] The six-phase thematic analysis required the researcher to 1) familiarise themselves with the data, 2) generate initial codes, 3) search for themes, 4) review the themes, 5) define and name the themes and finally, 6) produce a report at the completion

of the analysis.[274] *Familiarisation with the data* included reading the transcript and listening to the audio files a minimum of twice. Key words and sentences were noted and highlighted in the electronic copies of the transcripts. *Generation of initial codes* involved several steps; after familiarisation of the data of one interview occurred, the broad codes were entered into NVivo as parent nodes. Child nodes were also created in NVivo, which are sub-nodes of the parent nodes demonstrating a relationship between the two. *Searching for themes* involved running a coding query and a text word query within NVivo to gather patterns in themes and phrases and grouping the nodes to create themes. *Reviewing the themes* included running a matrix coding query to ask a range of questions of the data and themed codes were explored using the tree mapping function within NVivo. The themes were reviewed by the research team. *Defining and naming the themes* this process involved using the tree mapping that was run within NVivo to finalise the themes, the final themes were decided based on consensus with the research team. *Producing a report at the end of the analysis* the analysis of the qualitative data produced two publications. Given the large volume and disparate data collected from the interviews, it was decided to report the findings of the qualitative data in two separate papers (Publications 5 and 6).

3.10 Data integration

Central to the mixed methods study design is the mixing or integration of the quantitative and qualitative data, building on the insights of the results that both datasets provide individually.[192, 288] Integration in mixed methods studies provides a process for a complete comprehensive analysis and leads to consistency in the results.[289] The quantitative and qualitative components in a mixed methods study are required to be integrated as either a logical whole or two separate sets of a whole.[194] In this PhD research, integration was

achieved through the model described by Creswell and Creswell[290] on data integration in mixed methods research. They propose three models of data integration specific to the various mixed methods designs, that is: 1) merging: suited to convergent mixed methods studies, 2) connection: suited to explanatory mixed methods studies, and 3) embedding: suited to exploratory mixed methods studies.[289] Since this PhD thesis was a sequential explanatory mixed methods study, whereby the qualitative data were used to further explain the results of the quantitative phase, the connection model was used to integrate the data.

3.10.1 Integration of results

Joint displays are often used in mixed methods research as a visually juxtaposed representation of the quantitative and qualitative findings.[289, 291] When used as a tool for communicating the research, a joint display explicitly integrates the quantitative and qualitative phases and demonstrates how they are mixed, drawing out new insights.[292] Integration of the results of this research has been presented as a joint display in Chapter 8. Meta-inferences or fit of data integration refers to the consistency of the findings, leading to either a conclusion of confirmation, expansion or discordance.[289, 293] Confirmation refers to both quantitative and qualitative findings confirming the results of both phases, whereas expansion implies that the data has diverged and provides insight, or has complementary aspects, by providing a complete picture. In contrast, discordance refers to either the quantitative or qualitative data being incongruent or disagreeing with each other.[289, 291]

3.11 Ethics

Ethical conduct in research is informed by the values of research merit and integrity, justice, beneficence and respect.[294] Ethics approval was sought from the University of Wollongong Human Research Ethics Committee prior to data collection. Ethics approval (approval no: 2020/306) was received on 19 August 2020 (see Appendix 5).

This research provided all potential participants with information about the study, including the purpose and expectations of participants. Participants were also provided with the contact details of the researchers so that they had an opportunity to ask questions regarding the study prior to partaking in it. The foreseeable risk associated with this research was the inconvenience of participants' time to complete the survey or semi-structured interview and the potential for the semi-structured interviews to cause some distress, which was mitigated by ensuring the participants felt comfortable. Participants would have been offered counselling services if they were distressed during or following the interview; however, it was not needed by any of the participants. In contrast, participants of this type of research may gain a therapeutic benefit, where participants derive satisfaction from being able to be self-expressive and having a chance to voice their opinion or experiences[295] during the pandemic. Involvement in this research was entirely voluntary; however, due to the anonymity of the survey, participants were unable to withdraw their consent or data once the survey had been completed. Participants who consented to involvement in the semi-structured interviews were able to withdraw their consent and data at any time without consequence.

3.11.1 Risks and benefits

When conducting human research, the risks of harm must be assessed to ensure that the benefits of the research outweigh the risks. Ethically acceptable research occurs when the

benefits justify any risks to the participants.[294] This research aimed to minimise any harm to the participants, as well as consider their welfare, with the research to provide benefits, if not directly to the participants, then to the wider Australian community.

3.11.2 Consent

Participation in this study was completely voluntary. Adults participating in the online survey had to, on the first page following the participant information sheet (PIS), select a response from a tick box to indicate that they had read the PIS and, therefore, agreed to participate in the survey. Completion and submission of the survey were considered implied consent. All survey data was anonymous; therefore, data from participants who wished to withdraw following the completion of the survey was not possible. This was made clear to all participants.

Survey participants who agreed to be contacted further for the semi-structured interviews were provided with a PIS and consent form (see Appendix 6). All participants were provided with the option to participate at a mutually agreed time without coercion. To support the autonomy of the participants in deciding to partake in the study, the PIS and consent forms were designed to be at an appropriate level of information readability for the public.[263] Participants were reminded that taking part in this research was voluntary and that they were able to withdraw from the study at any time without any consequences or judgement.

3.12 Chapter conclusion

This chapter has presented the methodology, design and methods used in this research. The explanatory sequential mixed methods approach has been informed by the overall aim of exploring the relationship between wellbeing and social determinants of health

among adults during the COVID-19 pandemic. A detailed description of the participant

sampling, recruitment and setting has been specified, including Publication 2, exploring

the feasibility of social media recruitment of a national sample. The data collection, data

storage and management, data analysis, rigour, integration and ethics of the quantitative

and qualitative approaches have been detailed in this chapter.

Chapter 4: Predictors of Wellbeing

4.1 Chapter introduction

This chapter presents Publication 3, 'Well-being and social determinants of health among Australian adults: A national cross-sectional study'. The publication addresses research questions 1 and 2: What is the association between wellbeing and social determinants of health in the Australian adult population during the COVID-19 pandemic? and What are the predictors of wellbeing in the Australian adult population during the COVID-19 pandemic? Permission to include the publication in the thesis has been granted by John Wiley & Sons. The full text publication and permission are found in Appendix 7. This paper was published in Health and Social Care in the Community (Impact Factor – 2.821) as:

Green H, Fernandez R, MacPhail C. Well-being and social determinants of health among Australian adults: A national cross-sectional study. Health & Social Care in the Community. 2022 May 13. https://doi.org/10.1111/hsc.13827

4.2 Abstract

The social determinants of health affect an individual's capacity to cope during a crisis such as the COVID-19 pandemic which could potentially impact their wellbeing. The aim of this study was to examine the relationship between wellbeing and the social determinants of health among Australian adults during the COVID-19 pandemic. A cross-sectional study of adults residing in Australia was conducted using SurveyMonkey between 20 August – 14 October 2020. Participants were recruited via social media. Wellbeing was measured using the 10-item Multicultural Quality of Life Index and social determinants of health were measured using validated tools and investigator developed questions. Data were analysed using SPSS version 25. Inferential statistics, including

independent t-test and one-way ANOVA were undertaken. Multiple regression analysis was used to investigate the predictors of wellbeing. In total, 1211 responses were received. Females accounted for 80.7% of the responses, men 16.7% and transgender/non-binary 2.6%. The mean age of the respondents was 43 years (SD 14.2). The mean score for total wellbeing was 62.58 (SD 21.22). The significant predictors of higher wellbeing were housing security (p = 0.000), food security (p = 0.000), social support (p = 0.000) and access to health care (p = 0.000). This study demonstrates that those with poor social support, difficulty accessing health care, insecure housing and food insecurity had significantly poorer wellbeing during the COVID-19 pandemic. It shows that the COVID-19 pandemic has exacerbated social vulnerabilities and highlights the need for action to address the social determinants of health and inequalities.

Keywords: COVID-19; Pandemic; Social determinants of health; wellbeing; health inequalities; Sustainable Development Goals

What is known about this topic?

- Epidemics and pandemics can elicit both a social and economic impact on communities and individuals.
- The impact can vary with some individuals and communities more susceptible to the effects such as loss of income and employment.

What this paper adds?

- Individuals with higher incomes, were employed, had postgraduate education, and identified as male were found to have significantly higher wellbeing during the pandemic.

- Housing security, food security, social support and access to health care are all important social determinants of health predictors of the wellbeing during the pandemic.

4.3 Introduction

The emergence of SARS-Cov-2, also known as COVID-19, in Wuhan China in December 2019 was declared a Public Health Emergency of International Concern (PHEIC) in January 2020.[296] Global transmission of COVID-19 has caused substantial morbidity and mortality with governments worldwide implementing extensive public health measures to reduce the spread of COVID-19 including social restrictions, 'lockdowns', travel restrictions and physical distancing. In Australia, the government commenced implementation of such measures on 18 March 2020 with limits on the number of people who could gather in both indoor and outdoor settings as well as travel restrictions.[297] By 25 March 2020, the Australian Government had imposed the highest priority measures, with a total ban on Australians travelling overseas and closure of many businesses including entertainment venues, libraries, museums, leisure and recreational businesses and retail outlets.[298] The highest priority measures implemented within Australia were in the response stage and compared to the previous two stages of prevention and preparedness.[137] Additionally, the Australian government placed limits on visitors to households and encouraged people to work from home. In some places within Australia, such as Melbourne, strict lockdowns were employed which included the introduction of curfews and a complete lockdown of a social housing block.[145]

Across the globe, restrictions imposed have resulted in a loss of social contact, reduction in income, loss of employment, insecurity in housing, difficulty accessing healthcare and food shortages.[299] Individuals with limited income or financial means, such as casual employees who lost their employment due to restrictions imposed, people who rely on public transportation, and those with the inability to work from home, may have found social distancing and isolation a non-viable option in the context of their lives.[57] Additionally, the social isolation created by lockdowns and restricted movement of

people may have exacerbated or triggered mental health issues.[300] The COVID-19 pandemic and associated public health measures has the ability to amplify existing social and health inequalities.[57] Social determinants of health, or *"the circumstances in which people grow, live, work, and age, and the systems put in place to deal with illness. The conditions in which people live and die are, in turn, shaped by political, social, and economic forces"*[301] have a substantial influence on health inequalities.

Using a contemporary notion of wellbeing, it is defined as the emotional, psychological, physical, financial, and spiritual wellbeing and incorporates aspects of quality of life such as self-fulfilment and life satisfaction.[29] Structural conditions such as the social determinants of health have been reported to affect people's wellbeing and quality of life.[302] Challenges in coping with the effects of the COVID-19 pandemic and associated government responses are likely to not only exacerbate existing inequalities but could affect the wellbeing and quality of life of particular individuals or communities.[303, 304] The public health measures, while effective at assisting in reducing the spread of infectious diseases, have been reported to significantly impact people's lives socially, psychologically, and economically during the Middle East Respiratory Syndrome (MERS), Severe Acute Respiratory Syndrome (SARS) and Ebola outbreaks.[305, 306] These impacts are reported to be increased emotional distress, loneliness, loss of employment and stigmatisation, to name a few. Despite recent infectious disease outbreaks such as MERS, SARS and Ebola occurring, Australia has had very limited experience in managing large infectious disease outbreaks and as such, this is the first time Australia has been impacted, particularly in large population numbers. At the time of the study, there had been a total of 25,746 cases of COVID-19 within Australia and 652 deaths attributed to COVID-19. There were 19,080 cases and 565 deaths due to COVID-19 in Victoria, which was the state highly affected by COVID-19. The Northern Territory had

only 33 cases of COVID-19, with no deaths, likely due to lower population numbers and density.[307]

The World Health Organizations (WHO) Commission on Social Determinants of Health has been used as the theoretical framework for this study. While the framework consists of three key elements: Socio-political; Structural determinants; and Intermediary determinants,[47] this study will focus on the structural and intermediary determinants. The structural determinants referring to the structural conditions that create health inequalities such as income, employment status and gender, and the intermediary determinants referring to the downstream factors that create health inequalities such as housing, food, social support and the health system.[47]

With COVID-19 being an emerging disease and Australia not previously experiencing large infectious disease outbreaks, the impact of the COVID-19 pandemic on the lives of adult Australians is unknown. Therefore, the aim of this study is twofold: (1) to explore the association between wellbeing and the social determinants of health in adults residing in Australia during the COVID-19 pandemic; and (2) to identify the predictors of the wellbeing of adults residing in Australia during the COVID-19 pandemic.

4.4 Methods

To explore the relationship between wellbeing and social determinants of health during COVID-19, we conducted a cross-sectional survey of the Australian population. All participants were recruited into an online survey (SurveyMonkey) using social media including Facebook and Instagram between 20 August and 14 October 2020. Recruitment incorporated two methods, firstly, through joining existing community noticeboard groups within Facebook and secondly, through a paid advertisement campaign through

Facebook. The second approach used Facebook's advertisement platform that meant advertisements were run across Facebook and Instagram. A study image and link to the survey were posted on the existing community noticeboards in Facebook, with the same image and link to the survey used in the paid advertisements. A detailed description of the recruitment method is presented elsewhere.[308] The inclusion criteria for the study were individuals aged 18 years and over with the ability to read English and residing in any state or territory within Australia. Participation in the survey was voluntary and participants were invited to enter a draw to win one of ten $50 gift vouchers at the end of the survey with winners selected randomly using SPSS version 25. The survey took 10-20 minutes to complete. This paper is reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

4.4.1 Measures of social determinants of health (independent variables)

Using the WHO Commission on Social Determinants of Health Framework, data collected for social determinants of health variables were gender, educational attainment, employment status, income, social support, housing and food security, and access to healthcare using a variety of validated tools as well as investigator-developed questions. Postcodes were collected from the participants and used to determine their socioeconomic status based on the Socio-Economic Indexes for Areas (SEIFA) as well as the remoteness structure using the Accessibility and Remoteness Index of Australia (ARIA+). SEIFA classification within Australia is divided into quintiles with 20% of the population placed in each quintile.[222] The median income in Australia is $49,805,[309] therefore a cut-off value of $49,999 was used for income. As those above the median income are considered to have the ability to afford goods and services.[310]

Social support was assessed using the 3–item Oslo social support scale (OSSO-3).[240] The reliability of the OSSO-3 is high with a Cronbach's alpha of 0.91. The 2 items of the OSSO-3 were rated on a 5-point scale and 1 item on a 4-point scale with the sum of the 3 scores providing the overall social support score. The maximum obtainable score was 14 with scores 3-8 signifying poor social support, 9-11 moderate support and 12 – 14 strong social support. Housing security was assessed using the 10-item Housing Instability Index,[243] with 8 items eliciting a dichotomous yes or no response, the other 2 items were recoded to be dichotomous. The Cronbach's alpha for the housing instability index was 0.70. Food insecurity was assessed using the 2-item Food Insecurity (FI) Screen.[241] Each item was rated on a 4-point likert scale (1 = "I don't know", 2 = "never true", 3 = "sometimes true" and 4 = "often true"). The FI Screen has a reported sensitivity of 97% and specificity of 83% with good convergent validity. Access to healthcare was measured using an investigator developed tool using 4-items "have to put off going to the doctor/pharmacy because you couldn't afford to go"; "have to put off going to the doctor/pharmacy because of distance or transportation"; "Worry whether my medications would run out before you got money to buy more" and "find it was difficult to access the health care services (eg GP, specialist, pharmacy, medications) you needed". Each item was rated on a 4-point likert scale (1 = "I don't know", 2 = "never true", 3 = "sometimes true" and 4 = "often true"). The items were then recoded to be dichotomous (0 = "I don't know" and "never true" and 1= "sometimes true" and "often true") with higher scores indicating difficult access to healthcare. The items were then reverse coded for linear regression.

4.4.2 Measures of wellbeing (dependent variable)

For this study, wellbeing was assessed using the 10-item Multicultural Quality of Life Index.[242] Wellbeing was rated on a scale of 1 (poor) to 10 (excellent) for each of the items.

The 10–items in the index assessed 'Physical wellbeing', 'Psychological/emotional wellbeing', 'Self-care and independent functioning', 'Occupational functioning', 'Interpersonal functioning', 'Social emotional support', 'Community and services support', 'Personal fulfilment', 'Spiritual fulfilment' and 'Global perception of quality of life'. Additional phrasing was used within the survey to describe each of the 10 items of the index as per the index creator's instructions. 'Physical wellbeing' included feeling energetic, free of pain and physical problems; 'Psychological/emotional wellbeing included feeling good, comfortable with yourself; 'Self-care and independent functioning' included carrying out daily living tasks, making own decisions; 'Occupational functioning' included able to carry out work, school and homemaking duties; 'Interpersonal functioning' included able to respond and relate well to family, friends and groups; 'Social emotional support' included availability of people you can trust and who can offer help and emotional support; 'Community and services support' included pleasant and safe neighbourhood, access to financial, informational and other resources; 'Personal fulfilment' included experiencing a sense of balance, dignity, and solidarity, enjoying sexuality, the arts; 'Spiritual fulfilment' included experiencing faith, religiousness, and transcendence beyond ordinary material life; and 'Global perception of quality of life' included feeling satisfied and happy with your life in general. The total scale was used in this study to measure total wellbeing, with the maximum obtainable score for the total scale was 100, and with higher scores indicated higher wellbeing. The reliability of the Multicultural Quality of Life Index is high with a Cronbach's alpha of 0.92.

4.4.3 Data analysis

Statistical analysis was performed using SPSS version 25 with data exported directly from Survey Monkey. All instruments were scored and analysed according to instrument

developer guidelines. Descriptive statistics including means, frequencies, standard deviations, and percentages were used to summarise the data. For the purposes of this study the social determinants of health included were gender, educational attainment, employment status, income, socioeconomic status, remoteness, social support, housing security, food security and access to healthcare. Inferential statistics including t-test and one-way analysis of variance (ANOVA) using Bonferroni correction were used to assess the differences between wellbeing and the social determinants of health. Pearson's correlations were used to assess the association between the wellbeing and social determinants of health. Variables that were statistically significant within the univariate analyses were then included in a multivariable linear regression to identify the predictors of wellbeing. The variables for inclusion in the multivariable linear regression were gender, education, income, social support, access to healthcare, food security and housing security. The regression model was checked for assumptions of normality, linearity, homoscedasticity, and absence of multicollinearity. The Beta (β) values and the 95% confidence intervals were calculated in the multiple regression analyses. Statistical significance was set at p value less than 0.05. Missing data was not imputed.

4.4.4 Ethics approval and informed consent

Ethics approval to conduct this study was received from the University of Wollongong Human Ethics Committee (2020/306). Written information regarding the aim of study, the voluntary nature of the participation and confidentiality of the handling of the data was provided to the participants electronically as the first page of the online survey. Participants were required to tick a box on the information screen in the online survey to indicate that they agreed to participate in the study.

4.5 Results

4.5.1 Sociodemographic characteristics

A total of 1211 individuals responded to the survey during the nine-week recruitment period. The mean age of the participants was 43 years (SD 14.2 years). Of those who responded, 80.7% (n=938) were female, 16.7% (n=194) were male and 2.6% (n=30) were non-binary or transgender. A total of 63.6% (n = 702) of individuals who responded were employed during the COVID-19 pandemic. (Table 6).

4.5.2 Wellbeing and Social determinants of health

The mean score for total wellbeing was 62.58 (SD 21.22). The mean scores for each of the 10-items of wellbeing were: 'physical wellbeing' 6.23 (SD 2.41), 'psychological wellbeing' 5.46 (SD 2.51), 'self-care and independent functioning' 7.21 (SD 2.53), 'occupational functioning' 7.08 (SD 2.48), 'interpersonal functioning' 6.64 (SD 2.53), social-emotional support' 6.53 (SD 2.67), 'community and services support' 6.78 (SD 2.59), 'personal fulfilment' 5.55 (SD 2.71), 'spiritual fulfilment' 5.47 (SD 2.87) and 'global perception of quality of life' 5.84 (SD 2.56). Housing insecurity was identified in 25.7% (n=311) participants. An annual income of under $49,999 during the pandemic was reported in 32.4% (n=392) of participants. Difficulty in access to healthcare was identified among 58.2% (n=581) of participants. A total of 20.7% (n =240) of participants had completed high school education and 37.7% (n =437) of participants had completed a Bachelor's degree. Unemployment was reported by 29.7% (n= 328) of participants. Poor social support was identified by 37.7% (n=430) of participants and 22% (n = 237) of participants were identified as food insecure. A total of 37.9% (n= 441) participants were identified to be living in locations classified as the two lowest socioeconomic status brackets in Australia.

4.5.3 Associations between wellbeing and social determinants of health

Those with housing security had significantly higher wellbeing scores (67.34, SD 19.4) compared to those with housing insecurity (50.91, SD 21.0) (p < 0.001). Similarly, those with incomes > $50,000 had significantly higher wellbeing scores (66.60, SD 19.3) compared to those with incomes < $49,999 (55.29, SD 22.3) (p < 0.001). Those with easy access to healthcare had significantly higher wellbeing scores (70.85, SD 18.4) compared to those with difficult access to healthcare (56.04, SD 21.1) (p<0.001). Likewise, those with food security had significantly higher wellbeing scores (66.70, SD 19.4) compared with those who are food insecure (48.18, SD 21.0) (p< 0.001). Equally, those employed had significantly higher wellbeing scores (65.10, SD 20.2) compared with those unemployed (56.70, SD 22.3) (p<0.001). With regards to education, those with a postgraduate qualification had significantly higher wellbeing scores (66.20, SD 19.3) compared to those with a vocational qualification (59.49, SD 23.3) (F test 0.007). Participants with strong social support had significantly higher wellbeing scores (76.00, SD 17.5) compared to those with moderate (65.73, SD 17.9) and poor (51.78, SD 21.3) social support (F test 0.001). Additionally, those with moderate social support had significantly higher wellbeing scores than those with poor social support. In respect to gender, men had significantly higher wellbeing scores (64.60, SD 21.7) compared with those who identified as transgender or non-binary (51.23, SD 22.2) (F test 0.011), however there were no significant differences in wellbeing scores between women and men or women and transgender or non-binary genders. There were no statistically significant differences between wellbeing and socioeconomic status (SEIFA) or wellbeing and remoteness (Table 7).

4.5.4 Predictors of wellbeing

Factors including housing, income, access to healthcare, education, employment, social support, gender, and food security, were found to be significant in the univariate analysis and were included in the multivariate analysis. The multiple regression model to predict total wellbeing among Australian adults during the COVID-19 pandemic was significant and accounted for 32.7 % of the variance, R^2 Adj = 0.327, F (7, 963) = 66.832, p = 0.000. The significant predictors of higher wellbeing were housing security (β = 0.166 95% CI 4.96 to 10.42 p = 0.000), food security (β = 0.152 95% CI 4.63 to 10.70 p = 0.000), social support (β = 0.309 95% CI 7.25 to 10.46 p = 0.000) and access to health care (β = 0.183 95% CI 5.47 to 10.22 p = 0.000) (Table 8).

4.6 Discussion

Confronted with the COVID-19 pandemic, national data provides the opportunity to identify vulnerable population groups within Australia that have been impacted by this emerging virus and its association with wellbeing and quality of life. Therefore, this study aimed to explore the relationship between wellbeing and the social determinants of health. Findings from this study suggest that housing security, food security, social support and access to health care are all important social determinants of health predictors of the wellbeing of adult Australians during the COVID-19 pandemic. While not predictors of wellbeing, people with higher incomes, were employed, had postgraduate education, and identified as male were found to have significantly higher wellbeing compared to their counterparts. However, being a cross-sectional study, causal inferences are not able to be drawn from this study.

Efforts to curb the public health impact of COVID-19 within Australia initially focused on reducing hospitalisations, attempting to identify unknown long term health consequences, morbidity and mortality from COVID-19 infections. [295] However, this emerging virus has revealed other serious implications that have impacted populations ranging from financial insecurity and social isolation to access to healthcare and food security. These social determinants of health are vital to maintaining the wellbeing of the population. Results from this study have demonstrated that approximately a third of participants were found to be housing insecure during the COVID-19 pandemic. However, with no evidence of the degree of housing insecurity in the general Australian population prior to the COVID-19 pandemic, it is difficult to ascertain the significance of this result. Despite this, a report by the Australian Housing and Urban Research Institute (AHURI) indicates that the pandemic has exacerbated the housing rental crisis, and increased the demand for social housing, and emergency accommodation.[311] One of the predominant economic challenges of COVID-19 was the ability for people to pay for housing,[312] primarily due to substantial job losses and economic downturn. Housing, as a basic human right and important social determinant of health, can threaten an individual's health and wellbeing particularly when individuals are found to be housing insecure. The results of this study demonstrate this notion with housing insecurity a predictor of poorer wellbeing among participants. This is similar to a study conducted in the United States the found that those with housing instability reported significantly higher levels of mental stress compared to homeowners.[313] Moreover, housing insecurity during a pandemic may mean individuals are homeless or living in temporary accommodation that hinders their ability to comply with any strategies recommended to curb the spread of COVID-19, potentially making them more susceptible to being infected.[312]

Despite Australia being considered a high-income country, the prevalence of food insecurity was identified as 22% in this study, while prior to the pandemic the prevalence of food insecurity within Australia ranged from 5.1% to 10.6%.[314] During the COVID-19 pandemic, food insecurity was more prevalent among Australians and could be due to loss of employment and housing as a result of the lockdown and other public health measures. This aligns with research conducted in the United States that showed that food insecurity in households during the pandemic doubled.[315] While another study indicates that food insecurity within the Unites States prior to the pandemic was approximately 11%, during the pandemic this increased to 38%.[316] Additionally, the results of this study demonstrate that food insecurity is a predictor of poorer wellbeing, indicating that there is a relationship between this social determinant of health and total wellbeing or quality of life. These findings are similar to a study conducted in the United Kingdom (UK) during the pandemic demonstrating that food insecurity increased by 66.7% and was significantly associated with participants with a low income. Additionally, the UK study findings indicate that food insecurity was significantly associated with housing tenure, with those participants renting more likely to experience food security, therefore affecting their wellbeing.[317] However, the findings of our study may not be representative of the entire Australian population due to the study design. Indeed, the findings of this study validate the need for action on social determinants of health not only for the current pandemic, but as a goal for alleviating social and health inequalities into the future.

The economic instability created by the COVID-19 pandemic has created a loss of employment and income. A study conducted in Australia during the pandemic demonstrated a fall of 9.1% in income during the early stages of the pandemic.[318] The results of this study found that approximately one third of participants reported being unemployed and similarly one third had a household income of less than $49,999 during

the COVID-19 pandemic. While this study shows that there was an association between unemployment and poorer wellbeing and low income and poorer wellbeing, these were not found to be predictors of total wellbeing.

As a life-threatening disease, COVID-19 can create significant anxiety and stress within the population. The anxiety and stress are compounded by job loss, food and housing insecurity. Social support has been identified as an important factor to overcome stress and anxiety.[319] However, this study has highlighted that almost 40% of participants had poor social support during the COVID-19 pandemic in Australia. Social support is reported in the literature to have the ability to increase resilience and strengthen internal resources.[320] Therefore, a lack of social support will inhibit an individual's ability to cope during the pandemic. The OSSO-3 social support scale used in this study is recommended for population-based surveys and measured participants ability to receive practical and instrumental support from others, emotional support from others and the number of people they have access to for support. The findings of this study demonstrated that poor social support was a predictor of poorer wellbeing. Comparably, a population-based study conducted in Austria showed that participants with higher levels of social support during the pandemic was associated with higher wellbeing.[321] The findings of our study indicate that there may be an increased need for psychological services both short and long term to combat the impact of the pandemic on individuals with poor social support. Moreover, consideration of alternate ways of managing lockdowns and isolation enabling the meeting of both social and disease prevention objectives. Allowing individuals time and opportunity to rearrange their living situations prior to imposing lockdowns to counter the negative impacts of a loss of social support and isolation.

Often the neglected social determinant of health, having access to healthcare is central to reducing health inequalities. Results from this study demonstrate that almost 60% of

participants had difficulty accessing healthcare during the pandemic, this could be a result of geographical location, an inability to afford health care associated costs, or increased need for health care services such as mental health. Prior to COVID-19, the evidence on the prevalence of difficulty accessing healthcare in Australia is limited and varies, with one study in 2018 reporting 21% of Australians experienced two or more barriers to accessing primary health care. While data from the Australian Institute of Health and Welfare (AIHW) from 2016-2017 indicates 7.6% of the Australian population reports barriers to access to healthcare including consultation with a medical specialist or General Practitioner (GP) and medical imaging and pathology tests.[322] Access to healthcare, as a self-rated measure in this study, was targeted at affordability issues and general access barriers to primary healthcare, and not a measure of urgency of health need. Despite Australia having a universal health insurance scheme, Medicare, which aims to provide access to a range of health services at little or no cost, equitable access to healthcare for many Australians is lacking.[323] Some general practices can charge upfront payments declining the use of bulk billing, which may result in some Australians not being able to attend due to affordability. Dentistry and some allied health services are not covered under Medicare, therefore only accessible to those privately insured or those from wealthy areas.[318] This study has identified that there were affordability issues related to access to healthcare during the pandemic, however this maybe an existing social determinant of health prior to the pandemic or it could indicate an exacerbation of this social determinant during the pandemic. In response to the COVID-19 pandemic, the Australian Government injected funds into the telehealth scheme, previously limited to rural and remote communities, to enable access to healthcare.[324] However, the literature indicates that Australians experienced challenges and barriers to the use of the telehealth service including communication and expressing themselves as well as not being available to

have a physical consultation.[325] Indeed, this study reveals that Australians with difficult access to health care have poorer wellbeing compared to those with easy access to healthcare, with this being a measure of affordability to access health care. These findings highlight the unequal distribution of power and resources and emphasise the need to address the social determinants of health more than ever before.

While the pandemic has demonstrated a continued impact of the social determinants of health on the population's wellbeing, it has also highlighted the need for government and non-government organisations (NGOs) to address these social and health disparities. Using the evidence that already exists on social determinants in addition to the newly created evidence from the global experience of the pandemic, policymakers and governments can use this as guidance to make investments to mitigate social and health inequalities. Such measures would be to design and implement policies to alleviate housing stress and instability, increasing the number of social housing facilities and affordable housing options. Regarding access to healthcare, effective mental health coverage is required not just immediately but for the longer term. Furthermore, governments need to strengthen access to public healthcare by increasing the availability of resources particularly to those with limited resources to access. Improving employment conditions, such as benefits for those casually employed or mandating against long term casual workforce and rising the social government support benefits and payments, as well as basic income support programs should be adopted to address income and employment issues that exacerbate social and health inequalities. Addressing income and employment issues will also assist in tackling the food security problems that have been identified in this study. Finally, the government, policymakers and NGOs need to take responsibility for innovating social protection strategies and policies to protect the population now and into the future and such strategies must be sustainable. The first step in this process is to

revitalise the agenda on the United Nations (UNs) Sustainable Development Goals (SDGs), which recognise that ending poverty and other disparities are central to improved health, wellbeing, and equality. Bipartisan agreement to consider the social determinants of health within all policies and throughout the policy process is required, however without the identification of social determinants of health as an issue that needs addressing, this is will not be part of a political agenda. Critical to achieving policy action on the social determinants of health is through inter-organisational and intersectoral collaborations. Government agencies need to work in partnership to coordinate policy action on the social determinants of health, this could be achieved through a cross government agency. Increasing awareness of the need to address the social determinants of health is critical, public health professionals and researchers are key to this approach and can be fundamental resources for all levels of government and policymakers. It is expected that key findings from this study will be disseminated broadly to decision-makers and other stakeholders to ensure action on the social determinants of health. The evidence could also be used to inform public health interventions aimed at community connectedness which will function as a useful measure to address the poor social support issues that have been identified in this study.

4.6.1 Strengths and limitations

This national study offers a wealth of information to identify the impacts of the COVID-19 pandemic on the Australian population. A key strength of this study is that it highlights the social determinants of health and the relationship with wellbeing. It is also important to acknowledge the limitations of this study. Firstly, it must be noted that females are over-represented in this study and ethnicity is not representative of the Australian population. Strategies that could be used in future research to ensure all genders are represented would be to receive input from community partners to encourage recruitment

from event specific transgender gatherings; specifically targeting men's groups through social media; and adjusting the Facebook paid recruitment campaign to target men only. While social media was used as the recruitment modality for this study, it must be recognised as a limitation, especially for those who do not have social media accounts. While there is often debate over the digital divide, 91% of Australians have access to the internet. However, using an online approach to recruit into this study is a limitation especially for those who lack access to technology and have low digital literacy. This potential digital fracture could be minimised by using a hybrid approach of online and telephone or mailed surveys. Moreover, there is a potential that responses may have been limited to individuals who viewed the pandemic as a threat to public health and hence more willing to respond and may over-represent those with access to online data and devices. The data was collected using an online self-administered survey which is known to be subject to responder bias. Additionally, due the study design, cross-sectional study, using a one-time measurement, makes it difficult to infer a causal relationship and is therefore a limitation of this study.

4.7 Conclusion

While there is still much to learn about COVID-19, this study has highlighted the social determinants of health that have impacted the Australian population's wellbeing during the COVID-19 pandemic. The social determinants of health, housing insecurity, food insecurity, difficult access to health care, poor social support are all predictors of poorer wellbeing among Australian adults during the pandemic. The COVID-19 pandemic is likely to remain a threat, not only to population health long term but also to individuals' wellbeing. Importantly, further research on the long-term impacts of the pandemic on social determinants of health need to be conducted. This study has highlighted once again

the need to tackle the social determinants of health that contribute to social and health inequalities, particularly in terms of housing and food security as well as access to health care. The findings from this study also provide important insights into the social vulnerabilities that have been worsened as a consequence of the pandemic. However, further research using a longitudinal study design will be able to identify the impact of COVID-19 on wellbeing and social determinants of health over time. Addressing social determinants of health needs to become a priority for policymakers and governments and requires modifying the systemic and structural barriers that are central causal factors. These can be achieved through provision of social housing, further action on ensuring housing affordability, access to food subsidies including food vouchers and community connectedness programs. Without this, social and health inequalities will widen.

Table 6: Sociodemographic characteristics

Sociodemographic characteristics[*]	Frequency (%)	Australian population[#] (%)
Age		
18-24	118 (9.7)	-
25-39	413 (34.1)	-
40-59	464 (38.3)	-
60-74	135 (11.1)	-
75+	7 (0.6)	-
Missing	*74*	
Gender		
Woman	938 (80.7)	-
Man	194 (16.7)	-
Transgender/non-binary	30 (2.6)	-
Missing	*44*	
Income (during COVID-19)		
Under $15000	125 (11.6)	-
$15000 - $29999	145 (13.4)	-
$30000 - $49999	122 (11.3)	-
$50000 - $74999	162 (15.0)	-
$75000 - $99999	151 (14.0)	-
$100000 - $150000	192 (17.8)	-
Over $150000	183 (16.9)	-
Missing	*131*	
Education		
Completed years 7 to 12 high school	240 (20.7)	-
Vocational	253 (21.8)	-
Bachelors	437 (37.7)	-
Postgraduate	230 (19.8)	-
Missing	*51*	
Employment (during COVID-19)		
Employed	776 (70.3)	72.2
Unemployed	328 (29.7)	27.8
Missing	*107*	
Living status		
Alone	178 (16.6)	-
Friends	24 (2.2)	-
Family/partner	813 (75.6)	-
Share house	55 (5.1)	-
Emergency/temporary/homeless	5 (0.4)	-
Missing	*136*	

Sociodemographic characteristics[*]	Frequency (%)	Australian population[#] (%)
Socioeconomic status		
Lowest (most disadvantaged)	157 (13.8)	20
Low	252 (22.1)	20
Middle	210 (18.4)	20
High	193 (16.9)	20
Highest (most advantaged)	328 (28.8)	20
Missing	71	

[*]Missing Data [#]Australian Bureau of Statistics Data

Table 7: Associations between social determinants of health and wellbeing

	Total wellbeing Mean (SD)	P value
Housing		
Secure	67.34 (19.4)	<0.001
Insecure	50.91 (21.0)	
Income		
< $15,000 to $49,999	55.29 (22.3)	<0.001
$50,000 +	66.60 (19.3)	
Access to healthcare		
Easy access	70.85 (18.4)	<0.001
Difficult access	56.04 (21.1)	
Food security		
Food secure	66.70 (19.4)	<0.001
Food insecure	48.18 (21.0)	
Employment		
Unemployed	56.70 (22.3)	<0.001
Employed	65.10 (20.2)	
	Mean (SD)	**F test**
Education		
High school (years 7 – 12)	61.41 (21.3)	
Vocational♦	59.49 (23.3)	0.007
Bachelor's degree	63.13 (20.5)	
Postgraduate♦	66.20 (19.3)	
Social support		
Poor♥	51.78 (21.3)	
Moderate♥	65.73 (17.9)	<0.001
Strong♥	76.00 (17.5)	
Gender		
Woman	62.52 (20.9)	
Man[#]	64.60 (21.7)	0.011
Transgender or Non-binary[#]	51.23 (22.2)	
Socioeconomic status		

	Total wellbeing	
	Mean (SD)	**P value**
Lowest	63.94 (22.1)	
Low	60.09 (22.8)	
Middle	62.97 (19.9)	0.305
High	63.08 (20.9)	
Highest	63.68 (20.2)	
Remoteness		
Major cities	63.02 (20.1)	
Inner regional	62.01 (23.5)	
Outer regional	62.78 (21.3)	0.881
Remote	58.42 (24.3)	
Very remote	62.37 (21.2)	

♦Significance between these 2 variables; ♥Significance is between these 3 variables; #Significance is between these 2 variables

Table 8: Predictors of wellbeing

	Unstandardized coefficients		95.0% Confidence interval for ß	
Model	ß	Sig.	Lower bound	Upper bound
Total wellbeing				
Constant	26.49	0.00	20.03	32.96
Gender	1.15	0.35	-1.24	3.55
Education	0.35	0.54	-0.76	1.45
Income	2.34	0.07	-0.19	4.86
Social support	8.85	0.00	7.25	10.46
Access to health care	7.84	0.00	5.47	10.22
Food security	7.66	0.00	4.63	10.70
Housing security	7.70	0.00	4.96	10.43

Chapter 5: Economic Wellbeing

5.1 Chapter introduction

This chapter presents Publication 4, 'Association between economic wellbeing and ethnicity, socioeconomic status, and remoteness during the COVID-19 pandemic'. The publication addresses research question 3: How has the COVID-19 pandemic impacted on the financial and economic wellbeing of adult populations in Australia across socioeconomic areas? Permission to include the publication in the thesis has been granted by John Wiley & Sons. The full text publication and permissions are in Appendix 8. This paper was published in Public Health Nursing (Impact Factor – 1.770) as:

Green H, MacPhail C, Alananzeh I, Fernandez R. Association between economic wellbeing and ethnicity, socioeconomic status, and remoteness during the COVID-19 pandemic. Public Health Nursing. 2022 Jun 17. https://doi.org/10.1111/phn.13107

5.2 Abstract

Objective: The aim of this study is to explore the association between the economic wellbeing and ethnicity, socioeconomic status, and remoteness during the COVID-19 pandemic.

Design: A cross-sectional study via SurveyMonkey was conducted in Australia between August 2020 – October 2020. Descriptive and inferential statistics were used to analyse the data.

Results: A total of 1,211 individuals responded to the survey. Income loss was significantly associated with those from low socioeconomic status (OR = 1.65; 95% CI 1.01–2.68). Access of superannuation was significantly associated with those in outer regional (OR = 3.61; 95% CI 0.81-16.03) and low socioeconomic status (OR = 2.72; 95% CI 1.34-5.53). Financial inability to pay for services was significantly associated with

living in remote areas (OR = 2.26; 95% CI 0.88-5.80). **Conclusions:** The economic wellbeing of people who identify as Aboriginal and Torres Strait Islander, live in regional or remote areas, and reside in low socioeconomic areas have been substantially impacted during the pandemic. Findings call for policies to address the underlying social determinants of health.

Keywords: Social determinants of health; Sustainable development goals; Economic wellbeing; Pandemic; Health disparities; COVID-19

5.3 Introduction

As the public health burden of COVID-19 and its numerous variants, spreads globally, countries continue to implement public health measures to suppress transmission.[326] In addition to health and medical actions such as symptomatic and comprehensive testing, contact tracing and treating infected individuals, measures to alleviate the spread of COVID-19 have included restrictions on human mobility, often referred to as 'lockdown', quarantining, social distancing, and cancellation of large-scale gatherings.[327, 328] The aim of this study is to explore the association between economic wellbeing and ethnicity, socioeconomic status, and remoteness in adults during the COVID-19 pandemic.

In Australia, the government, under the direction of the Australian Health Protection Principal Committee (AHPPC), designed various strategies and directives to manage the pandemic, including guidelines on the protective behaviours that should be adopted by the general population.[329] Border controls, travel restrictions and a national lockdown were all public health measures that were imposed by 25 March 2020 within Australia, and necessitated the closure of many businesses, and encouragement of individuals to work from home where possible.

While public health measures such as lockdown have shown to be effective at slowing the spread of infectious diseases, they do have implications for many aspects of individuals' daily lives.[330] Population groups that have lost employment, are unable to work from home and are living in poverty experience unequal impacts. As financial support provided by the government has been described as an economic abandonment, limiting an individual's ability to pay rent, purchase food and meet utility bills.[331, 332] Indeed, the literature shows that in the early stages of the COVID-19 pandemic there were disparities between different population groups, with those from certain minority ethnic

groups, low-income earners and those living in the lowest socioeconomic status areas most affected.[333] The resultant social, economic, and psychological impacts of the restrictions imposed during COVID-19 have magnified existing health and social inequalities. The economic consequences of lockdowns to contain infectious diseases are well known. As a consequence of lockdown measures due to COVID-19, job losses in the United States (US) reached record levels in April 2020 with the unemployment rate increasing to 14.7% and with some evidence suggesting it rose as high as 20%.[334] During the Severe Acute Respiratory Syndrome (SARS) outbreak in 2003, the majority of the cases occurred within South East Asia and Canada.[335] Evidence in the literature highlights the significant economic impact that SARS had in these countries with businesses closed and tourism non-existent. As a result, people employed in tourism, retail and hospitality sectors were most affected financially, through bankruptcy and job losses.[335] Literature has also shown the detrimental effects of infectious disease outbreaks on household incomes.[336] During the Ebola outbreak, the economic effects were vast with income losses in Sierra Leone reaching 30% and 35% in Liberia.[336]

Throughout the US, minority ethnic population groups have particularly experienced the negative economic impacts of the COVID-19 pandemic. Those who identify as Asian, Hispanic and Black American have been demonstrated to be at higher risk of job and income loss and are often employed in roles that do not lend themselves to work from home arrangements.[337] In contrast, there is a scarcity of evidence of the economic impacts on ethnic groups within Australia. However, a study conducted in western Sydney identified that unemployed culturally and linguistically diverse populations were perceived to experience a significantly higher impact of the COVID-19 pandemic.[338] Australia is an ethnically diverse nation, with the 2016 Australian census data revealing that while England was the most common birthplace following Australia,[339] there has

been a steady increase in the proportion of migrants from China, India and the Middle East.[339] Aboriginal and Torres Strait Islander people accounted for 2.8% of the Australian population in 2016 and have a much younger age profile than non-indigenous Australians, with a mean age of 23 years compared to 38 years for non-Indigenous Australians.[340]

The impact of the COVID-19 pandemic on individuals is affected by their experience of the social determinants of health. Health inequalities stem from the underlying social determinants of health, which are defined as *"the circumstances in which people grow, live, work, and age, and the systems put in place to deal with illness. The conditions in which people live and die are, in turn, shaped by political, social, and economic forces*".[47] This leads to what is often referred to as the social gradient, whereby those who are most disadvantaged are inclined to have the worst health.[48] Those higher on the social gradient have greater access to food, housing, higher incomes, more employment opportunities, and access to health care. These social determinants of health can serve as a protective factor against illness and chronic disease. In contrast, those lower on the social gradient have limited resources and hence at greater risk of poorer health outcomes.[341] When considered in the context of COVID-19, these individuals are most vulnerable to the social and economic effects of the pandemic. Social determinants of health can also impact on individuals' wellbeing (physical, emotional, spiritual and psychological wellbeing), including their economic or financial wellbeing.[29] With the rise in focus on the social determinants of health and being a key strategy in prevention and treatment of disease, public health professionals including nurses, are ideally situated to promote equity through health promotion initiatives, educational programs and targeted interventions.[342]

In Australia, the government responded to the potential economic impact of the pandemic by introducing financial support packages to secure employment, support business and

mitigate loss of income.[343] One such measure under this support package was to allow individuals to access up to $20,000 AUD from their superannuation.[344] In Australia, superannuation is a compulsory privately funded retirement income scheme, whereby employers are obliged to make a compulsory contribution to all employees' superannuation schemes.[345] Additionally, in response to the rapid closure of many businesses during the lockdown, the Australian government introduced a financial support package called 'Job Keeper'. Job Keeper was a payment to provide income support, paid to businesses and not for profit organisations of $1,500 AUD per fortnight to cover the cost of employee wages. Designed to support business and preserve employment, Job Keeper was initially implemented from 30 March to 27 September 2020, with a second phase initiated from 28 September 2020 to 28 March 2021 with payment tapering over this period.[346] However, it is important to note that Job Keeper was not available across all economic sectors and through all employers.

While coordinating this population wide economic response may be effective for some, the influence nationally may not be equitable. This may especially be the case for individuals who live in regional and remote areas, those who reside in lower socioeconomic areas and certain ethnic groups. Additionally, as Australia has not previously experienced an infectious disease outbreak of this magnitude in the 21st century, it is timely to investigate the impact.

5.4 Methods

5.4.1 Study design

This study is part of a larger mixed methods study consisting of both a cross-sectional survey and qualitative interviews, therefore the results of this study are reported in several

papers. This study uses the World Health Organization's (WHO) Commission on Social Determinants of Health (CSDH) as the theoretical foundation.[47] The structural determinants of health used in this study are income, employment, ethnicity, socio-economic status and remoteness. The intermediary determinants, or the downstream factors that shape health, used in this study are psychosocial circumstances including stressors and material circumstances such as financial means to buy food and pay for housing.[47] This paper is reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

5.4.2 Study setting and participants

A cross-sectional national study using an online method via SurveyMonkey was conducted between August 2020 – October 2020. Adults aged 18 years and over, with the ability to read English and residing in any State or Territory within Australia were recruited into the study using social media. Two methods within social media were used: (1) the no-cost option, which included the first author joining existing community noticeboard groups within Facebook; and (2) the paid option, which included placing an advertisement on Facebook and Instagram. In both options, a study image with a link to the survey was placed. With the paid option, the study image and link were sent to target specific groups within Facebook and Instagram. A comprehensive description of the recruitment process has been published elsewhere.[308] Sample size calculation was derived by using the Australian estimated population of 25,499,844, using a 95% confidence level and a 3% margin of error, the sample size required for this study was 1067 participants.[235]

5.4.3 Data collection

Data were collected using SurveyMonkey, the first page of the survey included a participant information sheet, and participants were instructed to click the 'yes' box if

they agreed to participate in the survey and to indicate they had read the study information. Data were collected on participants' demographics (age, gender, ethnicity, postcodes), employment status both before and during the COVID-19 pandemic, income before and during the COVID-19 pandemic, access to superannuation, and financial inability to pay for services during the COVID-19 pandemic.

Employment status was assessed using investigator developed questions to indicate participants' employment before and during the pandemic, with seven options in the before question of 'fulltime', 'part-time', 'casual', 'retired', 'homemaker', 'unemployed' and 'student' and nine options in the during question – the same seven options in the before with the addition of 'JobKeeper' and 'Leave without pay'. These questions were then recoded to be dichotomous (employed or not employed).

Income was assessed using investigator developed questions to nominate participants' annual income before and during the pandemic, with seven income brackets. These income brackets were under $15,000; between $15,000 and $29,999; between $30,000 and $49,999; between $50,000 and $74,999; between $75,000 and $99,999; between $100,000 and $150,000; and over $150,000.

Access to superannuation was measured using an investigator developed question eliciting a dichotomous yes or no response. Financial inability to pay for services was assessed using a 3 -item investigator developed tool during the COVID-19 pandemic…'I worried whether I could pay my electricity, gas or water bills', 'I worried that I may not have access to the internet because I had no money to pay the bill', and 'I worried whether I was able to get to the supermarket, doctors, pharmacy or work because I had no money to pay for transport'. Each item was rated on a 4-point Likert scale (1 = "I don't know", 2 = "never true", 3 = "sometimes true" and 4 = "often true"). The 3-items were then

recoded to be dichotomous (0 = "I don't know" and "never true" and 1= "sometimes true" and "often true") with higher scores indicating more financial inability to pay for services.

Postcodes were used to indicate socioeconomic status based on the Australian Bureau of Statistics (ABS) and the Socio-Economic Indexes for Areas (SEIFA) and remoteness configuration using the ABS Accessibility and Remoteness Index of Australia (ARIA+). SEIFA was developed by the Australian Bureau of Statistics and is a summary measure of the various social and economic circumstances of suburbs and postcodes within Australia and are measured using a set of variables including income, education, occupation, and access to material and social resources.[342] The survey took 10-20 minutes to complete, and participants were invited to enter a draw to win one of ten $50 shopping gift cards. Ethics approval to conduct the study was received from University of Wollongong Human Research and Ethics Committee approval number 2020/306.

5.4.4 Statistical analysis

Data were directly exported from SurveyMonkey into SPSS version 25 to perform statistical analysis. In the context of this analysis, the relevant social determinants of health were socioeconomic status using SEIFA, ethnicity, and remoteness. Economic wellbeing was measured by employment loss, income loss, access to superannuation and financial inability to pay for services. Descriptive statistics including frequencies and percentages were used to summarise the data. Cross-tabulations were used to compare economic wellbeing and social determinants of health. Binary logistic regression was conducted to examine the social determinants of health associated with economic wellbeing, which is employment loss, income loss, access to superannuation and financial ability to pay for services. Assumptions of logistic regression were verified including, the dependant variable being ordinal, independence of observations and lack of

multicollinearity between the independent variables. Statistical significance was set at p < 0.05. Due to missing data accounting for only 5%, missing data was not imputed.

5.5 Results

In total, 1,211 participants responded to the survey, with non-responders accounting for 5% of missing data. Most of the participants were female 938 (80.7%) and the age range of the participants was between 18-90 years. Ethnicity was reflective of the Australian population with 53% (n=608), identifying as Caucasian (Australian, Canadian, American, New Zealander) (Table 9).

5.5.1 Employment loss

Overall, 13.7% (n=150) of all participants reported a loss of employment during the pandemic. Of these, the highest loss in major cities 55% (n=82). Participants in the low socioeconomic status reported the highest employment loss during the COVID-19 pandemic with 26.7% (n=40). Among ethnic groups, Caucasian and European participants reported the highest employment loss of 57.3% (n=86), and 26.7% (n=13) respectively. (Table 10)

5.5.2 Income loss

Income loss among all participants during the pandemic was 24.1% (n=260). Of these, income loss in major cities was 57.7% (n=150), inner regional areas was 26.5% (n=69), outer Within the socioeconomic status category, income loss was highest among those in the low socioeconomic status with 23.8% (n=62). Among the ethnic groups, income loss 56.9% (n=148) for Caucasians and 25.4% for Europeans. (Table 10)

5.5.3 Access to superannuation

Overall, 11.9% (n=142) of all participants accessed their superannuation during the pandemic, of these the majority were from major cities 50% (n=71). Within the socioeconomic status category, the highest access to superannuation during the pandemic came from participants in the low socioeconomic status 35.2% (n=50). Among the ethnic groups, the superannuation was accessed the highest from Caucasian 54.2% (n=77) and European 24.6% (n=35) participants.

5.5.4 Financial inability to pay for services

A total of 24.9% (n=265) of all participants reported concerns over meeting their financial commitments during the pandemic. Financial inability to pay for services was highest in major cities (55.9%, n=148). Within the socioeconomic status category, concerns about financial inability to pay for services during the pandemic was highest among those who lived in the low socioeconomic status (25.3%, n= 67). Among the ethnic groups, concern about financial inability to pay for services was highest among Caucasian participants (58.1%, n=154) (Table 10).

5.5.5 Association between the economic wellbeing and ethnicity, socioeconomic status, and remoteness

During the COVID-19 pandemic those who identified as Caucasian (OR = 0.49; 95% CI 0.27, 0.90), or other (OR = 0.40; 95% CI 0.19, 0.88) had significantly higher odds of not losing income compared to Europeans. Those in the low socioeconomic status category (OR = 1.65; 95% CI 1.01, 2.68) and those in the high socioeconomic status category (OR = 1.63; 95% CI 1.06, 2.51) had significantly higher odds of experiencing an income loss during the COVID-19 pandemic compared to those in the highest socioeconomic areas.

Access to superannuation during the COVID-19 pandemic was associated with a significantly higher odds of living in outer regional areas (OR = 3.6; 95% CI 0.81, 16.03) compared to those living in major cities. Living in outer regional areas, middle socioeconomic status category (OR = 3.55; 95% CI 1.87, 6.73), and a high socioeconomic status category (OR = 3.42; 95% CI 1.82, 6.42) were associated with a significantly higher odds of accessing superannuation during the COVID-19 pandemic. Financial inability to pay for services was associated with significantly higher odds of living in remote areas (OR = 2.26; 95% CI 0.88, 5.80) compared to major cities (Table 11).

5.6 Discussion

Despite the COVID-19 pandemic being initially labelled as the great equaliser, the social and economic impacts are unequally felt. The results of this study have demonstrated that employment loss was most likely to occur among those residing in regional and remote areas, among those within the middle socioeconomic status group and in individuals who ethnically identify as Caucasian or Asian. Moreover, income loss was highest in individuals who were from remote and inner regional areas, and from the low socioeconomic status category. Those who identified as Caucasian were most likely not to lose income during the pandemic. Furthermore, the results demonstrate that individuals who accessed their superannuation during the COVID-19 pandemic were most represented by those who lived in remote areas, resided in the low socioeconomic areas, and ethnically identified as Aboriginal or Torres Strait Islander. Finally, Australians who had concerns about the financial inability to pay for services during the COVID-19 pandemic were individuals who lived in outer regional and remote areas, were from low and middle socioeconomic areas and identified as Aboriginal and Torres Strait Islander.

Overall, employment loss during the pandemic in this study was 13.7% and is comparable to research conducted in the US with employment loss reported as 15%.[347] Similarly, a study exploring employment loss in the European Union found this to be 17%.[348] The results of this study demonstrate that employment loss was more prevalent in outer regional and remote areas, with one suggested reason for this prevalence being that most individuals within these areas are employed in jobs that cannot be conducted from home. Additionally, individuals who reside in regional areas of Australia are also less likely to have completed high school (76%) compared to those in major cities (92.1%),[349] with this having a significant effect on obtaining secure employment. Overall, employment rates in regional Australia are worse than major cities, while the population in some regional areas continues to grow, particularly attracting immigrants as the proportion of the population born overseas is higher in regional Australia than in major cities.[350] This reflects the Australian government refugee policy to focus resettlement of refugee populations within regional and rural Australia,[351] however reveals the lack of government policy to provide a safety net for migrants and refugees experiencing large scale negative events such as a pandemic. This aligns with the findings of this study that demonstrates employment loss associated with regional areas when compared to major cities, and that migrant and refugee populations are therefore more vulnerable to economic challenges. This is an important insight for public health nurses' who care for individuals from regional and rural areas who will be central to identifying disparities and committed to the health of vulnerable populations. Precarious employment and population growth within regional Australia, especially among migrant and refugee populations, calls for policy change and action to address and generate long term employment options.

Despite the Australian government implementing the Job Keeper payment, overall income loss was found to be high with approximately a quarter of Australians in this study reporting an income loss during the pandemic. Similarly, a study in the US indicated that a third of individuals lost their income during the pandemic.[347] Reported levels of income loss could be related to Job Keeper not matching an individual's pre-pandemic income levels,[352, 353] which would specifically be the case for individuals in high income areas or with higher paid employment. Moreover, Job Keeper was not provided to every sector or industry with some, such as higher education, excluded from this economic package.[354] The findings of this study indicate that there is a significant association between income loss and residing in low or high socioeconomic areas compared to those living in the highest socioeconomic areas, with people in low socioeconomic areas and those casually employed likely to be impacted more by income loss. Whereas for those who live in the high socioeconomic areas of Australia, income loss may be attributed to compulsory reductions in wages as occurred in the university sector or business owners who lost income due to lockdown and business closure. The aim of the Job Keeper payment was to provide a wage subsidy to assist businesses, with employers being paid to help retain their employees, however there were inherent flaws with this payment scheme.[355] Firstly, a business had to demonstrate a turnover loss of 30% in comparison to 2019, this relied on the assumption that the business was in operation in 2019.[356] Additionally, the scheme did not apply to temporary migrant workers, including individuals from New Zealand. It also was paid to employers to pass onto their employees, with anecdotal evidence suggesting that some business employers profited from this payment.[353] Moreover, not all sectors could benefit from this scheme, such as the university sector despite staff having compulsory wages reduction.[357] For many individuals who were self-employed, such as those in the music industry, a 30% turnover loss was difficult to demonstrate.[352]

While the Job keeper scheme injected a mass of public funds, this payment ceased as of 28 March 2021,[353] despite the pandemic and lockdown measures continuing. Job Keeper has only supported the economic wellbeing of Australians in the short term. However, there is an ongoing need to ensure social cash transfers are adequate and keep up with the rate of inflation as these are vital to ensuring Australians do not continue to live in poverty. Such an approach needs to be targeted and measured.

Superannuation is a compulsory payment made by an employer on behalf of the employee for their retirement and only accessible to the employee at retirement or in specific circumstances.[345] During the COVID-19 pandemic, the Australian government allowed Australians to temporarily access their superannuation savings if they were in financial distress.[344] The results of this study revealed that 11.9% of Australians accessed their superannuation during the pandemic. Accessing superannuation was associated with individuals living in outer regional areas and was more prevalent among those who identify as Aboriginal and Torres Strait Islander. It is important to note that while some Australians did access their superannuation, this is dependent upon having any superannuation available, and is therefore not available to everyone. Accessing superannuation for individuals may also be associated with income loss, with 26.5% of those living in outer regional areas reporting income loss during the pandemic. Indeed, the Australian superannuation scheme is inadequate and inequitable, particularly for women.[358] Periods of unemployment, low wages, and time out of the workforce due to illness or caring roles affect the capacity of Australians, especially women, to achieve sufficient superannuation funds.[359] While the Australian government addressed the immediate needs of individuals during COVID-19, this was at the expense of financial security at a later stage in their lives. A well-structured policy and financial package are critical to the sustainability of a healthy society.

Along with employment and income loss, many Australians had concerns about meeting their financial commitments during the pandemic. The results of this study found that a quarter of Australians had concerns about the financial stability to pay for services during the pandemic, which is similar to a study in the US that reported 27% of individuals in the US frequently worried about paying their bills.[360] Concerns about financial inability to pay for services were more prevalent among individuals who identify as Aboriginal and Torres Strait Islander and associated with those who live in remote areas. Although not statistically significant, Aboriginal and Torres Strait Islanders had a higher odds of employment loss during the pandemic which may have resulted in their inability to pay for bills during the pandemic. Recognising and taking policy action to increase emergency funding for bill relief specifically for Aboriginal and Torres Strait Islander people and those who live in remote areas, is imperative to address health inequalities. In Australia, with a lifetime of disempowerment and segregation, the gap between Aboriginal and Torres Strait Islanders and non-Indigenous populations is well established, with a life expectancy of 20 years less than other Australians.[361] The forcible removal of Aboriginal and Torres Strait Islander children from their families, referred to as the Stolen Generation, continue to leave an impact of intergenerational trauma on Aboriginal and Torres Strait Islander families.[362] Such trauma leads to disruptions in health and ability for economic participation.[362] Regarding education, 38% fewer Aboriginal and Torres Strait Islanders complete schooling and the employment rate is 24% lower than non-Indigenous Australians,[361] thus making Aboriginal and Torres Strait Islander Australians potentially more vulnerable to the economic shocks of the COVID-19 pandemic. Additionally, Aboriginal and Torres Strait Islander people are in higher concentration within remote areas of Australia, comprising of 15% and 49% of remote and very remote populations respectively.[359] Therefore, the association with the financial

inability to pay for services and remoteness and the Aboriginal and Torres Strait Islander population is mediating. Furthermore, although not found to be statistically significant, those individuals who resided in remote areas of Australia during the pandemic were found to have higher odds of employment loss compared to those in major cities, which in turn may be the contributing factor to financial concerns during the pandemic.

5.7 Implications for public health and future research

With COVID-19 disturbing the economic framework of Australian society, it is now more necessary than ever that Australian emerges as a more healthy and equitable nation. Indeed, the findings of this study indicate that COVID-19 has presented an opportunity to join in solidarity and have a renewed approach to the implementation of the United Nations (UN) Sustainable Development Goals (SDGs). Addressing the social determinants of health in all policies will ensure social and health disparities do not continue to widen. Public health professionals, including nurses, need to focus on the social determinants of health, becoming involved in health promotion strategies, lobbying governments, educating policymakers and promoting health and social equity through interdisciplinary collaboration and community partnerships. A commitment to addressing the economic wellbeing of Australians and disparities starts with increasing income support payments, employment securities with a less casual workforce, recognition of Aboriginal and Torres Strait Islanders and their leadership, partnering with communities and investment in social infrastructure. Further large-scale research is required to understand the long-term implications of the COVID-19 pandemic on economic wellbeing and the social determinants of health.

5.8 Limitations

While this study employed robust methods, it is important to acknowledge some limitations. A potential limitation and cause of recruitment bias may be the method used to recruit participants into this survey, as not all Australians have access to the internet or social media accounts, including the elderly and those financial insecure who went without the internet during the pandemic. However, according to the Australian and Communications Authority 91% of Australians have access to the internet,[213] demonstrating a high rate of accessibility. Recruitment via social media is also in keeping with a method that is most suitable for the lockdown periods in Australia during the pandemic and keeping within the budget constraints of the study. Additionally, online self-administered surveys are known to produce responder bias. This study also displays a gender bias with more participants identifying as female responding to the survey, this can also be said of ethnicity, with more participants who were Caucasian responding. Moreover, participants who felt impacted by the pandemic or perceived it as a threat may have been more inclined to respond.

5.9 Conclusion

This study has demonstrated that the economic wellbeing of people who live in regional or remote areas, in low socioeconomic areas and who are Aboriginal and Torres Strait Islander people have been impacted during the pandemic. Along with high rates of employment and income loss, having accessed superannuation and financial instability during the pandemic will have long lasted effects on these populations groups and potentially widen social and health inequalities. Such disparities between population groups, call for policies to address the underlying social determinants of health, which can be achieved through renewed action of the UNs Sustainable Development Goals.

Table 9: Demographic table

Demographics	Frequency (%)
Age	
18-24	118 (9.7)
25-39	413 (34.1)
40-59	464 (38.3)
60-74	135 (11.1)
75+	7 (0.6)
Gender	
Woman	938 (80.7)
Man	194 (16.7)
Transgender/non-binary	30 (2.6)
Socioeconomic status	
Lowest (most disadvantaged)	157 (13.8)
Low	252 (22.1)
Middle	210 (18.4)
High	193 (16.9)
Highest (most advantaged)	328 (28.8)
Remoteness	
Major cities	709 (62.1)
Inner regional	256 (22.4)
Outer regional	112 (9.8)
Remote	20 (1.8)
Very remote	45 (3.9)
Ethnicity	
European	332 (28.9)
Caucasian	608 (53.0)
Aboriginal	34 (3.0)
Asian	98 (8.5)
Others	75 (6.5)

Table 10: The relationship between economic wellbeing and remoteness, socio-economic status, and ethnicity

	Employment loss (n=150) N (%)	Income loss (n =260) N (%)	Access to super (n=142) N (%)	Financial inability to pay for services (n=265) N (%)
Economic Wellbeing				
Remoteness				
Major cities	82 (55.0)	150 (57.7)	71 (50.0)	148 (55.9)
Inner regional	44 (29.0)	69 (26.5)	44 (31.0)	68 (25.6)
Outer regional	18 (12.0)	27 (10.4)	20 (14.0)	38 (14.3)
Remote	3 (2.0)	5 (1.9)	5 (3.5)	3 (1.1)
Very remote	3 (2.0)	9 (3.5)	2 (1.5)	8 (3.1)
Socio-economic status				
Lowest	19 (12.7)	43 (16.5)	21 (14.8)	35 (13.2)
Low	40 (26.7)	62 (23.8)	50 (35.2)	67 (25.3)
Middle	30 (20.0)	55 (21.2)	31 (21.8)	53 (20.0)
High	25 (16.6)	39 (15)	22 (15.5)	46 (17.4)
Highest	36 (24.0)	61 (23.5)	18 (12.7)	64 (24.1)
Ethnicity				

	Economic Wellbeing			
European	40 (26.7)	66 (25.4)	35 (24.6)	58 (21.9)
Caucasian	86 (57.3)	148 (56.9)	77 (54.2)	154 (58.1)
Aboriginal	3 (2.0)	6 (2.3)	5 (3.5)	12 (4.5)
Asian	13 (8.6)	15 (5.8)	13 (9.2)	23 (8.7)
Others	8 (5.4)	25 (9.6)	12 (8.5)	18 (6.8)

Table 11: Association between economic wellbeing and ethnicity, remoteness and socioeconomic status

	Wald	Exp (B) (Odds Ratio)	95% CI	P value
Employment loss				
Ethnicity				
European (Ref)	1.53	-	-	0.82
Caucasian	0.01	1.04	0.44, 2.50	0.92
Aboriginal	0.15	1.18	0.51, 2.75	0.70
Asian	0.30	0.67	0.16, 2.86	0.59
Others	0.36	1.36	0.50, 3.67	0.55
Remoteness				
Major cities (ref)	3.46	-	-	0.49
Inner regional	0.61	1.63	0.48, 5.53	0.43
Outer regional	1.62	2.26	0.81, 16.03	0.20
Remote	2.47	2.36	0.64, 8.72	0.12
Very remote	0.83	2.26	0.40, 13.03	0.36
Socioeconomic status				
Lowest (Ref)	2.13	-	-	0.71
Low	0.17	1.14	0.61, 2.14	0.68
Middle	0.01	1.04	0.59, 1.83	0.91
High	1.83	1.44	0.85, 2.46	0.18
Highest	0.13	1.11	0.63, 1.95	0.72
Income loss				
Ethnicity				
European (Ref)	8.79	-	-	0.07
Caucasian	5.22	0.49	0.27, 0.90	0.02[*]
Aboriginal	2.45	0.63	0.35, 1.12	0.12
Asian	3.60	0.36	0.13, 1.03	0.06
Others	5.29	0.40	0.19, 0.88	0.02[*]

	Wald	Exp (B) (Odds Ratio)	95% CI	P value
Remoteness				
Major cities (ref)	1.06	-	-	0.90
Inner regional	0.06	1.10	0.50, 2.45	0.81
Outer regional	0.368	1.30	0.56, 3.00	0.54
Remote	0.01	1.06	0.43, 2.60	0.91
Very remote	0.19	1.34	0.36, 5.00	0.66
Socioeconomic status				
Lowest (Ref)	7.66	-	-	0.11
Low	4.02	1.65	1.01, 2.68	0.04[*]
Middle	0.30	1.14	0.71, 1.82	0.58
High	4.99	1.63	1.06, 2.51	0.03[*]
Highest	0.20	1.11	0.70, 1.77	0.65
Access to Superannuation				
Ethnicity				
European (Ref)	2.31	-	-	0.68
Caucasian	1.36	0.62	0.28, 1.38	0.24
Aboriginal	0.98	0.68	0.32, 1.46	0.32
Asian	0.29	0.72	0.21, 2.41	0.60
Others	0.01	0.95	0.38, 2.41	0.92
Remoteness				
Major cities (ref)	4.45	-	-	0.35
Inner regional	1.77	2.70	0.63, 11.64	0.18
Outer regional	2.84	3.61	0.81, 16.03	0.03*
Remote	2.47	3.42	0.74, 15.82	0.12
Very remote	3.13	5.06	0.84, 30.51	0.08
Socioeconomic status				
Lowest (Ref)	18.82	-	-	0.001[*]

	Wald	Exp (B) (Odds Ratio)	95% CI	P value
Low	7.67	2.72	1.34, 5.53	0.006*
Middle	15.06	3.55	1.87, 6.73	<0.001*
High	14.61	3.42	1.82, 6.42	<0.001*
Highest	5.19	2.20	1.12, 4.32	0.023*

Financial inability to pay for services

Ethnicity

	Wald	Exp (B) (Odds Ratio)	95% CI	P value
European (Ref)	8.95	-	-	0.62
Caucasian	2.44	0.59	0.31, 1.14	0.12
Aboriginal	0.10	0.90	0.49, 1.68	0.75
Asian	0.60	1.45	0.56, 3.74	0.44
Others	0.00	0.98	0.46, 2.10	0.95

Remoteness

	Wald	Exp (B) (Odds Ratio)	95% CI	P value
Major cities (ref)	7.19	-	-	0.13
Inner regional	0.27	1.26	0.53, 2.99	0.61
Outer regional	0.77	1.50	0.61, 3.70	0.38
Remote	2.85	2.26	0.88, 5.80	0.04*
Very remote	0.07	0.81	0.18, 3.70	0.79

Socioeconomic status

	Wald	Exp (B) (Odds Ratio)	95% CI	P value
Lowest (Ref)	2.91	-	-	0.57
Low	0.02	0.97	0.58, 1.61	0.90
Middle	0.12	1.08	0.69, 1.71	0.73
High	2.20	1.39	0.90, 2.14	0.14
Highest	0.45	1.17	0.74, 1.83	0.50

* Indicates significant P < 0.05

Chapter 6: Housing and Food Insecurity

6.1 Chapter introduction

This chapter presents Publication 5, '"I just wanted money for food": a qualitative study of the experiences of Australians during the COVID-19 pandemic'. The publication addresses research question 4: What are the experiences of adult Australians of the impact the COVID-19 pandemic on food and housing security, and what effect has this had on their wellbeing? The publication is currently under review in Perspectives in Public Health. The impact factor for this journal is 3.627.

Green, H., MacPhail, C., & Fernandez, R "I just wanted money for food": a qualitative study of the experiences of Australians during the COVID-19 pandemic. Perspectives in Public Health. 2022. RSH-22-0381 (under review)

6.2 Abstract:

The emergence of the infectious disease, SARS-CoV-2, in 2019 triggered a global pandemic that has had profound impacts on individuals and communities across the world. The social and economic impacts that have occurred during the pandemic can disproportionally affect those already experiencing poverty or at risk of poverty. The social determinants of health aggravate inequalities and can adversely affect population wellbeing, particularly during a public health crisis such as a pandemic. This descriptive qualitative study explores the relationship between wellbeing and social determinants of health among Australian adults during the COVID-19 pandemic. Three main themes emerged from the analysis of the data: Food security; Housing outcomes; and Psychological and emotional impact. This study identified that there was a clear social divide between adults living in low socioeconomic areas compared with those living in high socioeconomic areas, with participants in low socioeconomic areas faring worse in terms of exacerbated social determinants of health and consequent impacts on wellbeing.

6.3 Introduction

The emergence of the infectious disease, SARS-CoV-2, in 2019 triggered a global pandemic that has had profound impacts on individuals and communities across the world. In response, public health measures were globally implemented to prevent widespread transmission of the SARS-CoV-2 virus.[363] Nationwide lockdowns and social distancing actions were instigated in a majority of countries. Despite lockdowns being an effective public health action to prevent the spread of COVID-19, they can have varying impacts on different populations.[332, 363] The enforced lockdowns in Australia paused most social and economic activity, with the flow-on effect resulting in substantial loss of employment and income.[332, 363] It is important to highlight that a fundamental risk in any public health crisis is the aggravation of existing health and social inequalities.[364] In some areas of Australia, such as Melbourne, Victoria, strict lockdowns ensued on six occasions between 2020-2021, with more than 260 days spent in lockdown.[365] A hard lockdown of a public housing tower in Melbourne saw marginalised populations, such as Aboriginal and Torres Strait Islanders and other ethnic minority groups, subject to policing and coercion under the disguise of public health intervention.[145] New South Wales, the most populous state in Australia, experienced two strict lockdowns, the longest lockdown occurring in 2021 from 26 June – 11 October.[365] There is a growing body of global quantitative evidence indicating that the experience in Australia is similar to other high-income countries[366] and comparable to both middle- and low-income countries.[367, 368]

While some of the changes that occurred as a response to the pandemic have resulted in population groups losing employment, losing income, experiencing housing instability and losing adequate food supply, the impact of these changes is dependent upon the state of their pre-pandemic social determinants of health.[369] Basic human needs, such as housing, food, income, employment, and access to health care, are collectively known as

the social determinants of health.[370] According to the World Health Organization (WHO) social determinants of health *are the circumstances in which people are born, grow up, live, work and age, and the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies, and politics'*.[30] The social determinants of health, housing, and food, have a bi-directional relationship, with vulnerable populations having to spend significant proportions of their income on housing, leading to less money being able to be spent on food.[371] While some population groups already experienced poor health as a consequence of the social determinants of health prior to the pandemic, the consequences of the COVID-19 pandemic have exacerbated social determinants of health. Consequently, further health inequalities are formed through social positioning and stratification, whereby power and distribution of resources are unequal, creating health differences between population groups and the potential for future inequitable experiences.[372]

The social and economic impacts that have occurred during the pandemic can disproportionally affect those already experiencing poverty or at risk of poverty, such as those populations residing in low socioeconomic areas.[372] The exacerbation of the social determinants of health aggravates inequalities and can adversely affect population wellbeing, particularly during a public health crisis such as a pandemic. The contemporary idea of wellbeing involves an individual's physical, emotional, psychological, financial, and spiritual wellbeing and embraces elements of quality of life such as life satisfaction and fulfilment.[373] While there is increasing quantitative literature on the impact of the social determinants of health during the COVID-19 pandemic, there is a paucity of qualitative research reflecting the lived experience of these factors. Therefore, this study aims to explore the experiences of Australian adults relating to the

impacts of the COVID-19 pandemic on social determinants of health and the effects this has had on their wellbeing.

6.4 Methods

6.4.1 Design

This descriptive qualitative study is embedded within a sequential mixed-methods study exploring the relationship between wellbeing and social determinants of health among Australian adults during the COVID-19 pandemic. The main themes from the larger study have been divided into two publications. Ethics approval was received from the University of Wollongong Human Research Ethics Committee (HREC) approval no: 2020/306, prior to commencing this study.

6.4.2 Participants and recruitment

Purposive sampling was used to identify and recruit participants into the study. Participants who completed an online survey as part of the larger national study provided their contact details to participate in an interview and were purposively selected. This strategy was used to recruit a comprehensive cross section of participants from across the Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Advantage and Disadvantage (IRSAD).[205] The IRSAD is used to gather and collate data regarding the social and economic conditions of individuals by local government area and provides a score based on relative advantage or disadvantage, with a high score indicating greater socioeconomic advantage and a low score signifying greater disadvantage.[205] Using a purposive sampling approach meant that individuals from a range of IRSAD scores were invited to participate in the qualitative study. To ensure that contact information remained separate from survey information, each participant that agreed to

participate in the semi-structured interviews had a study code applied to their survey responses by an independent researcher. Following the application of the study code, all contact details were exported by the independent researcher into a password-protected excel file. Purposive sampling was conducted by the primary researcher (HG) using the study codes which were then provided to the independent researcher who gave the corresponding contact details to the primary researcher. During the recruitment process, the participants were contacted via email and provided with additional information regarding the qualitative study and a consent form.

6.4.3 Data collection

As this study aimed to gain a rich insight into adults' experiences of the social determinants of health during the COVID-19 pandemic, one-on-one semi-structured interviews were the most appropriate data collection method.[274] Semi-structured interviews allow for a deep understanding of the phenomenon being studied, by investigating the 'why' of a research question.[278] A semi-structured interview guide to broadly explore experiences during COVID-19, circumstances that impacted their experience of COVID-19, coping strategies used during COVID-19, and experiences accessing food, and housing was informed by the results of the quantitative analysis, the aim of the study and a review of literature on the social determinants of health. Probing questions were used to generate further explanation from the participants (see Figure 11).

Due to COVID-19 pandemic restrictions and the geographical location of the participants', one-on-one semi-structured interviews were conducted either via telephone or videoconference (via Zoom) at a mutually agreed time and date between March 2021 – August 2021. All interviews were conducted by a female PhD candidate (HG) who is an experienced public health professional and had previous experience in qualitative

interviewing. Prior to commencing the interviews, study details including the study outline and aims that had been emailed to the participants during recruitment were discussed, as well as ensuring the participants understood that the interview was voluntary and that they could withdraw their consent at any time. All participants provided signed informed consent prior to the commencement of the interview, this included consent for audio-recording of the interview. Each one-on-one semi-structured interview was digitally audio-recorded, with participants assigned a unique pseudonym following the interview to ensure anonymity. The semi-structured interviews ranged from 30 minutes to 60 minutes in length. Participants were provided with a $50 shopping gift card for their time. A total of 20 participants were interviewed, with data saturation, the point at which no new information is yielded,[372] thought to be achieved at 17 interviews, however, three more interviews were conducted as confirmation that data saturation had occurred.

Can you tell me a little about yourself? What do you do?
    Probes: Family life? Significant challenges in life? Significant blessings?

Can you tell me about your experiences during COVID-19?
Probes: work from home? Children? Loss of employment? Was your life and health the same as prior to COVID-19? Biggest changes? Anything particularly distressing for you?

Can you tell me a little bit about your relationships with family and friends during COVID-19?
Probe: affect wellbeing or quality of life? What were some of the good things? What were some of the bad things? Physical? Mental? Emotional?

Can you tell me about any challenges you may have encountered during COVID-19?
Probes: Employment? Health? Social support? Quality of Life? Gym close down? Moving to a new house? Financial? Relationship stress?

What strategies did you use to cope with any of the challenges you faced during COVID-19?
    Probes: Did you have access to social support? Use alcohol/ drugs? Eat more/differently? Seek health professional support?

Can you tell me about any circumstances in your life that you believe/feel impacted on your experience of COVID-19?
    Probes: Poverty, insecure/no employment, racism, food insecurity, local neighbourhood, your gender – has your experience as a man or woman or transgender or non-binary person different to that of other genders? Drugs/alcohol use? Comparison to others?

Can you tell me about accessing health care during COVID-19?
    Probes: alternative services? Challenges or difficulties? Telehealth use?

Figure 11: Semi-structured interview questions

6.4.4 Data analysis

All interview audio recordings were transcribed verbatim using a professional transcription service. Data analysis was supported by NVivo version 12,[287] with semi-structured interview transcripts imported into this software. All transcripts were checked

for accuracy against the audio recordings by the first author. The data collected from the semi-structured interviews were analysed using an inductive thematic analysis approach as described by Braun and Clarke.[274] An inductive thematic approach allows for meaning to be derived from the content of the data rather than the researchers' preconceived ideas and notions. Inductive thematic analysis was conducted through fundamental phases: immersion within the data, generation of initial codes and themes, clarifying that the codes were logical and supported by the data, defining the themes, and developing sub-themes and reviewing the themes for quality.[274]

6.4.5 Rigour

Rigour of this research, including trustworthiness and quality, was enhanced by using the four components of credibility, transferability, dependability, and confirmability described by Lincoln and Guba.[374] Credibility was achieved by ensuring that participants were a diverse sample; that is from a range of geographical locations and socioeconomic areas. Additionally, we ensured that data saturation had occurred within each of the geographic locations, rather than only across the sample as a whole. Transferability was enhanced by ensuring the participants were geographically dispersed across Australia and from various socio-economic groups, as well as through the use of detailed descriptions of participants' circumstances and experiences. In the context of this study, dependability was achieved by systematic documentation of the interpretation of the transcripts and theming. Lastly, confirmability was established through ongoing reflexivity and ensuring the interpretation of the data was representative of the participants' quotes.

6.5 Results

Twenty people (10 Female, 8 Male, 1 Non-binary and 1 Transgender) were recruited from various socioeconomic areas in all states and territories throughout Australia. Participants ranged in age from 21 years to 65 years (Table 12). Three main themes emerged from the analysis of the data: Food-related concerns; Housing outcomes; and Psychological and emotional impact. These themes are described in further detail below, with verbatim quotes from the participants to illustrate key themes. Quotes were selected based on best representation of the themes overall and where the experiences contrasted with the main thematic ideas.[375] Figure 12 details a case study of one of the participants, demonstrating the interplay of the social determinants of health and wellbeing. The centre ring in figure is the participant's wellbeing. The inner ring displays the leading social determinants of health, food, and housing that the participant experienced during the pandemic influencing her wellbeing. These are also the main themes of this paper. The outer ring shows all the other existing social determinants of health experienced by the participant, which are interconnected and affecting her wellbeing during the pandemic. In keeping with the interconnected nature of social determinants,[376] the social determinants of health within the outer ring impact on those social determinants of health in the inner ring.

Table 12: Characteristics of participants

Pseudonym	Age (years)	Gender	Socioeconomic Status (SES)	Employment Status	Living Status (Who they live with)	Ethnicity	State/ Territory
Aaron	65	Male	High	Retired	Wife	European	NSW
Alicia	31	Female	High	Fulltime	Husband and two children	Caucasian	ACT
Clara	38	Female	High	Unemployed	Mum	New Zealander	WA
Dominic	55	Male	Low	Unemployed	Alone	Aboriginal	SA
Emma	31	Female	High	Fulltime	Partner	American	WA
Haimi	25	Female	Low	Casual	Share house	Pakistani	QLD
Joshua	43	Male	Low	Fulltime	Wife and two children	Caucasian	TAS
Jayda	46	Female	Low	Student	Alone	Aboriginal	NT
Kailani	26	Female	Low	Fulltime	Share house	South Asian	VIC
Karlee	24	Female	Low	Casual/Student	Share house	Thai American	VIC
Mandeepa	26	Female	Low	Casual/Student	Partner	Indian	QLD
Manaia	52	Female	Low	Unemployed	Alone	New Zealander	VIC
Marcel	51	Male	High	Fulltime	Partner	Caucasian	VIC
Nick	52	Male	High	Fulltime	Alone	Caucasian	ACT
Nyah	46	Transgender	Low	Disability pension	Alone	Caucasian	NSW
Parrie	64	Male	High	Fulltime	Mum and adult daughter	Caucasian	ACT
Reuben	61	Male	Low	Disability pension	Share house	Caucasian	SA

Sergio	35	Male	High	Part-time/Student	Share house	Serbian	VIC
Trey	40	Non-Binary	High	Casual	Partner	European	VIC
Xiuying	21	Female	High	Fulltime	Husband	Chinese	NSW
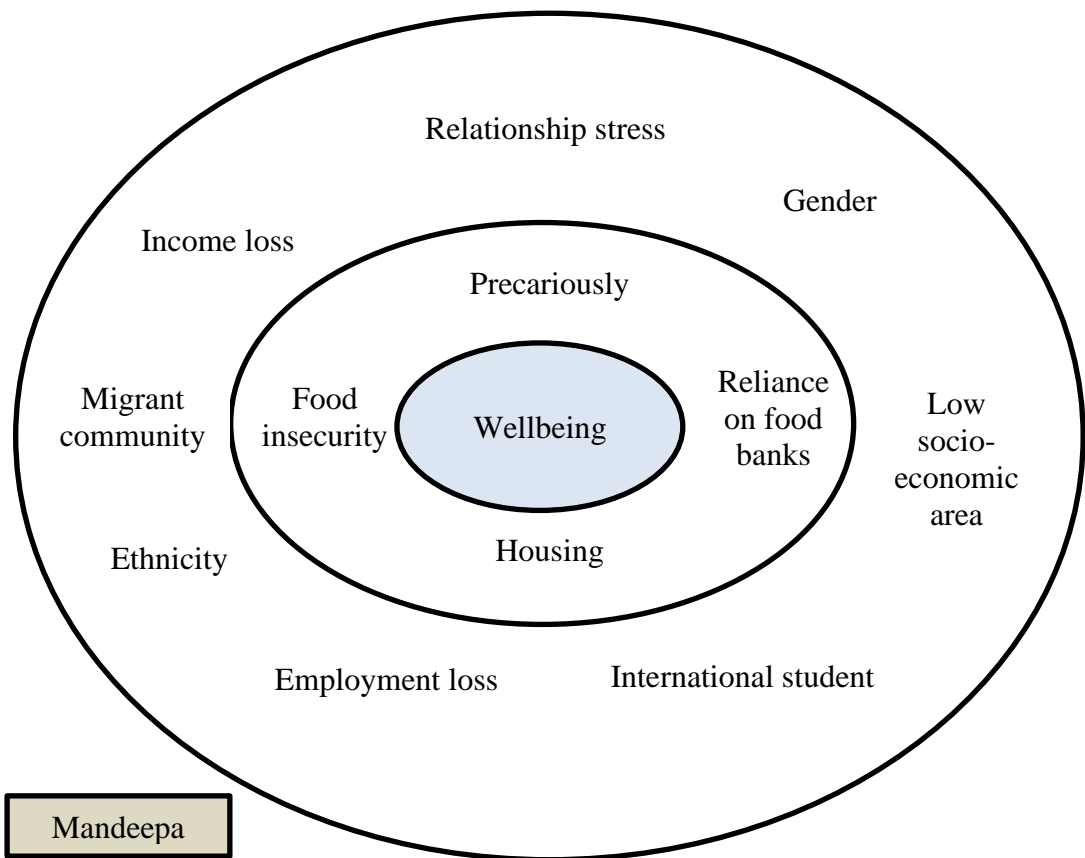
Figure 12: Interplay of social determinants of health and wellbeing

6.5.1 Food security

Accessing food, during the COVID-19 pandemic, for most participants who resided in low socioeconomic areas, was described as stressful and challenging, especially when compared to those who resided in high socioeconomic areas. Being able to access food was often reported as difficult with limited financial capacity, frequently precipitated through loss of employment or reduced working hours as part of casual employment. Participants noted this struggle by stating *"especially the nature of the work, - I mean, casual role - it was two days and five hours each, but it wasn't enough to sustain myself"* (Mandeepa, Low SES). These financial limitations meant that most participants living in a low socioeconomic area within Australia experienced food-related concerns and food

insecurity. One participant stated *"Then, with groceries, I'm budgeting it every week. I'm just supposed to be buying less than $50"* (Kailani, Low SES). Participants who experienced food insecurity during the pandemic expressed feelings of helplessness and substantial stress, often having to ration food or skip meals as a coping strategy, with Karlee explaining her challenges *"I would say financially, I already mentioned that but that was a challenge and then I think not having money to get food - I would try to eat one meal a day"* (Karlee, Low SES). Other participants in the low socioeconomic areas described having to borrow money from friends or family to purchase food *"Mostly it's financially, because I ran out of my savings and I contacted my mum and my sister. My sister sent me extra money to help buy food."* (Kailani, Low SES). While most participants in low socioeconomic areas reflected on increased hardship in relation to food access, one participant who lived in a low socioeconomic area noted that the pandemic changed their approach to managing meals for the better *"We've changed some of our purchasing habits. Even just that short experience of standard work from home lockdown has changed a lot of - we don't buy as many meals out anymore. For lunches, there's a lot more packed stuff that we make or leftovers from meals"* (Joshua, Low SES).

6.5.1.1 Reliance on foodbanks

The use of food banks and other non-government organisations to access a non-perishable food supply was 'a service availed quite frequently' during the pandemic, most prominently among those participants from low socioeconomic areas. Such safety nets ensured a consistent food supply for those most in need, with one participant saying, *"every week there were cartons of non-perishables and some fresh produce that were actually delivered to me, to be shared with my partner, which was really helpful."* (Mandeepa, Low SES). Another participant described that they were experiencing financial difficulties and were unable to afford food, she explained that *"For me, I just*

183

wanted money for food I thought, so that's why I'd just go to the foodbank" (Haimi, Low SES) and was pleased that this service was available. Being able to seek the assistance of the foodbanks alleviated some of the food worries and insecurity experienced by participants, with one participant appreciative that they could *"I go to the free food places, just to top up my cupboards."* (Dominic, Low SES). Comparatively, participants from higher socioeconomic areas did not have to avail themselves of the services of foodbanks or emergency food relief, with one participant saying, *"We have been very fortunate in our circumstances being able to keep a house and keep a job and not have any financial concerns and not have to rely on food relief services"* (Marcel, High SES).

Cultural and religious groups also coordinated the delivery of foods to those within their communities that they knew were food insecure, dropping the food in boxes at their doorstep, *"They [Filipino groups] sometimes give a freshly caught fish, rice, bread, pasta sauce, corned beef, canned goods and everything"* (Kailani, Low SES). Kailani voiced that the food delivered by the cultural groups saved them at times *"If we don't have anything to put on the table, we'll just grab the corn beef"*. Other participants discussed a sense of community when it came to food relief and support, saying *"The community came together. They were doing shopping for elderly and vulnerable people in my building and they would be ringing me or cooking for me, those sorts of things."* (Manaia, Low SES). Emergency food relief came in all forms including grocery gift cards, free meals and non-perishable food supplies, these were most often supplied by non-government organisations and religious groups.

However, reliance on food banks for access to a healthy food supply was relatively scarce among our sample, with most only being able to provide non-perishable items, meaning a lot of the food was of poor dietary quality. Participants described this as 'so depressing', with one communicating that *"Just looking at that made me really sad. But yeah, that*

was a challenge" (Haimi, Low SES), however, they were grateful for the support as without it they were unsure of how they would manage.

6.5.1.2 Stockpiling of food supplies

In contrast to participants living in low socioeconomic areas, participants in our sample within higher socioeconomic areas expressed dissimilar food concerns and were largely distressed by the inconvenience of their usual supplies not being available. To remedy this, many decided to support local hospitality businesses and ate *"lots of take out. Lots of opulent food. Like decadent food."* (Sergio, High SES). While others in high socioeconomic areas had no concerns with food supply, one participant said *"Getting food was not an issue, no, no not really at all. We're quite lucky in that we have a – we're financially, maybe not rich, but we're not that precarious, and we live right next door to a supermarket, so even during lockdown, we'd make it a regular part of our routine to walk the dogs down and buy our groceries. Yeah, food was not an issue."* (Trey, High SES) and another had a similar experience saying *"We could get everything that we needed. There was no shortage there where we lived. In fact it's amazing to think that Woolworths or Coles can get toilet paper at the present time."* (Aaron, High SES). The majority of those within high socioeconomic areas were able to afford to stockpile food supplies, with one participant communicating *'So we were always stocked up with our vegetables and things like that. We did go out and buy heaps of stuff, although the pasta - limiting to pasta and things like that, which with only the three of us, we were doing okay, but my sister's got four kids, so they were struggling a little bit with the limits of what they could buy.'* (Alicia, High SES).

In comparison, those from lower socioeconomic areas did not have the financial ability to stockpile food, *"We didn't stockpile, no."* (Mandeepa, Low SES), and another

participant had a similar experience stating, *"everyone was stocking up on toilet paper and food and everything, and we didn't have much in our pantry"* (Haimi, Low SES). However, for those who lived outside of urban areas and in agriculture-rich regions, fruit and vegetable markets continued to operate meaning there was an abundant supply of fresh produce. One participant explained *"I mean the supermarkets ran out of the strangest things but yeah, I mean, one of the benefits of living out of town is you tend to have a lot of dry stores so that was fine and since fresh vegetables - I mean we've got a lot of agriculture around us so you get vegetable stalls and they continued to operate and never ran out."* (Clara, High SES).

6.5.2 Housing outcomes

Hand in hand with the burden of food security, many participants in our sample from low socioeconomic areas expressed emotional distress in relation to securing and maintaining adequate housing that impacted their wellbeing.

6.5.2.1 Precariously housed

Many participants from low socioeconomic areas experienced feelings of helplessness and loss of control due to their insecure housing tenure. Those who described themselves as being precariously housed were almost exclusively females who lived in low socioeconomic areas, this affected their overall quality of life during the pandemic. One participant talked about being verbally abused by her landlord and living in fear *"I was in a shared house where my landlord was very abusive, verbally and just it was terrible. At the time I didn't know about my rights, so I was constantly scared that I would – even though that couldn't happen and I read about that in the news as well, but I was scared that I'd be kicked out of the house. So I wouldn't say anything and I was just in this house where there – you know, it was just a difficult situation. It was quite abusive and because*

of COVID, I couldn't really go out much so I was just stuck in that space." (Haimi, Low SES). Additionally, the landlord continually threatened to increase the rent, but without any employment, the participant felt she had to continue living in this threatening environment.

While prior to the pandemic there was a strain on housing within Australia, this was precipitated during the pandemic. In our sample, participants discussed the challenges with one lease ending and trying to find another available private rental or share house, describing it as very uprooting and increasing their anxiety levels and impacting on their wellbeing saying *"From there, the lease ran out, which was when I moved to the house-sitting place, there was a period of time that was not covered between them, so it was about three weeks that I had to find a place to live. It was - the level of anxiety!"* (Mandeepa, Low SES). One participant described having to move 'about four times' during the pandemic due to insecure housing, which took a toll on their overall wellbeing. Conversely, a participant who resided in her own home before the pandemic was able to lease her house out and move in with her mother when she lost her employment during the first wave of the pandemic, *"So in the end what I had to do was move in with my mum and rent out my house. Just so that - meet the mortgage."* (Clara, High SES). Kailani spoke about moving to a rural town to commence a new job and the difficulty she experienced in finding housing. She did not have enough money to secure a short-term rental through Airbnb and she ended up having to find housing in the next town. This made further challenges for Kailani in terms of transport to work as she didn't have a car *"I found a place, but then I always take the bus every day for six months, I think, I was taking the bus. Where the bus ride, in the morning and the afternoon, only goes once. So, if I'm going to miss it, I won't be able to go back home or go to work. Then in the afternoon, I'm waiting for two hours for the bus so that I'll go back - when I go back*

home." (Kailani, Low SES). Furthermore, she also lived in fear in the shared house because she had to share with four males, which made her very uncomfortable and lonely, never having had to share with males previously. 'Losing a sense of control' described the housing situation of most participants in our sample living in low socioeconomic areas.

6.5.2.2 Housing stability

The ability to have stable and affordable housing was an experience that most participants who lived in high socioeconomic areas were fortunate enough to achieve. This was often associated with either having secure employment or owning their own home. Interestingly, housing stability was more evident among males in high socioeconomic areas, however this may be due to the number of male participants in our sample living in higher socioeconomic areas. Despite Trey losing income during the pandemic, he talked about being lucky to have secure housing *"I have secure housing. My partner owns this house, which was a significant stress off our shoulders."* (Trey, High SES). Similarly, another participant, Nick was able to gain secondary employment enabling him to keep up with his mortgage payments*, "I was able to maintain my mortgage payments on the house so, no it had no impact at all, the housing"* (Nick, High SES). Having secure full-time employment and financial stability also assisted in housing security, with one participant who had recently moved out of her family home into a rental property explaining "*I'm being good to pay rent, I can buy things I wanted to buy, so I think it's okay, and I've got a fulltime job as well, so yeah, it's okay"* (Xiuying, High SES). Residing in a high socioeconomic area and living in a rental property, Sergio entertained the idea of asking for a rent reduction, however felt it would not be in his favour saying *"So the landlord could turn around and go no and actually move out because it sounds like you might be a financial liability to me. So we didn't ask for rent reduction. We still*

managed to pay rent and we were never in a situation of housing precarity. So that was also fortunate." (Sergio, High SES). For some participants who had paid off their mortgage housing was never an issue. One participant explained that *"Not long ago I managed to finalise my mortgage so yes I'm very lucky with that"* (Marcel, High SES), while another stated *"I'd been very fortunate, yeah, in that sense I'm a carer for my 92-year-old mother. So I don't live in the same house but I live on the same property, which we own"* (Parrie, High SES). Similarly, for participants, such as Aaron, who were self-funded retirees, housing stability was never a challenge, as he was fortunate enough to remain in his own his home.

Although the majority of low-income participants were concerned about their housing stability, some were able to capitalise on a range of opportunities to secure their housing. One participant felt lucky to have a considerate landlord who assisted her substantially, meaning she did not have a pay rent for a period of time *"So instead of paying rent I was able to help him with a couple of his other units because he had people move out. So I helped get them into condition for sale. So for doing that he gave me four months' rent free."* (Manaia, Low SES). Although Jayda lost employment during the pandemic, she was still about to negotiate paying her mortgage meaning she had housing stability *"I'm buying my home so I was – I'm fine [inaudible]. Fortunately, I have my own home. So yeah, just paying my mortgage"* (Jayda, Low SES). Despite residing in a low socioeconomic area, participants who had existing social housing provisions in place were able to maintain their housing security. This was the case for Nyah who explained *"I mean because of the disability, I'm lucky to have housing commission housing, so there was not change for me"* (Nyah, Low SES).

6.5.3 Psychological and emotional impact

The direct and indirect impacts on participants' psychological and emotional wellbeing during the COVID-19 pandemic varied substantially among those who lived in low socioeconomic areas compared to high socioeconomic areas. Participants in all socioeconomic areas were psychologically or emotionally impacted during the pandemic, however, this impact was often experienced more by those living in low socioeconomic areas.

6.5.3.1 Wellbeing and quality of life

The many challenges faced by participants who resided within low socioeconomic areas during the pandemic were related not only to the uncertainty of the pandemic, but also dealing with social determinants of health that were exacerbated during the COVID-19 pandemic. Challenges such as loss of employment, lack of available finances, difficulties in housing stability, and issues with food security only worsened the situation for many and directly affected their wellbeing. One participant voiced *"My mental health suffered. I didn't think – I had never experienced depression before, not that I noticed anyway, but I went into a really, really dark place when I didn't know how I was going to pay bills and those sorts of things. Before I let people know my situation things just got really dark and it was very easy to isolate so that people didn't know"* (Manaia, Low SES). This experience was after she had lost her employment, as well as recently losing her partner in an unexpected death. Manaia expressed a deep sense of loss and fear of losing the private rental she had shared with her partner that had memories for her. Additionally, being a New Zealand citizen Manaia was ineligible for Australian Government financial assistance, which meant that options to address her precarious economic situation were limited.

Wellbeing and quality of life for most participants in our sample was referred to in terms of their mental status and to a lesser degree about exercise and healthy eating. One international student explained *"I think my quality of life was not the best. It was quite a mess, very stressful time. But I think over just amplified that by [a lot], so I think it was really tricky. There were a lot of things I didn't know and I think that just made it more stressful with COVID as well; not eating well, no money, no job, so I never really felt too good, so yeah. I had multiple deficiencies. I wasn't feeling good and I think that made it worse as well."* (Haimi, Low SES). Many participants, especially in the lower socioeconomic areas, reported similar experiences of lack of financial stability, lack of employment, and issues with gaining housing. In particular, Kailani's experience during the pandemic was worsened by her existing vulnerability and lack of financial and housing stability, affecting her quality of life and wellbeing substantially. Kailani shared *"So, a lot of anxieties have been the time – a lot of crying, too, during the night. It's just my boyfriend who know about it. But I felt like I'm having – I don't know it's like a lot of struggles. Inside I'm struggling. Waking up in the morning, I just feel like I just want to cry. I'm always thinking about the financial aspect, too. So, a lot of things are happening."* (Kailani, Low SES).

Indeed, for participants who already experienced mental health issues, the pandemic took a particular toll on their ability to manage daily life. One participant expressed *"I would just curl up in bed and not get out of bed and just watch TV. I didn't really have a sense of day or night. I'd sleep when I was tired and be awake when I wasn't, so that didn't really help my mental health. It comforted me through, but it didn't help me improve and get beyond mental health issues"* (Reuben, Low SES). Reuben also stated that he felt 'like a zombie', with a very limited ability to function. Others residin' in low socioeconomic areas also described a lack of ability to cope generally, saying 'Inside I'm struggling' to

express the impact of COVID-19 on mental health and wellbeing, this was often associated with housing and food stress, including challenges with their finances during the pandemic.

While most participants described feeling negative effects on their wellbeing and quality of life during the pandemic, participants who resided within the highest socioeconomic areas of Australia discussed feeling less affected. Participants who expressed these sentiments had no changes in employment, were financially stable, and thrived during the pandemic. A female participant stated "*Like, if anything, everyone was saying 2020 was such a shit year, but for us it was great. I was pregnant, so I loved working from home. I was probably really healthy, because I wasn''t eating out or we weren''t spending money and it was -– I was actually sleeping -– getting a lot of sleep and all that important stuff. Then obviously we had our baby, so for us 2020 was a wonderful year.*" (Alicia, High SES). Another male participant, Marcel, expressed a similar experience in that he felt the benefits of being about to work from home and the ability to continue his exercise regime, which meant his quality of life was not affected and he enjoyed the experience of lockdowns, saying *"I think overall I''ve coped very well with the situation. I don't think there''s been any real challenges to me personally. […] I did maintain an exercise regime through much of the working -– the lockdown period. We were doing a lot of walking and stuff so physical fitness was good."* (Marcel, High SES).

6.6 Discussion

This study sought to investigate the experiences of Australian adults concerning the impacts of the COVID-19 pandemic on two of the social determinants of health, namely food supply and housing stability, while exploring if this impacted their wellbeing. This study identified themes that were of particular relevance for participants living in low

socioeconomic areas, including food-related concerns, precarious housing situations and the impacts that these had on their psychological and emotional wellbeing. Furthermore, this study recognised that there was a clear divide between the experiences of those living in low socioeconomic areas compared with adults living in high socioeconomic areas, with participants in low socioeconomic areas fairing worse in terms of exacerbated social determinants of health and consequent impacts on wellbeing. This was noticeably apparent when it came to food supply and housing stability, which are critical social determinants of health. Interconnected as basic human needs, food and housing are the prerequisites for health and wellbeing.[371] Those that live in poverty are also likely to experience both housing and food insecurity reflecting the impacts of financial constraints. Having to choose between paying rent or paying for food is the reality for low-income households, however if they were provided with affordable housing options then these households would have greater income to purchase food.[377] It has been well documented in the literature that low-income families spend a considerable amount of their income on securing housing, so as the cost for housing increases so does food insecurity.[371, 378] For the most part, a disadvantaged social status has made the impacts of COVID-19 worse for many Australians, with those already socially and economically vulnerable disproportionately affected by the pandemic.

Food insecurity, defined as the inability to acquire adequate food supply,[314] was experienced by the majority of participants who were from low socioeconomic areas in this study. According to the WHO Commission on Social Determinants of Health (CSDH) framework, social, economic, and political mechanisms define socioeconomic positions based on income, education, gender, ethnicity, and occupation. Socioeconomic positions then shape how people experience differences in vulnerability to illness and in exposure to a public health crisis,[369] such as a pandemic. This explains how those

participants from a higher socioeconomic area may lose their employment during the pandemic, however, remain food secure. Where on the other hand, participants from low socioeconomic areas who lost their employment became food insecure or experienced worsened food security. While food security may have been a challenge for some of the participants within low socioeconomic areas prior to the pandemic, the pandemic has amplified this social determinant of health for these participants. The experience for the participants in this study is that they had to seek food assistance at foodbanks, and through non-government organisations and cultural groups, with some participants skipping meals and rationing their food supply. Lack of access to an adequate food supply, even if temporary, is associated with poor nutritional intake and can impact long term health.[379] Aligning with the literature, participants' experience of reliance on the food banks as a food source in this study highlights the poor dietary quality. Food security enables optimal physical health and wellbeing;[380] without this, individuals may suffer from ill health having an impact on their quality of life and overall wellbeing.

Social determinants of health do not exist independently from one another as there are an abundance of factors involved, and the inequalities between socioeconomic groups arise in response to a range of unequal opportunities, unequal conditions and unequal resources.[61] That is, people can be affected by a collective of social determinants of health, such as food insecurity, gender, ethnicity, education, and housing instability, as they often coincide.[381] This was a key element of this participant experience in this study. This is portrayed in the case study of Mandeepa (Figure 12), whereby her food and housing insecurity is impacted by other existing social determinants of health and together influencing her total wellbeing. Pre-pandemic, food insecurity within Australia was estimated to be between 5.1%-10.6%,[314] however our previous research reports that this increased to 22% during the pandemic.[382] The increase in food insecurity during the

pandemic is an accumulation of social and economic disadvantage experienced by adults, particularly within low socioeconomic areas. Many participants experienced loss of employment and loss of income during the pandemic that made them economically vulnerable and ultimately food insecure. It is important to note that participants in this study that expressed food-related concerns were predominately female and from migrant communities. This is consistent with the global literature that demonstrates that women are more likely to report food insecurity, although there is limited evidence of the reasons for the gender difference.[383, 384] One theory is that women are perhaps more likely to be sole parents, may be less educated, and live in poverty compared to males.[385] Additionally, there is a direct association with low income and food insecurity, with a study conducted in New Zealand reporting that more women are in low-income households than males, with a relationship between low-income households, social welfare and access to foodbanks.[383]

The supply and demand for housing during the pandemic has uncovered the fundamental weaknesses within the Australian housing system.[386] In this study, participants who lived in low socioeconomic areas experienced precarious housing, describing the impact that having to move multiple times during the pandemic had on their wellbeing. Participants also expressed their experiences of trying to secure housing in a regional area of Australia as challenging and losing a sense of control with lack of supply and lack of finances to be able to secure even short-term housing. While the Australian government initiated a residential tenancy support package in the early stages of the pandemic to protect tenants against eviction if they were unable to meet their rental payments,[387] there was no deliberate action to increase housing availability and affordability for those with financial pressures or those experiencing loss of employment or income due to the pandemic. Australia has a chronic housing shortage, predominately affordable and secure housing,

with the pandemic amplifying and bringing this issue to the forefront.[386] The ability to work from home during the pandemic increased the demand for housing in regional areas within Australia, as the ability to work remotely no longer dictated that people live in metropolitan areas.[388] Therefore, people with high incomes and immediate resources chose to occupy regional and rural locations, which in turn decreased the availability of housing for people who were already living in these regional areas.

This study has highlighted that housing instability was mostly the experience of women, rather than men. One reason for this could be that of the ten women included in this study, six women resided in low socioeconomic areas, with the majority either casually employed or unemployed. This would have affected their ability to secure stable housing. Additionally, Australia's neoliberal preference for a private rental market has led to a lack of affordable housing options and shrinking social housing provision, leaving many women coping with housing instability.[389] This is likely to have been magnified during the pandemic, with limited housing availability and financial pressures further exacerbating relationship stress.[390] Furthermore, in this study, of the five male participants who resided in high socioeconomic areas, three were in fulltime employment, one retired and one in part-time employment, providing them with financial means to secure housing. Additionally, four of these male participants either owned their own home or had a mortgage. It is likely these factors contributed to housing stability of males from high socioeconomic areas in our sample.

The housing and food related stresses experienced by participants in this study has influenced their overall wellbeing, with many discussing the negative effect they had on their mental health; creating or worsening anxiety and depression. This is consistent with the findings of quantitative studies demonstrating that as food insecurity worsens, wellbeing deteriorates and when food insecurity is apparent it is associated with

depression, stress, and anxiety.[391] Similarly, there is a bi-directional relationship between housing instability and homelessness and wellbeing, whereby stress, created by housing instability, can weaken an individual's capacity to cope their affecting their overall wellbeing.[392] Furthermore, it is evident from this study that women's wellbeing was substantially impacted when compared to men. This is not unexpected, given that the majority of women experienced either food insecurity and/or housing instability.

6.7 Strengths and Limitations

A strength of this study is that the data were collected via purposively selected participants that allowed for a diverse sample from various socio-economic areas and geographical locations. Using qualitative methods allowed participants lived experiences to be highlighted, which was particularly important given that this is one of the few studies that have explored participants lived experiences of the social determinants of health during the COVID-19 pandemic. While every attempt was made to conduct all interviews through videoconference, three interviews had to be conducted over the phone, which meant body language and eye contact were not visible and may have impacted on the quality and interpretation of the data.[393] This was however mitigated through careful listening which enabled the researcher to note change in voice tone, or rapid speech; and to replace nods and facial expressions that would normally demonstrate interest with verbal signals. In terms of generalisability, given the sample is limited by purposive sampling of participants the extent to which the findings are relevant to other setting and populations is undetermined. However, using a diverse sample encouraged discussion of a wide and varying experience. While the SEIFA score for the participants postcode was used as a proxy for socioeconomic status, it is only intended to be an indication of the

socioeconomic status of the areas in which the participants live and not a reflection of their individual socioeconomic status.

6.8 Conclusion

This study highlights the social and economic divide of the COVID-19 pandemic experience and impacts. The pandemic has amplified existing social determinants of health experienced by those within low socioeconomic areas, particularly those who are female and from migrant communities, demonstrating that social and health inequalities are shaped by the conditions in which people are born, live and work. Overall, the wellbeing of participants from low socioeconomic areas decreased in response to their experiences and challenges with food insecurity and housing instability, highlighting the need for housing affordability strategies and funding of emergency food relief initiatives. Food access, insecurity and availability for local communities, particularly for those in areas with high socioeconomic disadvantage, can be improved to address some of the barriers associated with food security through providing café/supermarket meal vouchers, access to community gardens and school food programs. Housing affordability projects require program expansion and capacity in terms of availability, including an increase in supply of social and public housing. Additionally, there needs to be an increase in rental assistance provided to people within lower socioeconomic areas, especially those in the private rental market, is required to ensure they have access to affordable housing.

Chapter 7: Social Capital

7.1 Chapter introduction

This chapter presents Publication 6, 'Social capital and wellbeing among Australian adults' during the COVID-19 pandemic: a qualitative study'. The publication addresses research question 5: Among adult Australians, what has been the impacts of COVID-19 on their social capital, and what effect has this had on their wellbeing? This publication is currently under review in BMC Public Health. The impact factor for this journal is 4.135.

Green, H., Fernandez, R., Moxham, L., & MacPhail, C. Social capital and wellbeing among Australian adults' during the COVID-19 pandemic: a qualitative study. BMC Public Health. 2022 (under review).

7.2 Abstract

Background: COVID-19 has created global disruption, with governments across the world taking rapid action to limit the spread of the virus. Physical distancing and lockdowns abruptly changed living conditions for many, posing specific challenges of social isolation and lack of connectedness due to being physically and socially isolated from family and friends. The aim of this study was to qualitatively explore the impact that existing social capital has on Australians' experience of lockdowns during the COVID-19 pandemic and the effect this has had on their wellbeing and quality of life.

Methods: Participants from various socioeconomic areas within Australia were purposively selected to participate in semi-structured interviews conducted via videoconferencing or telephone. Inductive thematic analysis of the data was undertaken.

Results: A total of 20 participants were interviewed ranging in age from 21 to 65 years, including 50% (n=10) females, 40% (n=8) males, 5% (n=1) non-binary and 5% (n=1)

transgender. Three main themes merged from the analysis of the data: No person is an island; Social engagement; and Loneliness and isolation. Individuals who resided in low socioeconomic areas, those who lived alone and had reduced social support expressed feelings of poorer wellbeing.

Conclusions: This study describes the lived-experiences of the influence of the COVID-19 pandemic on Australians' social capital and wellbeing. The findings highlight the need for interventions to increase social support, social cohesion, and social connectedness, especially among Australians from low socioeconomic areas, to enhance their overall wellbeing.

Key words: Social determinants of health; Social capital; COVID-19; Wellbeing.

7.3 Background

Since emerging in December 2019 in Wuhan, China, SARS-CoV-2, otherwise known as COVID-19, has created global disruption, with governments across the world taking rapid action to limit the spread of the virus.[394] As part of the concentrated effort to curb the increasing number of people infected with COVID-19 and to decrease the number of severe infections, many countries imposed nationwide lockdowns.[395, 396] Massive scale lockdowns meant that travel was restricted, people were ordered to remain at home, quarantining for various regions, closure of businesses, schools and workplaces, reduction in public transport and work from home orders where possible.[396, 397] Physical (social) distancing and lockdowns abruptly changed living conditions for many, posing specific challenges of social isolation and lack of connectedness due to being physically and socially isolated from family and friends.

As a vital social determinant of health, the conditions in which individuals *"are born, live, grown and work",[43]* social capital provides a protective role in physical and mental health.[43] Social capital incorporates three relevant features: social support, social networks, and social cohesion. Social support is the direct help an individual receives through various social relationships. Social networks describe the people who are in an individual's life and the relationships that exist between them, whereas social cohesion refers to the strength of the relationships either within a community or with friends and family groups.[398] In the literature, having good social support and social networks can safeguard against some of the negative effects of other social determinants of health such as poverty,[399] and can lessen the vulnerability of people who are located lower on the social gradient.[400] Despite this potential, individuals with diminished economic capacity are sometimes unable to avail themselves of certain social capital or are excluded from social networks or participation and can therefore experience a negative effect on their

health.[401] Social capital plays a key role in shaping social and economic outcomes, and research has demonstrated that societies with higher social capital have higher incomes, are less corrupt, are healthier, and function better.[402] In fact, there is a direct association between social capital and health, with strong social capital correlated with health information sharing among family members and higher self-rated overall health.[403, 404] Indeed, social capital has the ability to improve economic efficiency through coordination and cooperation of shared norms to grow entrepreneurial firms, engage in technological advances and enhance strategic alliances.[402] However, it is imperative to note that varying levels of social capital can produce unequal impacts on social and health outcomes, as it means differing resources and support.[405]

The concept of social capital has been contributed to by social theorists Bourdieu and Putnam. The oldest of the sociological frameworks is that of Pierre Bourdieu, whose concept of social capital is related to his ideas on social class connected through three dimensions of cultural, economic, and social capital.[406] According to Bourdieu, social capital is defined as *"the aggregate of the actual potential resources which are linked to possession of a durable network of more of less institutionalized relationships of mutual acquaintance or recognition"*[406] From the Bourdieuan perspective, social capital occurs during the power function through the division of economic, cultural, and social resources. Social capital is used as a resource in social struggles that are conducted in various social arenas, whereby social relations (social class) increase the ability of the social actor to advance their interests (source of power).[407]

Social theorist, Robert Putnam's idea of social capital derives from norms, trust and networks. Putnam defines social capital as *"the features of social organisations such as trust, norms and networks that can improve the efficiency of society facilitating coordinated actions"* [408] (pg 167). According to Putnam, social capital is a communal

strength, with forms of social capital connected to the social capital of the community. Social capital is thought to be the property of the community connected by trust and social norms.[409]

Within the context of the pandemic, those who are already socially disadvantaged and those with low social capital are more likely to have experienced detrimental effects on their health and wellbeing. There is a direct association between social position and stress, with stress a result of coping with other social determinants such as poverty, housing instability, unemployment, and intergenerational disadvantage.[319, 410] Additionally, social distancing and lockdown measures in response to the pandemic have limited social interaction, with previous epidemics demonstrating rises in loneliness and psychological consequences such as anxiety and depression.[396] Furthermore, the impact of lockdowns have seen an alarming increase in domestic violence incidents globally due to social isolation,[411] affecting wellbeing and mental health and driven by those residing in a low socioeconomic areas, and among those with financial difficulties.[412]

Despite there being a wealth of quantitative literature exploring the impacts of the social determinants of health, such as social capital, there is limited post positivist evidence examining the lived experiences of individuals. Therefore, this study aims to qualitatively explore the impacts that existing social capital had on the experiences of Australians in lockdowns during the COVID-19 pandemic and the effect this has had on their wellbeing and quality of life.

7.4 Methods

7.4.1 Design

This descriptive qualitative study is underpinned by Sandelowski's[413] classification of qualitative descriptive design methods, which from a philosophical perspective draws upon naturalistic inquiry and interpretative study designs. A qualitative descriptive approach provides an opportunity to explore and gather a broad insight into the phenomena of interest, which is particularly indicated when little is known on the topic.[414] This is pertinent in a study that aims to explore how existing social capital impacts the experiences of Australians during lockdowns during the COVID-19 pandemic and the effect this had on their wellbeing. This approach enables a rich understanding of the participants' experiences and perceptions. This study is embedded within a nationwide mixed methods study investigating the relationship between wellbeing and social determinants of health among Australians during the COVID-19 pandemic.

7.4.2 Participants and Recruitment

Purposive sampling was used to ensure a comprehensive cross section of participants and representativeness of remoteness, socioeconomic status, gender, age and state and territory of Australia. Participants who had completed an online survey as part of the larger mixed methods study and agreed to participate in the qualitative component of the study were eligible for purposive sampling. A detailed description of the recruitment process for the online survey is reported in Green et al.[390] To achieve remoteness sampling, the primary researcher (HG) used the Australian Bureau of Statistics (ABS) remoteness structure, Accessibility and Remoteness Index of Australia (ARIA+) that enables the user to target major cities, regional and remote locations. Socioeconomic sampling was achieved by using the ABS Socio-Economic Indexes for Areas (SEIFA)

Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) maps, which enable the primary researcher to use postcodes to select participants based on their socioeconomic status. The IRSAD is used to collate data on individuals' social and economic conditions by local government area, providing a score of either advantage or disadvantage. A high score indicates greater socioeconomic advantage, and a low score specifies greater socioeconomic disadvantage.[205] This score has been used to classify participants in the study as either from a high or low socioeconomic area.

All participants that agreed to be contacted for the qualitative component of the study provided their contact details in the online survey, confidentiality of these participants was achieved by identifying them and providing a study code. Once assigned a study code, all contact details were removed and kept in a password protected file by an independent researcher. Using the sampling framework, potential participants were purposively selected by the primary researcher. Potential participants' study codes were then provided to the independent researcher who gave the contact details of the corresponding study codes to the primary researcher. Potential participants were approached through their email addresses and were provided with information regarding the study and a consent form to return should they agree to participate.

7.4.3 Data Collection

Semi-structured interviews were deemed the most appropriate method of data collection to meet the study aim and to provide a broad insight into the relationship between wellbeing and social determinants of health among Australians during the COVID-19 pandemic.[274] Informed by the results of the quantitative analysis[382, 415] and extensive review of the literature,[390] a semi-structured interview guide was designed to investigate the 'why'(see Figure 13). The semi-structured interview guide contained open-ended

questions such as 'Please tell me about your experiences during COVID-19?', and 'Please tell me about any circumstances in your life that you feel impacted your experience of COVID-19'. Prompting questions were also used to generate further discussion and explanation from the participants. To assess existing social capital participants were asked a question regarding their relationships with friends, family and community during the pandemic, this then prompted further questions regarding their social support and social capital. Additionally, questions regarding challenges and strategies used during COVID-19 also prompted further questions regarding social capital. The question used to explore the impact on participants' wellbeing was a prompting question of 'tell me how COVID-19 impacted your wellbeing', following the initial question of participants being asked to share any challenges they may have encountered during COVID-19.

> Can you tell me a little about yourself? What do you do?
> *Probes: Family life? Significant challenges in life? Significant blessings?*
>
> Can you tell me about your experiences during COVID-19?
> *Probes: work from home? Children? Loss of employment? Was your life and health the same as prior to COVID-19? Biggest changes? Anything particularly distressing for you?*
>
> Can you tell me a little bit about your relationships with family and friends during COVID-19?
> *Probe: affect wellbeing or quality of life? What were some of the good things? What were some of the bad things? Physical? Mental? Emotional?*
>
> Can you tell me about any challenges you may have encountered during COVID-19?
> *Probes: Employment? Health? Social support? Quality of Life? Gym close down? Moving to a new house? Financial? Relationship stress?*
>
> What strategies did you use to cope with any of the challenges you faced during COVID-19?
> *Probes: Did you have access to social support? Use alcohol/ drugs? Eat more/differently? Seek health professional support?*
>
> Can you tell me about any circumstances in your life that you believe/feel impacted on your experience of COVID-19?
> *Probes: Poverty, insecure/no employment, racism, food insecurity, local neighbourhood, your gender – has your experience as a man or woman or transgender or non-binary person different to that of other genders? Drugs/alcohol use? Comparison to others?*
>
> Can you tell me about accessing health care during COVID-19?
> *Probes: alternative services? Challenges or difficulties? Telehealth use?*

Figure 13: Semi-structured interview guide

Due to the geographical dispersion of the participants, the one-on-one semi-structured interviews were held either by videoconference or telephone. Despite the primary researcher's preference for conducting the interviews via videoconference, some interviews were held on the telephone due to slow internet bandwidth or no camera options available to the participants. All interviews were conducted at a mutually agreed time and date between March 2021 – August 2021. The semi-structured interviews were

conducted by a female PhD candidate and the primary researcher on the study (HG) who is a public health professional with previous experience in descriptive qualitative interviewing. Before conducting the interviews, the study details were emailed to the participants, with all participants understanding that their participation was voluntary, and they had the option of withdrawing from the study at any time. A signed consent form was returned to the primary researcher prior to the commencement of the interviews. All semi-structured interviews were audio-recorded, with field notes taken during and following each interview. Each of the interviews with the participants ranged from 30 - 60 minutes. A $50 grocery gift card was provided as a gratuity to each participant in recognition of their time. Semi-structured interviews continued until data saturation had been achieved.[416]

7.4.4 Data analysis

An inductive thematic analysis as described by Braun and Clarke[274] was used to analyse the data. Instead of the researcher assigning their predetermined ideas, the inductive thematic approach allows for meaning to be originated from the content of the data. To ensure anonymity, each participant was provided with a pseudonym and the semi-structured interview audio-recordings were then transcribed verbatim by a professional transcription service. Once transcribed, all audio-recordings were re-listened to and checked against the transcripts to ensure accuracy. To assist with data analysis, all transcripts were imported into NVivo 12. Using the inductive thematic analysis approach, the first step was immersion within the data, reading and re-reading the transcripts and listening to the audio recordings. Secondly, initial codes, meanings and patterns were generated. As the analysis progressed the initial codes were arranged into potential themes, with coded extracts collated. To ensure the potential themes remained grounded in the data[417] and resembled the data, the coding framework was reviewed and checked

209

against the transcripts. From the themes, sub-themes were identified that described and summarised the data. Each theme and sub-theme were refined to ensure it reflected the patterns and meanings within the entire dataset.

7.4.5 Ethical Considerations

Ethics approval was received from the University of Wollongong Human Research Ethics Committee (HREC) approval no: 2020/306, prior to commencing this study.

7.4.6 Rigour

To ensure rigour, the criteria of trustworthiness and quality as explained by Lincoln and Guba[374] were used. Checking the accuracy of the data and ensuring data saturation had occurred established the credibility. A diverse sample of participants from various socioeconomic areas that were geographically dispersed enabled transferability. Dependability was established by the research team engaging in frequent open discussions about the interpretation of the data. Establishing ongoing reflexivity throughout the research process allowed for confirmability to be achieved.

7.5 Results

Twenty participants were interviewed from a range of socioeconomic areas across Australia. Participants varied in ages from 21 to 65 years, with 50% (n=10) identifying as females, 40% (n=8) males, 5% (n=1) non-binary and 5% (n=1) identifying as transgender. Participants were geographically dispersed across all states and territories and from a variety of socioeconomic areas within Australia. Data analysis revealed three themes: No person is an island; Social engagement; and Loneliness and isolation. Verbatim quotes from the participants in this study have been used to illustrate the key

themes. Quotes used in this study were chosen based on the best representation of the experiences that matched the main themes. The themes are discussed in detail below.

7.5.1 No person is an island

Concerns regarding social connection were voiced by the majority of participants in this study, with lockdowns creating a social void in their lives, a desire among some for human touch, relationship stress among some couples, while others felt a lack of social support during the pandemic. Physical distance between friends and family was often expressed as 'anxiety inducing' and a challenge.

7.5.1.1 Influence of social support

There were clear differences in the experience of social support based on living arrangements and socioeconomic status at the start of the pandemic. Some participants expressed that they had received adequate social support, while others felt that their social support was distanced or taken from them, and others lacked social support altogether. Living in a share house provided some participants with a familial social support, with one participant expressing "*I was really, really lucky to have a supportive familial relationship in my share house. So we really looked after each other. So there was that solidarity by all of us sharing together and we have each other and we would find ways to entertain ourselves.*" (Sergio). Despite this type of social support considered positive, for some it did not replace the social support received from friends or others, saying "*I mean, I have been described as a social butterfly and an extrovert so there was support but there wasn't enough and that's me, so yeah*". (Sergio). In contrast, being an international student who recently arrived in Australia while living in a share house that had no social interaction was difficult and isolating, with one female participant explaining that "*They [house mates] were very stressed and we'd hardly talk to each*

other. No one wanted to have a chat, so I think that's when I felt really isolated, because I was in that house all the time and I didn't have anyone to talk to" (Haimi). It was a particularly difficult time for those who were isolated from family and friends, feeling their social support was removed from them saying *"It meant that I couldn't see people face to face, and because so many of my friends are interstate, it did mean that I was cut off largely from them."* (Reuben). Living in a rural area, with a lack of access to social support while having to endure a miscarriage was particularly challenging and distressing for one female participant who said "*With friends, that basically just evaporated. Everybody was locked down and stressed and really, I lost touch with just about everybody. I mean, other than my mum, I had no one. That was pretty tough, to be honest, because in a lot of ways, when you're in rural areas, you rely on your social supports rather than anything else and that just wasn't there. I mean, it was but it's just kind of not the conversations that you can really have over Facebook, you know?"* (Clara). While Clara had support from her mum, she felt awkward discussing her grief saying, "*I felt really awkward because she [mum] spends all day dealing with people who've got significantly worse problems so I didn't want to add to that. So I mean, when she [mum] gets home, she doesn't need to continue working. So if I was having a bad day or something, I just kept it to myself."* (Clara).

However, other participants expressed receiving adequate social support and discovering who 'true' friends were. One participant said *"I really found who my friends are. Some of them, and it was much to my annoyance at the time, but some of them just made a real effort to make sure that they knew I was okay and then others I now see as fair-weather friends, if you've heard of that term. The ones I thought were my true friends I know are my true friends and they were really there for me and did what they could to help*." (Manaia). For those that lived with their partners, they expressed sufficient social support

being able to connect with each other but also maintain a connection with friends. One participant elaborated on this saying *"We are both quite capable of becoming homebodies if need be. We have the dogs, we're quite content with each other's company a lot of the time, play computer games, boardgames, talk. I wouldn't say our friendships suffered at all. We kept in contact with each other. I made a point of making phone calls, which we almost never do. We don't use telephones. But I made a point of actually ringing my friends, at least once a month just to check how they're going, make sure things are fine."* (Trey). This was a similar experience expressed by another participant who said "*I think my social support is pretty strong, so that's pretty good. I've got friends, family, husband and then now I've got some workmates as well in the hospital because we - so that's a lot of support as well."* (Xiuying). Furthermore, others felt that social support was available to them if they required it, with one participant saying, "*I don't think I've had any particularly lack of support in any one direction so I suspect if there were people I needed to talk to I could."* (Marcel). Participants who resided in high socioeconomic areas and in geographic locations in which strict lockdowns were not imposed, did not experience the lack of social support that other participants felt, saying, *"Well Canberra didn't really - we didn't go through any kind of lockdown, really. So we haven't had that experience. So really, those patterns of - those social patterns and social support didn't change too much from our regular activities"* (Parrie).

7.5.1.2 Relationship stress

Although some participants felt they had adequate social support, others expressed relationship stress due to changes in their living arrangements, other stressors and anxiety. This was expressed among participants, regardless of their socioeconomic status. One female international student expressed her concerns regarding her relationship with her partner saying *"Because we had never lived together or had that and putting two people*

213

that are in a long-distance relationship in one confined space does not really go well. Definitely it took a huge toll on our relationship. I was at the point where I'm like, okay. My thesis is dependent on him. Things are just not going okay. I'm going to have to go back home. Yeah, I was prepared to go back and figure out a new life, and everything." (Mandeepa). While for other participants the anguish caused by border closures and fear of spread of COVID-19 meant that they experienced relationship tensions because of extreme concerns and anxiety. One female participant who had family overseas explains *"Like, around April, May, June, it was quite - I don't know the word, but like my partner and I had a lot of relationship challenges as a result of me just being super-irritable and panicky and anxious."* (Emma). Furthermore, lockdowns and stay at home orders forced couples to be confined to their residence precipitating relationship stress, with couples arguing. One non-binary participant said *"I function from day-to-day quite fine, there's no domestic violence. I say I'm arguing with my partner, but this is for the first time in 10 years of a relationship. We're not serious arguing, we're not fighting. We always make up by the end of it. Although, I think we're both aware that it's something we need to deal with, it's not like we're looking at the world collapsing down around us."* (Trey).

7.5.1.3 Loss of intimate connections

A lack of intimate human connection during the COVID-19 pandemic was a common experience felt among the participants in our sample, which was most prominent among those who resided in low socioeconomic areas and didn't live with a partner or were occupants of a share house. One international student who lived in a share house expressed how she missed human physical touch saying *"like sometimes you just really crave physical touch. I just wanted someone to give me a hug. I could talk to them, but I just really wanted a hug, or I really wanted to just sit with someone and play boardgames, or just do something together."* (Haimi). While for another participant who had recently

lost her partner to an unexpected death and had also lost her employment due to the pandemic, she felt she needed the human connection and comfort of her friends stating *"That was when I was really needing my friends. Not having a lot to do and having to try and find things to keep me occupied rather than getting into my own head."* (Manaia). The loss of human connection was associated with poorer wellbeing for many participants, particularly those who resided in low socioeconomic areas and among international students. One international female student participant explained her psychological wellbeing after being geographically separated from her boyfriend *"Oh, it's really hard. As I told you, when I went here, to Victoria, I felt like I have separation anxiety. Because I was crying every day, every night. Everything little thing I'll remember about him when we're together. We just sometimes really want to be with each other, human touch and talk about things, which we cannot do. We're just on Zoom call. It's hard."* (Kailani). This was a similar experience for Nick, who was in a long-distance relationship. Being geographically distanced from his partner affected his human connection during the pandemic, he expressed his concerns as *"My partner actually lives interstate, it's a bit of a long-distance relationship. The travel bans affected that interaction and connection. Missing out on going on holidays. We'd planned to go overseas and all that kind of stuff. It's also delayed our plans about marriage and living together as well."* (Nick).

For other participants, the lack of ability to leave the house beyond the restricted 5 km radius, was challenging especially for those who were single and used social events to meet potential partners. The lack of social events led to non-existent intimate human connections for some, with one participant expressing *"I feel like that led to a lot of yeah, just a lack of human touch. A lack of actual engagement with my fellow human beings as we share this space. So that made it really difficult and socialising and having a social*

outlet and even meeting people was just unimaginable". (Sergio). Others used animals as

a substitute for human connection, with Manaia elaborating *"One of my friends' dogs had*

puppies, so I ended up with one of the puppies. That gave me the companionship I was

really missing. She gave me the puppy as a foster situation but I think she knew that she

was never going to get it back." (Manaia). However, for Parrie who did not live with his

partner, he felt cautious when it came to sexual intimacy due to the concerns around the

spread of COVID-19, with him saying "*Of course, health and safety is always a priority*

in that regard but I suppose intimacy has been an issue as well. With my partner. Although

that sort of has relaxed a bit. Initially, we were very wary about all that." (Parrie).

7.5.2 Social engagement

Stay at home orders limited social interaction and social engagement among participants

in this study. Social events and outlets were almost non-existent for many during the

height of the lockdown period and in the time following, due to fear of spread of COVID-

19. The lack of social engagement affected many participants' wellbeing and quality of

life, this was especially noticed by those who resided in low socioeconomic areas, lived

alone and were from regional areas.

7.5.2.1 Inability for social engagement that safeguards wellbeing

The absence of any social engagement was described by participants as affecting their

wellbeing, leaving them feeling lonely and desiring social interaction. For one

transgender participant who lived alone in regional Australia, the community event that

she joined on a weekly basis was cancelled, she expressed the impact this had on her

wellbeing saying *"It wasn't too good. I mean especially because most of the time I am*

alone at home, so that as pretty much the only outing that I'd have during the week, apart

from just going shopping. But yeah, it was a bit lonely." (Nyah). For Reuben, who also

lived alone and engaged socially through interstate travel, the closure of borders meant that he was unable to socially interact. This had a significant impact on his wellbeing as he was already experiencing mental health issues, with him saying *"Because I wasn't getting to travel, there was nothing that would give that bit of a bump in my motivation or my mood, so there was nothing that would break that cycle, so it [wellbeing] was worse from that point of view."* (Reuben). Furthermore, lack of social engagement for participants that lived alone in a low socioeconomic area influenced their ability to cope, with a male participant stating *"I don't have a huge amount of friends but just the social interactions that you miss. I do a weekly catch up with a group of mates. I'd go over to a mates place to watch some footy or car racing and stuff like that. That was all cancelled. That was the sort of impact but just the lack of social interaction I guess"* (Nick). The lack of a social outlet was challenging for Manaia, whose partner had recently passed away, while she needed to grieve, not being able to engage with others left her lonely with her mental health declining. Manaia said *"Yeah, and that's why I was quite lonely, because we had periods of time where we weren't allowed visitors."*

7.5.2.2 Remaining connected

While the ability to engage in physical and face to face social interaction was limited, many participants in this study found alternative methods to remain connected with family and friends, which assisted in their overall wellbeing. Many participants described 'catching-up' with family using videoconferencing services such as zoom and FaceTime to remain connected and replicate some sort of normalcy. Remaining connected through technologies was an experience often expressed by participants who resided in high socioeconomic areas. Using zoom was a common alternative used by families with one male participant saying, *"I remember at the beginning the lockdown in Melbourne I had a weekly Zoom catch up with the whole family"* (Marcel). While another male participant,

217

Joshua, explains "*During the actual lockdown, we set up video calls, we had group family calls, we were all chatting away and we'd just have in the background and the kids would play at each other, in a sense. We set up video calls for the kids with their cousins so that they would have a phone or an iPad with Facetime and be playing in their room with one of their cousins doing the same thing in their house*" (Joshua). Alicia's family had never used zoom to hold family meals together, however adopted this approach to stay connected during the lockdown, saying "*We've never done a Zoom meeting or anything like that, so for that benefit it was nice. We were doing it weekly with the whole family and it was - we made it a bit of fun. We all did our favourite dishes and it was nice. I think, if anything, we probably communicated more rather than less*" (Alicia). Social media was also a popular medium used to keep connected with friends, with one participant saying "*Then friends as well, because of the restrictions I used to see them once a week as well, so now I haven't seen them for months. Definitely do really miss them but we just keep in touch via social media.*" (Xiuying).

The border restrictions on overseas travel meant that being at the birth of her first grandchild was impossible for Manaia, however, she explains that Skype was used to enable her to still experience the birth in real time saying "*No, I haven't met my grandchild yet. I would have liked to have been there for her labour too and when she came home with bubby. But my mother-in-law - her mother-in-law has been fantastic and they sent me lots of videos and I was on Skype with them while she was in labour. So I was as close to being there without being able to be there. I was very grateful for technology. It just made it a lot easier. But it will be nice when they come over and see me.*" (Manaia). Technology and digital interaction were seen as tools for which participants were still able to engage and interact with friends and family, with one participant stating "*Yeah*

Messenger and Skype and WhatsApp were at the top of your priorities list. We've now got new family groups on Messenger." (Aaron).

7.5.3 Loneliness and isolation

Loneliness throughout the lockdown periods was experienced as an outcome of lack of in-person social interaction. Participants felt that loneliness was due to the isolation they experienced due to physical distancing measures and lack of human connection, which was often experienced by those who reported being affected by other social determinants of health. Living alone was consistently raised by participants as a contributing factor to their loneliness, however this was often associated with the exacerbation of other social determinants of health, including loss of employment and loss of income. One female participant elaborates saying *"I found Covid quite lonely. I had gone from living with my partner to being alone. I was dealing with grief and I found that going to work was really good for me. Then when there was no work not only was I dealing with grief, I was dealing with the fact that I wasn't entitled to any benefits at the time because I'm not an Australian citizen and New Zealand - my visa makes me ineligible for Centrelink [government] support. So things were quite stressful and dealing with grief on top of it and not being able to see my friends".* (Manaia). Loneliness and isolation were exacerbated for some participants during the pandemic, with one participant stating *"Yeah, I felt pretty isolated and lonely. But then, as I say, I feel isolated a lot of the time, but it gets broken up normally."* (Reuben). Feeling socially isolated and lonely was mentioned by one female international student participant as stemming from the lack of social cohesion within the share house, saying *"I think there were feelings of isolation and loneliness there too, because of the house situation, because I didn't get the social life as much at that point."* (Haimi). The isolation from social networks and social support, as well as the loneliness caused one participant to resort to taking drugs as a way of coping, saying *"to be honest,*

I may have broken out some of the prescription drugs that were around the house every so often." (Clara). Similarly, the stress and isolation from social networks intensified others addiction behaviours, leading to poorer wellbeing, with one participant saying "*I'm drinking probably the better part of a bottle of vodka a day now. That's not entirely lockdown, but definitely coronavirus and some of the stresses associated with that have exacerbated my drinking, I believe. It is definitely part of the way of coping with social isolation and what's happening."* (Trey)

7.6 Discussion

Individuals' behaviours and social relationships are embedded within communities and neighbourhoods, therefore social capital provides a valuable perspective on the understanding of how social environments can influence health outcomes. This study provides new evidence for understanding the influence that multiple components of social capital have on the wellbeing of the Australian population during the COVID-19 pandemic. Three themes emerged from this study, no person is an island, social engagement and loneliness and isolation.

Perceived or actual access to social support provides a protective factor against negative life events, both in terms of psychological and physical health, enabling individuals to feel in control of stressful life situations.[418, 419] While social support varied among participants in this study, most expressed concerns regarding inadequate social support during the pandemic. Those who lived in low socioeconomic areas, those who identified as female and among international students were particularly likely to note this. According to social scientist Putnam, in those communities that have high social capital individuals do things together, such as church, membership of organisations and simply, doing activities together such as bowling.[420] A study by Borgonovi and Andrieu found

that communities that were able to join together to do social activities *("bowl collectively")* prior to the pandemic, those with high social capital, were able to do activities alone *("bowl alone")* to a greater extent during the COVID-19 pandemic.[421] Similarly, this study found that those with higher levels of social support were buffered from difficulty in coping and poor psychological wellbeing, compared to those with poor levels of social support. Literature examining the mental health of individuals during the COVID-19 pandemic found that high social support was a protective factor against stress relating to crises, with being female and worsening finances predictors of stress.[422]

Additionally, this study found that those who resided in low socioeconomic areas expressed poor social support compared with those living in high socioeconomic areas and that residency in low socioeconomic areas was also associated with a loss of human connection during the pandemic. Furthermore, women and international students also conveyed poor social support, which could be a reflection of their social support prior to the pandemic as well as an exacerbation of their existing social determinants of health including ethnicity, employment, poverty and income. While social support was found to be reflective of socioeconomic status, relationship stress experienced by participants in this study was not associated with socioeconomic status. This finding is not consistent with what is found in the literature, which suggests that relationship stress during the pandemic was precipitated by male unemployment and social circumstances such as poor social support and housing insecurity.[423] This is unexpected given that unemployment and housing insecurity are factors associated with a lower socioeconomic status, however maybe a reflection of the type of participants recruited into the study.

Social engagement, immersion in community and a sense of belonging are vital for human wellbeing and health.[424, 425] Similar to Putnam's explanation of social capital, communities that demonstrate solid social connections, relationships and engagement,

also benefit from greater individual wellbeing.[420] In this study, the lack of social engagement and social connections significantly impacted the wellbeing of individuals residing in low socioeconomic areas, those living alone and from regional areas within Australia. Previous studies have shown that socioeconomic status affects patterns of social capital and that individuals with higher incomes, education and occupational status are more often involved in volunteering, belong to political parties and other organisational groups, and therefore have higher social capital.[426-428] This often reflects social inequalities that place constraints on the ability of and opportunities for individuals from lower socioeconomic areas to immerse themselves within the community.

Having strong social capital fosters a sense of belonging and provides meaning to life, therefore enhancing an individual's overall wellbeing.[429] This study has found that individuals within Australia who resided in high socioeconomic areas were still able to remain social connected while enduring the isolation of lockdowns. Remaining connected through technology was vital for their wellbeing and ensured some sense of normalcy during the pandemic. Participants in this study used alternative methods to remain connected with their family, friends and community providing them with the necessary support required to assist them through the difficulties of lockdown. This echoes the findings of a study conducted in the United States among older people at risk of isolation and loneliness, which demonstrated that adoption of technology, including video calls, significantly reduced loneliness measures and significantly increased emotional wellbeing.[430] It is clear from this study that having strong social support and networks prior to the pandemic enabled individuals to adapt to ensure their psychological wellbeing was maintained. However, access to and ability to pay for technologies to stay connected was also an important factor and may have been restricted by socioeconomic status.

Lack of social interaction exacerbated loneliness and isolation among those from low socioeconomic areas and those who lived alone prior to the pandemic. Indeed, a disadvantaged social status has only amplified the effects of the pandemic. To cope with the social isolation and loneliness of the pandemic some participants in this study resorted to using drugs and alcohol, further decreasing their mental wellbeing. This finding is consistent with US findings in the literature, which have shown that there is a direct relationship between loneliness and alcohol consumption, with the COVID-19 pandemic increasing solitary alcohol consumption.[431] The same study also noted that social support is a protective factor for excessive alcohol consumption.[431] Similarly, research from the US has shown that increased drug use during the pandemic was associated with elevated levels of loneliness and anxiety.[432] This study has provided evidence demonstrating the mental health and wellbeing consequences that a lack of social capital and social support has had on vulnerable individuals during the pandemic. Additionally, research in Australia examining South Australian women's experiences with alcohol consumption during the pandemic found that women used alcohol to relieve their anxiety and resemble normalcy, given the social isolation of the lockdowns.[433] The results of this study add to the body of evidence regarding the increase in loneliness within the 21st century,[434-437] not just during the pandemic. However, evidence-based interventions to address loneliness are limited. Social prescribing is one intervention that has been used throughout the UK to address loneliness, and this model connects an individual with a support worker for a short time period, to assist them in connecting with community groups and activities. While not primarily used for loneliness, some limited studies have demonstrated that social prescribing is successful in addressing loneliness.[438, 439] The findings of this study demonstrate the need for social isolation and loneliness to be address through interventions such as social prescribing. It calls for renewed action on the social

determinants of health for the immediate and long-term future. Evidenced based interventions to address social support, social cohesion and loneliness are urgently required.

7.7 Limitations

The scope of this study indicates a potential for responder bias towards individuals with an interest in COVID-19, despite participants being purposively selected. We took steps to ensure a diverse sample in terms of age, gender, socioeconomic status, and geographical location to ensure a wide range of Australian adults' experiences were received. Given the qualitative nature of this research, is the results are not intended to be generalisable, but instead seek to provide trustworthiness to allow readers to make their own assessment of transferability. While every attempt was made to interview participants using video conferencing, due to internet bandwidth issues, some had to be interviewed using the telephone. This may have limited the non-verbal communication, impacting on the quality of the data collection. Despite this, careful listening was used as a mitigation strategy enabling the researcher to note rapid speech and changes in voice tone.

7.8 Conclusion

This study provides insight into the challenges of social isolation faced by many Australians during the COVID-19 pandemic. The results of this study have indicated that a lack of social capital prior to the pandemic has led to negative impacts including loneliness, and social isolation resulting in poor wellbeing during the pandemic. This has been exacerbated by existing and amplified social determinants of health such as loss of employment, income, gender, remoteness, and lack of social support. The findings

highlight the need for interventions to increase social support, social cohesion, and social connectedness among Australians to enhance their overall wellbeing immediately and long term. Multiple and multilevel interventions aimed at a coordinated response to building networks that promote social participation and support among those with limited social capital are necessitated. This includes building social capital through involvement in community centres, exercise groups, partnerships with refugee leaders, neighbourhood programs and fostering intergenerational social capital programs. Social capital plays an enormous role in wellbeing and health, with this study identifying that the need for human connection is high therefore, interventions focussed on building social capital should be a priority. However, further research is required to develop optimal methods on implementing social capital interventions.

Chapter 8: Discussion and Conclusion

8.1 Chapter introduction

This concluding chapter integrates the findings from this mixed method thesis exploring the relationship between wellbeing and the social determinants of health among Australian adults during the COVID-19 pandemic. It is the intention of this chapter to present the key findings in an integrated format and display the new knowledge generated through this thesis. Within this chapter, public health and policy implications of the research's key findings will also be discussed. Furthermore, this chapter provides recommendations on areas for future research and concludes with the strengths and limitations of the thesis.

8.2 Aim and research questions

This section is a reminder of the aims and research questions of this PhD thesis, which are previously outlined in Chapter 1.

Aim: To investigate the relationship between wellbeing and the social determinants of health among adults residing in Australia during the COVID-19 pandemic.

Research questions:

1. What is the association between wellbeing and social determinants of health in the Australian adult population during the COVID-19 pandemic?

2. What are the predictors of wellbeing in the Australian adult population during the COVID-19 pandemic?

3. How has the COVID-19 pandemic impacted the financial and economic wellbeing of adult populations in Australia across socioeconomic areas?

4. What are the experiences of adult Australians of the impact of the COVID-19 pandemic on food and housing security, and what effect has this had on their wellbeing?

5. Among adult Australians, what have the impacts of COVID-19 been on their social capital, and what effect has this had on their wellbeing?

8.3 Summary of the key findings

With the emergence of a new global infectious disease, COVID-19, it was initially unknown how Australians' existing social determinants of health would be affected and what impact this would have on their overall wellbeing. This research has provided new insights into the impact of social determinants of health on Australians' capacity to cope during the pandemic and the consequences for their wellbeing. Three key findings have emerged from this research, and each is critically examined below and in the joint display table (see Table 13). The integration of results in this research has been achieved by bringing both the quantitative data and qualitative data together through a visual representation in a joint display table. This has drawn out new insights from this research beyond what the quantitative and qualitative results show separately and is a representation of the consistency of the findings. A detailed explanation of the integration methods and rationale for their use are described in Chapter 3.

Table 13: Joint display of findings

Key finding	Quantitative findings	Qualitative findings	Meta-inferences
Food and housing insecurity impacts wellbeing	Food and housing security were associated with higher wellbeing scores. Food and housing security were predictors of higher wellbeing.	Housing outcomes: *'From there, the lease ran out, which was when I moved to the house-sitting place, there was a period of time that was not covered between them, so it was about three weeks that I had to find a place to live. It was – the level of anxiety!'* (Mandeepa). Food-related concerns: *'I would say financially, I already mentioned that but that was a challenge and then I think not having money to get food – I would try to eat one meal a day'* (Karlee). Psychological and emotional impact: *'not eating well, no money, no job, so I never really felt too good, so yeah. I had multiple deficiencies. I wasn't feeling good and I think that made it worse as well.'* (Haimi).	Expansion
Social capital influences the ability to cope during the pandemic	Strong social support was associated with higher wellbeing scores. Strong social support was a predictor of higher wellbeing.	No person is an island: *'It meant that I couldn't see people face to face, and because so many of my friends are interstate, it did mean that I was cut off largely from them. But I think it was more significant with the impact it had on my mental health. I was just in a non-functioning zombie state for that period of time'* (Reuben).	Expansion

Key finding	Quantitative findings	Qualitative findings	Meta-inferences
		'*I was really, really lucky to have a supportive familial relationship in my share house. So we really looked after each other. So there was that solidarity by all of us sharing together and we have each other and we would find ways to entertain ourselves. (…) It was terrific and helped with the stress and anxiety*' (Sergio) Social engagement: '*It wasn't too good. I mean especially because most of the time I am alone at home, so that as pretty much the only outing that I'd have during the week, apart from just going shopping. But yeah, it was a bit lonely.*' (Nyah). '*We've never done a Zoom meeting or anything like that, so for that benefit it was nice. We were doing it weekly with the whole family and it was – we made it a bit of fun. We all did our favourite dishes and it was nice. I think, if anything, we probably communicated more rather than less (….) This helped with my mental wellbeing for sure.*' (Alicia). Loneliness and isolation: '*to be honest, I may have broken out some of the prescription drugs that were around the house every so often(…)That was pretty tough, to be honest, because in a lot of ways, when you're in rural areas, you rely on your*	

Key finding	Quantitative findings	Qualitative findings	Meta-inferences
		social supports rather than anything else and that just wasn't there.' (Clara).	
Employment and income loss were associated with low socioeconomic status	Australians with higher incomes and those that were employed were associated with higher wellbeing scores.	Employed with a higher income: *'I'm being good to pay rent, I can buy things I wanted to buy, so I think it's okay, and I've got a fulltime job as well, so yeah, it's okay(...) This helps me keeping the positive vibes.'* (Xiuying).	Confirmation
	Australians residing in a low socioeconomic area reported the highest employment loss and had significantly higher odds of experiencing income loss during the pandemic.	*'We're quite lucky in that we have a – we're financially, maybe not rich, but we're not that precarious(....) I do appreciate the fact that I'm extremely privileged. All my normal needs have been met: housing; food; companionship, with my partner; companionship with my dogs; I was kept warm, secure. So I've got to say, my quality of life was quite good.'* (Trey)	

8.3.1 Food and housing insecurity impacts wellbeing

Chapter 4 addressed the first and second research questions of this thesis by highlighting the direct association between wellbeing and food and housing. The most significant finding of this thesis is that food and housing insecurity during the COVID-19 pandemic was high among Australians and associated with diminished wellbeing. The prevalence of food insecurity was found to be 22%, with approximately a third of the study's participants reporting housing insecurity. The findings also highlight that food and housing security were a predictor of higher wellbeing, demonstrating a direct relationship to total wellbeing, housing security ($\beta = 0.166$ 95% CI 4.96 to 10.42 p = 0.000) and food security ($\beta = 0.152$ 95% CI 4.63 to 10.70 p = 0.000).

The qualitative study (Chapter 6) further examined the fourth research question, exploring the experiences of the social determinants of health of Australians during the pandemic and specifically exploring how access to food and housing impacted wellbeing. The findings expand on the quantitative findings of the thesis documented in Chapter 4. Difficulty in accessing food was more prevalent among Australians living in lower socioeconomic areas and amplified by reduced financial capacity and loss of employment as a result of the pandemic. Similarly, housing insecurity was predominantly associated with Australians living in lower socioeconomic areas and almost exclusively among females. Economic vulnerability through loss of employment and income, especially among Australians in a low socioeconomic area experiencing food and housing-related stress, has influenced their overall wellbeing.

As demonstrated in the joint display (see Table 13) for this key finding that food and housing insecurity impacts wellbeing, there has been an expansion of knowledge from the quantitative results. The qualitative findings of this mixed methods research have

expanded on the gender differences in food and housing insecurity and the effect this has had on Australian adults' wellbeing during the COVID-19 pandemic, specifically for women.

8.3.2 Social capital influences the ability to cope during the pandemic

Public health restrictions imposed to prevent the spread of COVID-19 resulted in a loss of social contact.[440] The results from Chapters 4 and 7 addressed research questions 1, 2 and 5 by providing evidence regarding the importance of social capital, including social support, in fostering wellbeing during the pandemic. It was determined that those with strong social support had significantly ($p < 0.000$) higher wellbeing scores (76.00, SD 17.5) compared to Australians with moderate (65.73, SD 17.9) and poor social support (51.78, SD 21.3). Additionally, social support was found to be a predictor of wellbeing, with those who had strong social support having better wellbeing ($\beta = 0.309$ 95% CI 7.25 to 10.46 $p = 0.000$).

Australians' lived experiences of social capital during the pandemic demonstrated that 'no person is an island', with most participants voicing concerns regarding a loss of social connection, as depicted in Chapter 7. Despite a desire for human touch and the need for social engagement by most participants, there were clear differences in social capital and social support based on living arrangements and socioeconomic status. Australians with existing high social capital prior to the pandemic were able to remain socially connected during the lockdown periods, resulting in a greater capacity to cope mentally during the pandemic. This was also the experience of Australians who resided in high socioeconomic areas as they perceived their ability to remain socially connected as regulated but still possible. Australians with low social capital and social support during the pandemic were

more likely to report resorting to drug and alcohol use to cope with the loneliness and isolation of the lockdowns.

The qualitative findings of this thesis have built upon the results of the quantitative data in terms of social capital and social support and have provided insights into the lived experiences of social capital across socioeconomic areas and gender. It has explained the relationship between these vital social determinants of health and wellbeing during the COVID-19 pandemic. The expansion of knowledge for this key finding is detailed in the joint display in Table 13.

8.3.3 Employment and income loss were associated with low socioeconomic status

Economic wellbeing was influenced by employment and income loss among Australians during the pandemic. Chapter 5 addressed research question 3 by examining the impact the pandemic had on the economic wellbeing of Australians across socioeconomic areas. The prevalence of employment and income loss among Australians during the pandemic was found to be 13.7% and 24.1%, respectively, in this thesis. Employment and income loss were found to be highest among Australians residing in low socioeconomic areas, 26.7% and 23.8%, respectively. There was an association between economic wellbeing and Australians who resided in low socioeconomic areas, with those living in low socioeconomic areas having significantly higher odds of experiencing employment loss during the pandemic (OR = 1.65 95% CI 1.01, 2.68). While Chapter 4 demonstrated that Australians that were employed had significantly ($p < 0.000$) higher wellbeing scores (65.10, SD 20.2) compared to their unemployed counterparts (56.70, SD 22.3), this was not found to be a predictor of wellbeing. Similarly, Australians with higher incomes had significantly ($p < 0.000$) higher wellbeing scores (66.60, SD19.3) compared to those with lower incomes (55.29, SD 22.3); this was also not found to be a predictor of wellbeing.

Loss of employment and income during the pandemic also resulted in housing and food insecurities, as explained by participants in the qualitative phase, Chapter 6. This was particularly experienced among female participants within our sample who resided in low socioeconomic areas. Participants who experienced employment loss and income loss felt that their wellbeing substantially worsened during the pandemic as they were not only dealing with the uncertainties of the pandemic but also trying to cope with challenges such as lack of finances, inability to pay for bills or loss of employment. However, the wellbeing of participants who resided in high socioeconomic areas was less affected, as they often had the ability to work from home and remain employed.

The key quantitative finding that employment and income loss were associated with low socioeconomic status has been confirmed by the qualitative results, as shown in the joint display (see Table 13), with the meta–inference concluded to be confirmation.

8.4 New literature on social determinants of health and wellbeing during the COVID-19 pandemic

Being an emerging infectious disease, the literature on COVID-19 and its impact on wellbeing and association with the social determinants of health, is a rapidly evolving field. The systematic review presented in Section 2.4 of this thesis was conducted with literature up until July 2020 and predominately includes speculative literature, as this was the only narrative at the time. Almost two years later, many studies have been conducted exploring the wellbeing and social determinants of health of populations in the context of the pandemic. This section reviews this new literature.

While the initial review of the literature on social determinants of health and wellbeing during COVID-19 primarily included papers from the US, there is now an abundance of

studies that have been conducted globally including in Australia, UK, US, New Zealand, Japan, Greece, Norway, Austria, Germany, Spain and other European countries, Brazil, Indonesia and other low- and middle-income countries, such as Africa and India. Despite the variance in countries, the issues identified in each of the studies are parallel. Similar to the synthesized conclusion 1 in the published systematic review at 2.4, there has been substantial evidence within the studies[150, 156, 372, 422, 432, 433, 441-450] to suggest that vulnerable population groups, specifically those from low income groups, lower social classes and those from particular racial/ethnic groups have been disproportionately affected by the pandemic. This includes through delay in medical care, disparities in the burden of disease, socioeconomic vulnerability, social isolation and loneliness, financial difficulties, poverty and poor mental health.[150, 156, 372, 422, 432, 433, 441-450]

Another major finding in the review of the recent literature on the social determinants of health and wellbeing during the pandemic, parallels the synthesised conclusion 2 in the existing published systematic review at 2.4, indicating that gender inequalities and domestic and family violence were exacerbated by the pandemic, which resulted in poorer wellbeing among women. Evidence in the literature[443, 448, 449, 451-461] suggests that lockdowns and other public health measures have meant that women are dealing with increased rates of poverty, greater prevalence of sexual assault and violence within the home, poor living conditions that create stress and precipitate relationship stress.[443, 448, 451, 456, 458] Women also report more loneliness, emotional problems and entrapment and an inability to seek assistance from women's shelter's that may normally protect them from harm. Additionally, gender inequalities were also evident, particularly when it came to parenting, with women having a disproportionate care burden and an unequal distribution of labor.[448, 452-455, 457-460]

Similar to the synthesised conclusion 3 within the published systematic review within this thesis at 2.4, another substantial finding of the review of the recent literature[315, 433, 444, 445, 449, 450, 462-468] on the wellbeing and social determinants of health during the pandemic is that COVID-19 is exacerbating the existing social determinants of health. Loss of income and employment and inequalities in social class, have led to an increase in food and housing insecurity and a lack of access to health care. [315, 444, 447-449, 462, 468] Social isolation and loneliness have resulted in an increase in alcohol consumption as a way of coping and other mental health issues.[433, 445, 449, 463, 464, 466-468]

The new evidence on social determinants of health and wellbeing during the pandemic has built upon the mostly speculative initial evidence that was published in the existing systematic review in Chapter 2 of this thesis.

8.5 Research findings in the context of the current literature

For a high-income country, Australia had high rates of poverty prior to the pandemic, at approximately 13.6%.[469] Poverty rates within Australia are impacted by unemployment rates, changes in housing costs, including rental increases for those on low incomes, availability of social protection and income support payments (social security rates) and the interconnectedness of the social determinants of health. However, the face of poverty is often hidden within Australia, with the dominant discourse that individuals are to blame for their own circumstances and responsible for their own suffering,[469] rather than poverty being a product of social determinants and the social gradient. According to social theorist Weber, social inequalities have arisen from unequal access to resources, and the social class of an individual is determined by life chances, including access to housing,

education and health[470] or the social determinants of health. Such inequalities can be derived from the intergenerational transfer of disadvantage, with children born to parents who are socially disadvantaged limited in terms of educational and employment opportunities and are found to be less healthy.[54] As explained in Chapter 1, the social gradient refers to socioeconomic status whereby health outcomes and life expectancy incrementally improve the higher an individual is on the social ladder. The findings from this research have demonstrated that those in lower socioeconomic areas have been disproportionately impacted by the multiple effects of the mitigation strategies to prevent transmission of COVID-19 in terms of diminished wellbeing and social and economic impacts.

8.5.1 Food insecurity

In Australia, food insecurity is experienced by populations who are vulnerable, including those with financial constraints, low-income earners and those on insufficient welfare/social assistance payments.[391] Food security encompasses four dimensions: availability of a consistent and reliable food supply, access to the financial and physical resources to acquire food, ability to utilise food, including safely preparing, storing and cooking food and transforming food into meals, and stability in the supply of food.[314, 391] Literature on food insecurity within Australia suggests the prevalence of food insecurity among Australian adults was approximately 4%–5% prior to the COVID-19 pandemic.[471] However, the findings of this research indicate that, during the COVID-19 pandemic, this figure increased to 22%. These elevated levels are likely to have been the result of individuals experiencing an exacerbation of other social determinants of health, unemployment, financial stress, loss of income, insufficient social assistance payments and poverty.[472, 473]

While the Australian government has social assistance payments to alleviate poverty and to assist individuals and families achieve a basic standard of living, for the past two decades, these payments have been below the poverty line.[474] A number of economic policy measures were enacted by the Australian government in March 2020 in response to the potential economic impacts of the COVID-19 pandemic.[357] The financial support packages 'JobKeeper' and 'JobSeeker' were introduced. JobKeeper was an income support payment paid to both businesses and not-for-profit organisations to compensate for employees' wages while businesses were unable to operate. They were designed to preserve employment; however, not all employment sectors received this income support payment.[346, 356] Conversely, JobSeeker was a transition from the old unemployment payment (Newstart or Youth Allowance) and was available to those who were unemployed prior to the COVID-19 pandemic and those newly unemployed due to the pandemic.[346] However, these income support payments were only temporary, with the payments reduced in September 2020 and suspended in March 2021, despite parts of Australia still being in lockdown. While this economic response may have benefited some, it was not equitable nationally, with JobKeeper and JobSeeker not corresponding to some individuals' pre-pandemic incomes.[475] Having a higher income is not necessarily a proxy for food security. Unexpected changes in economic circumstances, such as those experienced by the participants in this research through loss of employment and loss of income, can create financial instability, resulting in food insecurity. Additionally, international students and those on temporary work visas, including New Zealand citizens, were exempt from receiving income support payments. Participants in the first qualitative study of this thesis (Chapter 6) reported this exclusion as an issue contributing to their food insecurity during the COVID-19 pandemic.

Household food insecurity has substantial health implications and can amplify existing health inequalities.[476, 477] As with the existing literature,[471, 478] the findings of this research revealed that food insecurity was a predictor of diminished wellbeing. Seivwright[391] reflect on this in their research on food insecurity and socioeconomic disadvantage in Australia, identifying that there is an association between increased food insecurity and reduced overall wellbeing, which may be caused by the inability to meet nutritional needs leading to nutritional deficiencies, creating stress and mental health issues. These findings are supported not only by this thesis but also by international literature. Elgar[479] examined food insecurity and wellbeing in 160 countries and found that food insecurity was strongly associated with lower positive wellbeing and increased poor mental health symptoms. For those who are food insecure, the inability to meet nutritional needs, metabolic changes associated with poor nutrition and stress can lead to reduced wellbeing.[480]

Much of Australia's response to those experiencing food insecurity and its associated challenges occurs through informal food aid. The primary response in relation to food insecurity during the COVID-19 pandemic was much the same, with a large reliance on food banks and emergency food relief charities.[481] Participants in this research attempted to mediate their food insecurity by seeking assistance from food banks and community organisations. However, as revealed by Louie,[481] emergency food relief and food banks had an increase in demand with limited supply. Access to food relief services was hindered by capacity limits, the inability to acquire good quality food supplies and a lack of access to donations from supermarkets,[314] which limited the ability of food banks to effectively moderate the effects of food insecurity.

Stockpiling food and other supplies during the COVID-19 pandemic also hindered access to food supply. Challenges with procuring supplies during emergency or crisis situations are not a new phenomenon and have been discussed in the international literature. For

instance, during the winter storms and hurricane seasons in the United States, so-called 'panic buying' or pre-disaster buying occurs, with people hoarding supplies just in case.[482] Simandjuntak[483] reflect on stockpiling during the 2012 Sandy Hurricane, revealing that when faced with impending disaster, human behaviour is to stockpile food supplies, resulting in a sales surge and limited food supply for those whose income does not accommodate this type of spending. Similarly, the results of this research revealed that those with financial capacity took the opportunity to stockpile food items. This was predominately those living in high socioeconomic areas. Participants who had lost their income, lost their employment, lived in a low socioeconomic area and were reliant on food banks and charities for food supply were not able to capitalise on stockpiling.

8.5.2 Housing insecurity

Housing affordability, including rental affordability for low-income earners, has been a significant challenge in Australia for the last decade.[484] There are fundamental weaknesses in the Australian housing system created by neoliberal governmental approaches. Retreating from the funding of social housing, incentives to leverage private investment and a failure to ensure low-cost rental market options in the private rental market have led to housing affordability issues for Australians, especially those who are low-income earners.[484, 485] The findings from this research have uncovered the ultimate failings within the Australian housing system. For example, participants from low socioeconomic areas in the qualitative component of this research experienced challenges in finding rental accommodation in regional and rural areas of Australia and were precariously housed. This was amplified by participants' lack of finances and unemployment. The findings of this research show that housing insecurity in regional areas was exacerbated during COVID-19, as participants experienced a lack of supply of housing. Those individuals, usually from higher socioeconomic areas, who availed

themselves of the ability to work from home at the height of the COVID-19 pandemic, capitalised on the capacity to live where they wanted. This saw an increase in people migrating from urban areas or major cities to take up residence in regional areas of Australia.[486] This movement compounded the housing insecurity problems in regional Australia, with extremely limited supply and exceptionally unaffordable housing stock for low-income earners and those that lost their employment, as was experienced by participants in this research.

Housing is essential to provide adequate shelter, is fundamental to existence and provides an individual with the capacity to participate in society.[487] Insufficient resources to pay for housing can ultimately affect an individual's welfare. If the price of housing consumes a large percentage of an individual's income, this can diminish their ability to meet other basic needs, such as food. Such socioeconomic deprivation means that an individual can be driven into poverty. Participants in this research experiencing housing insecurity were predominately females from low socioeconomic areas. These women were not only impacted by housing insecurity but also negatively impacted by other social determinants such as employment loss, income loss and food insecurity. Poverty during COVID-19 has been a significant discourse across many low- and middle-income countries and in the US. Research on poverty in the Australian state of South Australia during the COVID-19 pandemic revealed that low-income earners and women were disproportionately affected,[488] which is consistent with the findings of this research. The literature has also noted that,[455, 489-491] although gender inequalities existed prior to the pandemic, the COVID-19 crisis has disproportionately impacted women in three key areas. Firstly, the closure of schools, childcare and unavailability of family to care for children and provide additional support has created an unequal distribution of care, with women disproportionately carrying the burden of unpaid work and domestic care.[490, 491] Secondly,

with the labour market in turmoil and women more commonly precariously employed, women were at an increased risk of losing their jobs during the pandemic.[455] Lastly, women tend to be employed in health, education and social care sectors, making them frontline workers and increasing their risk of exposure to COVID-19.[489, 491] Such inequalities exacerbate worsening mental health and wellbeing for women.[490]

Housing insecurity in this research was expressed as challenging, and its effects on participants' wellbeing were detrimental. In the quantitative study (Chapter 4) of this research, it was established that housing was a predictor of wellbeing, with those that indicated that they were housing secure during the COVID-19 pandemic demonstrating higher levels of wellbeing compared to those who were housing insecure. The link between housing insecurity and wellbeing is reflected in the international literature,[492, 493] with a study in the US revealing that secure housing is a mediator of positive wellbeing, while a study in the UK found that chronic insecure housing gives rise to persistent stress, poor mental health and lack of control. The findings from this research substantiated this established international knowledge, explaining that forced housing mobility gave participants in Australia a sense of loss of control.

8.5.3 Social capital

Social capital and its positive association with health is well established in public health[494-497] and is an important social determinant of health. On an individual level, social capital improves the exchange of psychosocial resources such as emotional and instrumental support, which in turn facilitates improved psychological health and wellbeing.[498] This type of social support is pertinent during a public health crisis such as the COVID-19 pandemic because it facilitates solidarity, social cohesion and bonding relationships. The importance of social capital for building and maintaining resilience and

as a mechanism for coping has been echoed in other significant global events, such as the Ebola outbreak.[499] Participants in this research explained that it was indeed the ability to remain connected during lockdowns and their social support networks that facilitated their individual coping. For example, participants who embraced remaining connected using various methods such as 'virtual family meals', transitioning to purposeful online engagement with friends and talking on the phone felt less negative impacts on their wellbeing compared to those who had difficulty remaining connected or did not have social support available.

However, the ability to remain connected with social support networks was dependent upon an individual's existing social capital and social support prior to the COVID-19 pandemic. Notably, strong social support was a predictor for high wellbeing in this research ($\beta = 0.309$ 95% CI 7.25 to 10.46 p = 0.000); participants with solid social capital and social support prior to the pandemic were able to capitalise on this during the pandemic. Concurring with research by Wickes'[500] research on social capital during and following the 2011 Brisbane floods, this research demonstrates that strong social capital pre-disaster or pre-crisis fosters community and individual resilience during and post crisis. This evidences the significance of social capital as a protective factor for psychological health and wellbeing. Conversely, the reverse occurs when pre-crisis social capital is low or non-existent. This was revealed in this research, with participants who experienced a lack of social capital prior to the pandemic finding it challenging to maintain social connectedness during the lockdown periods of the COVID-19 pandemic. This led to loneliness and had a substantial negative impact on their wellbeing. This research also reveals the link between social capital and socioeconomic status, wherein income was also a predictor of how well participants were able to maintain socially connected.

Loneliness was on the rise in Australia prior to the COVID-19 pandemic, costing approximately AUD $1.7 billion in health care associated and economic costs.[501] The findings of this research reiterate the growing concern about loneliness in Australian society. For instance, many participants explained that a lack of human connection and social interaction during the lockdown periods of the COVID-19 pandemic contributed to loneliness. This was often exacerbated by other social determinants of health, such as employment loss and income loss, and for one participant, this coincided with the unexpected passing of her partner. As explained in the literature, subjective loneliness occurs when features of social relationships are deficient and is more apparent in cultures that place emphasis on individualism, such as is the case in (Anglo) Australia.[502] Loneliness is associated with worsening mental health and wellbeing, and while situational loneliness can be associated with mortality risk, those experiencing chronic loneliness experience a heightened mortality risk.[445] The findings of this research reveal that loneliness was expressed predominately by those living in low socioeconomic areas.

While some participants in this research were able to remain connected due to their existing social networks prior to the pandemic, having a low socioeconomic status and lack of economic capital created barriers for some individuals to develop and use social capital.[503] For example, a dependency between economic and cultural capital is essential to use and gather social capital; however, without social networks, this is challenging.[504, 505] Consequently, as demonstrated in the findings of this research, individuals from a low socioeconomic background had seemingly less social capital than those from with high socioeconomic status and, therefore, did not have the buffering effect on their wellbeing or the ability to cope, which social capital provides.[504]

8.5.4 Employment loss and income loss

Neoliberal policies, under which profit-generating solutions to issues such as unemployment have been made, have resulted in Australia's precarious labour market.[506] Over recent decades, Australia has experienced an increase in job market inequalities. One of the major causes of these inequalities is the casualisation of the workforce, and another is a skills bias.[507] Technology advancements and automation of tasks have reduced the need for medium-skilled workers and increased the demand for highly skilled workers.[508] Because higher skills are required to meet the demands of the labour market, skilled wages have increased at a higher rate than among those who are less skilled and who are, therefore, forced to earn lower wages.[506] Furthermore, within Australia, higher-skilled employees find it easier to find employment than those with low skills.[509]

Labour markets underpinned by neoliberalism encountered significant economic challenges during the COVID-19 pandemic. This was observed in the results of this research. The quantitative study indicated that employment loss for participants in this study was 13.7%, while income loss was 24.1%. The casualisation of the workforce is thought to be responsible for the significant employment loss and income loss across Australia during the pandemic. The shift towards precarious employment, as indicated by a steep increase in casual, temporary and contract employment, has caused greater vulnerability to employment variations as a response to challenges such as COVID-19.[510]

Employment not only shapes an individual's lifestyle and living standards, but it also asserts one's role on the social gradient.[511] Findings from this research revealed that loss of employment and loss of income during the pandemic predominately occurred among individuals living in low socioeconomic areas of Australia. A study conducted in Wales during the pandemic revealed similar results, showing that low-skilled, low-income and

those from a lower social class were more negatively impacted by employment loss during the pandemic.[512] The consequence of low-skilled workers losing their jobs can be a decline in the other social determinants of health, opening vulnerability to social deprivation and poverty. According to the literature in Australia on the labour market during the pandemic, not only were low-skilled workers more vulnerable to job loss but so too were women, who are often employed in casual and part-time roles.[331, 513] International literature indicates that women are over-represented in perilous forms of employment, and women in the UK, Germany and US lost their employment and income at a higher rate than men during the pandemic.[514] Loss of employment and income is substantial, especially for women, because they generally earn less than men and are more vulnerable to job loss due to the tenure of their employment.[515] This is important as previous research has indicated that loss of employment affects future income[516] and, therefore, increases gender inequalities within the workplace.

Employment is an important social determinant of health and is associated with wellbeing.[517, 518] For example, the findings of this research indicate that those with employment demonstrated significantly higher wellbeing compared to those who were unemployed. It is established in the literature that employment loss reduces financial resources, disrupts social connection, precipitates a loss of one's sense of identity and creates stress.[519-521] Income loss associated with a loss of employment can also affect other important social determinants of health, such as housing, food security and social support. Cole[522] posit in their research regarding employment and wellbeing that people who are employed have higher wellbeing than those who are unemployed. Additionally, they reflect that people's wellbeing deteriorates the longer they are out of employment, making it more difficult for them to rejoin the labour market. This holds great significance post-pandemic and for the participants in this research. If the labour market continues to

be driven by neoliberal policies promoting a casualised workforce, this can be detrimental not only to individuals' economic wellbeing but also to their psychological wellbeing.

8.6 Interpretation of the findings in context with the conceptual model

Food supply and housing are intermediary determinants according to the WHO CSDH conceptual framework[47] and are linked to economic hardship, which flows from underlying social stratification and exposes individuals to ill health (see Figure 14). Using the WHO CSDH conceptual framework, the socioeconomic and political context that existed prior to and during the COVID-19 pandemic has contributed to the food and housing stress that has been experienced by many Australians in this study, particularly among women. Food and housing security, according to the WHO CSDH conceptual framework, directly affects an individual's equity in health and wellbeing, which links back to the social and public policies of Australia.[47] This feedback mechanism also affects the social class and socioeconomic position of an individual, much like a cyclic process. Therefore, for change to occur in an individual's food and housing insecurity, this should be mitigated through coordination of policies and interventions that alter an individual's vulnerability to the intermediary determinants, such as food and housing.
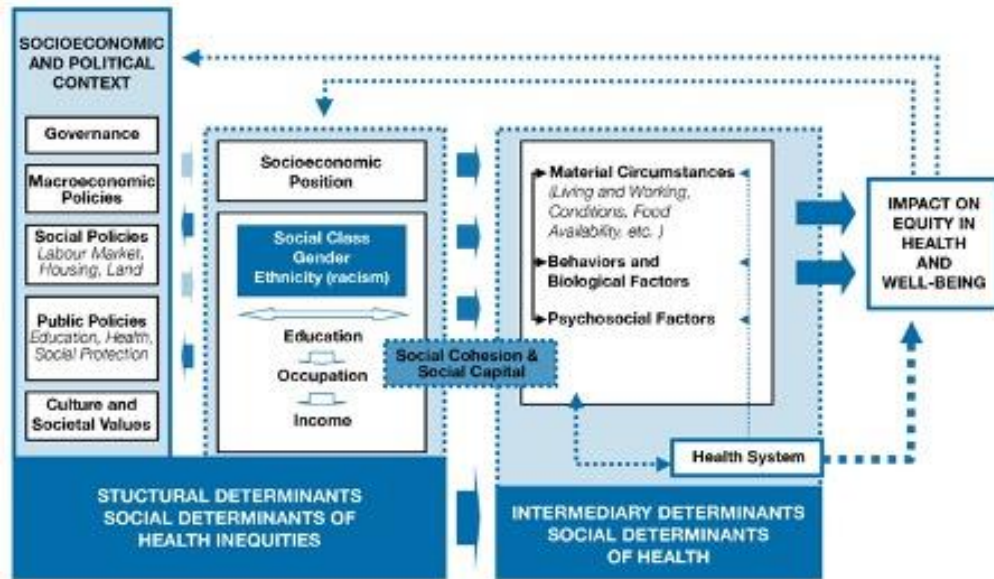
Figure 14: WHO CSDH conceptual framework

Reproduced with permission from WHO,[47] see Appendix 2

According to the WHO CSDH conceptual framework, social capital tracks across both the structural and intermediary social determinants of health, labelled the crosscutting determinant (see Figure 14).[47] Social capital is viewed as the extension of social relationships and influences health through the social support systems that social relationships provide to those who participate within them. Social capital provides the flow of resources through individuals' social networks.[47] The WHO CSDH conceptual framework as applied to this thesis increases the understanding of the role that social capital has in reducing loneliness, creating a sense of belonging and enhancing wellbeing. The WHO CSDH conceptual framework's notion of social capital resembles Putnam's conceptualisation of social capital of bonding, bridging and linking, which refers to the trust and cooperation of relationships, respectful relationships and social norms. The fundamental aspect of social capital in the WHO CSDH conceptual framework is that there needs to be a re-distribution of power to enable the community to gain influence over the policies that hinder its wellbeing.[47]

Employment and income, according to the WHO CSDH framework, are structural determinants of health. In each society, inequalities are produced through a social hierarchy, which corresponds to social class (socioeconomic position/status), employment status and income levels.[47] Occupational status can be understood as a proxy for social class, and as such, individuals can be assigned a class based on their skill level, occupational title and income. Employment and income then reflects social standing and allows certain privileges, including material resources, to determine living standards and allow access to education, health care and better housing (see Figure 14). Even in Australia, where universal access to health services is provided through Medicare, enhanced health care access is available to those able to afford private health cover.[523]

8.7 Implications and recommendations for public health

It is evident from this research that there exists a socioeconomic status variation on the effects on Australians' wellbeing during the pandemic based on their existing or amplified experiences of the social determinants of health. Public health professionals possess the expertise and experience to develop health promotion strategies and public health interventions and advocate for policies that impact Australians in terms of social determinants of health that create health and social inequalities. As indicated throughout this research, those who reside in low socioeconomic areas are disproportionately affected by the pandemic through the amplification of their social determinants of health in ways that influence their overall wellbeing. To address the social divide, there must be a greater emphasis by public health organisations and professionals to lobby governments and increase awareness of the need to address social determinants of health across all policies. However, it must be noted that, globally, there have been major challenges in recognising

and understanding the policy process to address the complex issues of the social determinants of health.[524]

8.7.1 Inclusion of the social determinants of health in policies

For public health organisations and professionals to begin lobbying the government for the inclusion of the social determinants of health into the policy agenda, it is vital that they understand the policy process. Kingdon's 1985 multiple streams model of policy process and change outlines how issues are introduced into the policy agenda and then translated into policy.[524] For an issue such as the social determinants of health to receive priority on a government agenda, Kingdon identifies that three streams must converge through 'windows of opportunity'; that is, the problem stream, policy stream and politics stream. The problem stream is where the role of public health organisations, researchers and professionals is at the forefront. Social determinants of health can only be defined as a 'problem' when they are deemed as such, requiring a consensus among key stakeholders (public health organisations, researchers and professionals) in bringing the specific issues to the attention of policymakers.[525] This is often achieved through independent inquiries into social determinants of health or health inequalities, continued accumulation of evidence (including research, such as this thesis) and using media and key events or crises, such as the COVID-19 pandemic. Kingdon describes the policy stream as a 'primeval soup' wherein the myriad opportunities for policy action are evaluated and tightened to a subset of seemingly feasible options.[526, 527] The third stream, the political stream, encompasses factors and influences within the political field, including public opinion, government priorities, the budgetary context, activists' and lobby groups' campaigns and pressure on local government officials. Such influences can exert a commanding effect on the policy agenda.[527, 528]

Through understanding the theoretical formulation of Kingdon's model, public health organisations and public health professionals have a basis from which to advocate and develop strategies to generate attention and priority to the social determinants of health. The Public Health Association of Australia (PHAA) are one such organisation that has been the driver for effective advocacy strategies and achieving change in the political arena, including such issues as health equity.[529] As a practical measure, public health professionals could be part of policy change and policy action by joining special interest groups that are coordinated through the PHAA, as well as being included in the development of policy position statements and working groups that advocate for public health policy.[530] This requires public health research that meaningfully engages with current issues to form a strong evidence base on which policy change can be argued.

8.7.2 Strategies to mitigate food insecurity

While food insecurity may be associated with developing or low- and middle-income countries, nations like Australia also have people and communities that experience food insecurity.[478] Results from this research found that Australians residing in low socioeconomic areas experience food insecurity, with a substantial negative impact on their wellbeing. One of the largest barriers to addressing food insecurity within Australia is that it is not routinely or consistently measured,[314] and therefore, the extent of the issue is likely to be underestimated.

Addressing food insecurity within the Australian context should involve public health professionals replicating international interventional studies used to mitigate food insecurity. A review conducted on household food insecurity interventions in high-income countries found that social protection interventions such as cash transfers and food subsidy programs, including the US Supplement Nutrition and Assistance

Programme, reduced the incidence of food insecurity.[531] Additionally, while only demonstrating limited effects, community kitchens, food banks and community shops also influence food insecurity. However, such interventions are limited in that they rely on volunteers and may not always reach people experiencing food insecurity. Other studies have shown subsidised café meals[532] community gardens, community kitchens[533] and supermarket voucher systems to be effective measures against food insecurity.[534] Although there have been some successful attempts at these types of programmes within Australia, such as the Café meals program,[535] social café meals[536] and Healthy rewards choice,[537] the majority have relied on charitable organisations who lack funding or are time-limited due to being funded by research grants. Such interventions need to be appropriately funded and have sufficient resources to ensure their success. Further intervention research and program evaluations are required to ensure that such interventions have established effectiveness and will, therefore, address the long-term needs of those within low socioeconomic areas.

8.7.3 Interventions to address social capital and combat loneliness

Findings from this research show that Australians with low social capital and poor social support have poorer wellbeing, which impacted their ability to cope during the pandemic. Possessing high social capital provides a protective factor against negative life events,[494] such as a public health crisis. Therefore, public health interventions aimed at increasing social connectedness and social cohesion are vital. There have been various public health intervention studies in the literature that have demonstrated how social capital has a positive effect on wellbeing, social connectedness and a sense of belonging. Webber et al.[538] used a connecting people intervention (CPI) aimed at improving social capital for people with mental illness or a learning disability, with results demonstrating that those with high-fidelity exposure to the CPI model had significantly higher access to social

capital and perceived social inclusion than those exposed to low fidelity of the CPI model. Similarly, a physical exercise intervention within a workplace in Denmark demonstrated that group-based exercise at work increased social capital and social cohesion within teams.[539]

Public health professionals should adopt interventions to build social capital within communities thought to be low in social capital. These could include social prescribing, community centre involvement, exercise groups and other interest groups. Social prescribing has been recognised as a mechanism to address socioeconomic issues, individual wellbeing and social inclusion.[540] Social prescribing has been used in the UK since the early 2000s and includes a health professional aiming to enhance social connections by referring people to the community or social enterprise sector. This includes libraries, social or hobby clubs (books, arts and crafts, horticulture or dance groups), self-help organisations and lunch clubs.[541] Social prescribing is a growing concept within Australia, with limited studies conducted; however, the Royal Australian College of General Practitioners released a roundtable report on social prescribing in 2020 outlining the beneficial effects of social prescribing and recommended a systematic approach to incorporate social prescribing into the Australian health care system.[542]

8.8 Implications and recommendations for policy

The first element in the WHO CSDH conceptual framework, the socioeconomic and political context, broadly refers to a continuum of factors that go beyond the individual, such as the structural, cultural and political aspects of a social system. A focus of this element is the political context that is responsible for generating and maintaining social stratification within society.[47] It is political parties and the policy positions that they adopt that influence a broad range of factors, which in turn impacts the distribution of funding,

resources and materials within society. Therefore, policy recommendations are vital to address social and health inequalities that are produced in response to the amplification of the social determinants of health and the influence these have always had on the wellbeing of Australians, particularly during times of crisis such as the COVID-19 pandemic.

8.8.1 Addressing housing affordability

As neoliberalism in Australia drives the private rental market, this has led to a short supply of affordable housing options and a shrinking pool of social housing. Housing affordability over the last decade in Australia has declined for low-income renters and for some low-income homeowners.[543] The challenges of affordable housing impact a household's ability to pay for food, utilities, transport, health and childcare. Such challenges can, in turn, result in stress from financial pressure and fewer opportunities, leading to a decrease in quality of life and overall wellbeing.[544] The findings of this thesis demonstrate that during the COVID-19 pandemic, about a third of all participants experienced housing instability. While pre-pandemic incidence figures on housing in/security are not available, much of the literature on housing affordability pre-pandemic within Australia indicates increasing concern.[485, 545, 546] A greater emphasis needs to be placed on affordable housing strategies to address the housing insecurity that has been highlighted by the pandemic. Policymakers need to use evidence produced from research to act on the housing crisis in Australia. This includes providing increased rental assistance for Australians in the private rental market, particularly for those within low socioeconomic areas.

8.8.2 Recommendations to use existing policy frameworks

Australia is currently committed to a policy framework to address the social determinants of health through the UN SDGs. In 2015, all 193 UN member states, including Australia, committed to the 2030 Agenda for Sustainable Development. The basis of this agenda is the 17 SDGs, which are indicator-based and contain specific and general targets that recognise that ending poverty and other social deprivations must coincide with strategies to improve health, education, economic growth and climate change.[547, 548] Understood as a vehicle through which social determinants of health can be addressed, embracing the SDGs are crucial to advance health and promote wellbeing.[549, 550] However, Australia has been comparatively slow to implement mechanisms to achieve the 2030 target on the SDGs, ranking below the average score of other advanced countries.[551] With this in mind, the Australian government and policymakers need to revitalise the agenda of the UN SDGs through a national vision and framework to coordinate efforts. Politicians need to work on bringing policies in line with the global agenda to which they are signatories. In particular, the Australian government should promote changes to eliminate poverty (SDG 1), end hunger and achieve food security (SDG 2), promote health and wellbeing (SDG 3), promote inclusive economic growth and employment (SDG 8) and reduce inequality within Australia (SDG 10).

One important step in achieving these SDG targets that has gained traction in Australia in recent years comes from the 2017 Uluru Statement from the Heart, read at the First Nations National Constitutional Convention, to recognise Aboriginal and Torres Strait Islanders in the Australian constitution.[552] The outcome of the recognition of Aboriginal and Torres Strait Islanders in the constitution enables a First Nations voice in parliament, healing and truth-telling and treaties with governments that suit their socioeconomic situations; however, a national referendum needs to occur for this to be achieved.[553] While

this has been a topic of discussion by Australian governments since 1988, several strategies, such as the implementation of expert panels, community engagements and referendum council consultations, have aimed to inform the public; however, to date, no referendum has taken place.[552] Constitutional recognition of Aboriginal and Torres Strait Islanders will create an opportunity to reduce inequality within Australia between Aboriginal and Torres Strait Islanders and non-Indigenous populations.[554] Additionally, the UN has identified universities as key to the implementation of the UN SDGs. To this end, many universities across Europe, the United States, the United Kingdom, Australia, New Zealand and Asia have implemented initiatives and have embedded the SDGs within the university curriculum.[555]

8.8.3 Recommendations for employment and income security

As identified in this research, the casualisation of the Australian workforce has contributed to the economic challenges and employment loss faced by many Australians during the pandemic. Casual employment is underpinned by a lack of security, being deployed on an ad hoc basis and with no guarantee of future work. Additionally, casual employment lacks paid leave entitlements (sick leave, annual leave, carers leave and redundancy benefits) that are typically awarded to permanent employees.[556] It is also important to note that casual employment is often associated with income insecurity.[557] A further issue in the Australian labour market is the use of fixed term contracts, which are concentrated in industries such as health care, education and social assistance. These are particularly problematic because these industries have predominately female employees and, therefore, contribute to a gendered labour market disparity and the continued economic disadvantage of women.[558] Although they may have paid leave entitlements, employees with fixed term contracts face higher employment insecurity as employers are not obligated to renew their contract once it comes to an end.[559] The

Australian government and policymakers have a role to play in 'pulling the policy levers' to reform fixed term contracts and casualisation of the workforce.

8.9 Recommendations for future research

This research used a mixed methods approach aimed at developing an understanding of the relationship between wellbeing and the social determinants of health among Australians during the COVID-19 pandemic. Given that this is an emerging infectious disease and is currently ongoing, the full extent of the impacts of public health mitigation strategies and effects on wellbeing is still being established. Despite Australia's previous experience of infectious disease outbreaks, including SARS and MERS, the COVID-19 pandemic has been the largest in the twenty-first century and is, therefore, a novel event for Australia. While this research has shown a relationship between wellbeing and many of the social determinants of health, there is still much to learn about the impact of the pandemic. As the COVID-19 pandemic remains a threat and the impacts of mitigation efforts continue, the effects on both population and individuals' wellbeing and social determinants of health long term need to be explored. Longitudinal studies should be conducted to identify the impacts of the pandemic on wellbeing and the social determinants of health over a longer period to contribute to knowledge in this field.

This cross-sectional study design provided the opportunity to estimate the odds ratios of the study relationship between exposure and outcomes. However, a cross-sectional study design is an analysis at one point in time; therefore, a causal relationship is difficult to infer.[560] Future research could include the use of quasi-experimental study designs. For example, this could include interventions such as these that have been conducted in the international literature: 1) gratitude interventions for individuals who are lonely in lockdown to improve mental wellbeing[561] and 2) Cognitive Behaviour Therapy versus

Groups 4 Health (intervention to increase social belonging) for individuals in lockdown to improve quality of life and loneliness.[562]

Future research may build on the concept of wellbeing and social determinants of health among different population groups within Australia. While this research employed robust methods appropriate to the existing lockdown measures to achieve a diverse sample of Australian participants, females accounted for most respondents. This is not an uncommon phenomenon in research, with more females participating in research than males. Evidence from the literature indicates that this is partially due to the way women are socialised; women often participate due to altruistic reasons, or in some cultures, to fulfil the social expectation and to please male family leaders.[563] Therefore, building on the findings of this research, sampling to incorporate more men, non-binary and transgender persons needs to be explored. Social determinants of health are most likely to be experienced by those whose lives are characterised by intersectionality, such as gender, sexuality, poverty and experience of racism.[564] Therefore, further research could also be conducted to explore the experiences of the relationship between wellbeing and social determinants of health among subpopulation groups within Australia, such as international students, LGBTQI+ people, refugees and Aboriginal and Torres Strait Islander populations. Additionally, future research could explore a comparison between states and territories with harsh public health restrictions compared to those states and territories within Australia that had minimal restrictions imposed.

One of the key features of the social determinants of health is that they can and do coexist.[564] Studying social determinants individually can miss coexisting patterns. For example, those living with low incomes are more likely to be exposed to food insecurity or housing instability, or those experiencing racism or from a specific ethnic group may be at a higher likelihood of low social capital. Programs and interventions that target

multiple determinants of health have the potential for greater impact than strategies that address only one adversity.[564] For example, in addressing housing instability, it is critical that other social determinants of health, such as food insecurity, unemployment or financial difficulties, be taken into consideration. Therefore, further research needs to be conducted on the social determinants of health that have not been addressed through this research.

8.10 Strengths and limitations

A strength of this thesis is that it explored the relationship between wellbeing and social determinants of health during a new and emerging infectious disease outbreak. When this research commenced, there was very limited research conducted on the social determinants of health during the pandemic. Much of the early literature included in the text and opinion systematic review (Chapter 2) was based on expert opinion of the potential exacerbation of the social determinants of health and the effect on health outcomes, including wellbeing. At that point in time, much of the literature was emerging from the United States. Therefore, this research contributes to the now-growing evidence of the effect of the pandemic on existing social determinants of health and the impact this has had on overall wellbeing. It highlights the health and social inequalities that already exist in Australia and promotes calls for renewed action on the social determinants of health.

Data for this research was drawn from a national sample, including participants from each state and territory and from a range of socioeconomic areas, thereby providing a diverse cross-section of Australians. This is a strength of the research. Additionally, the use of a mixed methods study design is a key strength as it allowed for a comprehensive understanding of the relationship between wellbeing and social determinants of health

during the COVID-19 pandemic. The findings from the quantitative phase of the research were confirmed, explained and expanded by the qualitative findings.

As with all research, there are some limitations that need to be acknowledged, and the findings of this research should be interpreted with consideration of these limitations. As mentioned previously, using a cross-sectional study design for the quantitative phase of this mixed methods research makes it impossible for a causal relationship to be drawn, given that measurements are at one time point.[560] Social media recruitment into an online survey was used for the quantitative phase of the research. While there are advantages to this method, there is also debate about the potential impacts of the digital divide in ensuring a representative sample.[534] Australians without access to the internet, those who have low digital literacy and those without social media accounts may have unintentionally been excluded from participating in this study. However, 91% of Australians are reported to have access to the internet[565] and the study purposively recruited individuals from more disadvantaged communities to ensure that less-advantaged Australians were included in the sample.

While robust methods were used to ensure a diverse national sample of participants, females were over-represented in the quantitative phase of this research. Future research could use targeted strategies to ensure a representative sample of all genders is included. A further limitation of this research is that some of the participants purposively selected for the qualitative phase of the research had to be interviewed over the telephone rather than through videoconferencing. This meant that there was no non-verbal communication, such as eye contact or body language occurring, which may have had an impact on the interpretation of the data. However, the literature suggests that there is no significant difference in the quality, length and substantive coding of semi-structured interviews conducted through videoconferencing and telephone compared to face-to-face

interviews. Although this potential limitation may not have significantly impacted the data quality, the researcher nevertheless mitigated the potential loss of non-verbal communication through careful listening, noting changes in voice tones and rapid speech.[566]

8.11 Concluding remarks

This thesis provides new evidence of the relationship between Australians' wellbeing and social determinants of health during the COVID-19 pandemic. The findings highlight the significance of a public health crisis on Australians' existing social determinants of health and the burden this has placed on their overall wellbeing during the COVID-19 pandemic. The findings demonstrate that those residing in low socioeconomic areas experienced significant food and housing insecurity, low social capital and were more likely to have income and employment loss that influenced their overall wellbeing during the COVID-19 pandemic. Importantly, the interconnectedness of the social determinants of health experienced by some Australians has exposed the need to address poor and unfair social and health policies. It has highlighted the unequal distribution of power and resources between individuals in different socioeconomic areas and demonstrated that those with socioeconomic advantages were less affected by the mitigation strategies implemented during the pandemic. This resulted in those from higher socioeconomic areas exhibiting positive wellbeing despite the challenges of the pandemic.

References

1. Marmot MG, Stansfeld S, Patel C, et al. Health inequalities among British civil servants: the Whitehall II study. *The Lancet* 1991; 337: 1387-1393. Available from: https://doi.org/10.1016/0140-6736(91)93068-K

2. Braveman P and Gottlieb L. The social determinants of health: it's time to consider the causes of the causes. *Public Health Reports* 2014; 129: 19-31. Available from: https://doi.org/10.1177/00333549141291S206

3. Irwin A and Scali E. Action on the social determinants of health: a historical perspective. *Global Public Health* 2007; 2: 235-256. Available from: https://doi.org/10.1080/17441690601106304

4. Rifkin SB. Alma Ata after 40 years: Primary Health Care and Health for All—from consensus to complexity. *BMJ Global Health* 2018; 3: e001188. Available from: http://dx.doi.org/10.1136/bmjgh-2018-001188

5. World Health Organization. *Ottawa charter for health promotion, 1986*. 1986. World Health Organization. Regional Office for Europe. Available from: https://apps.who.int/iris/bitstream/handle/10665/349652/WHO-EURO-1986-4044-43803-61677-eng.pdf?sequence=1

6. Solar O and Irwin A. Social determinants, political contexts and civil society action: a historical perspective on the Commission on Social Determinants of Health. *Health Promotion Journal of Australia* 2006; 17: 180-5185.

7. Boseley S. Michael Marmot: leader in the social determinants of health. *The Lancet* 2008; 372: 1625. Available from: https://doi.org/10.1016/S0140-6736(08)61675-X

8. Marmot M and Allen JJ. Social determinants of health equity. *American Journal of Public Health* 2014; 104: 517 - 519.

9. Marmot M and Bell R. Social determinants and non-communicable diseases: time for integrated action. *BMJ* 2019; 364. Available from: https://doi.org/10.1136/bmj.l251

10. Fosse E, Sherriff N and Helgesen M. Leveling the social gradient in health at the local level: applying the gradient equity lens to Norwegian local public health policy. *International Journal of Health Services* 2019; 49: 538-554.

11. Marmot M. The health gap: doctors and the social determinants of health. *Scandinavian Journal of Public Health* 2017; 45: 686-693.

12. De Vogli R, Brunner E and Marmot MG. Unfairness and the social gradient of metabolic syndrome in the Whitehall II Study. *Journal of Psychosomatic Research* 2007; 63: 413-419.

13. Marmot M. Social justice, epidemiology and health inequalities. *European Journal of Epidemiology* 2017; 32: 537-546.

14. Marmot MG. Status syndrome: a challenge to medicine. *JAMA* 2006; 295: 1304-1307. Available from: https://jamanetwork.com/journals/jama/article-abstract/202520

15. Gruba-McCallister F. Condemned at birth: income inequality is destroying our children, (2017, accessed 10 August 2022) Available from: https://medium.com/@FrankGrubaMc/condemned-at-birth-income-inequality-is-destroying-our-children-c99e73e1fc45.

16. Australian Institute of Health and Welfare. Indicators of socioeconomic inequalities in cardiovascular disease, diabetes and chronic kidney disease. In: AIHW, (ed.). Canberra 2019 Available from: https://www.aihw.gov.au/reports/social-determinants/indicators-socioeconomic-inequalities/summary.

17. Thomas SL, Wakerman J and Humphreys JS. Ensuring equity of access to primary health care in rural and remote Australia-what core services should be locally available? *International Journal for Equity in Health* 2015; 14: 1-8. Available from: https://doi.org/10.1186/s12939-015-0228-1

18. Bourke SL, Harper C, Johnson E, et al. Health care experiences in rural, remote, and metropolitan areas of Australia. *Online Journal of Rural Nursing and Health Care* 2021; 21: 67-84. Available from: https://doi.org/10.14574/ojrnhc.v21i1.652

19. Handley T, Rich J, Davies K, et al. The challenges of predicting suicidal thoughts and behaviours in a sample of rural Australians with depression. *International Journal of Environmental Research and Public Health* 2018; 15: 928. Available from: https://doi.org/10.3390/ijerph15050928

20. Khatri RB and Assefa Y. Access to health services among culturally and linguistically diverse populations in the Australian universal health care system: issues and challenges. *BMC Public Health* 2022; 22: 1-14.

21. Monani D, Smith JA, O'Mara B, et al. Building equitable health and social policy in Australia to improve immigrant health literacy. *Health Promotion Journal of Australia* 2021; 32: 152-154.

22. Taylor J and Haintz GL. Influence of the social determinants of health on access to healthcare services among refugees in Australia. *Australian Journal of Primary Health* 2018; 24: 14-28.

23. Spike EA, Smith MM and Harris MF. Access to primary health care services by community-based asylum seekers. *Medical Journal of Australia* 2011; 195: 188-191.

24. McBride J, Block A and Russo A. An integrated healthcare service for asylum seekers and refugees in the south-eastern region of Melbourne: Monash health refugee health and wellbeing. *Australian Journal of Primary Health* 2017; 23: 323-328.

25. Pearson O, Schwartzkopff K, Dawson A, et al. Aboriginal community controlled health organisations address health equity through action on the social determinants of health of Aboriginal and Torres Strait Islander peoples in Australia. *BMC Public Health* 2020; 20: 1-13.

26. Chenhall RD and Senior K. Living the social determinants of health: Assemblages in a remote Aboriginal community. *Medical Anthropology Quarterly* 2018; 32: 177-195.

27. George E, Mackean T, Baum F, et al. Social determinants of Indigenous health and Indigenous rights in policy: A scoping review and analysis of problem representation. *International Indigenous Policy Journal* 2019; 10.

28. Diener E. Subjective well-being: The science of happiness and a proposal for a national index. *American Psychologist* 2000; 55: 34.

29. La Placa V, McNaught A and Knight A. Discourse on wellbeing in research and practice. *International Journal of Wellbeing* 2013; 3.

30. World Health Organization. Social determinants of health: key concepts. (2013, accessed 10 March 2022)., Available from: https://www.who.int/news-room/questions-and-answers/item/social-determinants-of-health-key-concepts

31. Diener E, Pressman SD, Hunter J, et al. If, why, and when subjective well-being influences health, and future needed research. *Applied Psychology: Health and Well-Being* 2017; 9: 133-167.

32. Hettler B. *Six dimension model*. Stevens Point, WI: National Wellness Institute; 1977.

33. Simons G and Baldwin DS. A critical review of the definition of 'wellbeing' for doctors and their patients in a post Covid-19 era. *International Journal of Social Psychiatry* 2021; 67: 984-991.

34. Gong F, Xiong Y, Xiao J, et al. China's local governments are combating COVID-19 with unprecedented responses—from a Wenzhou governance perspective. *Frontiers of Medicine* 2020: 1-5.

35. Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *The Lancet* 2020; 395: 1054-1062.

36. Xiao Y and Torok ME. Taking the right measures to control COVID-19. *The Lancet Infectious Diseases* 2020; 20: 523-524.

37. World Health Organization. WHO Coronavirus Disease (COVID-19) Dashboard, (2020, accessed 19 September 2020).Available from: https://covid19.who.int

38. Huang L and rong Liu H. Emotional responses and coping strategies of nurses and nursing college students during COVID-19 outbreak. PLoS ONE 2020;15(8): e0237303. Available from: https://doi.org/10.1371/journal.pone.0237303

39. Lin C-Y. Social reaction toward the 2019 novel coronavirus (COVID-19). *Social Health and Behavior* 2020; 3: 1.

40. Blustein DL, Duffy R, Ferreira JA, et al. Unemployment in the time of COVID-19: A research agenda. *Journal of Vocational Behavior* 2020; 119. Available from: https://doi.org/10.1016/j.jvb.2020.103436

41. Smith JA and Judd J. COVID-19: Vulnerability and the power of privilege in a pandemic. *Health Promotion Journal of Australia* 2020; 31: 158.

42. University of Wollongong. Higher Degree Research (HDR) Thesis by Compilation Guidelines, (2017, accessed 2022 September 21). Available from: https://documents.uow.edu.au/content/groups/public/@web/@gov/documents/doc/uow238024.pdf

43. Wilkinson RG and Marmot M. *Social determinants of health: the solid facts*. 2nd ed. Copenhagen, Denmark: WHO Regional Office for Europe; 2003. 31 p.

44. Baum FE, Bégin M, Houweling TA, et al. Changes not for the fainthearted: reorienting health care systems toward health equity through action on the social determinants of health. *American Journal of Public Health* 2009; 99: 1967-1974.

45. Baker EA, Metzler MM and Galea S. Addressing social determinants of health inequities: learning from doing. American Public Health Association, 2005. Available from: https://doi.org/10.2105/AJPH.2005.061812

46. Friel S and Marmot MG. Action on the social determinants of health and health inequities goes global. *Annual Review of Public Health* 2011; 32: 225-236.

47. Solar O and Irwin A. *A conceptual framework for action on the social determinants of health*. 2010. Geneva: World Health Organization; 2010. 62 p.

48. Marmot M and Commission on Social Determinants of Health. Achieving health equity: from root causes to fair outcomes. *The Lancet* 2007; 370: 1153-1163. Available from: https://doi.org/10.1016/S0140-6736(07)61385-3

49. Haigh F, Kemp L, Bazeley P, et al. Developing a critical realist informed framework to explain how the human rights and social determinants of health relationship works. *BMC Public Health* 2019; 19: 1-12.

50. Gómez CA, Kleinman DV, Pronk N, et al. Practice full report: addressing health equity and social determinants of health through healthy people 2030. *Journal of Public Health Management and Practice* 2021; 27: S249.

51. Kindig DA. Understanding population health terminology. *The Milbank Quarterly* 2007; 85: 139-161.

52. Kilanowski JF. Breadth of the socio-ecological model. *Journal of Agromedicine* 2017; 22: 295-297.

53. Ballantyne PJ. The social determinants of health: a contribution to the analysis of gender differences in health and illness. *Scandinavian Journal of Public Health* 1999; 27: 290-295.

54. Bharmal N, Derose KP, Felician M, et al. *Understanding the upstream social determinants of health*. 2015. California: RAND Health.

55. Dixon J and Welch N. Researching the rural–metropolitan health differential using the 'social determinants of health'. *Australian Journal of Rural Health* 2000; 8: 254-260.

56. Shaw M. Housing and public health. *Annual Review of Public Health* 2004; 25: 397-418.

57. Bambra C, Gibson M, Sowden A, et al. Tackling the wider social determinants of health and health inequalities: evidence from systematic reviews. *Journal of Epidemiology & Community Health* 2010; 64: 284-291.

58. Williams DR, Costa MV, Odunlami AO, et al. Moving upstream: how interventions that address the social determinants of health can improve health and reduce disparities. *Journal of Public Health Management and Practice* 2008; 14: S8.

59. McNeil R, Guirguis-Younger M, B Dilley L, et al. Learning to account for the social determinants of health affecting homeless persons. *Medical Education* 2013; 47: 485-494.

60. Garrett BE, Dube SR, Babb S, et al. Addressing the social determinants of health to reduce tobacco-related disparities. *Nicotine & Tobacco Research* 2014; 17: 892-897.

61. Lundberg O. Next steps in the development of the social determinants of health approach: the need for a new narrative. *Scandinavian Journal of Public Health* 2020; 48: 473-479.

62. Sfeatcu R, Cernuşcă-Miţariu M, Ionescu C, et al. The concept of wellbeing in relation to health and quality of life. *European Journal of Science and Theology* 2014; 10: 123-128.

63. Gillett-Swan JK and Sargeant J. Wellbeing as a process of accrual: Beyond subjectivity and beyond the moment. *Social Indicators Research* 2015; 121: 135-148.

64. Dolan P, Kudrna L, Testoni S, et al. *Definition and measures of subjective wellbeing*. 2017. Centre for Economic Performance (Discussion paper 3).

65. Ruggeri K, Garcia-Garzon E, Maguire Á, et al. Well-being is more than happiness and life satisfaction: a multidimensional analysis of 21 countries. *Health and Quality of Life Outcomes* 2020; 18: 1-16.

66. Mead J, Fisher Z and Kemp AH. Moving beyond disciplinary silos towards a transdisciplinary model of wellbeing: An invited review. *Frontiers in Psychology* 2021; 12.

67. McAllister F. Wellbeing concepts and challenges. *Sustainable Development Research Network*. 2005, p. 1-22.

68. Diener E, Suh EM, Lucas RE, et al. Subjective well-being: Three decades of progress. *Psychological Bulletin* 1999; 125: 276.

69. Seligman ME. *Flourish: A visionary new understanding of happiness and well-being*. Simon and Schuster, 2012.

70. Halleröd B and Seldén D. The multi-dimensional characteristics of wellbeing: How different aspects of wellbeing interact and do not interact with each other. *Social Indicators Research* 2013; 113: 807-825.

71. Stoewen DL. Dimensions of wellness: Change your habits, change your life. *The Canadian Veterinary Journal* 2017; 58: 861.

72. Abraham A, Sommerhalder K and Abel T. Landscape and well-being: a scoping study on the health-promoting impact of outdoor environments. *International Journal of Public Health* 2010; 55: 59-69.

73. D'Alessandro D, Buffoli M, Capasso L, et al. Green areas and public health: improving wellbeing and physical activity in the urban context. *Epidemiology Prevention* 2015; 39: 8-13.

74. Groenewegen PP, Van den Berg AE, De Vries S, et al. Vitamin G: effects of green space on health, well-being, and social safety. *BMC Public Health* 2006; 6: 1-9.

75. Burt EL and Atkinson J. The relationship between quilting and wellbeing. *Journal of Public Health* 2012; 34: 54-59.

76. Daykin N, Mansfield L, Meads C, et al. What works for wellbeing? A systematic review of wellbeing outcomes for music and singing in adults. *Perspectives in Public Health* 2018; 138: 39-46.

77. Jensen A and Bonde LO. The use of arts interventions for mental health and wellbeing in health settings. *Perspectives in Public Health* 2018; 138: 209-214.

78. Dannheim I, Ludwig-Walz H, Buyken AE, et al. Effectiveness of health-oriented leadership interventions for improving health and wellbeing of employees: a systematic review. *Journal of Public Health* 2021: 1-13.

79. Lunau T, Bambra C, Eikemo TA, et al. A balancing act? Work–life balance, health and well-being in European welfare states. *The European Journal of Public Health* 2014; 24: 422-427.

80. Purba A and Demou E. The relationship between organisational stressors and mental wellbeing within police officers: a systematic review. *BMC Public Health* 2019; 19: 1-21.

81.   Mitchell KR, Lewis R, O'Sullivan LF, et al. What is sexual wellbeing and why does it matter for public health? *The Lancet Public Health* 2021; 6: e608-e613.

82.   Semlyen J, King M, Varney J, et al. Sexual orientation and symptoms of common mental disorder or low wellbeing: combined meta-analysis of 12 UK population health surveys. *BMC Psychiatry* 2016; 16: 1-9.

83.   Tough H, Siegrist J and Fekete C. Social relationships, mental health and wellbeing in physical disability: a systematic review. *BMC Public Health* 2017; 17: 1-18.

84.   Burton EJ, Mitchell L and Stride CB. Good places for ageing in place: development of objective built environment measures for investigating links with older people's wellbeing. *BMC Public Health* 2011; 11: 1-13.

85.   Liddell C and Guiney C. Living in a cold and damp home: frameworks for understanding impacts on mental well-being. *Public Health* 2015; 129: 191-199.

86.   Frasquilho D, Matos MG, Salonna F, et al. Mental health outcomes in times of economic recession: a systematic literature review. *BMC Public Health* 2015; 16: 1-40.

87.   Greco G, Lorgelly P and Yamabhai I. Outcomes in economic evaluations of public health interventions in low-and middle-income countries: health, capabilities and subjective wellbeing. *Health Economics* 2016; 25: 83-94.

88.   Hiswåls A-S, Marttila A, Mälstam E, et al. Experiences of unemployment and well-being after job loss during economic recession: Results of a qualitative study in east central Sweden. *Journal of Public Health Research* 2017; 6. Available from: https://doi.org/10.4081/jphr.2017.995

89.   Bou-Hamad I, Hoteit R and Harajli D. Health worries, life satisfaction, and social well-being concerns during the COVID-19 pandemic: Insights from Lebanon. *Plos One* 2021; 16: e0254989.

90.   Clair R, Gordon M, Kroon M, et al. The effects of social isolation on well-being and life satisfaction during pandemic. *Humanities and Social Sciences Communications* 2021; 8: 1-6.

91.   Dawood FS, Ricks P, Njie GJ, et al. Observations of the global epidemiology of COVID-19 from the prepandemic period using web-based surveillance: a cross-sectional analysis. *The Lancet Infectious Diseases* 2020; 20: 1255-1262.

92.   Wallinga J and Teunis P. Different epidemic curves for severe acute respiratory syndrome reveal similar impacts of control measures. *American Journal of Epidemiology* 2004; 160: 509-516.

93.   Zumla A, Hui DS and Perlman S. Middle East Respiratory Syndrome. *The Lancet* 2015; 386: 995-1007.

94.   Yang S, Cao P, Du P, et al. Early estimation of the case fatality rate of COVID-19 in mainland China: a data-driven analysis. *Annals of Translational Medicine* 2020; 8.

95.   Yee J, Unger L, Zadravecz F, et al. Novel coronavirus 2019 (COVID-19): Emergence and implications for emergency care. *Journal of the American College of Emergency Physicians Open* 2020; 1: 63-69.

96.   Shereen MA, Khan S, Kazmi A, et al. COVID-19 infection: Origin, transmission, and characteristics of human coronaviruses. *Journal of Advanced Research* 2020; 24: 91-98.

97. Wiersinga WJ, Rhodes A, Cheng AC, et al. Pathophysiology, transmission, diagnosis, and treatment of coronavirus disease 2019 (COVID-19): a review. *JAMA* 2020; 324: 782-793.

98. Jin Y, Yang H, Ji W, et al. Virology, epidemiology, pathogenesis, and control of COVID-19. *Viruses* 2020; 12: 372.

99. Polak SB, Van Gool IC, Cohen D, et al. A systematic review of pathological findings in COVID-19: a pathophysiological timeline and possible mechanisms of disease progression. *Modern Pathology* 2020: 1-11. Available from: https://doi.org/10.1038/s41379-020-0603-3

100. Yuki K, Fujiogi M and Koutsogiannaki S. COVID-19 pathophysiology: A review. *Clinical Immunology* 2020; 215: 108427.

101. World Health Organization. Tracking SARS-CoV-2 variants, (2022, accessed 20 April 2022). Available from: https://www.who.int/activities/tracking-SARS-CoV-2-variants

102. Meyerowitz EA, Richterman A, Gandhi RT, et al. Transmission of SARS-CoV-2: a review of viral, host, and environmental factors. *Annals of Internal Medicine* 2021; 174: 69-79.

103. Kotlyar AM, Grechukhina O, Chen A, et al. Vertical transmission of coronavirus disease 2019: a systematic review and meta-analysis. *American Journal of Obstetrics and Gynecology* 2021; 224: 35-53. e33.

104. Lauer SA, Grantz KH, Bi Q, et al. The incubation period of coronavirus disease 2019 (COVID-19) from publicly reported confirmed cases: estimation and application. *Annals of Internal Medicine* 2020; 172: 577-582.

105. McAloon C, Collins Á, Hunt K, et al. Incubation period of COVID-19: a rapid systematic review and meta-analysis of observational research. *BMJ open* 2020; 10: e039652.

106. Bi Q, Wu Y, Mei S, et al. Epidemiology and Transmission of COVID-19 in Shenzhen China: Analysis of 391 cases and 1,286 of their close contacts. *MedRxiv* 2020. Available from: https://doi.org/10.1101/2020.03.03.20028423

107. Elias C, Sekri A, Leblanc P, et al. The incubation period of COVID-19: A meta-analysis. *International Journal of Infectious Diseases* 2021; 104: 708-710.

108. Quesada J, López-Pineda A, Gil-Guillén V, et al. Incubation period of COVID-19: A systematic review and meta-analysis. *Revista Clínica Española (English Edition)* 2021; 221: 109-117.

109. van Kampen JJ, van de Vijver DA, Fraaij PL, et al. Shedding of infectious virus in hospitalized patients with coronavirus disease-2019 (COVID-19): duration and key determinants. *MedRxiv* 2020. Available from: https://doi.org/10.1101/2020.06.08.20125310.

110. Chen X, Zhu B, Hong W, et al. Associations of clinical characteristics and treatment regimens with the duration of viral RNA shedding in patients with COVID-19. *International Journal of Infectious Diseases* 2020; 98: 252-260.

111. Han J, Shi L-x, Xie Y, et al. Analysis of factors affecting the prognosis of COVID-19 patients and viral shedding duration. *Epidemiology & Infection* 2020; 148.

112. Cevik M, Tate M, Lloyd O, et al. SARS-CoV-2, SARS-CoV, and MERS-CoV viral load dynamics, duration of viral shedding, and infectiousness: a systematic review and meta-analysis. *The Lancet Microbe* 2021; 2: e13-e22.

113. Byrne AW, McEvoy D, Collins AB, et al. Inferred duration of infectious period of SARS-CoV-2: rapid scoping review and analysis of available evidence for asymptomatic and symptomatic COVID-19 cases. *BMJ open* 2020; 10: e039856.

114. Ito K, Piantham C and Nishiura H. Relative instantaneous reproduction number of Omicron SARS-CoV-2 variant with respect to the Delta variant in Denmark. *Journal of Medical Virology* 2022; 94: 2265-2268.

115. Luo CH, Morris CP, Sachithanandham J, et al. Infection with the SARS-CoV-2 Delta Variant is Associated with Higher Recovery of Infectious Virus Compared to the Alpha Variant in both Unvaccinated and Vaccinated Individuals. *Clinical Infectious Diseases* 2021; 75. Available from: https://doi.org/10.1093/cid/ciab986

116. Australian Government Department of Health. Coronavirus Disease 2019 (COVID-19), (2022, accessed 9 September 2022). Available from: https://www1.health.gov.au/internet/main/publishing.nsf/Content/cdna-song-novel-coronavirus.htm

117. Du Z, Liu C, Wang C, et al. Reproduction Numbers of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Variants: A Systematic Review and Meta-analysis. *Clinical Infectious Diseases* 2022; 75: e293-e295.

118. Roa TM and Biller-Andorno N. Financial incentives for participants in health research: when are they ethical? *Swiss Medical Weekly* 2022.

119. Liu Y, Gayle AA, Wilder-Smith A, et al. The reproductive number of COVID-19 is higher compared to SARS coronavirus. *Journal of Travel Medicine* 2020: 1-4. Available from: https://doi.org/10.1093/jtm/taaa021

120. Grasselli G, Pesenti A and Cecconi M. Critical care utilization for the COVID-19 outbreak in Lombardy, Italy: early experience and forecast during an emergency response. *JAMA* 2020; 323: 1545-1546.

121. Fu L, Wang B, Yuan T, et al. Clinical characteristics of coronavirus disease 2019 (COVID-19) in China: a systematic review and meta-analysis. *Journal of Infection* 2020; 80: 656-665.

122. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet* 2020; 395: 497-506.

123. Zhu J, Ji P, Pang J, et al. Clinical characteristics of 3,062 COVID-19 patients: a meta-analysis. *Journal of Medical Virology* 2020; 92. Available from: https://doi.org/10.1002/jmv.25884

124. Escalera-Antezana JP, Lizon-Ferrufino NF, Maldonado-Alanoca A, et al. Clinical features of cases and a cluster of Coronavirus Disease 2019 (COVID-19) in Bolivia imported from Italy and Spain. *Travel Medicine and Infectious Disease* 2020; 35. Available from: https://doi.org/10.1016/j.tmaid.2020.101653

125. Jiang F, Deng L, Zhang L, et al. Review of the clinical characteristics of coronavirus disease 2019 (COVID-19). *Journal of General Internal Medicine* 2020; 35: 1545 - 1549.

126. Pan L, Mu M, Yang P, et al. Clinical characteristics of COVID-19 patients with digestive symptoms in Hubei, China: a descriptive, cross-sectional, multicenter study. *The American Journal of Gastroenterology* 2020; 115. Available from: https://doi.org/10.14309%2Fajg.0000000000000620

127. Ibekwe TS, Fasunla AJ and Orimadegun AE. Systematic review and meta-analysis of smell and taste disorders in COVID-19. *OTO open* 2020; 4: 2473974X20957975. Available from: https://doi.org/10.1177/2473974X20957975

128. Chinazzi M, Davis JT, Ajelli M, et al. The effect of travel restrictions on the spread of the 2019 novel coronavirus (COVID-19) outbreak. *Science* 2020; 368: 395-400.

129. Thevarajan I, Buising KL and Cowie BC. Clinical presentation and management of COVID-19. *The Medical Journal of Australia* 2020; 213: 134 - 139.

130. Lee A. Wuhan novel coronavirus (COVID-19): why global control is challenging? *Public Health* 2020; 179. Available from: https://doi.org/10.1016%2Fj.puhe.2020.02.001

131. Keni R, Alexander A, Nayak PG, et al. COVID-19: Emergence, spread, possible treatments, and global burden. *Frontiers in Public Health* 2020; 8. Available from: https://doi.org/10.3389/fpubh.2020.00216

132. van Zandwijk N and Rasko JE. The COVID-19 outbreak: a snapshot from down under. *Expert Review of Anticancer Therapy* 2020;20(6):433-436.. Available from: https://doi.org/10.1080/14737140.2020.1766974

133. Lai C-C, Shih T-P, Ko W-C, et al. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and corona virus disease-2019 (COVID-19): the epidemic and the challenges. *International Journal of Antimicrobial Agents* 2020;55(3): 105924. Available from: https://doi.org/10.1016/j.ijantimicag.2020.105924

134. Choi J, Cho Y, Shim E, et al. Web-based infectious disease surveillance systems and public health perspectives: a systematic review. *BMC Public Health* 2016; 16. Available from: https://doi.org/10.1186/s12889-016-3893-0

135. Gong Y and Zhao G. Wealth, health, and beyond: Is COVID-19 less likely to spread in rich neighborhoods? *PloS one* 2022; 17: e0267487.

136. Sturrock B, Chevassut E, Shahvisi A, et al. Impact of affluence on the local spread of SARS-CoV2 during the first wave of the COVID-19 pandemic. *Public Health in Practice* 2021; 2: 100141.

137. Australian Government Department of Health. *Australian Health Sector Emergency Response Plan for Novel Coronavirus (COVID-19)*. 2020. Canberra: Australian Government Department of Health.

138. Australian Institute of Health and Welfare. *Australia's health 2020 data insights.* 2020. Canberra: Australian Institute of Health and Welfare

139. Storen R and Corrigan N. COVID-19: a chronology of state and territory government announcements (up until 30 June 2020). *Department of Parliamentary Services, editor Canberra: Parliament of Australia* 2020.

140. Duckett S and Stobart A. Australia's COVID-19 response part 1 of 2: The story so far. *Pearls and Irritations* 2020; 11.

141. Duckett S. Public Health Management of the COVID-19 Pandemic in Australia: The Role of the Morrison Government. *International Journal of Environmental Research and Public Health* 2022; 19: 10400.

142. Stobart A and Duckett S. Australia's Response to COVID-19. *Health Economics, Policy and Law* 2022; 17: 95-106.

143. Reason J. *Human error*. Cambridge University Press, 1990.

144. Vardoulakis S, Sheel M, Lal A, et al. COVID-19 environmental transmission and preventive public health measures. *Australian and New Zealand Journal of Public Health* 2020; 44(5):333–5. Available from: https://doi.org/10.1111%2F1753-6405.13033

145. Silva DS. COVID-19 in the public housing towers of Melbourne: upholding social justice when invoking precaution. *Australian and New Zealand Journal of Public Health* 2020; 44: 430.

146. Australian Government Department of Health. Australia's Vaccine Agreements, Canberra, ACT; Australian Government Department of Health and Aged Care; (2022, accessed 7 May 2022). Available from: https://www.health.gov.au/initiatives-and-programs/covid-19-vaccines/about-rollout/vaccine-agreements

147. Koff WC, Schenkelberg T, Williams T, et al. Development and deployment of COVID-19 vaccines for those most vulnerable. *Science Translational Medicine* 2021; 13: eabd1525.

148. Australian Government Department of Health. Who can get vaccinated, Canberra, ACT; Australian Government Department of Health and Aged Care; (2022, accessed 3 October 2022). Available from: https://www.health.gov.au/initiatives-and-programs/covid-19-vaccines/who-can-get-vaccinated

149. Mein SA. COVID-19 and Health Disparities: the Reality of "the Great Equalizer". *Journal of General Internal Medicine* 2020: 1. Available from: https://doi.org/10.1007/s11606-020-05880-5

150. Benjamin GC. Ensuring health equity during the COVID-19 pandemic: the role of public health infrastructure. *Pan American Journal of Public Health* 2020; 44.

151. Rangel JC, Ranade S, Sutcliffe P, et al. COVID-19 policy measures—Advocating for the inclusion of the social determinants of health in modelling and decision making. *Journal of Evaluation in Clinical Practice* 2020; 26. Available from: https://doi.org/10.1111%2Fjep.13436

152. Anderson G, Frank JW, Naylor CD, et al. Using socioeconomics to counter health disparities arising from the covid-19 pandemic. *BMJ* 2020; 369. Available from: https://doi.org/10.1136/bmj.m2149

153. Mullen L, Potter C, Gostin LO, et al. An analysis of international health regulations emergency committees and public health emergency of international concern designations. *BMJ Global Health* 2020; 5: e002502.

154. Anderson RM, Hollingsworth TD, Baggaley RF, et al. COVID-19 spread in the UK: the end of the beginning? *The Lancet* 2020; 396: 587-590.

155. Broughel J and Kotrous M. The benefits of coronavirus suppression: A cost-benefit analysis of the response to the first wave of COVID-19 in the United States. *PloS one* 2021; 16: e0252729.

156. Gibertoni D, Adja KYC, Golinelli D, et al. Patterns of COVID-19 related excess mortality in the municipalities of Northern Italy during the first wave of the pandemic. *Health & Place* 2021; 67: 102508.

157. Triukose S, Nitinawarat S, Satian P, et al. Effects of public health interventions on the epidemiological spread during the first wave of the COVID-19 outbreak in Thailand. *PLoS One* 2021; 16: e0246274.

158. Coleman R and Mullin-McCandlish B. The Harms of State, Free-Market Common Sense and COVID-19. *State Crime Journal* 2021; 10: 170-188.

159. Crawley H. The Politics of Refugee Protection in a (Post) COVID-19 World. *Social Sciences* 2021; 10: 81.

160. Marmot M and Allen J. COVID-19: exposing and amplifying inequalities. *Journal of Epidemiology and Community Health* 2020; 74: 681-682.

161. Hyder AA, Hyder MA, Nasir K, et al. Inequitable COVID-19 vaccine distribution and its effects. *Bulletin of the World Health Organization* 2021; 99: 406.

162. Maness SB, Merrell L, Thompson EL, et al. Social determinants of health and health disparities: COVID-19 exposures and mortality among African American people in the United States. *Public Health Reports* 2021; 136: 18-22.

163. Upshaw TL, Brown C, Smith R, et al. Social determinants of COVID-19 incidence and outcomes: A rapid review. *PloS one* 2021; 16: e0248336.

164. Clouston SA, Natale G and Link BG. Socioeconomic inequalities in the spread of coronavirus-19 in the United States: A examination of the emergence of social inequalities. *Social Science & Medicine* 2021; 268: 113554.

165. Kim S and Kim S. Exploring the determinants of perceived risk of Middle East Respiratory Syndrome (MERS) in Korea. *International Journal of Environmental Research and Public Health* 2018; 15: 1168.

166. Furceri D, Loungani P, Ostry JD, et al. The rise in inequality after pandemics: can fiscal support play a mitigating role? *Industrial and Corporate Change* 2021; 30: 445-457.

167. Ali S, Asaria M and Stranges S. COVID-19 and inequality: are we all in this together? *Canadian Journal of Public Health* 2020; 111: 415-416.

168. Douglas M, Katikireddi SV, Taulbut M, et al. Mitigating the wider health effects of covid-19 pandemic response. *BMJ* 2020; 369.

169. Haynes N, Cooper LA, Albert MA, et al. At the heart of the matter: unmasking and addressing the toll of COVID-19 on diverse populations. *Circulation* 2020; 142: 105-107.

170. Xafis V. 'What is Inconvenient for You is Life-saving for Me': How Health Inequities are playing out during the COVID-19 Pandemic. *Asian Bioethics Review* 2020; 12: 223-234.

171. McArthur A, Klugárová J, Yan H, et al. Innovations in the systematic review of text and opinion. *JBI Evidence Implementation* 2015; 13: 188-195.

172. McArthur A, Klugarova J, Yan H, et al. Chapter 4: Systematic reviews of text and opinion. *Joanna Briggs Institute Reviewer's Manual*. 2017, p. 136-177.

173. Munn Z, Porritt K, Lockwood C, et al. Establishing confidence in the output of qualitative research synthesis: the ConQual approach. *BMC Medical Research Methodology* 2014; 14: 1-7.

174. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *Systematic Reviews* 2021; 10: 1-11.

175. Baptiste DL, Commodore-Mensah Y, Alexander KA, et al. COVID-19: Shedding light on racial and health inequities in the USA. *Journal of Clinical Nursing* 2020; 29.

176. Kinsey EW, Kinsey D and Rundle AG. COVID-19 and food insecurity: An uneven patchwork of responses. *Journal of Urban Health* 2020; 97: 332-335.

177. Schulz AJ, Mehdipanah R, Chatters LM, et al. Moving health education and behavior upstream: lessons from COVID-19 for addressing structural drivers of health inequities. *Health Education & Behavior* 2020; 47: 519-524.

178. Takian A, Kiani MM and Khanjankhani K. COVID-19 and the need to prioritize health equity and social determinants of health. *Journal of Public Health* 2020; 65: 521-523.

179. Betron M, Gottert A, Pulerwitz J, et al. Men and COVID-19: Adding a gender lens. *Global Public Health* 2020; 15: 1090-1092.

180. Bucciardini R, Contoli B, De Castro P, et al. The health equity in all policies (HEiAP) approach before and beyond the Covid-19 pandemic in the Italian context. *International Journal for Equity in Health* 2020; 19: 1-3.

181. Farley JH, Hines J, Lee NK, et al. Promoting health equity in the era of COVID-19. *Gynecologic Oncology* 2020; 158: 25-31.

182. Gray DM, Anyane-Yeboa A, Balzora S, et al. COVID-19 and the other pandemic: populations made vulnerable by systemic inequity. *Nature Reviews Gastroenterology & Hepatology* 2020; 17: 520-522.

183. Kantamneni N. The impact of the COVID-19 pandemic on marginalized populations in the United States: A research agenda. *Journal of Vocational Behavior* 2020; 119: 103439.

184. Van Dorn A, Cooney RE and Sabin ML. COVID-19 exacerbating inequalities in the US. *The Lancet* 2020; 395: 1243-1244.

185. Shah GH, Shankar P, Schwind JS, et al. The detrimental impact of the COVID-19 crisis on health equity and social determinants of health. *Journal of Public Health Management and Practice* 2020; 26: 317-319.

186. Aidukaite J, Saxonberg S, Szelewa D, et al. Social policy in the face of a global pandemic: Policy responses to the COVID-19 crisis in Central and Eastern Europe. *Social Policy & Administration* 2021; 55: 358-373.

187. Hák T, Janoušková S and Moldan B. Sustainable Development Goals: A need for relevant indicators. *Ecological indicators* 2016; 60: 565-573.

188. Webber-Ritchey KJ, Simonovich SD and Spurlark RS. COVID-19: qualitative research with vulnerable populations. *Nursing Science Quarterly* 2021; 34: 13-19.

189. Perry BL, Aronson B and Pescosolido BA. Pandemic precarity: COVID-19 is exposing and exacerbating inequalities in the American heartland. *Proceedings of the National Academy of Sciences* 2021; 118: e2020685118.

190. MacIntyre R. The risk of selective investment in downstream pandemic planning. *Global Biosecurity* 2019; 1.

191. Andermann A. Taking action on the social determinants of health in clinical practice: a framework for health professionals. *Canadian Medical Association Journal* 2016; 188: E474-E483.

192. Creswell JW and Clark VLP. *Designing and conducting mixed methods research*. Sage publications, 2017.

193. Creswell JW, Klassen AC, Plano Clark VL, et al. Best practices for mixed methods research in the health sciences. *Bethesda (Maryland): National Institutes of Health* 2011; 2013: 541-545.

194. Creswell JW, Fetters MD and Ivankova NV. Designing a mixed methods study in primary care. *The Annals of Family Medicine* 2004; 2: 7-12.

195. Tashakkori A, Johnson RB and Teddlie C. *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*. Sage publications, 2020.

196. Creswell JW. *A concise introduction to mixed methods research*. SAGE publications, 2014.

197. Ivankova NV, Creswell JW and Stick SL. Using mixed-methods sequential explanatory design: From theory to practice. *Field Methods* 2006; 18: 3-20.

198. WHO Commission on Social Determinants of Health. *Closing the gap in a generation: health equity through action on the social determinants of health: Commission on Social Determinants of Health final report*. Geneva: World Health Organization; 2008. Report No.: 9241563702.

199. Setia MS. Methodology series module 3: Cross-sectional studies. *Indian Journal of Dermatology* 2016; 61: 261.

200. Sedgwick P. Cross sectional studies: advantages and disadvantages. *BMJ* 2014; 348.

201. Bowling A. *Research methods in health: investigating health and health services*. McGraw-hill education (UK), 2014.

202. Wang X and Cheng Z. Cross-sectional studies: strengths, weaknesses, and recommendations. *Chest* 2020; 158: S65-S71.

203. Glover JD and Tennant SK. *Remote areas statistical geography in Australia: notes on the Accessibility/Remoteness Index for Australia (ARIA+ version)*. Public Health Information Development Unit, the University of Adelaide, 2003.

204. Eckert KA, Taylor AW, Tucker GR, et al. How does mental health status relate to accessibility and remoteness? *Medical Journal of Australia* 2004; 181: 540-543.

205. Australian Bureau of Statistics. Socio-Economic Indexes for Areas, (2020, accessed 7 August 2020). Available from: https://www.abs.gov.au/websitedbs/censushome.nsf/home/seifa

206. Sadler GR, Lee HC, Lim RSH, et al. Recruitment of hard-to-reach population subgroups via adaptations of the snowball sampling strategy. *Nursing & Health Sciences* 2010; 12: 369-374.

207. Bennetts SK, Hokke S, Crawford S, et al. Using paid and free Facebook methods to recruit Australian parents to an online survey: an evaluation. *Journal of Medical Internet Research* 2019; 21: e11206.

208. Arigo D, Pagoto S, Carter-Harris L, et al. Using social media for health research: Methodological and ethical considerations for recruitment and intervention delivery. *Digital Health* 2018; 4: 2055207618771757.

209. We Are Social. Digital 2020, (2020, 11 October 2020). Available from: https://wearesocial.com/au/blog/2020/01/digital-2020-australia/

210. Australian Bureau of Statistics. Household use of information technology, (2018, accessed 13 November 2020). Available from: https://www.abs.gov.au/statistics/industry/technology-and-innovation/household-use-information-technology/latest-release

211. Shaver LG, Khawer A, Yi Y, et al. Using Facebook advertising to recruit representative samples: feasibility assessment of a cross-sectional survey. *Journal of Medical Internet Research* 2019; 21: e14021.

212. Sinclair M, O'Toole J, Malawaraarachchi M, et al. Comparison of response rates and cost-effectiveness for a community-based survey: postal, internet and telephone modes with generic or personalised recruitment approaches. *BMC Medical Research Methodology* 2012; 12: 1-8.

213. Larson PD. A note on mail surveys and response rates in logistics research. *Journal of Business Logistics* 2005; 26: 211-222.

214. Nelson EJ, Loux T, Arnold LD, et al. Obtaining contextually relevant geographic data using Facebook recruitment in public health studies. *Health & Place* 2019; 55: 37-42.

215. Yuan P, Bare MG, Johnson MO, et al. Using online social media for recruitment of human immunodeficiency virus-positive participants: a cross-sectional survey. *Journal of Medical Internet Research* 2014; 16: e3229.

216. Australian Communications and Media Authority. Communications report 2018-19, (2020, accessed 26 September 2021 2021). Available from: https://www.acma.gov.au/publications/2020-02/report/communications-report-2018-19

217. Australian Bureau of Statistics. Household use of information technology, Australia. (2014, accessed 11 October 2020). Available from: https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/8146.0Main+Features12014-15?OpenDocument=

218. Russomanno J, Patterson JG and Tree JMJ. Social media recruitment of marginalized, hard-to-reach populations: development of recruitment and monitoring guidelines. *JMIR Public Health and Surveillance* 2019; 5: e14886.

219. O'Connor A, Jackson L, Goldsmith L, et al. Can I get a retweet please? Health research recruitment and the Twittersphere. *Journal of Advanced Nursing* 2014; 70: 599-609.

220. Thornton L, Batterham PJ, Fassnacht DB, et al. Recruiting for health, medical or psychosocial research using Facebook: Systematic review. *Internet interventions* 2016; 4: 72-81.

221. Facebook. Ads Manager Basics, (2021, accessed 15 September 2020). Available from: https://www.facebook.com/business/help/4157454018055342020

222. Australian Bureau of Statistics. Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia, 2016, (2018, accessed 2 March 2021). Available from: https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2033.0.55.001~2016~Main%20Features~IRSAD~20

223. Stellefson M, Chaney B and Chaney D. The digital divide in health education: myth or reality? *American Journal of Health Education* 2008; 39: 106-112.

224. Burgess JD, Kimble RM, Watt K, et al. The adoption of social media to recruit participants for the Cool Runnings randomized controlled trial in Australia. *JMIR Research Protocols* 2017; 6: e8189.

225. Pechmann C, Phillips C, Calder D, et al. Facebook recruitment using zip codes to improve diversity in health research: longitudinal observational study. *Journal of Medical Internet Research* 2020; 22: e17554.

226. Topolovec-Vranic J and Natarajan K. The use of social media in recruitment for medical research studies: a scoping review. *Journal of Medical Internet Research* 2016; 18: e286.

227. Kwak N and Radler B. A comparison between mail and web surveys: Response pattern, respondent profile, and data quality. *Journal of Official Statistics* 2002; 18: 257.

228. Smith G. Does gender influence online survey participation?: A record-linkage analysis of university faculty online survey response behavior. *ERIC document reproduction service no ED 501717*. 2008.

229. Slauson-Blevins K and Johnson KM. Doing gender, doing surveys? Women's gatekeeping and men's non-participation in multi-actor reproductive surveys. *Sociological Inquiry* 2016; 86: 427-449.

230. Jackson LA, Ervin KS, Gardner PD, et al. Gender and the Internet: Women communicating and men searching. *Sex Roles* 2001; 44: 363-379.

231. Ali SH, Foreman J, Capasso A, et al. Social media as a recruitment platform for a nationwide online survey of COVID-19 knowledge, beliefs, and practices in the United States: methodology and feasibility analysis. *BMC Medical Research Methodology* 2020; 20: 1-11.

232. Saberi P. Research in the time of coronavirus: continuing ongoing studies in the midst of the COVID-19 pandemic. *AIDS and Behavior* 2020; 24: 2232-2235.

233. Gaupp-Berghausen M, Raser E, Anaya-Boig E, et al. Evaluation of different recruitment methods: longitudinal, web-based, pan-European physical activity through sustainable transport approaches (PASTA) project. *Journal of Medical Internet Research* 2019; 21: e11492.

234. Whitaker C, Stevelink S and Fear N. The use of Facebook in recruiting participants for health research purposes: a systematic review. *Journal of Medical Internet Research* 2017; 19: e7071.

235. Charan J and Biswas T. How to calculate sample size for different study designs in medical research? *Indian Journal of Psychological Medicine* 2013; 35: 121.

236. Creative Research Systems. Sample Size Calculator, (2012, accessed 12 October 2020). Available from: https://www.surveysystem.com/sscalc.htm

237. Australian Bureau of Statistics. Population Clock, (2020, accessed 16 October 2020). Available from: https://www.abs.gov.au/ausstats/abs%40.nsf/94713ad445ff1425ca25682000192af2/1647509ef7e25faaca2568a900154b63?OpenDocument

238. Little TD, Jorgensen TD, Lang KM, et al. On the joys of missing data. *Journal of Pediatric Psychology* 2014; 39: 151-162.

239. SurveyMonkey Inc. San Mateo, California, USA.

240. Dalgard OS, Dowrick C, Lehtinen V, et al. Negative life events, social support and gender difference in depression. *Social Psychiatry and Psychiatric Epidemiology* 2006; 41: 444-451.

241. Hager ER, Quigg AM, Black MM, et al. Development and validity of a 2-item screen to identify families at risk for food insecurity. *Pediatrics* 2010; 126: e26-e32.

242. Mezzich JE, Cohen NL, Ruiperez MA, et al. The multicultural quality of life index: presentation and validation. *Journal of Evaluation in Clinical Practice* 2011; 17: 357-364.

243. Rollins C, Glass NE, Perrin NA, et al. Housing instability is as strong a predictor of poor health outcomes as level of danger in an abusive relationship: findings from the SHARE Study. *Journal of Interpersonal Violence* 2012; 27: 623-643.

244. Duko B, Gebeyehu A and Ayano G. Prevalence and correlates of depression and anxiety among patients with tuberculosis at Wolaita Sodo University Hospital and Sodo Health Center, WolaitaSodo, South Ethiopia, cross sectional study. *BMC Psychiatry* 2015; 15: 214.

245. Mundal I, Laake P, Mezzich J, et al. Assessment of the quality of life in parents of children with ADHD: Validation of the multicultural quality of life index in norwegian pediatric mental health settings. *Frontiers in Psychology* 2021: 210.

246. Navarro-Sánchez A, Luri-Prieto P, Compañ-Rosique A, et al. Sexuality, Quality of Life, Anxiety, Depression, and Anger in Patients with Anal Fissure. A Case–Control Study. *Journal of Clinical Medicine* 2021; 10: 4401.

247. Patmisari E, McLaren H and Jones M. Multicultural quality of life predictive effects on wellbeing: a cross-sectional study of a Muslim community in South Australia. *Journal of Religion & Spirituality in Social Work: Social Thought* 2022: 1-20.

248. Tennant R, Hiller L, Fishwick R, et al. The Warwick-Edinburgh mental well-being scale (WEMWBS): development and UK validation. *Health and Quality of life Outcomes* 2007; 5: 1-13.

249. Valentine MA, Nembhard IM and Edmondson AC. Measuring teamwork in health care settings: a review of survey instruments. *Medical Care* 2015; 53: e16-e30.

250. Tavakol M and Dennick R. Making sense of Cronbach's alpha. *International Journal of Medical Education* 2011; 2: 53.

251. Taherdoost H. Validity and reliability of the research instrument; how to test the validation of a questionnaire/survey in a research. *International Journal of Academic Research in Management* 2016;5(3):28–36. Available from: http://dx.doi.org/10.2139/ssrn.3205040

252. Connell J, Carlton J, Grundy A, et al. The importance of content and face validity in instrument development: lessons learnt from service users when developing the Recovering Quality of Life measure (ReQoL). *Quality of Life Research* 2018; 27: 1893-1902.

253. Rönkkö M and Cho E. An updated guideline for assessing discriminant validity. *Organizational Research Methods* 2022; 25: 6-14.

254. Wood JK, Anglim J and Horwood S. A less evaluative measure of big five personality: comparison of structure and criterion validity. *European Journal of Personality* 2021; 36(5): 809–824. Available from: https://doi.org/10.1177/08902070211012920

255. Trevethan R. Sensitivity, specificity, and predictive values: foundations, pliabilities, and pitfalls in research and practice. *Frontiers in Public Health* 2017; 5: 307.

256. Blumenberg C and Barros AJ. Response rate differences between web and alternative data collection methods for public health research: a systematic review of the literature. *International Journal of Public Health* 2018; 63: 765-773.

257. Stedman RC, Connelly NA, Heberlein TA, et al. The end of the (research) world as we know it? Understanding and coping with declining response rates to mail surveys. *Society & Natural Resources* 2019; 32: 1139-1154.

258. Ebert JF, Huibers L, Christensen B, et al. or web-based questionnaire invitations as a method for data collection: cross-sectional comparative study of differences in response rate, completeness of data, and financial cost. *Journal of Medical Internet Research* 2018; 20: e8353. Available from: https://doi.org/10.2196/jmir.8353

259. Dillman DA, Smyth JD and Christian LM. *Internet, phone, mail, and mixed-mode surveys: the tailored design method*. John Wiley & Sons, 2014.

260. Guo Y, Kopec JA, Cibere J, et al. Population survey features and response rates: a randomized experiment. *American Journal of Public Health* 2016; 106: 1422-1426.

261. IMB Analytics. SPSS. Chicago, IL: IBM Analytics, 2018.

262. Peat J. *Health science research: A handbook of quantitative methods*. London: Sage, 2001.

263. National Health Medical Research Council. Australian Code for the Responsible Conduct of Research. In: National Health Medical Research Council, (ed.). Canberra, ACT: Australian Government 2007.

264. Polit DF. Clinical significance in nursing research: A discussion and descriptive analysis. *International Journal of Nursing Studies* 2017; 73: 17-23.

265. Royal KD. Survey research methods: A guide for creating post-stratification weights to correct for sample bias. *Education in the Health Professions* 2019; 2: 48.

266. Schober P, Boer C and Schwarte LA. Correlation coefficients: appropriate use and interpretation. *Anesthesia & Analgesia* 2018; 126: 1763-1768.

267. VanderWeele TJ and Mathur MB. Some desirable properties of the Bonferroni correction: is the Bonferroni correction really so bad? *American Journal of Epidemiology* 2019; 188: 617-618.

268. Avery L, Rotondi N, McKnight C, et al. Unweighted regression models perform better than weighted regression techniques for respondent-driven sampling data: results from a simulation study. *BMC Medical Research Methodology* 2019; 19: 1-13.

269. Osman T, Koyuncu I and Gelbal S. The influence of using plausible values and survey weights on multiple regression and hierarchical linear model parameters. *Journal of Measurement and Evaluation in Education and Psychology* 2019; 10: 235-248.

270. Winship C and Radbill L. Sampling weights and regression analysis. *Sociological Methods & Research* 1994; 23: 230-257.

271. Sandelowski M. Whatever happened to qualitative description? *Research in Nursing & Health* 2000; 23: 334-340.

272. Doyle L, McCabe C, Keogh B, et al. An overview of the qualitative descriptive design within nursing research. *Journal of Research in Nursing* 2020; 25: 443-455.

273. Flood A. Understanding phenomenology. *Nurse Researcher* 2010; 17.

274. Braun V and Clarke V. Using thematic analysis in psychology. *Qualitative Research in Psychology* 2006; 3: 77-101.

275. Campbell S, Greenwood M, Prior S, et al. Purposive sampling: complex or simple? Research case examples. *Journal of Research in Nursing* 2020; 25: 652-661.

276. Brown A and Danaher PA. CHE principles: Facilitating authentic and dialogical semi-structured interviews in educational research. *International Journal of Research & Method in Education* 2019; 42: 76-90.

277. Polit D and Beck C. *Essentials of Nursing Research: Appraising Evidence for Nursing Practice, 9th*. 9th ed. London: Lippincott and Williams, 2017.

278. Fylan F. Semi-structured interviewing. Teoksessa Miles, Jeremy & Gilbert Paul (eds): A Handbook of Research Methods for Clinical and Health Psychology. Oxford University Press, 2005.

279. Kallio H, Pietilä AM, Johnson M, et al. Systematic methodological review: developing a framework for a qualitative semi-structured interview guide. *Journal of Advanced Nursing* 2016; 72: 2954-2965.

280. Donaghy E, Atherton H, Hammersley V, et al. Acceptability, benefits, and challenges of video consulting: a qualitative study in primary care. *British Journal of General Practice* 2019; 69: e586-e594.

281. Johnson DR, Scheitle CP and Ecklund EH. Beyond the in-person interview? How interview quality varies across in-person, telephone, and Skype interviews. *Social Science Computer Review* 2021; 39: 1142-1158.

282. Saunders B, Sim J, Kingstone T, et al. Saturation in qualitative research: exploring its conceptualization and operationalization. *Quality & quantity* 2018; 52: 1893-1907.

283. Ritchie J, Lewis J, Nicholls CM, et al. *Qualitative research practice: A guide for social science students and researchers*. sage, 2013.

284. Glaser BG. The constant comparative method of qualitative analysis. *Social problems* 1965; 12: 436-445.

285. Rutakumwa R, Mugisha JO, Bernays S, et al. Conducting in-depth interviews with and without voice recorders: a comparative analysis. *Qualitative Research* 2020; 20: 565-581.

286. Braun V and Clarke V. One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology* 2021; 18: 328-352.

287. QSR International Pty Ltd. NVivo Qualitative Data Analysis Software Version 12.: QSR International. , 2018.

288. Creswell JW and Hirose M. Mixed methods and survey research in family medicine and community health. *Family Medicine and Community Health* 2019; 7. Available from: https://doi.org/10.1136%2Ffmch-2018-000086

289. Fetters MD, Curry LA and Creswell JW. Achieving integration in mixed methods designs—principles and practices. *Health Services Research* 2013; 48: 2134-2156.

290. Creswell JW and Creswell JD. *Research design: Qualitative, quantitative, and mixed methods approaches*. California: Sage Publications, 2017.

291. Reeping D and Edwards C. Integrating Using a Crossover Analysis With Formative Joint Displays in Mixed Methods Research. *Journal of Mixed Methods Research* 2021; 13: 15586898211047660. Available from: https://doi.org/10.1177/15586898211047660

292. Haynes-Brown TK and Fetters MD. Using joint display as an analytic process: an illustration using bar graphs joint displays from a mixed methods study of how beliefs shape secondary school teachers' use of technology. *International Journal of Qualitative Methods* 2021; 20: 1609406921993286. Available from: https://doi.org/10.1177/1609406921993286

293. McCrudden MT, Marchand G and Schutz PA. Joint displays for mixed methods research in psychology. *Methods in Psychology* 2021; 5: 100067.

294. National Health Medical Research Council. National statement on ethical conduct national statement on ethical conduct in human research 2007 (updated May 2018). Canberra: National Health Medical Research Council,, 2018.

295. Clark T. On 'being researched': Why do people engage with qualitative research? *Qualitative Research* 2010; 10: 399-419.

296. World Health Organization. *COVID 19 Public Health Emergency of International Concern (PHEIC). Global research and innovation forum: towards a research roadmap*. 2020. Geneva: WHO.

297. Australian Government Department of Health. Latest statement on coronavirus (COVID-19) from the Prime Minister. Australian Government Department of Health and Aged Care; 2020 (2020, accessed 27 March 2021). Available from: https://www.health.gov.au/news/latest-statement-on-coronavirus-covid-19-from-the-prime-minister

298. Australian Government Department of Health. Update from the Prime Minister on social distancing and other measures to combat coronavirus (COVID-19). Australian Government Department of Health and Aged Care; 2020, accessed 27 March 2021). Available from: https://www.health.gov.au/news/update-from-the-prime-minister-on-social-distancing-and-other-measures-to-combat-coronavirus-covid-19

299. Ravindran S and Shah M. *Unintended consequences of lockdowns: COVID-19 and the shadow pandemic*. 2020. National Bureau of Economic Research.

300. Usher K, Bhullar N and Jackson D. Life in the pandemic: Social isolation and mental health. *Journal of Clinical Nursing* 2020; 29: 2756-2757.

301. World Health Organization. *A conceptual framework for action on the social determinants of health*. Report no. 9241500859, 2010. WHO.

302. Donkin A, Goldblatt P, Allen J, et al. Global action on the social determinants of health. *BMJ Global Health* 2018; 3: e000603.

303. Kelly MP. The relation between the social and the biological and COVID-19. *Public Health* 2021; 196: 18-23.

304. Paremoer L, Nandi S, Serag H, et al. Covid-19 pandemic and the social determinants of health. *BMJ* 2021; 372.

305. Jalloh MF, Li W, Bunnell RE, et al. Impact of Ebola experiences and risk perceptions on mental health in Sierra Leone, July 2015. *BMJ global health* 2018; 3: e000471.

306. Sim K and Chua HC. The psychological impact of SARS: a matter of heart and mind. *Canadian Medical Association Journal* 2004; 170: 811-812.

307. Australian Government Department of Health. Coronavirus (COVID-19) at a glance 31 August 2020. Canberra, ACT: Australian Government Department of Health and Aged Care; (2020, accessed 28 June 2021). Available from:

https://www.health.gov.au/sites/default/files/documents/2020/09/coronavirus-covid-19-at-a-glance-31-august-2020.pdf

308. Green H, Fernandez R and MacPhail C. Social media as a platform for recruitment to a national survey during the COVID-19 pandemic: feasibility and cost analysis. *JMIR Formative Research* 2021; 5: e28656.

309. Australian Bureau of Statistics. Personal income in Australia. Australian Bureau of Statistics; 2020 (2020, accessed 28 June 2021). Available from: https://www.abs.gov.au/statistics/labour/earnings-and-working-conditions/personal-income-australia/2014-15-2018-19

310. Azpitarte F and Kalb G. *Measuring income poverty in Australia: A review of methods and recent trends*. 2019, p.163-187.

311. Mason C, Moran M and Earles A. *Policy coordination and housing outcomes during COVID-19*. Melbourne, VIC: Australian Housing and Urban Research Institute Limited; 2020. 69 p. Report No.: 343. Available from: https://dx.doi.org/10.18408/ahuri5125801

312. Benfer EA, Vlahov D, Long MY, et al. Eviction, health inequity, and the spread of COVID-19: housing policy as a primary pandemic mitigation strategy. *Journal of Urban Health* 2021; 98: 1-12.

313. Bushman G and Mehdipanah R. Housing and health inequities during COVID-19: findings from the national Household Pulse Survey. *Journal of Epidemiology and Community Health* 2022; 76: 121-127.

314. McKay FH, Haines BC and Dunn M. Measuring and understanding food insecurity in Australia: A systematic review. *International Journal of Environmental Research and Public Health* 2019; 16: 476.

315. Owens MR, Brito-Silva F, Kirkland T, et al. Prevalence and social determinants of food insecurity among college students during the COVID-19 pandemic. *Nutrients* 2020; 12: 2515.

316. Wolfson JA and Leung CW. Food insecurity during COVID-19: an acute crisis with long-term health implications. American Public Health Association, 2020, p. 1763-1765. Available from: https://doi.org/10.2105/AJPH.2020.305953

317. Pool U and Dooris M. Prevalence of food security in the UK measured by the Food Insecurity Experience Scale. *Journal of Public Health* 2022; 44: 634-641.

318. Biddle N, Edwards B, Gray M, et al. *Hardship, distress, and resilience: The initial impacts of COVID-19 in Australia*. ANU Centre for Social Research & Methods 2020 May 7. Available from: http://hdl.handle.net/1885/213194

319. Yu H, Li M, Li Z, et al. Coping style, social support and psychological distress in the general Chinese population in the early stages of the COVID-19 epidemic. *BMC Psychiatry* 2020; 20: 1-11.

320. Bovier PA, Chamot E and Perneger TV. Perceived stress, internal resources, and social support as determinants of mental health among young adults. *Quality of Life Research* 2004; 13: 161-170.

321. Simon J, Helter TM, White RG, et al. Impacts of the Covid-19 lockdown and relevant vulnerabilities on capability well-being, mental health and social support: an Austrian survey study. *BMC Public Health* 2021; 21: 1-12.

322. Australian Institute of Health and Welfare. Primary Health Care, Australian Institute of Health and Welfare; (2018, accessed 28 June 2021). Available from: https://www.aihw.gov.au/reports-data/indicators/healthy-community-indicators/national/all-australia/primaryhealthcare/primary-health-care?tab=IND0027

323. Leeder SR. Achieving equity in the Australian healthcare system. *Medical Journal of Australia* 2003; 179: 475-478.

324. Isautier JM, Copp T, Ayre J, et al. People's experiences and satisfaction with telehealth during the COVID-19 pandemic in Australia: cross-sectional survey study. *Journal of Medical Internet Research* 2020; 22: e24531.

325. Fisk M, Livingstone A and Pit SW. Telehealth in the context of COVID-19: changing perspectives in Australia, the United Kingdom, and the United States. *Journal of Medical Internet Research* 2020; 22: e19264.

326. Leung K, Wu JT and Leung GM. Effects of adjusting public health, travel, and social measures during the roll-out of COVID-19 vaccination: a modelling study. *The Lancet Public Health* 2021; 6: e674-e682.

327. Singh K, Kondal D, Mohan S, et al. Health, psychosocial, and economic impacts of the COVID-19 pandemic on people with chronic conditions in India: a mixed methods study. *BMC Public Health* 2021; 21: 1-15.

328. Tran BX, Nguyen HT, Le HT, et al. Impact of COVID-19 on economic well-being and quality of life of the Vietnamese during the National social distancing. *Frontiers in Psychology* 2020; 11. Available from: https://doi.org/10.3389/fpsyg.2020.565153

329. Van Nguyen H, Lan Nguyen H, Thi Minh Dao A, et al. The COVID-19 pandemic in Australia: Public health responses, opportunities and challenges. *The International Journal of Health Planning and Management* 2021; 37: 5-13.

330. Corpuz JCG. Adapting to the culture of 'new normal': an emerging response to COVID-19. *Journal of Public Health* 2021; 43: e344-e345.

331. O'Keeffe P, Johnson B and Daley K. Continuing the precedent: Financially disadvantaging young people in" unprecedented" COVID-19 times. *Australian Journal of Social Issues* 2021; 57. Available from: https://doi.org/10.1002/ajs4.152

332. O'Sullivan D, Rahamathulla M and Pawar M. The impact and implications of COVID-19: An Australian perspective. *The International Journal of Community and Social Development* 2020; 2: 134-151.

333. Green H, Fernandez R and MacPhail C. The social determinants of health and health outcomes among adults during the COVID-19 pandemic: A systematic review. *Public Health Nursing* 2021; 38: 942-952.

334. Martin A, Markhvida M, Hallegatte S, et al. Socio-economic impacts of COVID-19 on household consumption and poverty. *Economics of Disasters and Climate Change* 2020; 4: 453-479.

335. Felix Castillo C. *A Comparison of the Economic Impact between SARS 2003 and SARS 2019. In Europe and China*. [final degree project]. [Castelló de la Plana, Spain]: Universitat Jaume I; 2021. 39 p. Available from: http://hdl.handle.net/10234/194204 2021.

336. United Nations Development Programme. *Socio-economic impact of the Ebola Virus Disease in Guinea, Liberia and Sierra Leone*. United Nations Development

Programme; 2014. Available from:
https://www.undp.org/content/dam/rba/docs/Reports/UNDP%20Policy%20note%20EN_web.pdf

337. Clark E, Fredricks K, Woc-Colburn L, et al. Disproportionate impact of the COVID-19 pandemic on immigrant communities in the United States. *PLoS Neglected Tropical Diseases* 2020; 14: e0008484.

338. 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: 1-11.

339. Australian Bureau of Statistics. Cultural Diversity in Australia, Australian Bureau of Statistics; 2022 (2017, accessed 26 September 2021). Available from:
https://www.abs.gov.au/articles/cultural-diversity-australia

340. Australian Institute of Health and Welfare. Indigenous Australians, Australian Institute of Health and Welfare; (2021, accessed 26 September 2021). Available from:
https://www.aihw.gov.au/reports-data/population-groups/indigenous-australians/about

341. Lathrop B. Nursing leadership in addressing the social determinants of health. *Policy, Politics, & Nursing Practice* 2013; 14: 41-47.

342. Phillips J, Richard A, Mayer KM, et al. Integrating the social determinants of health into nursing practice: Nurses' perspectives. *Journal of Nursing Scholarship* 2020; 52: 497-505.

343. Chen J and Langwasser K. *COVID-19 Stimulus Payments and the Reserve Bank's Transactional Banking Services*. 2021. RBA Bulletin.

344. Australian Government Treasury. Early access to superannuation, Australian Government Treasury; (2021, accessed 26 September 2021). Available from:
https://treasury.gov.au/sites/default/files/2020-10/Fact_sheet-Early_Access_to_Super.pdf

345. Worthington AC. *Coverage, knowledge and perceptions of superannuation in Australia*. 2005. Wollongong, NSW: University of Wollongong, School of Accounting and Finance; 2005 Jan. 21 p. Report No.: Working Paper Series No. 05/04.

346. Australian Government Treasury. JobKeeper Payment, Australian Government Treasury; (2021, accessed 26 September 2021). Available from:
https://treasury.gov.au/coronavirus/jobkeeper

347. Parker K, Minkin R and Bennett J. Economic fallout from COVID-19 continues to hit lower-income Amercians the hardest, Pew Research Center; (2020, accessed 26 September 2021). Available from: https://www.pewresearch.org/social-trends/2020/09/24/economic-fallout-from-covid-19-continues-to-hit-lower-income-americans-the-hardest/

348. Aljazeera. COVID-19 has already wiped out 6 million jobs, EU study finds, (2021, accessed 26 September 2021 2021). Available from:
https://www.aljazeera.com/news/2021/3/11/covid-19-has-already-wiped-out-6-million-jobs-eu-study-finds

349. Australian Institute of Health and Welfare. Secondary education: school retention and completion, Australian Institute of Health and Welfare; (2021, accessed 26 September

2021). Available from: https://www.aihw.gov.au/reports/australias-welfare/secondary-education-school-retention-completion

350. Daley J, Wood D and Chivers C. *Regional Patterns of Australia's Economy and Population*. Melbourne: Grattan Institute 2017 Aug. 41 p. Report No.: Working Paper No. 2017-8.

351. Wood N, Charlwood G, Zecchin C, et al. Qualitative exploration of the impact of employment and volunteering upon the health and wellbeing of African refugees settled in regional Australia: a refugee perspective. *BMC Public Health* 2019; 19: 1-15.

352. Kaine S. Australian industrial relations and COVID-19. *Journal of Australian Political Economy* 2020: 130-137.

353. Walkowiak E. JobKeeper: The Australian Short-Time Work Program. *Australian Journal of Public Administration* 2021; 80: 1046-1053.

354. Lam D and Kenworthy L. JobKeeper payment for January 2021 and beyond: What you need to know. *Governance Directions* 2021; 73: 30-32.

355. Cassells R and Duncan A. Job Keepers and Job Seekers: How many workers will lose and how many will gain. *Bankwest Curtin Economics Centre COVID-19 Research Brief* 2020; 3: 1-6.

356. Australian Government Treasury. The JobKeeper Payment: Three-month review, Australian Government Treasury; (2020, accessed 26 September 2021). Available from: https://treasury.gov.au/sites/default/files/2020-07/jobkeeper-review-2020.pdf

357. Phillips B, Gray M and Biddle N. *COVID-19 JobKeeper and JobSeeker impacts on poverty and housing stress under current and alternative economic and policy scenarios*. 2020. Canberra: ANU Centre for Social Research Methods.

358. Feng J, Gerrans P, Moulang C, et al. Why women have lower retirement savings: the Australian case. *Feminist Economics* 2019; 25: 145-173.

359. Broomhill R, Costa M, Austen S, et al. What went wrong with super?: Financialisation and Australia's retirement income system. *The Journal of Australian Political Economy* 2021: 71-94.

360. Horowitz JM, Brown A and Minkin R. A Year Into the Pandemic, Long-Term Financial Impact Weighs Heavily on Many Americans, Pew Research Center; (2021, accessed 26 September 2021). Available from: https://www.pewresearch.org/social-trends/2021/03/05/a-year-into-the-pandemic-long-term-financial-impact-weighs-heavily-on-many-americans/

361. Dodson M. Challenges and opportunities in Australian Indigenous education. *Closing the gap in education: Improving outcomes in southern world societies*. Melbourne: Monash University Publishing, 2010.

362. Lord H, MacPhail C, Cherry J, et al. Perceptions of Aboriginal and Torres Strait Islander Australians toward cardiovascular primary prevention programs: A qualitative systematic review. *Public Health Nursing* 2021; 38: 197-211.

363. Burström B and Tao W. Social determinants of health and inequalities in COVID-19. *European Journal of Public Health* 2020; 30: 617-618. Available from: https://doi.org/10.1093/eurpub/ckaa095

364. Abrams EM and Szefler SJ. COVID-19 and the impact of social determinants of health. *The Lancet Respiratory Medicine* 2020; 8: 659-661. Available from: https://doi.org/10.1016/S2213-2600(20)30234-4

365. Australian Bureau of Statistics. Impact of lockdowns on household consumption - insights from alternative data sources, Australian Bureau of Statistics; (2021, accessed 29 December 2021). Available from: https://www.abs.gov.au/articles/impact-lockdowns-household-consumption-insights-alternative-data-sources

366. Turner-Musa J, Ajayi O and Kemp L. Examining social determinants of health, stigma, and COVID-19 disparities. *Healthcare* 2020,;8(2):168 Available from: https://doi.org/10.3390/healthcare8020168

367. Figueiredo AMd, Figueiredo DCMMd, Gomes LB, et al. Social determinants of health and COVID-19 infection in Brazil: an analysis of the pandemic. *Revista brasileira de enfermagem* 2020; 73.

368. Pandey A, Prakash A, Agur R, et al. Determinants of COVID-19 pandemic in India: An exploratory study of Indian states and districts. *Journal of Social and Economic Development* 2021; 23: 248-279.

369. Palmer RC, Ismond D, Rodriquez EJ, et al. Social determinants of health: future directions for health disparities research. *American Public Health Association* 2019; 109: S70-S71.

370. Sharma S, Walton M and Manning S. Social Determinants of Health Influencing the New Zealand COVID-19 Response and Recovery: A Scoping Review and Causal Loop Diagram. *Systems* 2021; 9: 52.

371. Kirkpatrick SI and Tarasuk V. Housing circumstances are associated with household food access among low-income urban families. *Journal of Urban Health* 2011; 88: 284-296. Available from: https://doi.org/10.1007/s11524-010-9535-4

372. Choi K, Giridharan N, Cartmell A, et al. Life during lockdown: a qualitative study of low-income New Zealanders' experience during the COVID-19 pandemic. *The New Zealand Medical Journal (Online)* 2021; 134: 52-56.

373. Medvedev ON and Landhuis CE. Exploring constructs of well-being, happiness and quality of life. *PeerJ* 2018; 6: e4903.

374. Lincoln Y and Guba E. *Naturalistic Inquiry* London: Sage Publications, 1985.

375. Saldaña J. *The coding manual for qualitative researchers*. Sage, 2021.

376. Jonsson F, San Sebastian M, Hammarström A, et al. Are neighbourhood inequalities in adult health explained by socio-economic and psychosocial determinants in adolescence and the subsequent life course in northern Sweden? A decomposition analysis. *Health & Place* 2018; 52: 127-134.

377. Arshad A. Impact of financial inclusion on food security: evidence from developing countries. *International Journal of Social Economics* 2022; 49: 336-355. Available from: https://doi.org/10.1108/IJSE-08-2021-0462

378. Fafard St-Germain A-A and Tarasuk V. Homeownership status and risk of food insecurity: examining the role of housing debt, housing expenditure and housing asset using a cross-sectional population-based survey of Canadian households. *International Journal for Equity in Health* 2020; 19: 1-12. Available from: https://doi.org/10.1186/s12939-019-1114-z

379. Kent K, Murray S, Penrose B, et al. Prevalence and socio-demographic predictors of food insecurity in Australia during the COVID-19 pandemic. *Nutrients* 2020; 12: 2682.

380. Pooler JA, Hartline-Grafton H, DeBor M, et al. Food insecurity: a key social determinant of health for older adults. *Journal of the American Geriatrics Society* 2019; 67: 421.

381. Thornton M and Persaud S. Preparing today's nurses: Social determinants of health and nursing education. *The Online Journal of Issues in Nursing* 2018; 23. Available from: https://doi.org/10.3912/OJIN.Vol23No03Man05

382. Green H, Fernandez R and MacPhail C. Well-being and social determinants of health among Australian adults: A national cross-sectional study. *Health & Social Care in the Community* 2022. Available from: https://doi.org/10.1111/hsc.13827

383. Carter KN, Lanumata T, Kruse K, et al. What are the determinants of food insecurity in New Zealand and does this differ for males and females? *Australian and New Zealand Journal of Public Health* 2010; 34: 602-608. Available from: https://doi.org/10.1111/j.1753-6405.2010.00615.x

384. Maynard M, Andrade L, Packull-McCormick S, et al. Food insecurity and mental health among females in high-income countries. *International Journal of Environmental Research and Public Health* 2018; 15: 1424.

385. Grimaccia E and Naccarato A. Food insecurity in Europe: A gender perspective. *Social Indicators Research* 2020; 161: 649-667.

386. Buckle C, Gurran N, Phibbs P, et al. *Marginal housing during COVID-19.* 2020.

387. New South Wales Government Fair Trading. Residential tenancy support package, New South Wales Government Fair Trading; (2021, accessed 29 December 2021). Available from: https://www.fairtrading.nsw.gov.au/resource-library/publications/coronavirus-covid-19/property/moratorium

388. Regional Australia Institute. Pandemic sees doubling in net migrant from capital cities to regional Australia, Regional Australia Institute; (2022, accessed 10 March 2022). Available from: https://regionalaustralia.org.au/Web/Web/Media/Media-Releases/2022/Pandemic-Sees-Doubling-in-Net-Migration-From-Capital-Cities-to-Regional-Australia.aspx

389. Blunden H and Flanagan K. Housing options for women leaving domestic violence: the limitations of rental subsidy models. *Housing Studies* 2020: 1-20. Available from: https://doi.org/10.1080/02673037.2020.1867711

390. Green H, Fernandez R and MacPhail C. The social determinants of health and health outcomes among adults during the COVID-19 pandemic: A systematic review. *Public Health Nursing* 2021; 38: 942-952.

391. Seivwright AN, Callis Z and Flatau P. Food insecurity and socioeconomic disadvantage in Australia. *International Journal of Environmental Research and Public Health* 2020; 17: 559.

392. Padgett DK. Homelessness, housing instability and mental health: making the connections. *BJPsych Bulletin* 2020; 44: 197-201.

393. Irvine A, Drew P and Sainsbury R. 'Am I not answering your questions properly?'Clarification, adequacy and responsiveness in semi-structured telephone and face-to-face interviews. *Qualitative Research* 2013; 13: 87-106.

394. Fisher A, Roberts A, McKinlay AR, et al. The impact of the COVID-19 pandemic on mental health and well-being of people living with a long-term physical health condition: a qualitative study. *BMC Public Health* 2021; 21: 1-12.

395. El-Zoghby SM, Soltan EM and Salama HM. Impact of the COVID-19 pandemic on mental health and social support among adult Egyptians. *Journal of Community Health* 2020; 45: 689-695.

396. Szkody E, Stearns M, Stanhope L, et al. Stress-buffering role of social support during COVID-19. *Family Process* 2021; 60: 1002-1015.

397. Atalan A. Is the lockdown important to prevent the COVID-19 pandemic? Effects on psychology, environment and economy-perspective. *Annals of Medicine and Surgery* 2020; 56: 38-42.

398. Corvo E and De Caro W. Social capital and social networks. *European Journal of Public Health* 2019; 29: ckz186. 093.

399. Achdut N, Refaeli T and Schwartz Tayri TM. Subjective poverty, material deprivation indices and psychological distress among young adults: The mediating role of social capital and usage of online social networks. *Social Indicators Research* 2021; 158: 863-887.

400. Cattell V. Poor people, poor places, and poor health: the mediating role of social networks and social capital. *Social Science & Medicine* 2001; 52: 1501-1516.

401. Ehsan A, Klaas HS, Bastianen A, et al. Social capital and health: a systematic review of systematic reviews. *SSM-Population Health* 2019; 8: 100425.

402. Makridis C and Wu C. *Ties that bind (and social distance): How social capital helps communities weather the COVID-19 pandemic*. 2020. Standford University. Available from: http://dx.doi.org/10.2139/ssrn.3584581

403. Lee JK, Lin L and Magee C. Investigating the relationships between social capital, chronic health conditions and health status among Australian adults: findings from an Australian national cohort survey. *BMC Public Health* 2020; 20: 1-11.

404. Lee JK, Lin L and Wu XV. Social capital and health communication in Singapore: An examination of the relationships between community participation, perceived neighborliness and health communication behaviors. *Journal of Health Communication* 2020; 25: 323-332.

405. Pitas N and Ehmer C. Social Capital in the Response to COVID-19. *American Journal of Health Promotion* 2020; 34: 942-944.

406. Bourdieu P and Richardson JG. Handbook of Theory and Research for the Sociology of Education. *The forms of capital* 1986; 241: 258.

407. Carrasco MA and Bilal U. A sign of the times: To have or to be? Social capital or social cohesion? *Social Science & Medicine* 2016; 159: 127-131.

408. Putnam RD, Leonardi R and Nanetti RY. *Making democracy work: Civic traditions in modern Italy*. Princeton university press, 1992.

409. Gelderblom D. The limits to bridging social capital: Power, social context and the theory of Robert Putnam. *The Sociological Review* 2018; 66: 1309-1324.

410. Sherman GD and Mehta PH. Stress, cortisol, and social hierarchy. *Current Opinion in Psychology* 2020; 33: 227-232.

411. Piquero AR, Jennings WG, Jemison E, et al. Domestic violence during the COVID-19 pandemic-Evidence from a systematic review and meta-analysis. *Journal of Criminal Justice* 2021; 74: 101806. Available from: https://doi.org/10.1016/j.jcrimjus.2021.101806

412. Javed S and Mehmood Y. No lockdown for domestic violence during COVID-19: a systematic review for the implication of mental-well being. *Life and Science* 2020; 1: 6-6.

413. Sandelowski M. What's in a name? Qualitative description revisited. *Research in Nursing & Health* 2010; 33: 77-84.

414. Kim H, Sefcik JS and Bradway C. Characteristics of qualitative descriptive studies: A systematic review. *Research in Nursing & Health* 2017; 40: 23-42.

415. Green H, MacPhail C, Alananzeh I, et al. Association between economic wellbeing and ethnicity, socioeconomic status, and remoteness during the COVID-19 pandemic. *Public Health Nursing* 2022.

416. Braun V and Clarke V. To saturate or not to saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales. *Qualitative Research in Sport, Exercise and Health* 2021; 13: 201-216.

417. Glaser BG and Strauss AL. *The discovery of grounded theory: Strategies for qualitative research*. Routledge, 2017.

418. Chang Q, Peng C, Guo Y, et al. Mechanisms connecting objective and subjective poverty to mental health: Serial mediation roles of negative life events and social support. *Social Science & Medicine* 2020; 265: 113308.

419. Wang J, Mann F, Lloyd-Evans B, et al. Associations between loneliness and perceived social support and outcomes of mental health problems: a systematic review. *BMC Psychiatry* 2018; 18: 1-16.

420. Putnam RD. Bowling alone: America's declining social capital. In: LeGates R, Stout F, editors. *Culture and politics*. Springer, 2000, pp.223-234.

421. Borgonovi F and Andrieu E. Bowling together by bowling alone: Social capital and Covid-19. *Social Science & Medicine* 2020; 265: 113501.

422. Gloster AT, Lamnisos D, Lubenko J, et al. Impact of COVID-19 pandemic on mental health: An international study. *PloS one* 2020; 15: e0244809.

423. Bright CF, Burton C and Kosky M. Considerations of the impacts of COVID-19 on domestic violence in the United States. *Social Sciences & Humanities Open* 2020; 2: 100069.

424. Dickinson PR and Morrison PS. Aversion to Local Wellbeing Inequality is Moderated by Social Engagement and Sense of Community. *Social Indicators Research* 2022; 159: 907-926.

425. Spain D, Stewart V, Betts H, et al. Wheel of Wellbeing (WoW) health promotion program: Australian participants report on their experiences and impacts. *BMC Public Health* 2021; 21: 1-11.

426. Bennet L and Lindström M. Self-rated health and social capital in Iraqi immigrants to Sweden: The MEDIM population-based study. *Scandinavian Journal of Public Health* 2018; 46: 194-203.

427. McEwen L, Holmes A, Quinn N, et al. 'Learning for resilience': Developing community capital through flood action groups in urban flood risk settings with lower social capital. *International Journal of Disaster Risk Reduction* 2018; 27: 329-342.

428. Ye M and Aldrich DP. Substitute or complement? How social capital, age and socioeconomic status interacted to impact mortality in Japan's 3/11 tsunami. *SSM-Population Health* 2019; 7: 100403.

429. Sun Q and Lu N. Social capital and mental health among older adults living in urban China in the context of COVID-19 pandemic. *International Journal of Environmental Research and Public Health* 2020; 17: 7947.

430. Isaacson M, Cohen I and Shpigelman C. Leveraging emotional wellbeing and social engagement of the oldest old by using advanced communication technologies: a pilot study using Uniper-Care's technology. *3rd IET International Conference on Technologies for Active and Assisted Living*. London 2019. Available from: https://doi.org/10.1049/cp.2019.0102

431. Bragard E, Giorgi S, Juneau P, et al. Loneliness and Daily Alcohol Consumption During the COVID-19 Pandemic. *Alcohol and Alcoholism* 2021; 57: 198 - 202.

432. Horigian VE, Schmidt RD and Feaster DJ. Loneliness, mental health, and substance use among US young adults during COVID-19. *Journal of Psychoactive Drugs* 2021; 53: 1-9.

433. Lunnay B, Foley K, Meyer SB, et al. Alcohol consumption and perceptions of health risks during COVID-19: a qualitative study of middle-aged women in South Australia. *Frontiers in Public Health* 2021; 9: 616870.

434. Lim M, Holt-Lunstad J and Badcock J. *Loneliness: contemporary insights into causes, correlates, and consequences*. Springer, 2020, p.789-791.

435. Prohaska T, Burholt V, Burns A, et al. Consensus statement: loneliness in older adults, the 21st century social determinant of health? *BMJ open* 2020; 10: e034967.

436. Sagan O and Miller E. *Narratives of loneliness: Multidisciplinary perspectives from the 21st century*. Routledge, 2017.

437. Surkalim DL, Luo M, Eres R, et al. The prevalence of loneliness across 113 countries: Systematic review and meta-analysis. *BMJ* 2022; 376.

438. Foster A, Thompson J, Holding E, et al. Impact of social prescribing to address loneliness: A mixed methods evaluation of a national social prescribing programme. *Health & Social Care in the Community* 2021; 29: 1439-1449.

439. Kellezi B, Wakefield JRH, Stevenson C, et al. The social cure of social prescribing: a mixed-methods study on the benefits of social connectedness on quality and effectiveness of care provision. *BMJ open* 2019; 9: e033137.

440. Williams SN, Armitage CJ, Tampe T, et al. Public perceptions and experiences of social distancing and social isolation during the COVID-19 pandemic: A UK-based focus group study. *BMJ open* 2020; 10: e039334.

441. Alamilla SG and Cano MÁ. COVID-19 and adverse social determinants of health. *Behavioral Medicine* 2022; 48: 67-71.

442. Anastasiou E and Duquenne M-N. What about the "Social Aspect of COVID"? Exploring the determinants of social isolation on the Greek population during the COVID-19 lockdown. *Social Sciences* 2021; 10: 27.

443. Chen DT-H and Wang Y-J. Inequality-Related health and social factors and their impact on well-being during the COVID-19 pandemic: findings from a national survey in the UK. *International Journal of Environmental Research and Public Health* 2021; 18: 1014.

444. Fauk NK, Dent E, Asa GA, et al. Impact of COVID-19 lockdowns on the activity and mental health of older people in Indonesia: A qualitative study. *International Journal of Environmental Research and Public Health* 2022; 19: 13115.

445. Groarke JM, Berry E, Graham-Wisener L, et al. Loneliness in the UK during the COVID-19 pandemic: Cross-sectional results from the COVID-19 Psychological Wellbeing Study. *PloS one* 2020; 15: e0239698.

446. Lopez L, Hart LH and Katz MH. Racial and ethnic health disparities related to COVID-19. *JAMA* 2021; 325: 719-720.

447. Luo Y, Li Q, Jeong H, et al. The association between social determinants of health and psychological distress during the COVID-19 pandemic: a secondary analysis among four racial/ethnic groups. *BMC Public Health* 2022; 22: 1-12.

448. Ndumbe-Eyoh S, Muzumdar P, Betker C, et al. 'Back to better': amplifying health equity, and determinants of health perspectives during the COVID-19 pandemic. *Global Health Promotion* 2021; 28: 7-16.

449. Stok FM, Bal M, Yerkes MA, et al. Social inequality and solidarity in times of COVID-19. *International Journal of Environmental Research and Public Health* 2021; 18: 6339.

450. Szwarcwald CL, Malta DC, Barros MBdA, et al. Associations of sociodemographic factors and health behaviors with the emotional well-being of adolescents during the covid-19 pandemic in Brazil. *International Journal of Environmental Research and Public Health* 2021; 18: 6160.

451. Bambra C, Albani V and Franklin P. COVID-19 and the gender health paradox. *Scandinavian Journal of Public Health* 2021; 49: 17-26.

452. Christl M, De Poli S, Kucsera D, et al. COVID-19 and (gender) inequality in income: the impact of discretionary policy measures in Austria. *Swiss Journal of Economics and Statistics* 2022; 158: 4.

453. Clark S, McGrane A, Boyle N, et al. "You're a teacher you're a mother, you're a worker": Gender inequality during COVID-19 in Ireland. *Gender, Work & Organization* 2021; 28: 1352-1362.

454. Couch KA, Fairlie RW and Xu H. The evolving impacts of the COVID-19 pandemic on gender inequality in the US labor market: The COVID motherhood penalty. *Economic Inquiry* 2022; 60: 485-507.

455. Dang H-AH and Nguyen CV. Gender inequality during the COVID-19 pandemic: Income, expenditure, savings, and job loss. *World Development* 2021; 140: 105296.

456. Fisher AN and Ryan MK. Gender inequalities during COVID-19. *Group Processes & Intergroup Relations* 2021; 24: 237-245.

457. Hipp L and Bünning M. Parenthood as a driver of increased gender inequality during COVID-19? Exploratory evidence from Germany. *European Societies* 2021; 23: S658-S673.

458. Morgan R, Pimenta DN and Rashid S. Gender equality and COVID-19: act now before it is too late. *Lancet* 2022; 399: 2327.

459. Oreffice S and Quintana-Domeque C. Gender inequality in COVID-19 times: Evidence from UK prolific participants. *Journal of Demographic Economics* 2021; 87: 261-287.

460. Reichelt M, Makovi K and Sargsyan A. The impact of COVID-19 on gender inequality in the labor market and gender-role attitudes. *European Societies* 2021; 23: S228-S245.

461. Ruyak SL and Kivlighan KT. Perinatal behavioral health, the COVID-19 pandemic, and a Social Determinants of Health Framework. *Journal of Obstetric, Gynecologic & Neonatal Nursing* 2021; 50: 525-538.

462. Karageorghis CI, Bird JM, Hutchinson JC, et al. Physical activity and mental well-being under COVID-19 lockdown: a cross-sectional multination study. *BMC Public Health* 2021; 21: 1-13.

463. Kilian C, Rehm J, Allebeck P, et al. Alcohol consumption during the COVID-19 pandemic in Europe: a large-scale cross-sectional study in 21 countries. *Addiction* 2021; 116: 3369-3380.

464. Müller F, Röhr S, Reininghaus U, et al. Social isolation and loneliness during COVID-19 lockdown: Associations with depressive symptoms in the German old-age population. *International Journal of Environmental Research and Public Health* 2021; 18: 3615.

465. Padmanabhanunni A and Pretorius TB. The unbearable loneliness of COVID-19: COVID-19-related correlates of loneliness in South Africa in young adults. *Psychiatry Research* 2021; 296: 113658.

466. Roberts A, Rogers J, Mason R, et al. Alcohol and other substance use during the COVID-19 pandemic: A systematic review. *Drug and Alcohol Dependence* 2021; 229: 109150.

467. Williams CY, Townson AT, Kapur M, et al. Interventions to reduce social isolation and loneliness during COVID-19 physical distancing measures: A rapid systematic review. *PloS one* 2021; 16: e0247139.

468. Zorbas C, Browne J, Chung A, et al. Shifting the social determinants of food insecurity during the COVID-19 pandemic: the Australian experience. *Food Security* 2022: 1-20.

469. Davidson P, Bradbury B, Hill T, et al. *Poverty in Australia 2020-part 2: who is affected?* Report no. 0858710684, 2020. Sydney Australian Council of Social Service.

470. Gane N. Max Weber as Social Theorist: 'Class, Status, Party'. *European Journal of Social Theory* 2005; 8: 211-226.

471. Temple JB, Booth S and Pollard CM. Social assistance payments and food insecurity in Australia: Evidence from the household expenditure survey. *International Journal of Environmental Research and Public Health* 2019; 16: 455.

472. Niles MT, Bertmann F, Belarmino EH, et al. The early food insecurity impacts of COVID-19. *Nutrients* 2020; 12: 2096.

473. Olabiyi OM and McIntyre L. Determinants of food insecurity in higher-income households in Canada. *Journal of Hunger & Environmental Nutrition* 2014; 9.

474. Andrew J, Baker M, Guthrie J, et al. Australia's COVID-19 public budgeting response: the straitjacket of neoliberalism. *Journal of Public Budgeting, Accounting & Financial Management* 2020; 32: 759-770.

475.   Botha F, de New JP, de New SC, et al. Implications of COVID-19 labour market shocks for inequality in financial wellbeing. *Journal of Population Economics* 2021; 34: 655-689.

476.   De Marchis EH, Torres JM, Benesch T, et al. Interventions addressing food insecurity in health care settings: a systematic review. *The Annals of Family Medicine* 2019; 17: 436-447.

477.   Garthwaite K, Collins PJ and Bambra C. Food for thought: An ethnographic study of negotiating ill health and food insecurity in a UK foodbank. *Social Science & Medicine* 2015; 132: 38-44.

478.   Bowden M. *Understanding food insecurity in Australia*. Australian Institute of Family Studies Southbank, VIC, Australia, 2020.

479.   Elgar FJ, Pickett W, Pförtner T-K, et al. Relative food insecurity, mental health and wellbeing in 160 countries. *Social Science & Medicine* 2021; 268: 113556.

480.   Muscaritoli M. The impact of nutrients on mental health and well-being: Insights from the literature. *Frontiers in Nutrition* 2021: 97.

481.   Louie S, Shi Y and Allman-Farinelli M. The effects of the COVID-19 pandemic on food security in Australia: A scoping review. *Nutrition & Dietetics* 2022; 79: 28-47.

482.   Kulemeka O. *US consumers and disaster: Observing "panic buying" during the winter storm and hurricane seasons*. USA: ACR North American Advances, 2010.

483.   Simandjuntak DP, Jaenicke EC and Wrenn DH. Heterogeneity in Consumer Food Stockpiling and Retailer Experiences During Hurricane Sandy. *2022 Agricultural & Applied Economics Association Annual Meeting*. Anaheim2022.

484.   Pawson H. Housing Affordability and Homelessness: Probing Australian Evidence. *European Journal of Homelessness* 2021; 15.

485.   Saunders P. Housing costs, poverty and inequality in Australia. *Housing Studies* 2017; 32: 742-757.

486.   Nygaard CA and Parkinson S. Analysing the impact of COVID-19 on urban transitions and urban-regional dynamics in Australia. *Australian Journal of Agricultural and Resource Economics* 2021; 65: 878-899.

487.   Hohmann JM. *Housing as a Right*. Oxford: UK: 2021.

488.   Saikia U, Dodd MM, Chalmers J, et al. COVID-19, individual wellbeing and multi-dimensional poverty in the state of South Australia. *PloS one* 2021; 16: e0252898.

489.   Lee S, Schmidt-Klau D and Verick S. The labour market impacts of the COVID-19: A global perspective. *The Indian Journal of Labour Economics* 2020; 63: 11-15.

490.   Power K. The COVID-19 pandemic has increased the care burden of women and families. *Sustainability: Science, Practice and Policy* 2020; 16: 67-73.

491.   Seck PA, Encarnacion JO, Tinonin C, et al. Gendered impacts of COVID-19 in Asia and the Pacific: early evidence on deepening socioeconomic inequalities in paid and unpaid work. *Feminist Economics* 2021; 27: 117-132.

492.   Bone J. Neoliberal nomads: Housing insecurity and the revival of private renting in the UK. *Sociological Research Online* 2014; 19: 1-14.

493.   Marquez E, Francis CD and Gerstenberger S. Where I live: A qualitative analysis of renters living in poor housing. *Health & Place* 2019; 58: 102143.

494. Berry HL and Welsh JA. Social capital and health in Australia: an overview from the household, income and labour dynamics in Australia survey. *Social Science & Medicine* 2010; 70: 588-596.

495. du Plooy DR, Lyons A and Kashima ES. Social capital and the well-being of migrants to Australia: Exploring the role of generalised trust and social network resources. *International Journal of Intercultural Relations* 2020; 79: 1-12.

496. Kingsley J, Foenander E and Bailey A. "It's about community": Exploring social capital in community gardens across Melbourne, Australia. *Urban Forestry & Urban Greening* 2020; 49: 126640.

497. Taylor A, Kelly G, Dal Grande E, et al. Population levels of wellbeing and the association with social capital. *BMC Psychology* 2017; 5: 1-9.

498. Villalonga-Olives E, Wind T and Kawachi I. Social capital interventions in public health: A systematic review. *Social Science & Medicine* 2018; 212: 203-218.

499. Alonge O, Sonkarlay S, Gwaikolo W, et al. Understanding the role of community resilience in addressing the Ebola virus disease epidemic in Liberia: a qualitative study (community resilience in Liberia). *Global Health Action* 2019; 12: 1662682.

500. Wickes R, Zahnow R, Taylor M, et al. Neighborhood structure, social capital, and community resilience: Longitudinal evidence from the 2011 Brisbane flood disaster. *Social Science Quarterly* 2015; 96: 330-353.

501. Freak-Poli R, Ryan J, Neumann JT, et al. Social isolation, social support and loneliness as predictors of cardiovascular disease incidence and mortality. *BMC Geriatrics* 2021; 21: 1-14.

502. Mund M, Freuding MM, Möbius K, et al. The stability and change of loneliness across the life span: A meta-analysis of longitudinal studies. *Personality and Social Psychology Review* 2020; 24: 24-52.

503. Uphoff EP, Pickett KE, Cabieses B, et al. A systematic review of the relationships between social capital and socioeconomic inequalities in health: a contribution to understanding the psychosocial pathway of health inequalities. *International Journal for Equity in Health* 2013; 12: 1-12.

504. Addae EA. The mediating role of social capital in the relationship between socioeconomic status and adolescent wellbeing: evidence from Ghana. *BMC Public Health* 2020; 20: 1-11.

505. Yang Y, Wang S, Chen L, et al. Socioeconomic status, social capital, health risk behaviors, and health-related quality of life among Chinese older adults. *Health and Quality of Life Outcomes* 2020; 18: 1-8.

506. Esposto A and Agudelo JF. Casualisation of work and inequality in the Australian labour market. *Australian Journal of Labour Economics* 2019; 22: 53-74.

507. O'Keeffe P and Papadopoulos A. The Australian Government's business-friendly employment response to COVID-19: A critical discourse analysis. *The Economic and Labour Relations Review* 2021; 32: 453-471.

508. Sila U and Dugain V. *Income, wealth and earnings inequality in Australia: Evidence from the HILDA Survey*. Paris: OECD Publishing; 2019. 39 p. Report No.: 1538. Available from: https://doi.org/10.1787/cab6789d-en

509. McGuinness S, Pouliakas K and Redmond P. Skills mismatch: Concepts, measurement and policy approaches. *Journal of Economic Surveys* 2018; 32: 985-1015.

510. Campbell I and Burgess J. Patchy progress? Two decades of research on precariousness and precarious work in Australia. *Labour & Industry: A Journal of the Social and Economic Relations of Work* 2018; 28: 48-67.

511. Han WJ and Hart J. Job precarity and economic prospects during the COVID-19 public health crisis. *Social Science Quarterly* 2021; 102: 2394-2411.

512. Gray BJ, Kyle RG, Song J, et al. Characteristics of those most vulnerable to employment changes during the COVID-19 pandemic: a nationally representative cross-sectional study in Wales. *Journal of Epidemiology and Community Health* 2022; 76: 8-15.

513. Birch ER and Preston A. The Australian labour market in 2021. *Journal of Industrial Relations* 2022; 64: 327-346.

514. Cook R and Grimshaw D. A gendered lens on COVID-19 employment and social policies in Europe. *European Societies* 2021; 23: S215-S227.

515. Carli LL. Women, Gender equality and COVID-19. *Gender in Management* 2020; 35: 647-655.

516. Davis SJ and Von Wachter TM. *Recessions and the cost of job loss*. 2011. National Bureau of Economic Research.

517. Griffiths D, Sheehan L, van Vreden C, et al. The impact of work loss on mental and physical health during the COVID-19 pandemic: baseline findings from a prospective cohort study. *Journal of Occupational Rehabilitation* 2021; 31: 455-462.

518. Peckham T, Fujishiro K, Hajat A, et al. Evaluating employment quality as a determinant of health in a changing labor market. *RSF: The Russell Sage Foundation Journal of the Social Sciences* 2019; 5: 258-281.

519. Blustein DL, Kozan S and Connors-Kellgren A. Unemployment and underemployment: A narrative analysis about loss. *Journal of Vocational Behavior* 2013; 82: 256-265.

520. Luyckx K, Schwartz SJ, Goossens L, et al. Employment, sense of coherence, and identity formation: Contextual and psychological processes on the pathway to sense of adulthood. *Journal of Adolescent Research* 2008; 23: 566-591.

521. Wiertz D and Rodon T. Frozen or malleable? Political ideology in the face of job loss and unemployment. *Socio-Economic Review* 2021; 19: 307-331.

522. Cole K, Daly A and Mak A. Good for the soul: The relationship between work, wellbeing and psychological capital. *The Journal of Socio-Economics* 2009; 38: 464-474.

523. van Gaans D and Dent E. Issues of accessibility to health services by older Australians: a review. *Public Health Reviews* 2018; 39: 1-16.

524. Exworthy M. Policy to tackle the social determinants of health: using conceptual models to understand the policy process. *Health Policy and Planning* 2008; 23: 318-327.

525. Baker P, Friel S, Kay A, et al. What enables and constrains the inclusion of the social determinants of health inequities in government policy agendas? A narrative review. *International Journal of Health Policy and Management* 2018; 7: 101.

526. Béland D and Howlett M. The role and impact of the multiple-streams approach in comparative policy analysis. *Journal of Comparative Policy Analysis: Research and Practice* 2016; 18: 221-227.

527. De Wals P, Espinoza-Moya M-E and Béland D. Kingdon's Multiple Streams Framework and the Analysis of Decision-Making Processes Regarding Publicly-Funded Immunization Programs. *Expert Review of Vaccines* 2019; 18: 575-585.

528. Fisher M, Baum FE, MacDougall C, et al. To what extent do Australian health policy documents address social determinants of health and health equity? *Journal of Social Policy* 2016; 45: 545.

529. Amin-Korim R, Legge D and Gleeson D. PHAA's Health Equity Policy. *Australian and New Zealand Journal of Public Health* 2018; 42: 421-423.

530. Moore M, Yeatman H and Pollard C. Evaluating success in public health advocacy strategies. *Vietnam Journal of Public Health* 2013; 1: 66-75.

531. Loopstra R. Interventions to address household food insecurity in high-income countries. *Proceedings of the Nutrition Society* 2018; 77: 270-281.

532. Broton KM, Weaver KE and Mai M. Hunger in higher education: Experiences and correlates of food insecurity among Wisconsin undergraduates from low-income families. *Social Sciences* 2018; 7: 179.

533. Loopstra R and Tarasuk V. Perspectives on community gardens, community kitchens and the Good Food Box program in a community-based sample of low-income families. *Canadian Journal of Public Health* 2013; 104: e55-e59.

534. Barker M and Russell J. Feeding the food insecure in Britain: learning from the 2020 COVID-19 crisis. *Food Security* 2020; 12: 865-870.

535. Doljanin K and Olaris K. Subsidised Café Meals Program: more than just" a cheap meal". *Australian Journal of Primary Health* 2004; 10: 54-60.

536. Allen L, O'Connor J, Amezdroz E, et al. Impact of the social cafe meals program: a qualitative investigation. *Australian Journal of Primary Health* 2014; 20: 79-84.

537. Brown C, Laws C, Leonard D, et al. Healthy Choice Rewards: a feasibility trial of incentives to influence consumer food choices in a remote Australian Aboriginal community. *International Journal of Environmental Research and Public Health* 2019; 16: 112.

538. Webber M, Morris D, Howarth S, et al. Effect of the connecting people intervention on social capital: a pilot study. *Research on Social Work Practice* 2019; 29: 483-494.

539. Andersen LL, Poulsen OM, Sundstrup E, et al. Effect of physical exercise on workplace social capital: cluster randomized controlled trial. *Scandinavian Journal of Public Health* 2015; 43: 810-818.

540. Anderst A, Hunter K, Andersen M, et al. Screening and social prescribing in healthcare and social services to address housing issues among children and families: a systematic review. *BMJ open* 2022; 12.

541. Brandling J and House W. Social prescribing in general practice: adding meaning to medicine. *British Journal of General Practice* 2009; 59: 454-456.

542. Wells L, Morgan M and Zurynski Y. *Social Prescribing Roundtable November 2019: Stimulus paper*. 2020. Consumers' Health Forum of Australia.

543. Anacker KB. Introduction: Housing affordability and affordable housing. *International Journal of Housing Policy* 2019; 19: 1-16.

544. Pawson H, Milligan V and Yates J. *Housing policy in Australia*. Springer, 2020.

545. Morris A, Hulse K and Pawson H. Long-term private renters: Perceptions of security and insecurity. *Journal of Sociology* 2017; 53: 653-669.

546. Power ER and Bergan TL. Care and resistance to neoliberal reform in social housing. *Housing, Theory and Society* 2019; 36: 426-447.

547. Bolton M. Public sector understanding of sustainable development and the sustainable development goals: A case study of Victoria, Australia. *Current Research in Environmental Sustainability* 2021; 3: 100056.

548. Brolan CE, Hall N, Creamer S, et al. Health's role in achieving Australia's Sustainable Development Goal commitments. *The Medical Journal of Australia* 2019; 210: 204.

549. Keshavarz Mohammadi N. Complexity-informed approach, sustainable development goals path and social determinants of health. *Health Promotion International* 2022; 37: daac068.

550. Valentine NB, Koller TS and Hosseinpoor AR. Monitoring health determinants with an equity focus: a key role in addressing social determinants, universal health coverage, and advancing the 2030 sustainable development agenda. *Global Health Action* 2016;9(1):34247. Available from: https://doi.org/10.3402/gha.v9.34247

551. Allen C, Reid M, Thwaites J, et al. Assessing national progress and priorities for the Sustainable Development Goals (SDGs): experience from Australia. *Sustainability Science* 2020; 15: 521-538.

552. Davis M, Dixon R, Appleby G, et al. The Uluru Statement. *Bar News: The Journal of the NSW Bar Association* 2018: 41-48.

553. Fleay JJ and Judd B. The Uluru statement: a First Nations perspective of the implications for social reconstructive race relations in Australia. *International Journal of Critical Indigenous Studies* 2019; 12.

554. McKay D. *Uluru Statement: a quick guide*. Canberra, ACT: Australian Parliament Parliamentary Services; 2017 June 19. 6 p. Available from: https://healthinfonet.ecu.edu.au/healthinfonet/getContent.php?linkid=605548&title=Uluru+Statement%3A+a+quick+guide

555. Holmes J, Moraes OR, Rickards L, et al. Online learning and teaching for the SDGs–exploring emerging university strategies. *International Journal of Sustainability in Higher Education* 2021;23(3):503–21. Available from: https://doi.org/10.1108/IJSHE-07-2020-0278.

556. Markey R and McIvor J. Regulating casual employment in Australia. *Journal of Industrial Relations* 2018; 60: 593-618.

557. Burgess J, Campbell I and May R. Pathways from casual employment to economic security: the Australian experience. *Social Indicators Research* 2008; 88: 161-178.

558. Foley M, Williamson S and Mosseri S. Women, work and industrial relations in Australia in 2019. *Journal of Industrial Relations* 2020; 62: 365-379.

559. Alexander L. *Understanding insecure work in Australia*. 2019. Sydney: The McKell Institute Queensland. Available from: https://mckellinstitute.org.au/wp-

content/uploads/2022/02/McKell-Institute-Queensland-Understanding-Insecure-Work-in-Australia-1-2.pdf

560. Hemed M. Cross-sectional studies. *Training Course in Sexual and Reproductive Health Research Geneva*. Geneva: UNICEF Tanzania; 2017. Available from: https://www.gfmer.ch/SRH-Course-2017/research-methodology/pdf/Cross-sectional-studies-Hemed-2017.pdf

561. Geier MT and Morris J. The impact of a gratitude intervention on mental well-being during COVID-19: A quasi-experimental study of university students. *Applied Psychology: Health and Well-Being* 2022; 14.

562. Cruwys T, Haslam C, Rathbone JA, et al. Groups 4 Health protects against unanticipated threats to mental health: Evaluating two interventions during COVID-19 lockdown among young people with a history of depression and loneliness. *Journal of Affective Disorders* 2021; 295: 316-322.

563. Lobato L, Bethony JM, Pereira FB, et al. Impact of gender on the decision to participate in a clinical trial: a cross-sectional study. *BMC Public Health* 2014; 14: 1-9.

564. Gkiouleka A, Huijts T, Beckfield J, et al. Understanding the micro and macro politics of health: Inequalities, intersectionality & institutions-A research agenda. *Social Science & Medicine* 2018; 200: 92-98. Available from: https://doi.org/10.1016/j.socscimed.2018.01.025

565. Aissaoui N. The digital divide: a literature review and some directions for future research in light of COVID-19. *Global Knowledge, Memory and Communication* 2021; Available from: https://doi.org/10.1108/GKMC-06-2020-0075

566. Irani E. The use of videoconferencing for qualitative interviewing: Opportunities, challenges, and considerations. *Clinical Nursing Research* 2019;28(1):3–8. Available from: https://doi.org/10.1177/1054773818803170

Appendices

Appendix 1 - Systematic review publication and permission

PHN PUBLIC HEALTH NURSING **WILEY**

POPULATIONS AT RISK ACROSS THE
LIFESPAN-POPULATION STUDIES

The social determinants of health and health outcomes among adults during the COVID-19 pandemic: A systematic review

Heidi Green[1,2,3] | Ritin Fernandez[1,2,3] | Catherine MacPhail[4]

[1] School of Nursing, Faculty of Science, Medicine and Health, University of Wollongong, Wollongong, NSW, Australia

[2] St George Hospital, Centre for Research in Nursing and Health, Kogarah, NSW, Australia

[3] Centre for Evidence Based Initiatives in Health Care: a Joanna Briggs Centre of Excellence, Wollongong, NSW, Australia

[4] School of Health and Society, Faculty of the Arts, Social Sciences and Humanities, University of Wollongong, Wollongong, NSW, Australia

Correspondence
Heidi Green, Centre for Research in Nursing and Health, St George Hospital, Kogarah, New South Wales, Australia
Email: Heidi.Lord@health.nsw.gov.au

Abstract

Objective: To synthesize the best available evidence on the relationship between the social determinants of health and health outcomes among adults during the COVID-19 pandemic.

Introduction: COVID-19 has created widespread global transmission. Rapid increase in individuals infected with COVID-19 prompted significant public health responses from governments globally. However, the social and economic impact on communities may leave some individuals more susceptible to the detrimental effects.

Methods: A three-step search strategy was used to find published and unpublished papers. Databases searched included: MEDLINE, CINAHL, EMBASE, and Google Scholar. All identified citations were uploaded into Endnote X9, with duplicates removed. Methodological quality of eligible papers was assessed by two reviewers, with meta-synthesis conducted in accordance with JBI methodology.

Results: Fifteen papers were included. Three synthesized-conclusions were established (a) Vulnerable populations groups, particularly those from a racial minority and those with low incomes, are more susceptible and have been disproportionately affected by COVID-19 including mortality; (b) Gender inequalities and family violence have been exacerbated by COVID-19, leading to diminished wellbeing among women; and (c) COVID-19 is exacerbating existing social determinants of health through loss of employment/income, disparities in social class leading to lack of access to health care, housing instability, homelessness, and difficulties in physical distancing.

Conclusion: Reflection on social and health policies implemented are necessary to ensure that the COVID-19 pandemic does not exacerbate health inequalities into the future.

KEYWORDS
COVID-19, health inequalities, pandemic, social determinants, systematic review

ConQual Summary of Findings

The social determinants of health and health outcomes among adults during the COVID-19 pandemic: A systematic review Population: Adults

Phenomena of interest: Wellbeing and social determinants of health

Context: Community

Synthesized Conclusions	Type of research	Dependability	Credibility	ConQual score	Comments
Vulnerable populations groups, particularly those from a racial minority and those with low incomes, are more susceptible and have been disproportionately affected by COVID-19 in a range of ways including mortality.	Text and opinion papers	Moderate (downgraded one level)	Moderate (downgraded one level)	Moderate	Dependability downgraded—of 11 papers, nine papers addressed six dependability questions; and two papers addressed four dependability questions. Credibility downgraded due to mix of U and C findings (9 U + 11 C).
Gender inequalities and family violence have been exacerbated by COVID-19, leading to diminished wellbeing among women.	Text and opinion papers	Moderate (downgraded one level)	Low (downgraded two levels)	Low to Moderate	Dependability downgraded—of 4 papers, two papers addressed all six dependability questions; and two papers addressed four dependability questions. Credibility downgraded due to C findings only (7 C).
COVID-19 is exacerbating existing social determinants of health through loss of employment/income, disparities in social class leading to lack of access to health care, housing instability, homelessness and difficulties in social distancing.	Text and opinion papers	Moderate (downgraded one level)	Moderate (downgraded one level)	Moderate	Dependability downgraded—of 10 papers, eight papers addressed six dependability questions; and two papers addressed four dependability questions. Credibility downgraded due to mix of U and C findings (11 U + 9 C).

U = Unequivocal; C = Credible.

1 | BACKGROUND

The emergence of COVID-19, caused by a virus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has created widespread global transmission. Declared a Public Health Emergency of International Concern (PHEIC) by WHO on 30 January 2020 (Mullen et al., 2020), there have been over 192 million cases of COVID-19 globally as at July 23, 2021, with more than 4 million deaths (World Health Organization, 2021b). Rapid increase in individuals infected with COVID-19, along with mortality in the early phase of the pandemic, prompted significant public health responses from governments globally. The public health measures implemented during the first wave of the pandemic in countries like China, Thailand, Italy, the United Kingdom, and the United States to prevent further transmission were centered on physical distancing, lockdown measures, and closure of productive activities (Anderson et al., 2020; Broughel & Kotrous, 2021; Gibertoni et al., 2021; Triukose et al., 2021).

While COVID-19 was initially deemed by some governments as "the great equalizer" (Crawley, 2021; Coleman & Mullin-McCandish 2021), public health measures implemented to reduce the transmission of COVID-19, while effective, have had unequal implications for people within communities and globally (Marmot & Allen, 2020). Limitations to people's social freedoms, social isolation, and the impact on countries' economies as a result of efforts to curb the spread of COVID-19 have been widespread (Broughel & Kotrous, 2021). Additionally, since the scientific communities succeeded in producing several COVID-19

vaccines, there has been inequitable vaccine distribution within and among countries, leading to what has been termed as vaccine poverty (Hyder et al., 2021).

The social, psychological, health, and economic impacts of COVID-19 on communities may leave some individuals more susceptible to the detrimental effects on their health and wellbeing. Factors affecting susceptibility to COVID-19, as well as the impact of health and wellbeing outcomes, include insecure housing, limited access to health care, poverty, gender inequalities, racial segregation, food insecurity and loss of income, and employment (Maness et al., 2021). These factors are collectively described as the social determinants of health. Social determinants of health can create health inequalities within society, and "are the conditions in which people are born, grow, live, work and age. These circumstances are shaped by the distribution of money, power and resources at global, national and local levels" (World Health Organization, 2021a). Social determinants of health can affect the prevalence, mortality, wellbeing, and health outcomes and consequences of COVID-19 within communities globally (Upshaw et al., 2021). The impact of COVID-19 is not homogenous; therefore, there is merit in considering how the differential impacts are felt within countries, even in countries that are wealthy.

Global and national crises, including pandemics such as COVID-19, have the ability to emphasize social and health inequalities, particularly those that may be unseen or hidden prior to the pandemic (Clouston, Natale & Link 2021). For example, during the MERS epidemic those who were employed reported feeling that they had an increased risk of infection (Kim & Kim, 2018), whereas generally, employment is thought to be a protective factor when examining social determinants of health. Indeed, experience from recent epidemics such as SARS, MERS, and Ebola have shown that inequalities are amplified as a consequence of these infectious disease epidemics (Furceri et al., 2021). A number of public health experts have published in the literature on the consequences of COVID-19 for minority population groups, including the worsening of social determinants of health (Ali et al., 2020; Douglas et al., 2020; Haynes et al., 2020). Certain ethnic groups, while continuing to be employed during the COVID-19 pandemic, are employed in occupations that are considered to be essential services, such as transportation and retail, leaving them without the ability to work from home (Clouston, Natale & Link 2021; Xafis, 2020). Furthermore, minority populations are disproportionately affected by COVID-19, including increased morbidity, hospitalizations, and mortality (Douglas et al., 2020). In addition to these immediate impacts, COVID-19 is thought to have lasting impacts on health and social inequalities, with workers displaced due to the pandemic not likely to regain employment, even after economic recovery (Furceri et al., 2021). It is therefore vital that an understanding of the relationship between the social determinants of health and health and wellbeing outcomes is generated to inform social and health policies that can address health inequalities, not just for the current pandemic, but to achieve health for all into the future.

A preliminary search of PROSPERO, MEDLINE, the Cochrane Database of Systematic Reviews and the JBI Database of Systematic Reviews and Implementation Reports was conducted and did not reveal any literature reviews, integrative reviews or systematic reviews on the topic. Therefore, the objective of this review is to synthesize the evidence exploring the relationship between the social determinants of health and health outcomes of adults during the first 6 months of the COVID-19 pandemic.

2 | METHODS

2.1 | Search strategy and study selection

A three-step search strategy was employed to find both published and unpublished papers. Initially, a preliminary search of MEDLINE via OVID was undertaken to identify papers on the topic, followed by analysis of the text words contained in the titles and abstracts of the relevant papers. Secondly, specific search strategies for each of the selected databases were developed and a full search was undertaken. Databases included in the search were MEDLINE via OVID, CINAHL via EbscoHost, EMBASE via OVID, Cochrane Library (CENTRAL), PsycINFO, and Google Scholar using the following search terms ("Social determinants of health OR structural determinants of health OR socioeconomic factors OR social determinants OR social class OR social support OR education OR education status OR income OR poverty OR access to health care OR food supply OR employment OR employment status OR housing stability OR Gender OR ethnicity OR race) AND (COVID-19 OR coronavirus infection* OR Coronavirus) AND (health outcome* OR impact OR health OR wellbeing)". Finally, the reference list of all papers potentially suitable for inclusion were screened to identify any additional papers. All references were organized into EndNote V9, with all duplicate papers removed prior to screening the titles and abstracts. Two reviewers (H.G., R.F.) screened all the titles and abstracts to exclude those papers that did not meet the inclusion criteria. Full text papers that matched the inclusion criteria were obtained and were assessed by two independent reviewers for inclusion (H.G., R.F.). A protocol for this review was registered on PROSPERO International prospective register of systematic reviews under the registration number CRD42020214271.

2.2 | Inclusion and exclusion criteria

The review considered papers (opinion, discussion, and narrative) that included participants aged 18 years and over from countries in any geographical region globally. Papers published from January 2020 to July 2020 were considered for inclusion. This date range starts from when the COVID-19 pandemic was recognized by WHO as a PHEIC and ends at the first 6 months of the pandemic. Any paper that did not report on social determinants of health or health outcomes and wellbeing were excluded. Only papers published in the English language are included, as the authors are not fluent in any other language. No primary data collection papers were included in this review.

2.3 | Methodological quality assessment

Two independent reviewers (H.G., R.F.) critically appraised the methodological quality of each paper eligible for inclusion using the critical appraisal instruments from Joanna Briggs Institute (JBI) for text and opinion papers (McArthur et al., 2020). This instrument consists of six questions assessing the source, source field of expertise, reference to extant literature, and congruence with literature. Using the critical appraisal instrument, each question was allocated a score (Yes = 2, No = 0, Unclear = 1), with the maximum achievable score of 12 or 100% when converted to a percentage. A score of between 0% and 50% was considered low quality, 50% and 70% was medium quality and any textual paper that scored 70% and over was considered high quality. However, all papers, irrespective of methodological quality, were included in the review. Any disagreements between the reviewers concerning the inclusion of a paper in the review was resolved through the use of the third reviewer (C.M.).

2.4 | Data extraction and thematic synthesis

Data were extracted from the papers included in the review using the Joanna Briggs Institute System for the Unified Management, Assessment and Review of Information (JBI SUMARI) data extraction tool (McArthur et al., 2015) by one reviewer and checked by a second reviewer. The specific data extraction included details regarding the populations' represented, social determinants of health addressed, and author's conclusions significant to the review question. Authors of the included papers were not contacted regarding request for clarification or additional data.

An extract from the text was identified to support each conclusion and used as an illustration. The extracted author's conclusions from the included papers were assigned a credibility rating in order to assess the validity (unequivocal, credible, and unsupported). A rating of unequivocal (U) refers to the author's conclusions being beyond reasonable doubt, directly reported and not open to challenge; a rating of credible (C) refers to the author's conclusions being plausible, that is they could be open to interpretation; whereas a rating of unsupported (Un) refers to the author's conclusion not being supported by the text (Munn et al., 2014).

Each authors' conclusions were grouped to generate a set of statements (categories) based on similarity of meaning. These categories were then subjected to meta-synthesis to develop comprehensive synthesized conclusions (Munn et al., 2014) and can be used as a foundation for evidence based practice. To establish the dependability and credibility of the synthesized conclusions, each were rated using a modified ConQual approach. The JBI ConQual approach was developed for qualitative systematic reviews (Munn et al., 2014) and we have modified this approach to be used for systematic reviews of text and opinion. The modified ConQual approach enables the synthesized conclusions to be downgraded based on their credibility or dependability. The papers have a starting rank of high and can be downgraded for both dependability and credibility. Using all six questions from the critical appraisal tool, dependability is scored as: 5–6 "yes" responses—the conclusion remains high; 2–4 "yes" responses - the conclusion is downgraded one level; 0–1 "yes" responses—the conclusion is downgraded two levels. Credibility is ranked according to the assigned levels of credibility: unequivocal; equivocal and unsupported, with a synthesized conclusion consisting of all unequivocal findings remaining high, while a mixture of unequivocal and equivocal findings is downgraded one level. Credibility is downgraded two levels if the synthesized conclusion contains all equivocal findings, while a synthesized conclusion consisting of a mixture of unequivocal, equivocal, and unsupported findings is downgraded three levels. If the synthesized conclusion only contains unsupported findings then the credibility is downgraded four levels. The dependability and credibility rankings are then compiled into a modified ConQual score, which provides a level of confidence in the synthesized conclusions (Author's own).

3 | RESULTS

3.1 | Search results

A search of the literature produced 1504 potential records, after removal of duplicate papers, 1101 papers were ascertained as potential titles for inclusion (Figure 1). Following the review of the titles and abstracts of 1101 papers, 1082 papers were excluded as they did not meet the inclusion criteria. The remaining 19 papers were retrieved in full text to read completely. A total of four papers did not meet the inclusion criteria and were therefore excluded from the review (reasons for exclusion in Supplementary material).

3.2 | Methodological quality

Fifteen papers were critically appraised. The methodological quality of the papers was high with all scoring 70% or more. No papers were excluded based on methodological quality. Seven papers (Ali et al., 2020; Baptiste et al., 2020; Douglas et al., 2020; Kinsey et al., 2020; Schulz et al., 2020; Takian et al., 2020) met all the appraisal criteria, while eight papers (Betron et al., 2020; Bucciardini et al., 2020; Farley et al., 2020; Gray et al., 2020; Haynes et al., 2020; Kantamneni, 2020; Van Dorn et al., 2020; Xafis, 2020) did not meet all the appraisal criteria, including the lowest scoring papers (Betron et al., 2020; Kantamneni, 2020) with 83.3%. The methodological quality for each included paper is described in Table 1.

3.3 | Characteristics of included papers

A total of 11 papers (Baptiste et al., 2020; Betron et al., 2020; Farley et al., 2020; Gray et al., 2020; Haynes et al., 2020; Kantamneni, 2020; Kinsey et al., 2020; Schulz et al., 2020; Shah et al., 2020; Van
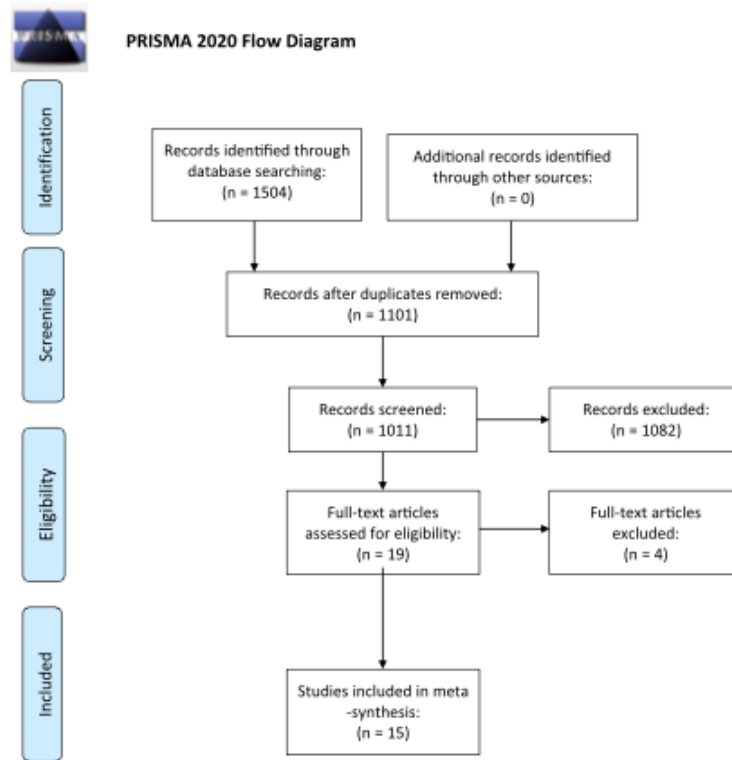
FIGURE 1 PRISMA flow diagram. Source: Page et al. (2021)

Dorn et al., 2020; Xafis, 2020) originated from the United States, two papers highlighted the United Kingdom experience (Ali et al., 2020; Douglas et al., 2020) and one paper each originated from Iran (Takian et al., 2020), and Italy (Bucciardini et al., 2020). Nine papers explored ethnicity and racism (Ali et al., 2020; Baptiste et al., 2020; Bucciardini et al., 2020; Gray et al., 2020; Haynes et al., 2020; Kantamneni, 2020; Schulz et al., 2020; Shah et al., 2020; Van Dorn et al., 2020; Xafis, 2020), socioeconomic status was referred to in seven papers (Ali et al., 2020; Baptiste et al., 2020; Bucciardini et al., 2020; Farley et al., 2020; Haynes et al., 2020; Kinsey et al., 2020; Takian et al., 2020). Six papers examined employment and income (Douglas et al., 2020; Farley et al., 2020; Kinsey et al., 2020; Schulz et al., 2020; Takian et al., 2020; Xafis, 2020), while access to health care was discussed in four papers (Farley et al., 2020; Gray et al., 2020; Haynes et al., 2020; Van Dorn et al., 2020). Other social determinants of health discussed in the papers were housing (Farley et al., 2020; Gray et al., 2020; Haynes et al., 2020; Schulz et al., 2020), food supply/security (Kinsey et al., 2020; Schulz et al., 2020; Xafis, 2020) gender (Betron et al., 2020; Dou-

glas et al., 2020; Kantamneni, 2020), domestic violence (Douglas et al., 2020; Xafis, 2020). The types of papers included were: Commentary (Betron et al., 2020; Bucciardini et al., 2020; Gray et al., 2020; Shah et al., 2020; Van Dorn et al., 2020), Editorial essay (Kantamneni, 2020), letter to the editor (Ali et al., 2020), Editorial (Baptiste et al., 2020; Kinsey et al., 2020; Takian et al., 2020), Opinion –Analysis and perspective paper (Douglas et al., 2020; Haynes et al., 2020; Schulz et al., 2020; Xafis, 2020), and Clinical practice statement (Farley et al., 2020). The characteristics of the included studies are further specified in Table 2.

3.4 | Review findings

Meta-synthesis of textual data based on narrative and opinion generated three synthesized conclusions. These were derived from 47 authors' conclusions that were subsequently aggregated into six categories.

304

TABLE 1 Critical appraisal results

Citation	Q1	Q2	Q3	Q4	Q5	Q6	Results (%)
Shah et al. (2020)	Y	Y	Y	Y	Y	Y	12/12 (100)
Kantamneni (2020)	Y	U	Y	Y	Y	U	10/12 (83.3)
Kinsey et al. (2020)	Y	Y	Y	Y	Y	Y	12/12 (100)
Douglas et al. (2020)	Y	Y	Y	Y	Y	Y	12/12 (100)
Xafis (2020)	Y	U	Y	Y	Y	Y	11/12 (91.7)
Takian et al. (2020)	Y	Y	Y	Y	Y	Y	12/12 (100)
Gray et al. (2020)	Y	U	Y	Y	Y	Y	11/12 (91.7)
Haynes et al. (2020)	Y	U	Y	Y	Y	Y	11/12 (91.7)
Ali et al. (2020)	Y	Y	Y	Y	Y	Y	12/12 (100)
Schulz et al. (2020)	Y	Y	Y	Y	Y	Y	12/12 (100)
Baptiste et al. (2020)	Y	Y	Y	Y	Y	Y	12/12 (100)
Betron et al. (2020)	Y	U	Y	Y	Y	U	10/12 (83.3)
Bucciardini et al. (2020)	Y	U	Y	Y	Y	Y	11/12 (91.7)
Van Dorn et al. (2020)	Y	U	Y	Y	Y	Y	11/12 (91.7)
Farley et al. (2020)	Y	U	Y	Y	Y	Y	11/12 (91.7)
Results	100%	55.6%	100%	100%	100%	93.3%	

Yes (Y) = 2, No (N) = 0, Unclear (U) = 1.

Q1 Is the source of the opinion clearly identified? Q2 Does the source of opinion have standing in the field of expertise? Q3 Are the interests of the relevant population the central focus of the opinion? Q4 Is the stated position the result of an analytical process, and is there logic in the opinion expressed? Q5 Is there reference to the extant literature? Q6 Is any incongruence with the literature/sources logically defended?.

3.4.1 | Synthesized conclusion 1 - Vulnerable populations groups, particularly those from a racial minority and those with low incomes, are more susceptible and have been disproportionately affected by COVID-19 in a range of ways including mortality

This synthesized conclusion incorporates two categories comprising of 20 authors' conclusions. (see Supplementary material)

Disparities in burden of disease among those from racial minorities, low-income populations and other disadvantaged groups.

Current tracking of the COVID-19 cases in countries such as the United States, indicate the communities of color or racial minority groups have been disproportionately affected (Haynes et al., 2020; Kantamneni, 2020; Schulz et al., 2020; Shah et al., 2020; Van Dorn et al., 2020), with early data highlighting the disparities in hospitalizations of African Americans and Hispanic American population groups, who are overrepresented. Preliminary data from both the United Kingdom and the United States suggest that there are COVID-19 hotspots where black communities' mortality risk from COVID-19 is at least twice that of white community groups (Ali et al., 2020; Baptiste et al., 2020). A baseline of disadvantage in the most impoverished communities means they are already affected by the social determinants of health (Gray et al., 2020; Schulz et al., 2020), and the high burden of chronic disease that plagues such population groups predisposes them to even poorer health outcomes if they are infected with COVID-19 (Gray et al., 2020; Xafis, 2020). Not only are racial minority and low-income populations affected with high numbers of COVID-19 cases, they also have

substantially higher mortality due to COVID-19 than any other group (Baptiste et al., 2020; Schulz et al., 2020).

The inability to work from home, stockpile food supplies or obtain secure housing (homelessness) increases susceptibility and exposure to COVID-19.

Compounding disadvantaged communities' susceptibility to COVID-19 are structural drivers of health inequalities, such as racism, poverty, economic vulnerability, and lack of social services (Douglas et al., 2020; Farley et al., 2020; Gray et al., 2020; Schulz et al., 2020; Xafis, 2020). The pandemic has forced many essential and low-income workers (cleaners, delivery drivers, supermarket jobs) to continue to work in frontline roles exposing them to increased risk of becoming infected with COVID-19 (Farley et al., 2020; Xafis, 2020). Physical distancing and an ability to work from home and quarantine have become for the privileged, with those on the lowest incomes still having to move around during the pandemic, increasing their risk for exposure to COVID-19 (Douglas et al., 2020; Farley et al., 2020). Indeed, families and communities that are financially insecure have fewer resources to stockpile food supplies (Schulz et al., 2020), this results in more frequent outings to the supermarkets increasing their susceptibility to COVID-19 infection (Kinsey et al., 2020; Schulz et al., 2020). The inability to stockpile food could also led to food insecurity with families and communities not being able to afford or source food products, often due to food being bought out by others for stockpiling (Xafis, 2020). The COVID-19 pandemic has also created issues for disadvantaged community members to secure housing, with many shelters at full capacity and those that are available overcrowded, with increased transmission risks of COVID-19 (Farley et al., 2020; Schulz

TABLE 2 Characteristics of included studies

Author	Country	Main outcome/s
Xafis (2020)	US	• Ethnicity and racism: Structural racial injustice with Hispanics and African Americans disproportionately affected by COVID-19 • Employment and income: Increased unemployment and those in low paying jobs forced to continue working exposing them to risk of COVID-19 • Domestic violence: Increase domestic violence due to inability to escape the abuser • Food supply: food insecurity among disadvantaged population groups • Access to health services: Lack of access to health care
Douglas et al. (2020)	UK	• Employment and income: 3.5 million people are expected to need unemployment payments through loss of income and employment • Gender: Women and children to lose income and fare worse • Domestic violence: Increased risk of domestic violence
Takian et al. (2020)	Iran	• Socioeconomic status: Political instability and COVID has widened the gap between socioeconomic groups • Employment and income: Low-income workers are not able to abide by the quarantine measures (while those in higher incomes are able to work and stay at home
Gray et al. (2020)	US	• Ethnicity and racism: Hispanics and native and African Americans are disproportionately experience the burden of disease • Access to health care: Disadvantaged groups have less access to primary care services • Housing: overrepresented among essential workers and those living in overcrowded conditions
Haynes et al. (2020)	US and UK	• Ethnicity and racism: Disparities in burden of disease with communities of color disproportionately affected by COVID −19 • Socioeconomic status and Access to health care: Lack of health resources perpetuating poverty and segregation • Housing: Households are overcrowded making communities of color more susceptible to COVID-19
Ali et al. (2020)	UK	• Ethnicity and racism: Mortality risk in ethnic minority groups six times higher than white populations • lowest income households were six times less likely to work from home during COVID, three times less likely to self-isolate • Socioeconomic status: Higher percentage of people tested positive in low socioeconomic areas compared to high socioeconomic areas
Schulz et al. (2020)	US	• Ethnicity and racism: African Americans account for 11% of Michigan's population but account for 32% of COVID cases and 41% of deaths • Employment and income: Social distancing in hard due to most African Americans working in essential services such as transport • Food supply: Those in low socioeconomic areas have fewer resources to stockpile supplies, meaning more frequently visit to supermarkets and at risk of food insecurity • Housing: Households have lost their homes and homelessness shelters are struggling to accommodate people
Betron et al. (2020)	US	• Gender: Altering gender roles; Opportunity to upend men as head of the household and share caregiving roles
Bucciardini et al. (2020)	Italy	• Socioeconomic status: People in a lower socioeconomic areas are suffering the ill effects of COVID-19 • Employment and income: Loss of work and income is a major consequence of COVID-19
Van Dorn et al. (2020)	US	• Ethnicity and racism: African Americans are disproportionately affected by COVID-19; Minority populations in the US are essential workers which don't have the privilege of staying at home • Access to health care: Millions without health care access and many local and regional hospitals closed
Farley et al. (2020)	US	• Income: Only 9.2% of workers with the lowest income can work from home compared to 61.5% of those with a higher income • Housing and poverty: Poverty, lack of savings and unstable housing increase susceptibility to COVID-19 • Ethnicity and racism: Minority populations in the US disproportionately affected by COVID
Kantamneni (2020)	US	• Ethnicity and racism: Black Americans and LatinX populations are being displaced from employment during COVID-19 pandemic; • Income: People of color and low-income earners are disproportionately affected by COVID-19 • Gender: Gender inequalities, with women expected to balance multiple roles during the pandemic

(Continues)

TABLE 2 (Continued)

Author	Country	Main outcome/s
Kinsey et al. (2020)	US	• Socioeconomic status: Stockpiling foods in response to the pandemic leaves disadvantaged (lower socioeconomic) families with facing food insecurity • Employment and income: Low-income households are required to travel around to multiple store to find cheapest food items which puts them at increased exposure to COVID-19 • Food supply: Low-income households can't afford to stockpile food
Shah et al. (2020)	US	• Ethnicity and racism: Impact of COVID-19 disproportionate among populations due to structural racial injustice; Higher rates of COVID-19 among black communities; Higher mortality from COVID-19 in black communities
Baptiste et al. (2020)	US	• Ethnicity and racism: Racial minority groups are being infected with COVID-19 at higher rates than white population and are more likely to die from COVID-19 • Socioeconomic status: Those from a low social class are vulnerable to COVID-19 due to housing instability, food insecurity and limited access to health care.

et al., 2020). Overcrowding within low-income and ethnic minority households, due to the inability to secure housing, creates conditions that make physical distancing impossible resulting in a higher risk of exposure to COVID-19 (Farley et al., 2020; Gray et al., 2020).

3.4.2 | Synthesized conclusion 2: Gender inequalities and family violence have been exacerbated by COVID-19, leading to diminished wellbeing among women

This synthesized conclusion incorporates two categories comprising of seven authors' conclusions. (see Supplementary material)

Gender inequalities and imbalances in loss of income and within the household.

Public health measures such as closure of schools and childcare in response to the COVID-19 pandemic have meant that dual income households have had to juggle home schooling and employment (Douglas et al., 2020; Kantamneni, 2020). For those families with the ability to work from home, school and childcare closures have added pressure and stress within the household, due to balancing paid work and schooling children (Douglas et al., 2020). This pressure is disproportionately felt by women who shoulder more responsibility for childcare in the household, leading to role conflict and affecting women's wellbeing (Betron et al., 2020; Kantamneni, 2020). Furthermore, it has been indicated that loss of income during the pandemic will be unequal, with women most burdened with loss of income and therefore likely to fare worse than men (Douglas et al., 2020).

Increased incidence of family violence.

Family relationships during the COVID-19 pandemic have exacerbated existing tensions and created new strains, with increased concerns regarding domestic and family violence (Douglas et al., 2020; Xafis, 2020). Public health measures, including physical distancing and quarantine, implemented to slow the transmission of COVID-19, have placed, particularly women, at increased risk of domestic abuse (Douglas et al., 2020). This is predominantly occurring because victims can-

not escape the home environment or the attention of the abuser and may have fewer resources and money due to income loss (Xafis, 2020).

3.4.3 | Synthesized conclusion 3: COVID-19 is exacerbating existing social determinants of health through loss of employment/income, disparities in social class leading to lack of access to health care, housing instability, homelessness, and difficulties in physical distancing

This synthesized conclusion incorporates two categories comprising of 20 authors' conclusions. (see Supplementary material)

COVID-19 is exacerbating health disparities with social position directly and indirectly affecting health outcomes and difficultly in physical distancing.

COVID-19 is having significant impacts on vulnerable populations such as those in a lower social class (Ali et al., 2020; Baptiste et al., 2020; Bucciardini et al., 2020; Farley et al., 2020; Haynes et al., 2020; Van Dorn et al., 2020). While the benefits of public health measures to curb the spread of COVID-19 are evident, those most impacted by the pandemic are disadvantaged population groups, including those in a lower socioeconomic class who may not be able to comply with simple measures such as physical distancing (Farley et al., 2020; Haynes et al., 2020; Van Dorn et al., 2020). Disruption to essential services, residing in multigenerational households, and inability to work from home during the pandemic impose additional burdens on those in a lower social class who already face barriers with existing poor health, predisposing them to worse health outcomes as a result of COVID-19 (Baptiste et al., 2020; Douglas et al., 2020; Farley et al., 2020; Haynes et al., 2020). Those in a higher social class have the ability to mitigate the risks of the pandemic, through working from home and the ability to physically distance, this once again highlights that social position can influence health outcomes (Farley et al., 2020; Takian et al., 2020).

Limited access to health care, particularly in regional areas, among uninsured populations, and where health systems are overwhelmed.

Geographical locations and resource allocations have left some population groups with limited access to health care, not only for COVID-19 testing and hospitalization, but also for the management of existing health conditions (Farley et al., 2020; Gray et al., 2020; Haynes et al., 2020). In the United States, the high cost of health care and refusal of some states to accept the Affordable Care Act has led to the closure of many regional hospitals, which has presented barriers to appropriate diagnosis and treatment of COVID-19 for some communities (Gray et al., 2020; Van Dorn et al., 2020). The limited access to health care is predominantly seen in under-resourced communities that serve those most affected by COVID-19, which also happen to be lower socioeconomic areas (Douglas et al., 2020; Farley et al., 2020; Gray et al., 2020). Furthermore, the disparity in access to health care during the pandemic perpetuates poverty and creates further segregation (Douglas et al., 2020; Haynes et al., 2020), leaving those most vulnerable (sick and disadvantaged) without health care (Van Dorn et al., 2020). Disruption to essential health care during the COVID-19 pandemic may leave many with worsening existing health conditions and poorer health outcomes (Douglas et al., 2020).

4 | DISCUSSION

Termed by some governments as the great equalizer (Coleman & Mullin-McCandish 2021; Furceri et al., 2021), COVID-19 is far from such, with the impact felt disproportionately among ethnic groups, the socio-economically disadvantaged and women. This review synthesizes the available evidence on the relationship between the social determinants of health and health outcomes among adults during the first 6 months of the COVID-19 pandemic. The findings of this review highlight that there is a direct relationship between the social determinants of health and health and wellbeing outcomes among adults during the COVID-19 pandemic.

COVID-19 has brought the social determinants of health and resultant health inequalities to the forefront and demonstrated that action needs to be taken to address underlying social and health inequalities, "the causes of the causes" (Marmot & Allen, 2020). Disparities among vulnerable populations including ethnic groups, low-income earners, those living in poverty and women have been demonstrated in this review. Addressing such disparities requires a collaborative approach, one that initiates widespread changes in social and health policy (Aidukaite et al., 2021). COVID-19 is not the great equalizer; however, COVID-19 has renewed the need to tackle the inequalities created by the social determinants of health. Large-scale global initiatives such as the United Nations (UN) Sustainable Development Goals (SDGs) are just one approach to take action on health inequalities, particularly SDG 1 no poverty, SDG 3 good health and wellbeing, SDG 5 Gender equality, SDG 10 reduce inequalities and SDG 11 sustainable cities and communities (Hák et al., 2016).

While the direct burden of COVID-19 has impacted populations, it is the health and wellbeing outcomes beyond those attributable to the virus itself that are most alarming. Public health actions, in collaboration with governments and public health professionals must be made to support those considered to be among vulnerable population groups (Webber-Ritchey et al., 2021). As nations, we cannot afford to have inaction on the social determinants of health and the resultant health inequalities. The results of this review have demonstrated that COVID-19 has negative consequences, especially for vulnerable population groups who are already affected by social and health inequalities. COVID-19 has exacerbated existing health inequalities and provided a wakeup call to advance efforts to address health inequalities and the social determinants of health (Perry et al., 2021).

Pandemic response and planning should take into account the social determinants of health to reduce the unequal consequences of COVID-19. Health responses including COVID-19 vaccine rollout need to take account of increased risk associated with the social determinants of health as well as inequities in access to care. Policy decisions made as a result of COVID-19 must be reflected upon to ensure that they do not damage health and create health inequalities in the future (MacIntyre, 2019). Public health professionals need to be part of the solution for addressing health inequalities and social determinants of health; this can be achieved at the individual, practice and community levels (Andermann, 2016). On an individual level, this may include discussing potential social challenges with patients; within an organization or at a practice level, identifying methods to reduce barriers to accessing health care; and at a community level, partnering with community groups (Andermann, 2016).

5 | STRENGTHS AND LIMITATIONS

This review used standardized critical appraisal instruments for the text and opinion papers. In addition, this review used a modified ConQual approach (modified from the JBI ConQual approach for qualitative reviews) to rate the dependability and credibility of the synthesized conclusions, allowing for confidence in the findings. To our knowledge, this is the first review to use the modified ConQual approach for text and opinion systematic reviews. While the review employed robust methods, some limitations that need to be acknowledged. Firstly, although a systematic search was conducted to identify relevant papers for inclusion, some papers might have been missed during the search process. Additionally, the search was restricted to papers only published in the English language, which may have omitted papers published in any other language. This review included studies from January 2020 to July 2020 when there were no vaccines for COVID-19 available hence papers on health inequalities surrounding vaccination roll outs was not available. Further research needs to be conducted on the health inequities associated with vaccination roll outs. Finally, because the COVID-19 pandemic is a rapidly evolving situation, the evidence in the literature from the first 6 months of the epidemic was limited to predominately the US experience. However, recent evidence since the search was conducted in July 2020, demonstrates that low- and middle-income countries are reporting similar experiences as reported in this review.

6 | CONCLUSION

Vulnerable population groups have been disproportionately impacted by COVID-19, including on health outcomes such as hospitalizations and mortality. The COVID-19 pandemic has highlighted the need for action on health inequalities and the social determinants of health if we are to ever achieve the SDGs and health for all. Public health professionals should be part of this response by developing a better understanding of the underlying causes of poor health, assisting people to access support services, improving access to care for people in hard-to-reach communities and partnering with community groups. Reflection on social and health policies implemented are necessary to ensure that the COVID-19 pandemic does not exacerbate health inequalities into the future.

DATA AVAILABILITY STATEMENT

The data that supports the findings of this study are available in the supplementary material of this article.

ORCID

Heidi Green https://orcid.org/0000-0002-7908-3819

REFERENCES

Aidukaite, J., Saxonberg, S., Szelewa, D., & Szikra, D. (2021). Social policy in the face of a global pandemic: Policy responses to the COVID-19 crisis in Central and Eastern Europe. *Social Policy & Administration, 55*(2), 358–373. https://doi.org/10.1111/spol.12704

Ali, S., Asaria, M., & Stranges, S. (2020). COVID-19 and inequality: Are we all in this together? *Canadian Journal of Public Health, 111*(3), 415–416. https://doi.org/10.17269/s41997-020-00351-0

Andermann, A. (2016). Taking action on the social determinants of health in clinical practice: A framework for health professionals. *Cmaj, 188*(17-18), E474-E483. https://doi.org/10.1503/cmaj.160177

Anderson, R. M., Hollingsworth, T. D., Baggaley, R. F., Maddren, R., & Vegvari, C. (2020). COVID-19 spread in the UK: The end of the beginning?. *The Lancet, 396*(10251), 587–590.

Baptiste, D. L., Commodore-Mensah, Y., Alexander, K. A., Jacques, K., Wilson, P. R., Akomah, J., Sharps, P., & Cooper, L. A. (2020). *COVID-19: Shedding light on racial and health inequities in the USA.* Wiley Online Library.

Betron, M., Gottert, A., Pulerwitz, J., Shattuck, D., & Stevanovic-Fenn, N. (2020). Men and COVID-19: Adding a gender lens. *Global Public Health, 15*(7), 1090–1092. https://doi.org/10.1080/17441692.2020.1769702

Broughel, J., & Kotrous, M. (2021). The benefits of coronavirus suppression: A cost-benefit analysis of the response to the first wave of COVID-19 in the United States. *Covid Economics, 67*, 128–171.

Bucciardini, R., Contoli, B., De Castro, P., Donfrancesco, C., Falzano, L., Ferrelli, R., Giammarioli, A., Mattioli, B., Medda, E., & Minardi, V. (2020). The health equity in all policies (HEiAP) approach before and beyond the Covid-19 pandemic in the Italian context. *International Journal for Equity in Health, 19*(1), 1–3. https://doi.org/10.1186/s12939-020-01209-0

Clouston, S. A., Natale, G., & Link, B. G. (2021). Socioeconomic inequalities in the spread of coronavirus-19 in the United States: A examination of the emergence of social inequalities. *Social Science & Medicine, 268*, 113554. https://doi.org/10.1016/j.socscimed.2020.113554

Coleman, R., & Mullin-McCandlish, B. (2021). The harms of state, free-market common sense and COVID-19. *State Crime Journal, 10*(1), 170–188.

Crawley, H. (2021). The politics of refugee protection in a post-COVID-19 World. *Social Sciences, 10*(3), 81.

Douglas, M., Katikireddi, S. V., Taulbut, M., McKee, M., & McCartney, G. (2020). Mitigating the wider health effects of covid-19 pandemic response. *BMJ (Clinical Research Ed.), 369.* https://doi.org/10.1136/bmj.m1557

Farley, J. H., Hines, J., Lee, N. K., Brooks, S. E., Nair, N., Brown, C. L., Doll, K. M., Sullivan, E. J., & Chapman-Davis, E. (2020). Promoting health equity in the era of COVID-19. *Gynecologic Oncology, 158*(1), 25–31. https://doi.org/10.1016/j.ygyno.2020.05.023

Furceri, D., Loungani, P., Ostry, J., & Pizzuto, P. (2021). The rise in inequality after pandemics: Can fiscal support play a mitigating role?. *International Monetary Fund Working Paper.* Available From:https://www.imf.org/en/Publications/WP/Issues/2021/04/30/The-Rise-in-Inequality-after-Pandemics-Can-Fiscal-Support-Playa-Mitigating-Role-50287

Gibertoni, D., Adja, K. Y. C., Golinelli, D., Reno, C., Regazzi, L., Lenzi, J., & Fantini, M. P. (2021). Patterns of COVID-19 related excess mortality in the municipalities of Northern Italy during the first wave of the pandemic. *Health & Place, 67*, 102508.

Gray, D. M., Anyane-Yeboa, A., Balzora, S., Issaka, R. B., & May, F. P. (2020). COVID-19 and the other pandemic: Populations made vulnerable by systemic inequity. *Nature Reviews Gastroenterology & Hepatology, 17*(9), 520–522. https://doi.org/10.1038/s41575-020-0330-8

Hák, T., Janoušková, S., & Moldan, B. (2016). Sustainable development goals: A need for relevant indicators. *Ecological Indicators, 60*, 565–573. https://doi.org/10.1016/j.ecolind.2015.08.003

Haynes, N., Cooper, L. A., Albert, M. A., & Cardiologists, A. o. B. (2020). At the heart of the matter: Unmasking and addressing the toll of COVID-19 on diverse populations. *Circulation, 142*(2), 105–107. https://doi.org/10.1161/CIRCULATIONAHA.120.048126

Hyder, A. A., Hyder, M. A., Nasir, K., & Ndebele, P. (2021). Inequitable COVID-19 vaccine distribution and its effects. *Bulletin of the World Health Organization, 99*(6), 406. https://doi.org/10.2471/BLT.21.285616

Kantamneni, N. (2020). The impact of the COVID-19 pandemic on marginalized populations in the United States: A research agenda. *Journal of Vocational Behavior,* https://doi.org/10.1016/j.jvb.2020.103439

Kim, S., & Kim, S. (2018). Exploring the determinants of perceived risk of Middle East Respiratory Syndrome (MERS) in Korea. *International Journal of Environmental Research and Public Health, 15*(6), 1168.

Kinsey, E. W., Kinsey, D., & Rundle, A. G. (2020). COVID-19 and food insecurity: An uneven patchwork of responses. *Journal of Urban Health, 97*, 332–335. https://doi.org/10.1007/s11524-020-00455-5

MacIntyre, R. (2019). The risk of selective investment in downstream pandemic planning. *Global Biosecurity, 1*(2). https://doi.org/10.31646/gbio.36

Maness, S. B., Merrell, L., Thompson, E. L., Griner, S. B., Kline, N., & Wheldon, C. (2021). Social determinants of health and health disparities: COVID-19 exposures and mortality among African American people in the United States. *Public Health Reports, 136*(1), 18–22.

Marmot, M., & Allen, J. (2020). COVID-19: Exposing and amplifying inequalities. *Journal of Epidemiology and Community Health, 74*(9), 681–682. https://doi.org/10.1136/jech-2020-214720

McArthur, A., Klugárová, J., Yan, H., & Florescu, S. (2015). Innovations in the systematic review of text and opinion. *JBI Evidence Implementation, 13*(3), 188–195. https://doi.org/10.1097/XEB.0000000000000060

McArthur, A., Klugarova, J., Yan, H., & Florescu, S. (2020). Chapter 4: Systematic reviews of text and opinion. In Munn, Z., Aromataris, E (Ed.), *JBI manual for evidence synthesis.* https://doi.org/10.46658/JBIMES-20-05

Mullen, L., Potter, C., Gostin, L. O., Cicero, A., & Nuzzo, J. B. (2020). An analysis of international health regulations emergency committees and public health emergency of international concern designations. *BMJ Global Health, 5*(6), e002502. https://doi.org/10.1136/bmjgh-2020-002502

Munn, Z., Porritt, K., Lockwood, C., Aromataris, E., & Pearson, A. (2014). Establishing confidence in the output of qualitative research synthesis: The ConQual approach. *BMC Medical Research Methodology, 14*(1), 1–7. https://doi.org/10.1186/1471-2288-14-108

Perry, B. L., Aronson, B., & Pescosolido, B. A. (2021). Pandemic precarity: COVID-19 is exposing and exacerbating inequalities in the American heartland. *Proceedings of the National Academy of Sciences, 118*(8),. https://doi.org/10.1073/pnas.2020685118

Schulz, A. J., Mehdipanah, R., Chatters, L. M., Reyes, A. G., Neblett Jr, E. W., & Israel, B. A. (2020). Moving health education and behavior upstream: Lessons from COVID-19 for addressing structural drivers of health inequities. *Health Education & Behavior, 47*(4), 519–524. https://doi.org/10.1177/1090198120929985

Shah, G. H., Shankar, P., Schwind, J. S., & Sittaramane, V. (2020). The detrimental impact of the COVID-19 crisis on health equity and social determinants of health. *Journal of Public Health Management and Practice, 26*(4), 317–319. https://doi.org/10.1097/PHH.0000000000001200

Takian, A., Kiani, M. M., & Khanjankhani, K. (2020). COVID-19 and the need to prioritize health equity and social determinants of health. *International Journal of Public Health, 65*, 521–523. https://doi.org/10.1007/s00038-020-01398-z

Triukose, S., Nitinawarat, S., Satian, P., Somboonsavatdee, A., Chotikarn, P., Thammasanya, T., & Poovorawan, Y. (2021). Effects of public health interventions on the epidemiological spread during the first wave of the COVID-19 outbreak in Thailand. *Plos One, 16*(2), e0246274.

Upshaw, T. L., Brown, C., Smith, R., Perri, M., Ziegler, C., & Pinto, A. D. (2021). Social determinants of COVID-19 incidence and outcomes: A rapid review. *Plos One, 16*(3), e0248336. https://doi.org/10.1371/journal.pone.0248336

Van Dorn, A., Cooney, R. E., & Sabin, M. L. (2020). COVID-19 exacerbating inequalities in the US. *Lancet, 395*(10232), 1243. https://doi.org/10.1016/S0140-6736(20)30893-X

Webber-Ritchey, K. J., Simonovich, S. D., & Spurlark, R. S. (2021). COVID-19: Qualitative research with vulnerable populations. *Nursing Science Quarterly, 34*(1), 13–19. https://doi.org/10.1177/0894318420965225

World Health Organization. (2021a). *Social determinants of health.* https://www.who.int/health-topics/social-determinants-of-health#tab=tab_2

World Health Organization. (2021b). *WHO Coronavirus (COVID-19) Dashboard.* https://covid19.who.int/

Xafis, V. (2020). 'What is Inconvenient for You is Life-saving for Me': How health inequities are playing out during the COVID-19 Pandemic. *Asian Bioethics Review, 12*, 223–234. https://doi.org/10.1007/s41649-020-00119-1

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

RESPONSE REQUIRED for Your Request to John ==Wiley== & Sons - Books

N no-reply@copyright.com
To: Heidi Green (South Eastern Sydney LHD)

Fri 03/06/2022 23:00

Dear Heidi Green,

John ==Wiley== & Sons - Books has approved your recent request. Before you can use this content, you must accept the license fee and terms set by the publisher.

Use this link to accept (or decline) the publisher's fee and terms for this order.

Request Summary:
Submit date: 03-Jun-2022
Request ID: 600082710
Publication: Public health nursing
Title: The social determinants of health and health outcomes among adults during the COVID-19 pandemic: A systematic review
Type of Use: Republish in a thesis/dissertation

Please do not reply to this message.

To speak with a Customer Service Representative, call +1-855-239-3415 toll free or +1-978-646-2600 (24 hours a day), or email your questions and comments to support@copyright.com.

Sincerely,

Copyright Clearance Center

Appendix 2 - World Health Organization permission to reproduce Commission on Social Determinants of Health Conceptual Framework

From: permissions@who.int <permissions@who.int>

Sent: Tuesday, 29 September 2020 8:00 AM

To: Heidi Lord (South Eastern Sydney LHD) <Heidi.Lord@health.nsw.gov.au>

Cc: permissions@who.int

Subject: ID: 361712 Permission authorization for WHO copyrighted material

Dear Ms Lord

Thank you for your request for permission to reproduce, reprint or translate certain WHO copyrighted material.

On behalf of the World Health Organization, we are pleased to authorize your request to reproduce the WHO materials as detailed in the form below, subject to the terms and conditions of the non-exclusive licence below.

If you have questions regarding this authorization, please contact permissions@who.int.

We thank you for your interest in WHO published materials.

Kind regards,

WHO Permissions team

WORLD HEALTH ORGANIZATION (WHO)

Non-exclusive licence to use selected WHO published materials

You submitted a request, through WHO's online platform, for permission to reprint and reproduce certain WHO copyrighted material (the "Licensed Materials"). This is a legal agreement (the "Agreement") between you and WHO, granting you a licence to use the Licensed Materials subject to the terms and conditions herein.

Read this Agreement in its entirety before using the Licensed Materials.

By using the Licensed Materials, you enter into, and agree to be bound by, this Agreement.

This licence is granted only for original materials belonging to WHO. If any part of the WHO published materials you wish to reproduce are credited by WHO to a source other than WHO, those materials are not covered by this Agreement and are not part of the Licensed Materials. You are responsible for determining if this is the case, and if so, you are responsible for obtaining any necessary permission from the source of those third-party materials prior to their use.

If you enter into this Agreement on behalf of an organization, by using the Licensed Materials you confirm (represent and warrant) that you are authorized by your organization to enter into this Agreement on the organization's behalf. In such a case, the terms "you" and "your" in this Agreement refer to, and this Agreement applies to, the organization.

WHO grants this licence to you based on the representations and warranties you made in the licence request you submitted through WHO's online platform. If any of those

313

representations and/or warranties are or become false or inaccurate, this licence agreement shall automatically terminate with immediate effect, without prejudice to any other remedies which WHO may have.

If you have questions regarding this Agreement, please contact permissions@who.int.

1. <u>Licence</u>. Subject to the terms and Conditions of this Agreement, WHO grants to you a worldwide, royalty free, non-transferable, non-sublicensable, non-exclusive licence to use, reproduce, publish, and display the Licensed Materials in the manner and using the media indicated in the Permissions Request Form you submitted to WHO (the "Licensed Use"). This licence is limited to the current edition of your publication. Future editions or a different use of the Licensed Materials will require additional permission from WHO. If your request includes translation into different languages, then non-exclusive permission is hereby granted to translate the Licensed Materials into the languages indicated.

2. <u>Retained Rights</u>. Copyright in the Licensed Materials remains vested in WHO, and WHO retains all rights not specifically granted under this Agreement.

3. <u>Mandatory Acknowledgement</u>. In every instance of the Licensed Use, you must make suitable acknowledgement of WHO, either as a footnote or in a reference list at the end of your publication, as follows:

"Reprinted from Publication title, Vol /edition number, Author(s), Title of article / title of chapter, Pages No., Copyright (Year)."

In addition, If the Licensed Materials originate from the WHO web site, you must also include the URL reference and the date accessed.

Translations of the Licensed Materials should be attributed as follows:

"Translated with permission of the publisher from Publication title, Vol /edition number, Author(s), Title of article / title of chapter, Pages No., Year."

4. Altering or Modifying the Licensed Materials. As part of the Licensed Use, you may minimally alter or adapt figures and tables in the Licensed Materials to match the style of your publication. Any other alteration or modification of the Licensed Materials (including abbreviations, additions, or deletions) may be made only with the prior written authorization of WHO.

5. Appropriate and Prohibited Uses. You must use the Licensed Materials in a factual and appropriate context. You may not use the Licensed Materials in association with any product marketing, promotional, or commercial activities, including, without limitation, in advertisements, product brochures, company-sponsored web sites, annual reports, or other non-educational publications or distributions.

6. No WHO endorsement. You shall not state or imply that WHO endorses or is affiliated with your publication or the Licensed Use, or that WHO endorses any entity, organization, company, or product.

7. <u>No use of the WHO logo</u>. In no case shall you use the WHO name or emblem, or any abbreviation thereof. Notwithstanding the foregoing, if the WHO name and/or emblem appear as an integral part of the Licensed Materials (e.g. on a map) you may use the name and/or emblem in your use of the License Materials, provided the name and/or logo is not used separately from the Licensed Materials.

8. <u>No Warranties by WHO</u>. All reasonable precautions have been taken by WHO to verify the information contained in the Licensed Materials. However, WHO provides the Licensed Materials to you without warranty of any kind, either expressed or implied, and you are entirely responsible for your use of the Licensed Materials. In no event shall WHO be liable for damages arising from your use of the Licensed Materials.

9. <u>Your Indemnification of WHO</u>. You agree to indemnify WHO for, and hold WHO harmless against, any claim for damages, losses, and/or any costs, including attorneys' fees, arising in any manner whatsoever from your use of the Licensed Materials or for your breach of any of the terms of this Agreement.

10. <u>Termination</u>. The licence and the rights granted under this Agreement shall terminate automatically upon any breach by you of the terms of this Agreement. Further, WHO may terminate this licence at any time with immediate effect for any reason by written notice to you.

11. <u>Entire Agreement, Amendment</u>. This Agreement is the entire agreement between you and WHO with respect to its subject matter. WHO is not bound by any additional terms that may appear in any communication from you. This Agreement may only be amended by mutual written agreement of you and WHO.

12. <u>Headings</u>. Paragraph headings in this Agreement are for reference only.

13. <u>Dispute resolution</u>. Any dispute relating to the interpretation or application of this Agreement shall, unless amicably settled, be subject to conciliation. In the event of failure of the latter, the dispute shall be settled by arbitration. The arbitration shall be conducted in accordance with the modalities to be agreed upon by the parties or, in the absence of agreement, with the rules of arbitration of the International Chamber of Commerce. The parties shall accept the arbitral award as final.

14. <u>Privileges and immunities</u>. Nothing in or relating to this Agreement shall be deemed a waiver of any of the privileges and immunities enjoyed by WHO under national or international law and/or as submitting WHO to any national court jurisdiction.

Appendix 3 - Methods publication

Original Paper

Social Media as a Platform for Recruitment to a National Survey During the COVID-19 Pandemic: Feasibility and Cost Analysis

Heidi Green[1,2], BN, MPH; Ritin Fernandez[1,2], MN, PhD; Catherine MacPhail[3], BA, PhD

[1]School of Nursing, University of Wollongong, Wollongong, Australia
[2]Centre for Research in Nursing and Health, St George Hospital, Kogarah, Australia
[3]School of Health and Society, University of Wollongong, Wollongong, Australia

Corresponding Author:
Heidi Green, BN, MPH
School of Nursing
University of Wollongong
Northfields Ave
2522
Wollongong
Australia
Phone: 61 0412108532
Email: Heidi.Lord@health.nsw.gov.au

Abstract

Background: With improved accessibility to social media globally, health researchers are capitalizing on social media platforms to recruit participants for research studies. This has particularly been the case during the COVID-19 pandemic, when researchers were not able to use traditional methods of recruitment. Nevertheless, there is limited evidence on the feasibility of social media for recruiting a national sample.

Objective: This paper describes the use of social media as a tool for recruiting a national sample of adults to a web-based survey during the COVID-19 pandemic.

Methods: Between August and October 2020, participants were recruited through Facebook via two advertisement campaigns (paid option and no-cost option) into a web-based survey exploring the relationship between social determinants of health and well-being of adults during the COVID-19 pandemic. Data were analyzed using SPSS software and Facebook metrics that were autogenerated by Facebook Ads Manager. Poststratification weights were calculated to match the Australian population on the basis of gender, age, and state or territory based on the 2016 Australian census data.

Results: In total, 9594 people were reached nationally with the paid option and potentially 902,000 people were reached through the no-cost option, resulting in a total of 1211 survey responses. The total cost of the advertisement campaign was Aus $649.66 (US $489.23), resulting in an overall cost per click of Aus $0.25 (US $0.19).

Conclusions: Facebook is a feasible and cost-effective method of recruiting participants for a web-based survey, enabling recruitment of population groups that are considered hard to reach or marginalized. Recruitment through Facebook facilitated diversity, with participants varying in socioeconomic status, geographical location, educational attainment, and age.

Introduction

Numerous strategies such as newspaper advertisements, random mail out of surveys, and random digit dialing have been used to recruit participants into population health research. However, implementation of these traditional strategies in modern society has limitations due to the reduced use of landline phones and increased postage costs [1,2], which make these recruitment methods less feasible. Additionally, these approaches have low participation rates ranging from 7.5% [3] to 30% [4]. With improved access to the internet globally, particularly through mobile phones, social media has become an active part of modern society [5]. Public health researchers have harnessed social media and web platforms as a modality for recruitment

318

into population health research [6,7]. Used as more than just a method to connect with friends and family, social media platforms are increasingly used for sharing content, engaging with news content, entertainment, and receiving health information. The most popular social media platforms globally are Facebook, Twitter, YouTube, and Instagram [8], with over 4 billion users. Social media platforms enable users to connect and share information through both traditional and interactive methods, with most platforms allowing free use [9].

According to the Australian Communications and Media Authority [10], in 2018-19, approximately 91% of all Australians had access to the internet. In 2016-17, 80% of Australians used the internet for social networking [11] compared with 66% in 2011 [12], with an average of 1.2 social media accounts per Australian [8]. Facebook is the most popular social media platform among Australians, with approximately 93% of Australian social media consumers using this platform, followed closely by Instagram at 73% [13]. Moreover, almost 60% of Australians use social media daily [8].

Given the increased prevalence of daily social media use among Australians, social media platforms have been increasingly used as a viable method for recruiting participants into health research [14]. More specifically, social media platforms allow researchers to access hard-to-reach populations as well as target recruitment through the use of advertising campaigns to specific users based on gender, geographical location, interests, and age [9]. Social media use has been harnessed by heath researchers to recruit participants into a range of studies, including cross-sectional studies, observational studies, and interventional studies [5], particularly due to the cost-effectiveness of this recruitment method. There is evidence in the literature that health researchers have recruited participants and delivered health behavior interventions on a variety of topics. The success of these interventions has demonstrated the efficacy of social media as a suitable method for accessing participants [1,5,15-17]. However, a substantial number of studies use a localized sample.

Our study engaged the use of social media with the purpose of generating a national sample of Australian adults to explore the relationship between the social determinants of health and well-being during the COVID-19 pandemic. Currently, there is limited evidence available on the feasibility of social media for recruiting a national sample. Therefore, the aim of this paper is to describe the feasibility of using social media as a tool for recruiting a national sample of adults to a web-based survey during the COVID-19 pandemic. Feasibility was assessed in terms of reach, time invested in recruitment, number of surveys completed, cost-effectiveness, and recruitment of a diverse sample of participants.

Methods

Study Overview

The research study was undertaken to investigate the relationship between social determinants of health and well-being in Australian adults during the COVID-19 pandemic. Ethical approval to conduct this study was received from University of Wollongong Human Ethics Committee (2020/306). The inclusion criteria for the study were individuals aged 18 years and above, with the ability to read English and residing in any state or territory within Australia. Participants were recruited using Facebook over a 9-week period between August and October 2020. Participants were required to complete a web-based survey comprising 49 questions exploring social determinants of health. They were invited to enter a draw to win one of 10 Aus $50 gift vouchers at the end of the survey with winners selected randomly using SPSS software (version 25). A currency exchange rate of Aus $1=US $0.75 is applicable.

Recruitment Strategy

Recruitment for this study using Facebook was achieved by the following two methods: (1) joining existing community noticeboard Facebook groups (ie, no-cost option), and (2) through a paid Facebook advertisement campaign (ie, paid option). Both methods enabled snowball sampling where users could like, share, and circulate the social media post among others.

Joining Existing Community Noticeboard Groups on Facebook (No-Cost Option)

A specific Facebook page was created for the study using a study image. To ensure national representation, the primary author (HG) identified existing Facebook community noticeboard groups, according to Australian states and territories as well as based on urban, regional, and remote areas. The author contacted the administrators of each individual community group for permission to join. Each week, if permitted by the administrators, the advertisement was reposted on each of the community noticeboard group pages. Posting on the existing community noticeboard groups began on August 20, 2020, and ended on October 14, 2020.

Facebook Advertising Campaign (Paid Option)

To supplement the no-cost Facebook community noticeboard group approach, a paid advertisement through Facebook, which included Instagram, was designed to recruit participants. Two consecutive advertisement campaigns were set up, with the first campaign used to establish the feasibility of this strategy.

The Facebook advertisement platform, Facebook Ads Manager, was used to create paid advertisements. The features available for a payment allows the advertisement to be customized based on objective (eg, links or clicks to a web-based survey), target audience (eg, location, age, gender, interests, and behaviors), budget, and schedule [18]. Selecting the "automatic placements" option when setting up the advertisement in Facebook Ads Manager allowed the advertisements to run across associated services such as Instagram, Messenger, and Facebook Audience Network (ie, off-Facebook in-app advertising network for mobile apps).

These Facebook advertisements comprised a main text (eg, "Tell us how the COVID-19 pandemic has affected your health and wellbeing. Take our survey and go in the draw to WIN 1 of 10 Aus $50 gift vouchers"), an image (ie, the study image and university logo), and display link (Figure 1).

319

Figure 1. Paid Facebook and Instagram advertisements—example post.

A budget of Aus $650 was set as the maximum recruitment spend for the paid campaigns, with a daily limit of Aus $25. The cost per click can vary depending upon the number of clicks on the advertisement and the amount of the daily budget reached.

The first campaign was set as "engagement" (targeting people most likely to engage with the post through one of the following mechanisms: share, like, or click). The target audience for the first campaign was (1) people residing in Australia, (2) people aged 18-35 years inclusive, (3) people of all genders, and (4) people residing within certain postcodes. The primary researcher used the Australian Bureau of Statistics (ABS) Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) to set these specific postcodes. These postcodes were used to ensure the distribution of the ad campaign targeted potential participants in both relative advantaged and disadvantaged locations. The "automatic placements" option on Facebook was used, which allows the campaign to maximize the set budget and dissemination of the advertisement to a larger sample relevant to the inclusion criteria [18].

Next, the "post engagement" strategy was selected, enabling delivery to the people who are likely to share, like, and comment on the post at the lowest cost [18]. The first Facebook advertisement campaign ran from August 25, 2020, to September 1, 2020.

The second campaign employed the same strategies as the first advertisement campaign; however, the target audience locations were identified using suburbs set by ABS's IRSAD. This was undertaken as suburbs can contain multiple postcodes thus increasing the target audience. The use of the ABS's IRSAD suburbs allowed a general representation of both advantaged and disadvantaged locations, enabling diversity in targeting potential participants. The second campaign ran from September 6, 2020, to September 22, 2020.

Throughout the recruitment period, the Facebook posts were monitored daily to ensure that any comments, including individuals opportunistically using the advertisement to promote businesses, were hidden from other Facebook users. This was undertaken to ensure potential respondents were not influenced to either participate or be discouraged from participating in the survey. Additionally, monitoring the comments and hiding them from other potential participants was conducted for ethical reasons as a way of protecting any potential participants' identities. Automatic hiding of comments is not available as an option within Facebook's delivery system and, therefore, it had to be conducted manually.

Data Analysis

Data were analyzed using SPSS software (version 25). Poststratification weights were calculated to match the Australian population on the basis of gender, age, and state or

territory based on the 2016 Australian census [19], to account for over- or underrepresentation of certain people.

Facebook metrics were collected through Facebook Ads Manager, which auto generates the engagement activity for each advertisement campaign [18]. Summary and descriptive statistics including reach, impressions, and cost per click were analyzed for each campaign and for the overall campaign. "Reached" refers to the number of people who were shown the advertisement, "impressions" refers to the number of times the advertisement was on-screen for the target audience and could include multiple views of the advertisement by the same individual. "Cost per click" is derived from the total advertisement campaign spend divided by the number of clicks on the advertisement or the link [18].

Results

Recruitment Through Facebook (No-Cost Option)

The primary researcher (HG) made a request to the administrators of 110 existing Facebook community noticeboard groups to join those groups. All community groups approached approved the author's request to join. Posts and reposts to the existing community noticeboard group Facebook pages were conducted 10 times over the 9-week period commencing on August 21, 2020, and the last repost made on October 14, 2020. Using this option implies that no data on the individuals reached or impressions recorded is available to researchers through Facebook Ads Manager; however, the number of members in each community noticeboard group were available with a potential reach of 902,000 individuals. Nationally, each community noticeboard group had an average of 8205 group members, with slightly higher than the national average seen for Queensland and Australian Capital Territory, at 11,097 and 12,230 average total members per noticeboard community group, respectively. In contrast, South Australia and Victoria had marginally lower average members per group than the national average, with 6480 and 6287 members, respectively. Additionally, a comparison between the no-cost and paid options to determine the most cost-effective option was not possible, as both recruitment methods sent participants to the same survey link; therefore, no there was disaggregation between the options the participants used to reach the survey page.

Recruitment Through Facebook (Paid Option)

An aggregated 9594 individuals were reached via the two paid advertisement campaigns; however, a total of 14,232 impressions were recorded. The Facebook advertisement campaign reached 5316 (55.4%) male, 4062 (42.3%) female, and 216 (2.3%) users with uncategorized gender. Using the automatic placements option, most placements were conducted

through Instagram, reaching 5846 individuals, whereas Facebook reached 3856 individuals. The remainder of individuals were reached through Facebook Audience Network.

Strengths and Limitations of Facebook (No-Cost Option)

The greatest advantage in using the no-cost option is that there are no monetary costs associated with recruiting participants. However, it must be noted that the researchers had to continually repost the ad to the community noticeboard groups to ensure visibility, as the post would move down a user's feed once posts had been posted by another group or member; this in turn proved to be labor intensive. Additionally, during the first few days of recruitment, responses from the no-cost option were received predominantly from individuals aged 35 years and above. Therefore, to supplement this approach, the paid option was used and intentionally designed to target younger potential respondents.

Strengths and Limitations of Facebook (Paid Option)

The paid option allowed the researchers to specifically target younger potential respondents across not only Facebook but also Instagram, Messenger, and Facebook Audience Network. Furthermore, the paid option allows the researcher to customize the ad based on their objective and to create a specific schedule of when the ads will be seen [18]. This was particularly important to recruit a diverse national sample of participants. The drawback with using the paid option was the associated monetary costs, albeit being able to design the campaign to have a daily limit, the reach of potential participants did not guarantee actual respondents.

Overall Response to Survey

A total of 1211 individuals responded to the survey, with 100% meeting the eligibility criteria. The survey took respondents approximately 9 minutes to complete. Of the 1211 who commenced the survey, 1137 (93.89%) respondents completed it.

The number of responses received varied per day among the paid and no-cost recruitment options, with the highest number of responses (n=178) received on August 21, 2020, and the lowest (n=0), on October 21, 2020. In the first week the survey was live, a total of 326 responses were received, which was the most responses received over the 9-week period. Due to the no-cost and paid options running concurrently for the first 5 weeks, using the same survey link, the numbers of participants recruited through each option are unknown. Overall response to the survey per week for the no-cost and paid options are outlined in Figure 2.

321

Figure 2. Overall response to the survey (no-cost and paid options).
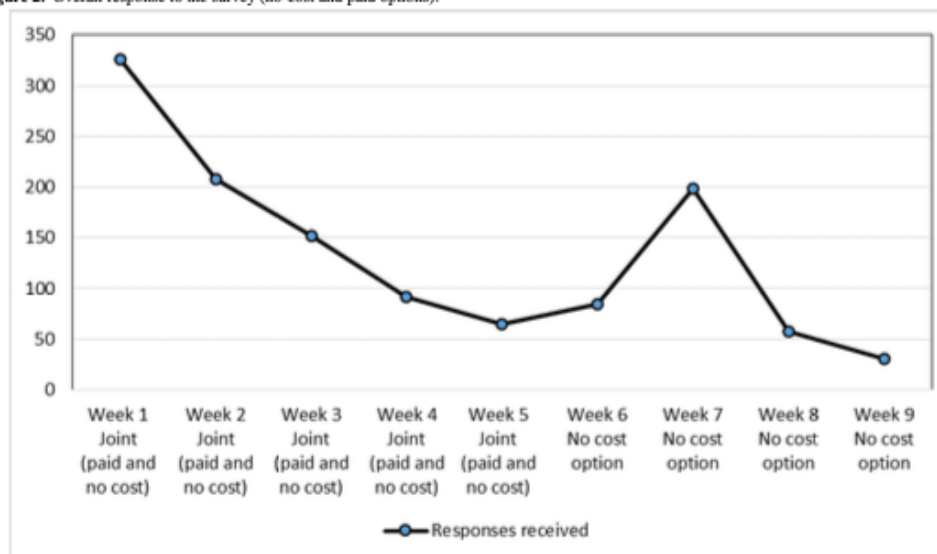
Cost Analysis

For the paid option, the total amount spent on the Facebook advertisement campaigns was Aus $649.66, with the average overall cost per click (per post engagement) reported at Aus $0.25. Individuals aged 18-24 years accounted for Aus $419.79 (64.6%) of the total advertisement budget, whereas individuals in the 25-34 age group accounted for Aus $192.49 (37.1%), those aged 35 years accounted for Aus $37.38 (7.6%). The majority of the advertisement spend was using Instagram, with a total spend of Aus $598.39. Facebook advertisement total spend was Aus $50.79, whereas $0.48 of the total spend was through Facebook Audience Network. The lowest cost per click day was on the 8 September 2020 at Aus $0.16, with the highest cost per click of Aus $0.32 on September 18, 2020.

More male participants engaged with the Facebook advertisement campaign compared to female participants, with the former accounting for 60.4% (Aus $392.35) of the total spend. Women in the 25-34 age group account for the highest cost per click at Aus $0.28.

Time

Economically, Facebook advertising campaigns are a feasible method to recruit participants into a web-based survey, requiring the use of a single researcher to create, manage, and maintain the recruitment strategy. The total number of hours spent by the researcher, including management of the no-cost option of posting on existing community noticeboard groups within Facebook, was a total of 30 hours over the 9-week period. The benefit of using Facebook's features of selecting a target audience, and posting on existing community noticeboard groups enabled recruitment of a large sample within a short timeframe,

with a relatively low cost of Aus $649.66. The cost-effectiveness and ability to recruit a large sample provides evidence to suggest that Facebook recruitment is a feasible option for public health researchers.

Distribution of Respondents

Participants from diverse geographic, education, and employment backgrounds were recruited through these two Facebook methods. Responses were received from all states (n=6) and territories (n=2) within Australia. Based on weighted data from 1211 participants, most responses received from New South Wales at 34.4% (n=387), whereas 0.4% (n=5) were received from the Northern Territory. Responses were received from 40.4% (n=447) participants living in locations classified as having the two lowest socioeconomic status brackets and 41.2% (n=646) participants living in locations classified as having two highest socioeconomic status brackets. Responses were received from 662 (58.8%) residents in major cities, 373 (23.1%) residents in inner or outer regional areas, and 70 (6.2%) residents in remote or very remote areas of Australia. Educational attainment varied among the respondents, with 36.1% (n=406) having at least a bachelor's degree, 20.2% (n=239) having a completed technical college, and 22.2% (n=250) had completed years 7 to 12 of high school. Responses received from those aged 25-39 years and 40-59 years was 30.2% (n=340) and 35.5% (n=40), respectively. The mean age of the respondents was 46.3 (SD 16.3) years. Responses received from female participants accounted for 51.7% (n=582) and that from male participants accounted for 48.3% (n=545). Unweighted data for transgender or nonbinary population was 2.6% (n=30). Weighted and unweighted distribution of respondents are detailed in Table 1.

322

Table 1. Distribution of respondents (nonweighted and weighted).

Characteristic	Nonweighted data	Weighted data
Age (years), mean (SD)	43 (14.2)	46.3 (16.3)
Age range (years), n (%)		
18-24	118 (9.7)	101 (8.9)
25-40	413 (34.1)	340 (30.2)
41-60	464 (38.3)	400 (35.5)
61-75	135 (11.1)	227 (20.2)
>75	7 (0.6)	59 (5.2)
Gender, n (%)		
Women	938 (80.7)	582 (51.7)
Men	194 (16.7)	545 (48.3)
Nonbinary or transgender	30 (2.6)	N/A[a]
Education, n (%)		
Completed years 7 to 12 high school	240 (20.7)	250 (22.2)
Vocational	253 (21.8)	239 (21.2)
Bachelor's degree	437 (37.7)	406 (36.1)
Postgraduate degree	230 (19.8)	230 (20.4)
State or territory, n (%)		
New South Wales	695 (59.8)	387 (34.4)
Victoria	181 (15.6)	305 (27.0)
Queensland	127 (10.9)	219 (19.4)
Western Australia	91 (7.8)	118 (10.5)
South Australia	17 (1.5)	57 (5.1)
Northern Territory	19 (1.6)	5 (0.4)
Australian Capital Territory	19 (1.6)	18 (1.6)
Tasmania	13 (1.1)	19 (1.7)
Remoteness, n (%)		
Major cities	709 (62.1)	662 (58.8)
Inner regional	256 (22.4)	224 (19.9)
Outer regional	112 (9.8)	149 (13.2)
Remote	20 (1.8)	12 (1.1)
Very remote	45 (3.9)	58 (5.1)
Socioeconomic status, n (%)		
Lowest (most disadvantaged)	157 (13.8)	188 (16.6)
Low	252 (22.1)	259 (23)
Middle	210 (18.4)	194 (17.2)
High	193 (16.9)	182 (16.1)
Highest (most advantaged)	328 (28.8)	282 (25.1)

[a]N/A: not applicable.

323

Discussion

Principal Findings

This study reports on the feasibility of using Facebook to recruit a national sample of participants. The findings demonstrate Facebook to be an efficient and effective method to recruit both a large and diverse sample of respondents. We recruited a total of 1211 respondents, with weighted data demonstrating recruitment was representative of the Australian population. The average cost per click for the paid option was Aus $0.25 with 9594 people reached. The no-cost option potentially reached 902,000 people, with an average number of 8205 members in each community noticeboard group. The findings of this study have implications for public health researchers seeking to recruit study participants through social media sites such as Facebook and contribute to the emerging evidence regarding the ability of social media to reach diverse populations groups.

Overall, the no-cost and paid Facebook advertisements used in this study proved to be an effective method for recruiting a large national sample of the Australian population. Although concerns have been raised in the literature regarding the digital divide [20], the accessibility of Facebook and Instagram globally and nationally refutes this notion [8]. The literature confirms that social media advertisement is a viable method to recruit marginalized population groups and those considered hard to reach [21,22]. The focus of this recruitment strategy was a diverse national sample of adults. The targeted paid advertisements for this study were achieved using the ABS's IRSAD postcode and suburbs to target a diverse audience, which proved effective, with respondents varying in socioeconomic status, remoteness, educational attainment and age. The representation of regional and remote area–based participants shows the potential benefit of using social media to recruit a segment that traditionally has been quite difficult to reach [14]; this can also be said from those from low-socioeconomic backgrounds [17]. However, it must be noted that gender was not diverse in this study with participants identifying as female overrepresented. This similar to the experience of other studies, in which male, nonbinary, and transgender participants are underrepresented [23,24]. Traditionally, female participants have been overrepresented in surveys and interviews, suggested to be due to the gender differences in communication [25]. Surveys require a willingness to disclose some personal information and often having to express more socioemotional behaviors. These are traits that are historically characterized by females and may therefore contribute to their greater participation in survey research [25]. Moreover, when engaging on the internet, female users are more likely to communicate and exchange information, whereas male users prefer to information seek [26].

The advantage of using Facebook's paid advertisement campaigns is that it can be set to target a specific audience, and set a daily cost limit. This is especially useful for researchers who are working within limited funding arrangements. Minimizing research costs and maximizing recruitment opportunities can be achieved with the use of social media for

population health research. Social media recruitment desirability has also increased during the COVID-19 pandemic [27,28], with traditional methods unable to be used to recruit participants due to the public health measures used to combat the transmission of COVID-19.

Compared with the paid advertisement, the no-cost Facebook method of recruitment was time intensive, by virtue of having to contact administrators for permission to join groups and the ongoing posts and reposts to the group pages to ensure continued visibility. However, it can be said that traditional methods of participant recruitment such as mailed surveys are often more labor intensive and expensive [29]. A number of studies have been conducted comparing social media recruitment and traditional methods, suggesting that social media is more effective for cost and time [16,17,30]. Indeed, social media recruitment through both the paid and no-cost options, as demonstrated in this study, represent a cost-effective method of recruitment into a population health survey.

Surprisingly, in week 7, a total of 198 responses were received; this coincided with a long weekend in 3 Australian States (New South Wales, Queensland, and South Australia) and one territory (Australian Capital Territory) and may have increased the response rates in this week. This finding suggests that targeting social media recruitment over weekends and when people have spare time, particularly during the COVID-19 pandemic when people may have been in lockdown over the long weekend, may provide a good opportunity for recruitment.

Limitations

Although this study used robust methods, there are some limitations that need to be acknowledged. First, there is potential for bias due to exposure to the advertisement being associated with time spent on Facebook (and therefore not the same for each user), especially with the community noticeboard groups where visibility of the post depended on when potential respondents were on Facebook.

Second, the feasibility of Facebook as a recruitment tool can be impacted by Facebook's automated advertising algorithms and metrics. Facebook sets advertising algorithms to determine the most appropriate advertisements to show to a specific audience. However, this is also impacted by Facebook as a business wanting to provide the user with a good experience. The metrics used by Facebook can be difficult to comprehend, which in turn can be challenging for researchers, particularly when they are not familiar with interpreting the metrics or following previously published social media recruitment protocols.

Third, only one online survey link was established for this study, which meant that being able to track respondents from each recruitment option was impossible. Future research employing both no-cost and paid options should use two separate links to enable a more robust comparison of the two options.

Despite male participants engaging with the Facebook advertisement campaigns more than women, they are underrepresented in this study. Approaches to increase male participation in online surveys needs to be explored.

Finally, further qualitative studies need to be conducted to understand why individuals choose or decline to participant in research advertised through social media.

Conclusions

Recruitment through social media, specifically Facebook, allowed for a cost-effective and efficient method for recruiting a national sample of participants for a web-based survey about the relationship between well-being and the social determinants of health during the COVID-19 pandemic. The diversity of participants recruited in this study, in terms of socioeconomic status, remoteness, educational attainment, and age, promotes and confirms the feasibility of social media to recruit hard-to-reach population groups as well as a diverse sample of the national population. The benefits of using Facebook should be considered by population health researchers when implementing health research in the future.

Conflicts of Interest

None declared.

References

1. Bennetts SK, Hokke S, Crawford S, Hackworth NJ, Leach LS, Nguyen C, et al. Using paid and free Facebook methods to recruit Australian parents to an online survey: an evaluation. J Med Internet Res 2019 Mar 06;21(3):e11206 [FREE Full text] [doi: 10.2196/11206] [Medline: 30839282]
2. Shaver LG, Khawer A, Yi Y, Aubrey-Bassler K, Etchegary H, Roebothan B, et al. Using Facebook advertising to recruit representative samples: feasibility assessment of a cross-sectional survey. J Med Internet Res 2019 Aug 19;21(8):e14021 [FREE Full text] [doi: 10.2196/14021] [Medline: 31429409]
3. Sinclair M, O'Toole J, Malawaraarachchi M, Leder K. Comparison of response rates and cost-effectiveness for a community-based survey: postal, internet and telephone modes with generic or personalised recruitment approaches. BMC Med Res Methodol 2012 Aug 31;12(1):132 [FREE Full text] [doi: 10.1186/1471-2288-12-132] [Medline: 22938205]
4. Larson PD. A note on mail surveys and response rates in logistics research. Journal of Business Logistics 2005;26(2):211-222. [doi: 10.1002/j.2158-1592.2005.tb00212.x]
5. Arigo D, Pagoto S, Carter-Harris L, Lillie SE, Nebeker C. Using social media for health research: methodological and ethical considerations for recruitment and intervention delivery. Digit Health 2018;4:2055207618771757 [FREE Full text] [doi: 10.1177/2055207618771757] [Medline: 29942634]
6. Nelson EJ, Loux T, Arnold LD, Siddiqui ST, Schootman M. Obtaining contextually relevant geographic data using Facebook recruitment in public health studies. Health Place 2019 Jan;55:37-42. [doi: 10.1016/j.healthplace.2018.11.002] [Medline: 30466814]
7. Yuan P, Bare MG, Johnson MO, Saberi P. Using online social media for recruitment of human immunodeficiency virus-positive participants: a cross-sectional survey. J Med Internet Res 2014 May 01;16(5):e117 [FREE Full text] [doi: 10.2196/jmir.3229] [Medline: 24784982]
8. Digital 2020 – Global Digital Overview. We Are Social and Hootsuite. 2020. URL: https://wearesocial-net. s3-eu-west-1.amazonaws.com/wp-content/uploads/common/reports/digital-2020/digital-2020-global.pdf [accessed 2021-06-30]
9. Khatri C, Chapman SJ, Glasbey J, Kelly M, Nepogodiev D, Bhangu A, STARSurg Committee. Social media and internet driven study recruitment: evaluating a new model for promoting collaborator engagement and participation. PLoS One 2015;10(3):e0118899 [FREE Full text] [doi: 10.1371/journal.pone.0118899] [Medline: 25775005]
10. Communications report 2018–19. Australian Communications and Media Authority. 2020 Feb 27. URL: https://www. acma.gov.au/publications/2020-02/report/communications-report-2018-19 [accessed 2021-06-30]
11. Household use of information technology. Australian Bureau of Statistics. URL: https://www.abs.gov.au/statistics/industry/ technology-and-innovation/household-use-information-technology/latest-release [accessed 2021-06-30]
12. Household Use of Information Technology, Australia, 2012-13. Australian Bureau of Statistics. URL: https://www.abs.gov.au/ ausstats/abs@.nsf/lookup/8146.0Media%20Release12012-13 [accessed 2021-06-30]
13. Trends in online behaviour and technology usage. Australian Communications and Media Authority. URL: https://www. acma.gov.au/publications/2020-09/report/trends-online-behaviour-and-technology-usage [accessed 2021-06-30]
14. Russomanno J, Patterson JG, Jabson Tree JM. Social media recruitment of marginalized, hard-to-reach populations: development of recruitment and monitoring guidelines. JMIR Public Health Surveill 2019 Dec 02;5(4):e14886 [FREE Full text] [doi: 10.2196/14886] [Medline: 31789598]
15. O'Connor A, Jackson L, Goldsmith L, Skirton H. Can I get a retweet please? health research recruitment and the Twittersphere. J Adv Nurs 2014 Mar;70(3):599-609. [doi: 10.1111/jan.12222] [Medline: 23909740]
16. Thornton L, Batterham PJ, Fassnacht DB, Kay-Lambkin F, Calear AL, Hunt S. Recruiting for health, medical or psychosocial research using Facebook: Systematic review. Internet Interv 2016 May;4:72-81 [FREE Full text] [doi: 10.1016/j.invent.2016.02.001] [Medline: 30135792]
17. Topolovec-Vranic J, Natarajan K. The use of social media in recruitment for medical research studies: a scoping review. J Med Internet Res 2016 Nov 07;18(11):e286 [FREE Full text] [doi: 10.2196/jmir.5698] [Medline: 27821383]

325

18. Ads Manager Basics. Facebook. URL: https://en-gb.facebook.com/business/help/ 282701548912119?id=649869995454285&ref=fbb_budgeting [accessed 2021-06-30]
19. 2016 Census QuickStats. Australian Bureau of Statistics. URL: https://quickstats.censusdata.abs.gov.au/census_services/ getproduct/census/2016/quickstat/036?opendocument [accessed 2021-06-30]
20. Stellefson M, Chaney B, Chaney D. The digital divide in health education. Am J Health Educ 2013 Jan 23;39(2):106-112. [doi: 10.1080/19325037.2008.10599023]
21. Burgess JD, Kimble RM, Watt K, Cameron CM. The adoption of social media to recruit participants for the cool runnings randomized controlled trial in Australia. JMIR Res Protoc 2017 Oct 24;6(10):e200 [FREE Full text] [doi: 10.2196/resprot.8189] [Medline: 29066427]
22. Pechmann C, Phillips C, Calder D, Prochaska JJ. Facebook recruitment using zip codes to improve diversity in health research: longitudinal observational study. J Med Internet Res 2020 Jun 05;22(6):e17554 [FREE Full text] [doi: 10.2196/17554] [Medline: 32501274]
23. Smith WG. Does gender influence online survey participation? A record-linkage analysis of university faculty online survey response behavior. ERIC Document Reproduction Service No ED501717. 2008. URL: https://eric.ed.gov/?id=ED501717 [accessed 2021-06-30]
24. Kwak N, Radler B. A comparison between mail and web surveys: Response pattern, respondent profile, and data quality. J Off Stat 2002;18(2):257-273.
25. Slauson-Blevins K, Johnson K. Doing gender, doing surveys? women's gatekeeping and men's non-participation in multi-actor reproductive surveys. Sociol Inq 2016 Jun 17;86(3):427-449. [doi: 10.1111/soin.12122] [Medline: 22489612]
26. Jackson L, Ervin K, Gardner P, Schmitt N. Gender and the internet: women communicating and men searching. Sex Roles 2001;44(5):363-379 [FREE Full text]
27. Ali SH, Foreman J, Capasso A, Jones AM, Tozan Y, DiClemente RJ. Social media as a recruitment platform for a nationwide online survey of COVID-19 knowledge, beliefs, and practices in the United States: methodology and feasibility analysis. BMC Med Res Methodol 2020 May 13;20(1):116 [FREE Full text] [doi: 10.1186/s12874-020-01011-0] [Medline: 32404050]
28. Saberi P. Research in the time of coronavirus: continuing ongoing studies in the midst of the COVID-19 pandemic. AIDS Behav 2020 Aug 18;24(8):2232-2235 [FREE Full text] [doi: 10.1007/s10461-020-02868-4] [Medline: 32303924]
29. Gaupp-Berghausen M, Raser E, Anaya-Boig E, Avila-Palencia I, de Nazelle A, Dons E, et al. Evaluation of different recruitment methods: longitudinal, web-based, Pan-European Physical Activity Through Sustainable Transport Approaches (PASTA) Project. J Med Internet Res 2019 Mar 09;21(5):e11492 [FREE Full text] [doi: 10.2196/11492] [Medline: 31066715]
30. Whitaker C, Stevelink S, Fear N. The use of Facebook in recruiting participants for health research purposes: a systematic review. J Med Internet Res 2017 Aug 28;19(8):e290 [FREE Full text] [doi: 10.2196/jmir.7071] [Medline: 28851679]

Abbreviations

ASB: Australian Bureau of Statistics
IRSAD: Index of Relative Socio-Economic Advantage and Disadvantage

---

Appendix 4 - Survey

The COVID-19 pandemic in Australia: wellbeing and social determinants of health

Participant Information Sheet

PURPOSE OF THE RESEARCH

We invite you to participate in a study being led by the University of Wollongong (UOW). This project will assess the differential impact the COVID-19 pandemic has had on the health and wellbeing of adult Australians depending on the social determinants of health. Despite implementation of public health measures, COVID-19 has rapidly spread globally, with the announcement of it being characterised as a pandemic by WHO on 11 March 2020. The COVID-19 pandemic is likely to have profound impacts on the personal lives of Australians.

INVESTIGATORS

Heidi Lord PhD candidate, School of Nursing UOW, Professor Ritin Fernandez School of Nursing UOW, A/Professor Catherine MacPhail School of Health and Society UOW, Dr Ibrahim Alananzeh School of Nursing UOW, Dr Rebekkah Middleton School of Nursing UOW, Professor Lorna Moxham School of Nursing UOW

WHAT WE WOULD LIKE YOU TO DO

Participation is voluntary, if you choose to participate you will be required to complete an online survey. There are no "right" or "wrong" answers, it is based on your experience and perception. You will also be required to provide some demographic information. The survey should take no more than 30 minutes to complete. *You may go into a draw to win 1 of 10 $50 gift vouchers* by providing your contact details at the end of the survey. Please note your information will be kept separately from the answers you provide in the survey and will be processed in the strictest confidence.

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS

Apart from the time taken to complete the survey we anticipate no risks associated with your participation. However, COVID-19 may have caused you stress and anxiety. If you think you need to speak to someone please visit the Australian government, Head to Health site (www.headtohealth.gov.au) that provides online resources and emergency counselling for the COVID-19 pandemic and we recommend to follow-up with your GP as required.

CONFIDENTIALITY & USE OF DATA

Findings from the study will be published in a report as well as being published in nursing journals and presented at international conferences. Confidentiality is assured, no individual participant will be identified in any part of the research. Decisions to participate in the study will not influence nor impair any existing or future relationships between the participant and the researchers, their universities or any other stakeholders involved in the research. All data will be stored for a period of 5 years following the publication of results before being permanently destroyed as per the Australian Code for the Responsible Conduct of Research 2007.

FUNDING AND BENEFITS OF THE RESEARCH

This study is not funded. The participants will receive no direct benefit other than the opportunity to share their experiences in a manner that can contribute to increased understanding and policy

1

327

development.

ETHICS REVIEW AND COMPLAINTS
This study has been reviewed by the Human Research Ethics Committee of the University of Wollongong (Approval number 2020/306). If you have any concerns or complaints regarding the way this research has been conducted you can contact the UOW Ethics Officer on (02) 4221 3386 or email rso-ethics@uow.edu.au.

STUDY ENQUIRIES
If you have any questions about this study, please contact: Ms Heidi Lord via email hll654@uowmail.edu.au or Professor Ritin Fernandez via email ritin@uow.edu.au

1. Have you read and understood the information described in the participant information sheet and agree to participate in the study?

○ Yes, please select the "next" button below to continue with the survey.

○ No, I do not wish to participate in this survey.

2

10. What is your occupation? (e.g. Factory worker, Delivery driver, Homemaker, Nurse, Bus Driver, Secretary etc)

The COVID-19 pandemic in Australia: wellbeing and social determinants of health

Social Support and Religion

11. How many people are so close to you that you can count on them if you had great personal problems (e.g. needed financial assistance, needed to make an important decision, needed help with meals) during the COVID-19 pandemic?

○ None ○ 1-2 ○ 3-5 ○ 5+

12. How much interest and concern do people show in what you do?

○ None ○ Little ○ Uncertain ○ Some ○ A lot

13. How easy is it to get practical help from neighbours if you should need it?

○ Very difficult ○ Difficult ○ Possible ○ Easy ○ Very easy

14. How often do you feel safe in your neighbourhood?

○ Never ○ Rarely ○ Sometimes ○ Often ○ Always

15. How much influence does religion have upon your daily life?

○ Not at all influential ○ Somewhat influential

○ Slightly influential ○ Very influential

16. During the COVID-19 pandemic, did you feel your level of religious support...

○ Stayed the same ○ Increased ○ Decreased

17. Do you have any grandchildren?

○ Yes ○ No

5

The COVID-19 pandemic in Australia: wellbeing and social determinants of health

18. Has the amount of time spent with your grandchildren during the COVID-19 pandemic:

○ Decreased   ○ Remained the same   ○ Increased

UNIVERSITY OF WOLLONGONG AUSTRALIA

The COVID-19 pandemic in Australia: wellbeing and social determinants of health

Employment

23. What was your employment status **BEFORE** the COVID-19 pandemic? (please select one answer only)

- ○ Fulltime
- ○ Part-time
- ○ Casual

- ○ Retired
- ○ Homemaker
- ○ Unemployed

- ○ Student

24. What is your employment status **DURING** the COVID-19 pandemic? (please select one answer only)

- ○ Fulltime
- ○ Part-time
- ○ Casual

- ○ Retired
- ○ Homemaker
- ○ Unemployed

- ○ Student
- ○ Jobkeeper
- ○ Leave without pay

25. What was your household annual income (before tax) **BEFORE** the pandemic? (Please tick one only)

- ○ Under $15,000
- ○ Between $15,000 and $29,999
- ○ Between $30,000 and $49,999

- ○ Between $50,000 and $74,999
- ○ Between $75,000 and $99,999
- ○ Between $100,000 and $150,000

- ○ Over $150,000

26. What is your household annual income (before tax) **DURING** the pandemic? (Please tick one only)

- ○ Under $15,000
- ○ Between $15,000 and $29,999
- ○ Between $30,000 and $49,999

- ○ Between $50,000 and $74,999
- ○ Between $75,000 and $99,999
- ○ Between $100,000 and $150,000

- ○ Over $150,000

27. Did you access your superannuation due to the COVID-19 pandemic?

- ○ Yes
- ○ No

Comments:

8

332

The COVID-19 pandemic in Australia: wellbeing and social determinants of health

Health

19. Have you been previously diagnosed with any of the following health conditions? (Please tick all that apply)

☐ Diabetes   ☐ Arthritis   ☐ Cancer

☐ Heart disease   ☐ Stroke   ☐ Overweight

☐ Asthma/Respiratory   ☐ Depression   ☐ None

☐ High blood pressure   ☐ Anxiety

☐ High blood cholesterol   ☐ Kidney problems

☐ Other (please specify)

[   ]

20. Did you smoke **prior** to the COVID-19 pandemic?

○ Yes   ○ No - never smoked   ○ No - ex smoker

21. Do you have a health care card (this does not include a medicare card)?

○ Yes   ○ No

22. During the COVID-19 pandemic did you:

	Not applicable	Don't know	Never	Sometimes	Often
Find it was difficult to access the health care services (eg GP, Specialist, Pharmacy, medications etc) you needed	○	○	○	○	○
Have to put off going to the doctor/pharmacy because of distance or transportation	○	○	○	○	○
Have to put off going to the doctor/pharmacy because you couldn't afford to go	○	○	○	○	○
Worry whether my medications would run out before you got money to buy more	○	○	○	○	○

7

333

The COVID-19 pandemic in Australia: wellbeing and social determinants of health

Food Security, Housing Stability and Utilities

28. What is your current living status?

○ I live alone

○ I live with my friends

○ I live with my family/partner

○ I live in a sharehouse

○ I live in emergency/temporary accommodation (eg. refuge, hotel or motel, hostel etc)

○ I am homeless

Comments

[   ]

29. What type of residence do you live in?

○ House

○ Semi detached (duplex, terrace)

○ Flat, unit or apartment

○ Other (please specify)

○ Retirement village

○ Caravan or mobile home

○ Granny flat

[   ]

30. How many people usually live in your household?

	Adults	Children
Please select a number from the drop down box	⬍	⬍

31. During the COVID-19 pandemic, have you had to live somewhere that you did not want to live?

○ Yes   ○ No

32. During the COVID-19 pandemic, have you had difficulty or were unable to pay for your housing?

○ Yes   ○ No

33. Have you had trouble getting housing during the COVID-19 pandemic?

○ Yes   ○ No   ○ N/A

34. Do you expect that you will be able to stay in your current housing for the next 6 months?

○ Yes   ○ No

35. During the COVID-19 pandemic, have you had to borrow money or ask friends/family or others for money to pay your rent/mortgage payment?

○ Yes   ○ No

36. During the COVID-19 pandemic, how many times have you moved?

[⬍]

37. Have you had trouble with a landlord during the COVID-19 pandemic?

○ Yes   ○ No   ○ N/A

38. During the COVID-19 pandemic, has your landlord threatened to evict you?

○ Yes   ○ No   ○ N/A

39. During the COVID-19 pandemic, have you been served an eviction notice?

○ Yes   ○ No   ○ N/A

40. How likely is it that you will be able to pay for your housing (e.g. rent/mortgage) this month?

○ Unlikely   ○ Likely

41. Do you have access to the internet at home?

○ Yes   ○ No

42. During the COVID-19 pandemic did you worry:

	Don't know	Never true	Sometimes true	Often true
Whether your food would run out before you got money to buy more	○	○	○	○
That the food you bought just didn't last and you didn't have money to buy more	○	○	○	○
Whether you could pay my electricity, gas or water bills	○	○	○	○
That you may not have access to the internet because you had no money to pay the bill	○	○	○	○
Whether you were able to get to the supermarket, doctors, pharmacy or work because you had no money to pay for transport	○	○	○	○

10

The COVID-19 pandemic in Australia: wellbeing and social determinants of health

Wellbeing

43. Please indicate the **quality of your health and life** during the COVID-19 restriction period, from **POOR** to **EXCELLENT**: (select one answer 1-10 for each statement)

	1 Poor	2	3	4	5	6	7	8	9	10 Excellent
Physical Well-being (feeling energetic, free of pain and physical problems)	○	○	○	○	○	○	○	○	○	○
Psychological/Emotional Well-being (feeling good, comfortable with yourself)	○	○	○	○	○	○	○	○	○	○
Self-Care and Independent Functioning (carrying out daily living tasks; making own decisions)	○	○	○	○	○	○	○	○	○	○
Occupational Functioning (able to carry out work, school and homemaking duties)	○	○	○	○	○	○	○	○	○	○
Interpersonal Functioning (able to respond and relate well to family, friends, and groups)	○	○	○	○	○	○	○	○	○	○
Social-Emotional Support (availability of people you can trust and who can offer help and emotional support)	○	○	○	○	○	○	○	○	○	○
Community and Services Support (pleasant and safe neighborhood, access to financial, informational and other resources)	○	○	○	○	○	○	○	○	○	○
Personal Fulfillment (experiencing a sense of balance, dignity, and solidarity; enjoying sexuality, the arts, etc.)	○	○	○	○	○	○	○	○	○	○
Spiritual Fulfillment (experiencing faith, religiousness, and transcendence beyond ordinary material life)	○	○	○	○	○	○	○	○	○	○
Global Perception of Quality of Life (feeling satisfied and happy with your life in general)	○	○	○	○	○	○	○	○	○	○

11

The COVID-19 pandemic in Australia: wellbeing and social determinants of health

Health behaviours

44. During the COVID-19 pandemic, I have done the following: (please select one answer per statement)

	Strongly Disagree	Disagree	Agree	Strongly Agree	Not applicable
Increased my participation in exercise	○	○	○	○	○
Used counselling services (e.g. Lifeline, Beyond Blue)	○	○	○	○	○
Increased my use of alcohol	○	○	○	○	○
Increased the amount of takeaway I eat	○	○	○	○	○
Increased the amount of fruit and vegetables I eat	○	○	○	○	○
Increased my smoking	○	○	○	○	○
Increased my use of drugs	○	○	○	○	○
Increased my food intake	○	○	○	○	○
Increased my time on the internet	○	○	○	○	○
Increased my time gardening	○	○	○	○	○
Increased my time with pet(s)/animals	○	○	○	○	○
Increased my time renovating	○	○	○	○	○
Increased my time cooking	○	○	○	○	○
Increased my time watching TV	○	○	○	○	○
Increased my time spent on social media or telephone	○	○	○	○	○
Made jokes about COVID-19	○	○	○	○	○

12

337

UNIVERSITY OF WOLLONGONG AUSTRALIA

The COVID-19 pandemic in Australia: wellbeing and social determinants of health

Information

45. Would like to enter into a draw to win 1 of 10 $50 gift vouchers?

⬤ Yes   ⬤ No

46. Would like to be contacted to participate in a subsequent telephone or face to face interview? (Please note you may choose to participate or decline when we contact you)

⬤ Yes   ⬤ No

47. If you answered yes to either of the above questions please provide your contact details in the space below:

This information will be kept separately from the answer to the survey that you provided above and will be processed in the strictest confidence in line with UOW privacy and confidentiality policy.

Full name

Email

Mobile/telephone number

Thank you for taking the time to complete this survey.

If you need to speak to someone during this time please contact Lifeline on 13 11 14.

Version 6 - 14 August 2020

Appendix 5 - Ethics approval

HREC Approval of Application 2020/306

rso-ethics@uow.edu.au

Wed 19/08/2020 11:54

To:ritin@uow.edu.au <ritin@uow.edu.au>;

Cc:ibrahima@uow.edu.au <ibrahima@uow.edu.au>; hll654@uowmail.edu.au <hll654@uowmail.edu.au>; cmacphai@uow.edu.au
    <cmacphai@uow.edu.au>; rmiddle@uow.edu.au <rmiddle@uow.edu.au>; lmoxham@uow.edu.au <lmoxham@uow.edu.au>;
    ritin@uow.edu.au <ritin@uow.edu.au>; rso-ethics@uow.edu.au <rso-ethics@uow.edu.au>;

Dear Professor Fernandez,

I am pleased to advise that the application detailed below has been **approved**.

Please be aware that prior to conducting any part of this research face-to-face, the current UOW requirement is that all researchers must complete a COVID-19 Safe Work Plan and have the document signed off by an appropriate WHS signatory. We appreciate all the effort your team has put into addressing the HREC's concerns, however this plan is a mandatory requirement and was introduced by University Management on 2 July. The COVID-19 Safe Work Plan document is accessible from the Intranet here https://intranet.uow.edu.au/coronavirus/returning-to-campus/index.html, and should be submitted to whs-admin@uow.edu.au. Please add your HREC reference number to the document. Once endorsed, WHS will forward the plan onto the Ethics Office for final approval.

Please note, as COVID-19 is an ever evolving health crisis, there may be times when it is necessary to cease face-to-face research activities again in the future. With this in mind, we ask that you regularly refer to the UOW COVID-19 webpage for up to date information regarding UOW research activities.

Ethics Number:	2020/306
Approval Date:	18/08/2020
Project Expiry Date:	17/08/2021
Project Title:	The COVID-19 pandemic in Australia: wellbeing and social determinants of health
Researchers:	Alananzeh Ibrahim; Lord Heidi; Mac Phail Catherine; Middleton Rebekkah; Moxham Lorna; Fernandez Ritin
Documents Approved:	• UOW Application Form rec. 04082020 • Protocol 14082020 • Response to HREC 14082020 • Participant Information Sheet and Consent Form V2, 14082020 • Survey Monkey Questionnaire rec. 14082020

Appendix 6 - Participant Information Sheet (Phase 1 and Phase 2)

UNIVERSITY
OF WOLLONGONG
AUSTRALIA

PARTICIPANT INFORMATION SHEET

The COVID-19 pandemic in Australia: wellbeing and social determinants of health

PURPOSE OF THE RESEARCH

We invite you to participate in a study being led by the University of Wollongong (UOW). This project will assess the differential impact the COVID-19 pandemic has had on the health and wellbeing of adult Australians depending on social determinants of health. Despite implementation of public health measures, COVID-19 has rapidly spread globally, with the announcement of it being characterised as a pandemic by WHO on 11 March 2020. The COVID-19 pandemic is likely to have profound impacts on the personal lives of Australians.

INVESTIGATORS

Heidi Lord (PhD Candidate), **Principal investigator:** Professor Ritin Fernandez, A/Professor Catherine MacPhail, Dr Ibrahim Alananzeh, Dr Rebekkah Middleton, Professor Lorna Moxham

WHAT WE WOULD LIKE YOU TO DO

Participation is voluntary, if you choose to participate you will be required to complete an online survey. There are no "right" or "wrong" answers, it is based on your experience and perception. You will also be required to provide some demographic information. The survey should take no more than 30minutes to complete. You may go into a draw to win 1 of 10 $50 gift vouchers by providing your contact details at the end of the survey. Please note your information will be kept separately from the answers you provide in the survey and will be processed in the strictest confidence.

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS

Apart from the time taken to complete the survey, we anticipate no risks associated with your participation. However, COVID-19 may have caused you stress and anxiety. If you think you need to speak to someone, please visit the Australian governments Head to Health site (www.headtohealth.gov.au) that provides online resources and emergency counselling for the COVID-19 pandemic and we recommend to follow-up with your GP, as required.

CONFIDENTIALITY & USE OF DATA

Findings from the study will be published within a doctoral thesis as well as being published in nursing journals and presented at international conferences. Confidentiality is assured, no individual participant will be identified in any part of the research. Individual participants will be de-identified from any reports, publications or presentations stemming from the study. Decisions to participate in the study will not influence nor impair any existing or future relationships between the participant and the researchers, their universities or any other stakeholders involved in the research. All data will be stored for a period of 5 years following the publication of results before being permanently destroyed as per the Australian Code for the Responsible Conduct of Research 2007.

FUNDING AND BENEFITS OF THE RESEARCH

Participant Information Sheet V2   4 August 2020

This study is not funded by any external agency. The participants will receive no direct benefit other than the opportunity to share their experiences in a manner that can contribute to increased understanding and policy development.

ETHICS REVIEW AND COMPLAINTS

This study has been reviewed by the Human Research Ethics Committee of the University of Wollongong (Approval No. 2020/306). If you have any concerns or complaints regarding the way this research has been conducted you can contact the UOW Ethics Officer on (02) 4221 3386 or email rso-ethics@uow.edu.au.

STUDY ENQUIRIES

If you have any questions about this study, please contact:

Ms Heidi Lord via email hll654@uowmail.edu.au or Professor Ritin Fernandez via email ritin@uow.edu.au or phone (02) 91131567.

Participant Information Sheet and consent form (Phase 2)

PARTICIPANT INFORMATION SHEET

The COVID-19 pandemic in Australia: wellbeing and social determinants of health

PURPOSE OF THE RESEARCH

We invite you to participate in a study being led by the University of Wollongong (UOW). This project will assess the impact the COVID-19 pandemic has had on the health and wellbeing of adult Australians depending on social determinants of health. Despite implementation of public health measures, COVID-19 has rapidly spread globally, with the announcement of it being characterised as a pandemic by WHO on 11 March 2020. The COVID-19 pandemic is likely to have profound impacts on the personal lives of Australians.

INVESTIGATORS

Heidi Lord (PhD Candidate), **Principal investigator:** Professor Ritin Fernandez, A/Professor Catherine MacPhail, Dr Ibrahim Alananzeh, Dr Rebekkah Middleton, Professor Lorna Moxham

WHAT WE WOULD LIKE YOU TO DO

If you agree to participate in this study we would ask you to participate in an interview either face-to-face, via telephone or video conference. The date, time and venue will be mutually agreed. This interview will involve responding to a series of questions about how you feel the COVID-19 pandemic has affected your health and wellbeing. The interview might last up to 60 minutes. All discussion will be audio recorded and transcribed verbatim, then de-identified for analysis and reporting.

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS

Apart from the time taken to complete the interview we anticipate no risks associated with your participation. However, COVID-19 may have caused you stress and anxiety. If you think you need to speak to someone you please visit the Australian governments Head to Health site (www.headtohealth.gov.au) that provides online resources and emergency counselling for the COVID-19 pandemic and we recommend to follow-up with your GP as required.

CONFIDENTIALITY & USE OF DATA

Findings from the study will be published within a doctoral thesis as well as likely being published in nursing journals. Confidentiality is assured, no individual participant will be identified in any part of the research. Individual participants will be de-identified from any reports, publications or presentations stemming from the study. You may choose to withdraw your consent to participate at any time. Decisions to participate in the study will not influence nor impair any existing or future relationships between the participant and the researchers, their universities or any other stakeholders involved in the research.

All audio data and transcripts will be stored for a period of 5 years following the publication of results before being permanently destroyed as per the Australian Code for the Responsible Conduct of Research 2007.

FUNDING AND BENEFITS OF THE RESEARCH

This study is not funded. The participants will receive no direct benefit other than the opportunity to share their experiences in a manner that can contribute to increased understanding and policy development. Participation in this study will not cost you anything and you will be given a $50 gift voucher for time.

ETHICS REVIEW AND COMPLAINTS

This study has been reviewed by the Human Research Ethics Committee of the University of Wollongong (Approval No. 2020/306). If you have any concerns or complaints regarding the way this research has been conducted you can contact the UOW Ethics Officer on (02) 4221 3386 or email rso-ethics@uow.edu.au.

STUDY ENQUIRIES

If you have any questions about this study, please contact:

Ms Heidi Lord via email hll654@uowmail.edu.au or Professor Ritin Fernandez via email ritin@uow.edu.au or phone (02) 91131567.

UNIVERSITY
OF WOLLONGONG
AUSTRALIA

CONSENT FORM

The COVID-19 pandemic in Australia: wellbeing and social determinants of health

INVESTIGATORS: University of Wollongong – Mrs Heidi Lord (PhD Candidate), Professor Ritin Fernandez, A/Professor Catherine MacPhail, Dr Ibrahim Alananzeh, Dr Rebekkah Middleton and Professor Lorna Moxham

I acknowledge that:

• I have been given information about the project 'The COVID-19 pandemic in Australia: wellbeing and social determinants of health' and been provided the opportunity to discuss and ask questions about the research project with the research team. The procedures required for the project and the time involved have been explained to me, and any questions I have about the project have been answered to my satisfaction.

• I understand that participation will involve taking part in a face-to-face, telephone or video conference interview. I understand and consent to the audio taping of my interview for data analysis purposes and that audio transcripts will be stored for a period of 5 years following the publication of results before being permanently destroyed as per the Australian Code for the Responsible Conduct of Research 2007.

• I understand that my involvement is confidential, with my information only accessible to the research investigators directly involved in the project. Information gained during the study will be published with no information about me, and in no way will be used that reveals my identity.

• I have been informed of the burdens associated with this research, which includes an interview that may last up to 60 minutes.

• I understand that my participation in this research is voluntary, and that I can withdraw from the study at any time, without affecting my relationship with the researcher/s or the University of Wollongong, now or in the future.

• If I have any enquiries about the research project, I have been informed that I can contact Ms Heidi Lord (hll654@uowmail.edu.au) or Professor Ritin Fernandez (ritin@uow.edu.au). If I have any concerns or complaints regarding the way the research is or has been conducted, I have been advised to contact the Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong on (02) 4221 3386 or email rso-ethics@uow.edu.au.

By signing below, I am indicating my consent to (please tick):

☐ Participate in an interview

☐ Audio-recording of the interview

I understand that the data collected from my participation will be used for the purposes of exploring how COVID-19 has affected my general health and wellbeing and will be reported in a de-identified form in various reports, presentations and publications, and I consent for it to be used in that manner.

Signed: _____

Name: _____ Date: _____ /_____ / _____

Appendix 7 - Wellbeing and social determinants of health publication and permission

ORIGINAL ARTICLE

Health and Social Care in the community **WILEY**

Well-being and social determinants of health among Australian adults: A national cross-sectional study

Heidi Green RN, BN, MPH, PhD candidate[1,2,3] | Ritin Fernandez RN, MN, PhD[1,2,3] | Catherine MacPhail BA, PhD[4]

[1]Centre for Research in Nursing and Health, St George Hospital, New South Wales, Australia

[2]School of Nursing, University of Wollongong, New South Wales, Australia

[3]Centre for Evidence Based Initiatives in Health Care: a Joanna Briggs Centre of Excellence, Wollongong, New South Wales, Australia

[4]School of Health and Society, University of Wollongong, New South Wales, Australia

Correspondence
Heidi Green, Level 1, Research and Education Building, St George Hospital, 4-10 South Street, Kogarah NSW.
Email: heidi.green@health.nsw.gov.au

Funding information
Nil funding for this research.

Abstract

The social determinants of health affect an individual's capacity to cope during a crisis such as the COVID-19 pandemic which could potentially impact their well-being. The aim of this study was to examine the relationship between well-being and the social determinants of health among Australian adults during the COVID-19 pandemic. A cross-sectional study of adults residing in Australia was conducted using SurveyMonkey between 20 August and 14 October 2020. Participants were recruited via social media. Well-being was measured using the 10-item Multicultural Quality of Life Index and social determinants of health were measured using validated tools and investigator developed questions. Data were analysed using SPSS version 25. Inferential statistics, including independent t-test and one-way ANOVA, were undertaken. Multiple regression analysis was used to investigate the predictors of well-being. In total, 1211 responses were received. Females accounted for 80.7% of the responses, men 16.7% and transgender/non-binary 2.6%. The mean age of the respondents was 43 years (SD 14.2). The mean score for total well-being was 62.58 (SD 21.22). The significant predictors of higher well-being were housing security ($p = 0.000$), food security ($p = 0.000$), social support ($p = 0.000$) and access to healthcare ($p = 0.000$). This study demonstrates that those with poor social support, difficulty accessing healthcare, insecure housing and food insecurity had significantly poorer well-being during the COVID-19 pandemic. It shows that the COVID-19 pandemic has exacerbated social vulnerabilities and highlights the need for action to address the social determinants of health and inequalities.

KEYWORDS
COVID-19, health inequalities, pandemic, social determinants of health, sustainable development goals, well-being

1 | INTRODUCTION

The emergence of SARS-Cov-2, also known as COVID-19, in Wuhan China in December 2019 was declared a Public Health Emergency of International Concern (PHEIC) in January 2020 (World Health Organization, 2020). Global transmission of COVID-19 has caused substantial morbidity and mortality with governments worldwide implementing extensive public health measures to reduce the spread of COVID-19 including social restrictions, 'lockdowns', travel restrictions and physical distancing. In Australia, the government

commenced implementation of such measures on 18 March 2020 with limits on the number of people who could gather in both indoor and outdoor settings as well as travel restrictions (Australian Government Department of Health, 2020c). By 25 March 2020, the Australian Government had imposed the highest priority measures, with a total ban on Australians travelling overseas and closure of many businesses including entertainment venues, libraries, museums, leisure and recreational businesses and retail outlets (Australian Government Department of Health, 2020d). The highest priority measures implemented within Australia were in the response stage and compared to the previous two stages of prevention and preparedness (Australian Government Department of Health, 2020a). Additionally, the Australian government placed limits on visitors to households and encouraged people to work from home. In some places within Australia, such as Melbourne, strict lockdowns were employed which included the introduction of curfews and a complete lockdown of a social housing block (Silva, 2020).

Across the globe, restrictions imposed have resulted in a loss of social contact, reduction in income, loss of employment, insecurity in housing, difficulty accessing healthcare and food shortages (Ravindran & Shah, 2020). Individuals with limited income or financial means, such as casual employees who lost their employment due to restrictions imposed, people who rely on public transportation, and those with the inability to work from home, may have found social distancing and isolation a non-viable option in the context of their lives (Bambra et al., 2020). Additionally, the social isolation created by lockdowns and restricted movement of people may have exacerbated or triggered mental health issues (Usher et al., 2020). The COVID-19 pandemic and associated public health measures has the ability to amplify existing social and health inequalities (Bambra et al., 2020). Social determinants of health, or 'the circumstances in which people grow, live, work, and age, and the systems put in place to deal with illness. The conditions in which people live and die are, in turn, shaped by political, social, and economic forces' (WHO Commission on Social Determinants of Health, 2008) have a substantial influence on health inequalities.

Using a contemporary notion of well-being, it is defined as the emotional, psychological, physical, financial, and spiritual well-being and incorporates aspects of quality of life such as self-fulfilment and life satisfaction (La Placa et al., 2013). Structural conditions such as the social determinants of health have been reported to affect people's well-being and quality of life (Donkin et al., 2018). Challenges in coping with the effects of the COVID-19 pandemic and associated government responses are likely to not only exacerbate existing inequalities but could affect the well-being and quality of life of particular individuals or communities (Kelly, 2021; Paremoer et al., 2021). The public health measures, while effective at assisting in reducing the spread of infectious diseases, have been reported to significantly impact people's lives socially, psychologically, and economically during the Middle East Respiratory Syndrome (MERS), Severe Acute Respiratory Syndrome (SARS) and Ebola outbreaks (Jalloh et al., 2018; Sim & Chua, 2004). These impacts are reported to be

---

What is known about this topic?

- Epidemics and pandemics can elicit both a social and economic impact on communities and individuals.
- The impact can vary with some individuals and communities more susceptible to the effects such as loss of income and employment.

What this paper adds?

- Individuals with higher incomes, were employed, had postgraduate education, and identified as male were found to have significantly higher well-being during the pandemic.
- Housing security, food security, social support and access to healthcare are all important social determinants of health predictors of the well-being during the pandemic.

---

increased emotional distress, loneliness, loss of employment and stigmatisation, to name a few. Despite recent infectious disease outbreaks such as MERS, SARS and Ebola occurring, Australia has had very limited experience in managing large infectious disease outbreaks and as such, this is the first time Australia has been impacted, particularly in large population numbers. At the time of the study, there had been a total of 25,746 cases of COVID-19 within Australia and 652 deaths attributed to COVID-19. There were 19,080 cases and 565 deaths due to COVID-19 in Victoria, which was the state highly affected by COVID-19. The Northern Territory had only 33 cases of COVID-19, with no deaths, likely due to lower population numbers and density (Australian Government Department of Health, 2020b).

The World Health Organisations (WHO) Commission on Social Determinants of Health has been used as the theoretical framework for this study. While the framework consists of three key elements, Socio-political; Structural determinants; and Intermediary determinants (WHO Commission on Social Determinants of Health, 2008), this study will focus on the structural and intermediary determinants. The structural determinants referring to the structural conditions that create health inequalities such as income, employment status and gender, and the intermediary determinants referring to the downstream factors that create health inequalities such as housing, food, social support and the health system (WHO Commission on Social Determinants of Health, 2008).

With COVID-19 being an emerging disease and Australia not previously experiencing large infectious disease outbreaks, the impact of the COVID-19 pandemic on the lives of adult Australians is unknown. Therefore, the aim of this study is twofold: (1) to explore the association between well-being and the social determinants of health in adults residing in Australia during the COVID-19 pandemic; and (2) to identify the predictors of the well-being of adults residing in Australia during the COVID-19 pandemic.

2 | METHODS

To explore the relationship between well-being and social determinants of health during COVID-19, we conducted a cross-sectional survey of the Australian population. All participants were recruited into an online survey (SurveyMonkey) using social media including Facebook and Instagram between 20 August and 14 October 2020. Recruitment incorporated two methods, first, through joining existing community noticeboard groups within Facebook and second, through a paid advertisement campaign through Facebook. The second approach used Facebook's advertisement platform that meant advertisements were run across Facebook and Instagram. A study image and link to the survey were posted on the existing community noticeboards in Facebook, with the same image and link to the survey used in the paid advertisements. A detailed description of the recruitment method is presented elsewhere (Green et al., 2021). The inclusion criteria for the study were individuals aged 18 years and over with the ability to read English and residing in any state or territory within Australia. Participation in the survey was voluntary and participants were invited to enter a draw to win one of ten $50 gift vouchers at the end of the survey with winners selected randomly using SPSS version 25. The survey took 10–20 min to complete. This paper is reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

2.1 | Measures of social determinants of health (independent variables)

Using the WHO Commission on Social Determinants of Health Framework, data collected for social determinants of health variables were gender, educational attainment, employment status, income, social support, housing and food security and access to healthcare using a variety of validated tools as well as investigator-developed questions. Postcodes were collected from the participants and used to determine their socioeconomic status based on the Socio-Economic Indexes for Areas (SEIFA) as well as the remoteness structure using the Accessibility and Remoteness Index of Australia (ARIA+). SEIFA classification within Australia is divided into quintiles with 20% of the population placed in each quintile (Australian Bureau of Statistics, 2018). The median income in Australia is $49,805 (Australian Bureau of Statistics, 2020); therefore, a cut-off value of $49,999 was used for income. Those above the median income are considered to have the ability to afford goods and services (Azpitarte & Kalb, 2019).

Social support was assessed using the 3–item Oslo social support scale (OSSO-3) (Dalgard et al., 2006). The reliability of the OSSO-3 is high with a Cronbach's alpha of 0.91. The 2 items of the OSSO-3 were rated on a 5-point scale and 1 item on a 4-point scale with the sum of the 3 scores providing the overall social support score. The maximum obtainable score was 14 with scores 3–8 signifying poor social support, 9–11 moderate support and 12–14 strong social support. Housing security was assessed using the 10-item

Housing Instability Index (Rollins et al., 2012), with 8 items eliciting a dichotomous yes or no response, the other 2 items were recoded to be dichotomous. The Cronbach's alpha for the housing instability index was 0.70. Food insecurity was assessed using the 2-item Food Insecurity (FI) Screen (Hager et al., 2010). Each item was rated on a 4-point likert scale (1 = 'I don't know', 2 = 'never true', 3 = 'sometimes true' and 4 = 'often true'). The FI Screen has a reported sensitivity of 97% and specificity of 83% with good convergent validity. Access to healthcare was measured using an investigator-developed tool using 4-items 'have to put off going to the doctor/pharmacy because you couldn't afford to go'; 'have to put off going to the doctor/pharmacy because of distance or transportation'; 'Worry whether my medications would run out before you got money to buy more' and 'find it was difficult to access the healthcare services (eg GP, specialist, pharmacy, medications) you needed'. Each item was rated on a 4-point likert scale (1 = 'I do not know', 2 = 'never true', 3 = 'sometimes true' and 4 = 'often true'). The items were then recoded to be dichotomous (0 = 'I do not know' and 'never true' and 1 = 'sometimes true' and 'often true') with higher scores indicating difficult access to healthcare. The items were then reverse coded for linear regression.

2.2 | Measures of well-being (dependent variable)

For this study, well-being was assessed using the 10-item Multicultural Quality of Life Index (Mezzich et al., 2011). Well-being was rated on a scale of 1 (poor) to 10 (excellent) for each of the items. The 10–items in the index assessed 'Physical well-being', 'Psychological/emotional well-being', 'Self-care and independent functioning', 'Occupational functioning', 'Interpersonal functioning', 'Social emotional support', 'Community and services support', 'Personal fulfilment', 'Spiritual fulfilment' and 'Global perception of quality of life'. The total scale was used in this study to measure total well-being, with the maximum obtainable score for the total scale being 100, with higher scores indicating higher well-being. The reliability of the Multicultural Quality of Life Index is high with a Cronbach's alpha of 0.92.

2.3 | Data analysis

Statistical analysis was performed using SPSS version 25 with data exported directly from Survey Monkey. All instruments were scored and analysed according to instrument developer guidelines. Descriptive statistics including means, frequencies, standard deviations and percentages were used to summarise the data. For the purposes of this study, the social determinants of health included were gender, educational attainment, employment status, income, socioeconomic status, remoteness, social support, housing security, food security and access to healthcare. Inferential statistics including t-test and one-way analysis of variance (ANOVA) using Bonferroni correction were used to assess the differences between well-being and the social determinants of health. Pearson's

correlations were used to assess the association between the well-being and social determinants of health. Variables that were statistically significant within the univariate analyses were then included in a multivariable linear regression to identify the predictors of well-being. The variables for inclusion in the multivariable linear regression were gender, education, income, social support, access to healthcare, food security and housing security. The regression model was checked for assumptions of normality, linearity, homoscedasticity and absence of multicollinearity. The Beta (β) values and the 95% confidence intervals were calculated in the multiple regression analyses. Statistical significance was set at p value less than 0.05. Missing data were not imputed.

2.4 | Ethics approval and informed consent

Ethics approval to conduct this study was received from the University of Wollongong Human Ethics Committee (2020/306). Written information regarding the aim of study, the voluntary nature of the participation and confidentiality of the handling of the data was provided to the participants electronically as the first page of the online survey. Participants were required to tick a box on the information screen in the online survey to indicate that they agreed to participate in the study.

3 | RESULTS

3.1 | Sociodemographic characteristics

A total of 1211 individuals responded to the survey during the nine-week recruitment period. The mean age of the participants was 43 years (SD 14.2 years). Of those who responded, 80.7% ($n = 938$) were female, 16.7% ($n = 194$) were male and 2.6% ($n = 30$) were non-binary or transgender. A total of 63.6% ($n = 702$) of individuals who responded were employed during the COVID-19 pandemic. (Table 1).

3.2 | Well-being and social determinants of health

The mean score for total well-being was 62.58 (SD 21.22). The mean scores for each of the 10-items of well-being were: 'physical well-being' 6.23 (SD 2.41), 'psychological well-being' 5.46 (SD 2.51), 'self-care and independent functioning' 7.21 (SD 2.53), 'occupational functioning' 7.08 (SD 2.48), 'interpersonal functioning' 6.64 (SD 2.53), social–emotional support' 6.53 (SD 2.67), 'community and services support' 6.78 (SD 2.59), 'personal fulfilment' 5.55 (SD 2.71), 'spiritual fulfilment' 5.47 (SD 2.87) and 'global perception of quality of life' 5.84 (SD 2.56). Housing insecurity was identified in 25.7% ($n = 311$) participants. An annual income of under $49,999 during the pandemic was reported in 32.4% ($n = 392$) of participants. Difficulty in access to healthcare was identified among 58.2% ($n = 581$) of

participants. A total of 20.7% ($n = 240$) of participants had completed high school education and 37.7% ($n = 437$) of participants had completed a Bachelor's degree. Unemployment was reported by 29.7% ($n = 328$) of participants. Poor social support was identified by 37.7% ($n = 430$) of participants and 22% ($n = 237$) of participants were identified as food insecure. A total of 37.9% ($n = 441$) participants were identified to be living in locations classified as the two lowest socioeconomic status brackets in Australia.

3.3 | Associations between well-being and social determinants of health

Those with housing security had significantly higher well-being scores (67.34, SD 19.4) compared to those with housing insecurity (50.91, SD 21.0) ($p < 0.001$). Similarly, those with incomes > $50,000 had significantly higher well-being scores (66.60, SD 19.3) compared to those with incomes < $49,999 (55.29, SD 22.3) ($p < 0.001$). Those with easy access to healthcare had significantly higher well-being scores (70.85, SD 18.4) compared to those with difficult access to healthcare (56.04, SD 21.1) ($p < 0.001$). Likewise, those with food security had significantly higher well-being scores (66.70, SD 19.4) compared with those who are food insecure (48.18, SD 21.0) ($p < 0.001$). Equally, those employed had significantly higher well-being scores (65.10, SD 20.2) compared with those unemployed (56.70, SD 22.3) ($p < 0.001$). With regard to education, those with a postgraduate qualification had significantly higher well-being scores (66.20, SD 19.3) compared to those with a vocational qualification (59.49, SD 23.3) (F test 0.007). Participants with strong social support had significantly higher well-being scores (76.00, SD 17.5) compared to those with moderate (65.73, SD 17.9) and poor (51.78, SD 21.3) social support (F test 0.001). Additionally, those with moderate social support had significantly higher well-being scores than those with poor social support. In respect to gender, men had significantly higher well-being scores (64.60, SD 21.7) compared with those who identified as transgender or non-binary (51.23, SD 22.2) (F test 0.011); however, there were no significant differences in well-being scores between women and men or women and transgender or non-binary genders. There were no statistically significant differences between well-being and socioeconomic status (SEIFA) or well-being and remoteness (Table 2).

3.4 | Predictors of well-being

Factors including housing, income, access to healthcare, education, employment, social support, gender and food security were found to be significant in the univariate analysis and were included in the multivariate analysis. The multiple regression model to predict total well-being among Australian adults during the COVID-19 pandemic was significant and accounted for 32.7% of the variance, R^2 Adj = 0.327, F (7, 963) = 66.832, $p = 0.000$. The significant predictors of higher well-being were housing security ($\beta = 0.166$ 95%

TABLE 1 Sociodemographic characteristics

Sociodemographic characteristics[a]	Frequency (%)	Australian population[b] (%)
Age		
18–24	118 (9.7)	–
25–39	413 (34.1)	–
40–59	464 (38.3)	–
60–74	135 (11.1)	–
75+	7 (0.6)	–
Missing	74	
Gender		
Woman	938 (80.7)	–
Man	194 (16.7)	–
Transgender/non-binary	30 (2.6)	–
Missing	44	
Income (during COVID-19)		
Under $15,000	125 (11.6)	–
$15,000-$29,999	145 (13.4)	–
$30,000-$49,999	122 (11.3)	–
$50,000-$74,999	162 (15.0)	–
$75,000- $99,999	151 (14.0)	–
$100,000-$150,000	192 (17.8)	–
Over $150,000	183 (16.9)	–
Missing	131	
Education		
Completed years 7 to 12 high school	240 (20.7)	–
Vocational	253 (21.8)	–
Bachelors	437 (37.7)	–
Postgraduate	230 (19.8)	–
Missing	51	
Employment (during COVID-19)		
Employed	776 (70.3)	72.2
Unemployed	328 (29.7)	27.8
Missing	107	
Living status		
Alone	178 (16.6)	–
Friends	24 (2.2)	–
Family/partner	813 (75.6)	–
Share house	55 (5.1)	–
Emergency/temporary/homeless	5 (0.4)	–
Missing	136	
Socioeconomic status		
Lowest (most disadvantaged)	157 (13.8)	20
Low	252 (22.1)	20
Middle	210 (18.4)	20
High	193 (16.9)	20
Highest (most advantaged)	328 (28.8)	20
Missing	71	

[a]Missing data.
[b]Australian Bureau of Statistics Data.

TABLE 2 Associations between social determinants of health and well-being

	Total well-being	
	Mean (SD)	p value
Housing		
Secure	67.34 (19.4)	<0.001
Insecure	50.91 (21.0)	
Income		
< $15,000 to $49,999	55.29 (22.3)	<0.001
$50,000 +	66.60 (19.3)	
Access to healthcare		
Easy access	70.85 (18.4)	<0.001
Difficult access	56.04 (21.1)	
Food security		
Food secure	66.70 (19.4)	<0.001
Food insecure	48.18 (21.0)	
Employment		
Unemployed	56.70 (22.3)	<0.001
Employed	65.10 (20.2)	
	Mean (SD)	F test
Education		
High school (years 7–12)	61.41 (21.3)	0.007
Vocational[a]	59.49 (23.3)	
Bachelor's degree	63.13 (20.5)	
Postgraduate[a]	66.20 (19.3)	
Social support		
Poor[b]	51.78 (21.3)	<0.001
Moderate[b]	65.73 (17.9)	
Strong[b]	76.00 (17.5)	
Gender		
Woman	62.52 (20.9)	0.011
Man[c]	64.60 (21.7)	
Transgender or Non-binary[c]	51.23 (22.2)	
Socioeconomic status		
Lowest	63.94 (22.1)	0.305
Low	60.09 (22.8)	
Middle	62.97 (19.9)	
High	63.08 (20.9)	
Highest	63.68 (20.2)	
Remoteness		
Major cities	63.02 (20.1)	0.881
Inner regional	62.01 (23.5)	
Outer regional	62.78 (21.3)	
Remote	58.42 (24.3)	
Very remote	62.37 (21.2)	

[a]Significance between these 2 variables.
[b]Significance is among these 3 variables.
[c]Significance is between these 2 variables.

CI 4.96 to 10.42 $p = 0.000$), food security ($\beta = 0.152$ 95% CI 4.63 to 10.70 $p = 0.000$), social support ($\beta = 0.309$ 95% CI 7.25 to 10.46 $p = 0.000$) and access to healthcare ($\beta = 0.183$ 95% CI 5.47 to 10.22 $p = 0.000$) (Table 3).

4 | DISCUSSION

Confronted with the COVID-19 pandemic, national data provide the opportunity to identify vulnerable population groups within Australia that have been impacted by this emerging virus and its association with well-being and quality of life. Therefore, this study aimed to explore the relationship between well-being and the social determinants of health. Findings from this study suggest that housing security, food security, social support and access to healthcare are all important social determinants of health predictors of the well-being of adult Australians during the COVID-19 pandemic. While not predictors of well-being, people with higher incomes, were employed, had postgraduate education and identified as male were found to have significantly higher well-being compared to their counterparts. However, being a cross-sectional study, causal inferences are not able to be drawn from this study.

Efforts to curb the public health impact of COVID-19 within Australia initially focused on reducing hospitalisations, attempting to identify unknown long-term health consequences, morbidity and mortality from COVID-19 infections (Ravindran & Shah, 2020). However, this emerging virus has revealed other serious implications that have impacted populations ranging from financial insecurity and social isolation to access to healthcare and food security. These social determinants of health are vital to maintaining the well-being of the population. Results from this study have demonstrated that approximately a third of participants were found to be housing insecure during the COVID-19 pandemic. However, with no evidence of the degree of housing insecurity in the general Australian population prior to the COVID-19 pandemic, it is difficult to ascertain the significance of this result. Despite this, a report by the Australian Housing and Urban Research Institute (AHURI) indicates that the pandemic has exacerbated the housing rental crisis, and increased the demand for social housing, and emergency accommodation (Mason et al., 2020). One of the predominant economic challenges of COVID-19 was the ability for people to pay for housing (Benfer et al., 2021), primarily due to substantial job losses and economic downturn. Housing, as a basic human right and important social determinant of health, can threaten an individual's health and well-being particularly when individuals are found to be housing insecure. The results of this study demonstrate this notion with housing insecurity a predictor of poorer well-being among participants. This is similar to a study conducted in the United States that found that those with housing instability reported significantly higher levels of mental stress compared to homeowners (Bushman & Mehdipanah, 2022). Moreover, housing insecurity during a pandemic may mean individuals are homeless or living in temporary accommodation that hinders

their ability to comply with any strategies recommended to curb the spread of COVID-19, potentially making them more susceptible to being infected (Benfer et al., 2021).

Despite Australia being considered a high-income country, the prevalence of food insecurity was identified as 22% in this study, while prior to the pandemic, the prevalence of food insecurity within Australia ranged from 5.1% to 10.6% (McKay et al., 2019). During the COVID-19 pandemic, food insecurity was more prevalent among Australians and could be due to loss of employment and housing as a result of the lockdown and other public health measures. This aligns with research conducted in the United States that showed that food insecurity in households during the pandemic doubled (Owens et al., 2020). While another study indicates that food insecurity within the Unites States prior to the pandemic was approximately 11%, during the pandemic, this increased to 38% (Wolfson & Leung, 2020). Additionally, the results of this study demonstrate that food insecurity is a predictor of poorer well-being, indicating that there is a relationship between this social determinant of health and total well-being or quality of life. These findings are similar to a study conducted in the United Kingdom (UK) during the pandemic demonstrating that food insecurity increased by 66.7% and was significantly associated with participants with a low income. Additionally, the UK study findings indicate that food insecurity was significantly associated with housing tenure, with those participants renting more likely to experience food security, therefore affecting their well-being (Pool & Dooris, 2021). However, the findings of our study may not be representative of the entire Australian population due to the study design. Indeed, the findings of this study validate the need for action on social determinants of health not only for the current pandemic, but as a goal for alleviating social and health inequalities into the future.

The economic instability created by the COVID-19 pandemic has created a loss of employment and income. A study conducted in Australia during the pandemic demonstrated a fall of 9.1% in income during the early stages of the pandemic (Biddle et al., 2020). The results of this study found that approximately one-third of participants reported being unemployed and similarly one-third had a household income of less than $49,999 during the COVID-19 pandemic. While

this study shows that there was an association between unemployment and poorer well-being and low income and poorer well-being, these were not found to be predictors of total well-being.

As a life-threatening disease, COVID-19 can create significant anxiety and stress within the population. The anxiety and stress are compounded by job loss, food and housing insecurity. Social support has been identified as an important factor to overcome stress and anxiety (Yu et al., 2020). However, this study has highlighted that almost 40% of participants had poor social support during the COVID-19 pandemic in Australia. Social support is reported in the literature to have the ability to increase resilience and strengthen internal resources (Bovier et al., 2004). Therefore, a lack of social support will inhibit an individual's ability to cope during the pandemic. The OSSO-3 social support scale used in this study is recommended for population-based surveys and measured participants ability to receive practical and instrumental support from others, emotional support from others and the number of people they have access to for support. The findings of this study demonstrated that poor social support was a predictor of poorer well-being. Comparably, a population-based study conducted in Austria showed that participants with higher levels of social support during the pandemic were associated with higher well-being (Simon et al., 2021). The findings of our study indicate that there may be an increased need for psychological services both short- and long term to combat the impact of the pandemic on individuals with poor social support. Moreover, there requires further consideration of alternate ways of managing lockdowns and isolation to enable both social and disease prevention objectives to be met. This includes allowing individuals time and opportunity to rearrange their living situations prior to imposing lockdowns to counter the negative impacts of a loss of social support and isolation.

Often, the neglected social determinant of health, having access to healthcare is central to reducing health inequalities. Results from this study demonstrate that almost 60% of participants had difficulty accessing healthcare during the pandemic; this could be a result of geographical location, an inability to afford healthcare-associated costs, or increased need for healthcare services such as mental health. Prior to COVID-19, the evidence on the prevalence of

TABLE 3 Predictors of well-being

Model	Unstandardized coefficients		95.0% confidence interval for ß	
	ß	Sig.	Lower bound	Upper bound
Total well-being				
Constant	26.49	0.00	20.03	32.96
Gender	1.15	0.35	−1.24	3.55
Education	0.35	0.54	−0.76	1.45
Income	2.34	0.07	−0.19	4.86
Social support	8.85	0.00	7.25	10.46
Access to healthcare	7.84	0.00	5.47	10.22
Food security	7.66	0.00	4.63	10.70
Housing security	7.70	0.00	4.96	10.43

difficulty accessing healthcare in Australia is limited and varies, with one study in 2018 reporting that 21% of Australians experienced two or more barriers to accessing primary healthcare. However, data from the Australian Institute of Health and Welfare (AIHW) from 2016 to 2017 indicate that 7.6% of the Australian population reports barriers to access to healthcare including consultation with a medical specialist or General Practitioner (GP) and medical imaging and pathology tests (Australian Government Australian Institute of Health and Welfare, 2018). Access to healthcare, as a self-rated measure in this study, was targeted at affordability issues and general access barriers to primary healthcare, and not a measure of urgency of health need. Despite Australia having a universal health insurance scheme, Medicare, which aims to provide access to a range of health services at little or no cost, equitable access to healthcare for many Australians is lacking (Leeder, 2003). Some general practices can charge upfront payments declining the use of bulk billing, which may result in some Australians not being able to attend due to affordability. Dentistry and some allied health services are not covered under Medicare, therefore only accessible to those privately insured or those from wealthy areas (Leeder, 2003). This study has identified that there were affordability issues related to access to healthcare during the pandemic; however, this maybe an existing social determinant of health prior to the pandemic or it could indicate an exacerbation of this social determinant during the pandemic. In response to the COVID-19 pandemic, the Australian Government injected funds into the telehealth scheme, previously limited to rural and remote communities, to enable access to healthcare (Isautier et al., 2020). However, the literature indicates that Australians experienced challenges and barriers to the use of the telehealth service including communication and expressing themselves as well as not being available to have a physical consultation (Fisk et al., 2020). Indeed, this study reveals that Australians with difficult access to healthcare have poorer well-being compared to those with easy access to healthcare, with this being a measure of affordability to access healthcare. These findings highlight the unequal distribution of power and resources and emphasise the need to address the social determinants of health more than ever before.

While the pandemic has demonstrated a continued impact of the social determinants of health on the population's well-being, it has also highlighted the need for government and non-government organisations (NGOs) to address these social and health disparities. Using the evidence that already exists on social determinants in addition to the newly created evidence from the global experience of the pandemic, policy makers and governments can use this as guidance to make investments to mitigate social and health inequalities. Such measures would be to design and implement policies to alleviate housing stress and instability, increasing the number of social housing facilities and affordable housing options. Regarding access to healthcare, effective mental health coverage is required not just immediately but for the longer term. Furthermore, governments need to strengthen access to public healthcare by increasing the availability of resources particularly to those with limited resources to access. Improving employment conditions, such as benefits for those casually employed or mandating

against long-term casual workforce and rising the social government support benefits and payments, as well as basic income support programmes should be adopted to address income and employment issues that exacerbate social and health inequalities. Addressing income and employment issues will also assist in tackling the food security problems that have been identified in this study. Finally, the government, policy makers and NGOs need to take responsibility for innovating social protection strategies and policies to protect the population now and into the future and such strategies must be sustainable. The first step in this process is to revitalise the agenda on the United Nations (UNs) Sustainable Development Goals (SDGs), which recognise that ending poverty and other disparities is central to improved health, well-being and equality. Bipartisan agreement to consider the social determinants of health within all policies and throughout the policy process is required; however, without the identification of social determinants of health as an issue that needs addressing, this will not be part of a political agenda. Critical to achieving policy action on the social determinants of health is through inter-organisational and intersectoral collaborations. Government agencies need to work in partnership to coordinate policy action on the social determinants of health, and this could be achieved through a cross government agency. Increasing awareness of the need to address the social determinants of health is critical, public health professionals and researchers are key to this approach and can be fundamental resources for all levels of government and policy makers. It is expected that key findings from this study will be disseminated broadly to decision makers and other stakeholders to ensure action on the social determinants of health. The evidence could also be used to inform public health interventions aimed at community connectedness which will function as a useful measure to address the poor social support issues that have been identified in this study.

4.1 | Strengths and limitations

This national study offers a wealth of information to identify the impacts of the COVID-19 pandemic on the Australian population. A key strength of this study is that it highlights the social determinants of health and the relationship with well-being. It is also important to acknowledge the limitations of this study. First, it must be noted that females are over-represented in this study and ethnicity is not representative of the Australian population. Strategies that could be used in future research to ensure that all genders are represented would be to receive input from community partners to encourage recruitment from event-specific transgender gatherings; specifically targeting men's groups through social media; and adjusting the Facebook paid recruitment campaign to target men only. While social media was used as the recruitment modality for this study, it must be recognised as a limitation, especially for those who do not have social media accounts. While there is often debate over the digital divide, 91% of Australians have access to the internet. However, using an online approach to recruit into this study is a limitation, especially for those who lack access to technology and have low digital literacy. This potential

digital fracture could be minimised by using a hybrid approach of on-line and telephone or mailed surveys. Moreover, there is a potential that responses may have been limited to individuals who viewed the pandemic as a threat to public health and hence more willing to respond and may over-represent those with access to online data and devices. The data were collected using an online self-administered survey which is known to be subject to responder bias. Additionally, due to the study design, cross-sectional study, using a one-time measurement, makes it difficult to infer a causal relationship and is therefore a limitation of this study.

5 | CONCLUSION

While there is still much to learn about COVID-19, this study has highlighted the social determinants of health that have impacted the Australian population's well-being during the COVID-19 pandemic. The social determinants of health, housing insecurity, food insecurity, difficult access to healthcare, poor social support are all predictors of poorer well-being among Australian adults during the pandemic. The COVID-19 pandemic is likely to remain a threat, not only to population health long term but also to individuals' well-being. Importantly, further research on the long-term impacts of the pandemic on social determinants of health needs to be conducted. This study has highlighted once again the need to tackle the social determinants of health that contribute to social and health inequalities, particularly in terms of housing and food security as well as access to healthcare. The findings from this study also provide important insights into the social vulnerabilities that have been worsened as a consequence of the pandemic. However, further research using a longitudinal study design will be able to identify the impact of COVID-19 on well-being and social determinants of health over time. Addressing social determinants of health needs to become a priority for policy makers and governments and requires modifying the systemic and structural barriers that are central causal factors. These can be achieved through provision of social housing, further action on ensuring housing affordability, access to food subsidies including food vouchers and community connectedness programmes. Without this, social and health inequalities will widen.

ORCID

Heidi Green https://orcid.org/0000-0002-7908-3819
Ritin Fernandez https://orcid.org/0000-0002-6143-7703
Catherine MacPhail https://orcid.org/0000-0002-0614-0157

REFERENCES

Australian Bureau of Statistics. (2018). Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA). Retrieved 22 March from https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2033.0.55.001~2016~Media%20Release~Census%20shows%20our%20most%20advantaged%20&%20disadvantaged%20areas%20(Media%20Release)~25

Australian Bureau of Statistics. (2020). Personal income in Australia. https://www.abs.gov.au/statistics/labour/earnings-and-work-hours/personal-income-australia/latest-release

Australian Government Australian Institute of Health and Welfare. (2018). Primary health care. https://www.aihw.gov.au/reports-data/indicators/healthy-community-indicators/national/all-australia/primaryhealthcare/primary-health-care?tab=IND0027|Latest&filter=IND0027|4|2016~17#IND0027

Australian Government Department of Health. (2020a). Australian health sector emergency response plan for novel coronavirus (COVID-19). https://www.health.gov.au/resources/publications/australian-health-sector-emergency-response-plan-for-novel-coronavirus-covid-19

Australian Government Department of Health. (2020b). Coronavirus (COVID-19) at a glance 31 august 2020. https://www.health.gov.au/sites/default/files/documents/2020/09/coronavirus-covid-19-at-a-glance-31-august-2020.pdf

Australian Government Department of Health. (2020c). Latest statement on coronavirus (COVID-19) from the prime minister. https://www.health.gov.au/news/latest-statement-on-coronavirus-covid-19-from-the-prime-minister

Australian Government Department of Health. (2020d). Update from the prime minister on social distancing and other measures to combat coronavirus (COVID-19). https://www.health.gov.au/news/update-from-the-prime-minister-on-social-distancing-and-other-measures-to-combat-coronavirus-covid-19

Azpitarte, F., & Kalb, G. (2019). Measuring income poverty in Australia: A review of methods and recent trends (pp. 163–187). Poverty, Social Security and Basic Income.

Bambra, C., Riordan, R., Ford, J., & Matthews, F. (2020). The COVID-19 pandemic and health inequalities. Journal of Epidemiology and Community Health, 74(11), 964–968.

Benfer, E. A., Vlahov, D., Long, M. Y., Walker-Wells, E., Pottenger, J., Gonsalves, G., & Keene, D. E. (2021). Eviction, health inequity, and the spread of COVID-19: Housing policy as a primary pandemic mitigation strategy. Journal of Urban Health, 98(1), 1–12.

Biddle, N., Edwards, B., Gray, M., & Sollis, K. (2020). Hardship, distress, and resilience: The initial impacts of COVID-19 in Australia.

Bovier, P. A., Chamot, E., & Perneger, T. V. (2004). Perceived stress, internal resources, and social support as determinants of mental health among young adults. Quality of Life Research, 13(1), 161–170.

Bushman, G., & Mehdipanah, R. (2022). Housing and health inequities during COVID-19: Findings from the national household pulse survey. Journal of Epidemiology and Community Health, 76(2), 121–127.

Dalgard, O. S., Dowrick, C., Lehtinen, V., Vazquez-Barquero, J. L., Casey, P., Wilkinson, G., Ayuso-Mateos, J. L., Page, H., & Dunn, G. (2006). Negative life events, social support and gender difference in depression. Social Psychiatry and Psychiatric Epidemiology, 41(6), 444–451.

Donkin, A., Goldblatt, P., Allen, J., Nathanson, V., & Marmot, M. (2018). Global action on the social determinants of health. BMJ Global Health, 3(Suppl 1), e000603.

Fisk, M., Livingstone, A., & Pit, S. W. (2020). Telehealth in the context of COVID-19: Changing perspectives in Australia, the United Kingdom, and the United States. *Journal of Medical Internet Research, 22*(6), e19264.

Green, H., Fernandez, R., & MacPhail, C. (2021). Social media as a platform for recruitment to a national survey during the COVID-19 pandemic: Feasibility and cost analysis. *JMIR Formative Research, 5*(7), e28656.

Hager, E. R., Quigg, A. M., Black, M. M., Coleman, S. M., Heeren, T., Rose-Jacobs, R., Cook, J. T., de Cuba, S. A. E., Casey, P. H., & Chilton, M. (2010). Development and validity of a 2-item screen to identify families at risk for food insecurity. *Pediatrics, 126*(1), e26–e32.

Isautier, J. M., Copp, T., Ayre, J., Cvejic, E., Meyerowitz-Katz, G., Batcup, C., Bonner, C., Dodd, R., Nickel, B., & Pickles, K. (2020). People's experiences and satisfaction with telehealth during the COVID-19 pandemic in Australia: Cross-sectional survey study. *Journal of Medical Internet Research, 22*(12), e24531.

Jalloh, M. F., Li, W., Bunnell, R. E., Ethier, K. A., O'Leary, A., Hageman, K. M., Sengeh, P., Jalloh, M. B., Morgan, O., & Hersey, S. (2018). Impact of Ebola experiences and risk perceptions on mental health in Sierra Leone, July 2015. *BMJ Global Health, 3*(2), e000471.

Kelly, M. P. (2021). The relation between the social and the biological and COVID-19. *Public Health, 196*, 18–23.

La Placa, V., McNaught, A., & Knight, A. (2013). Discourse on wellbeing in research and practice. *International Journal of Wellbeing, 3*(1), 116–125.

Leeder, S. R. (2003). Achieving equity in the Australian healthcare system. *Medical Journal of Australia, 179*(9), 475–478.

Mason, C., Moran, M., & Earles, A. (2020). Policy coordination and housing outcomes during COVID-19

McKay, F. H., Haines, B. C., & Dunn, M. (2019). Measuring and understanding food insecurity in Australia: A systematic review. *International Journal of Environmental Research and Public Health, 16*(3), 476.

Mezzich, J. E., Cohen, N. L., Ruiperez, M. A., Banzato, C. E., & Zapata-Vega, M. I. (2011). The multicultural quality of life index: Presentation and validation. *Journal of Evaluation in Clinical Practice, 17*(2), 357–364.

Owens, M. R., Brito-Silva, F., Kirkland, T., Moore, C. E., Davis, K. E., Patterson, M. A., Miketinas, D. C., & Tucker, W. J. (2020). Prevalence and social determinants of food insecurity among college students during the COVID-19 pandemic. *Nutrients, 12*(9), 2515.

Paremoer, L., Nandi, S., Serag, H., & Baum, F. (2021). Covid-19 pandemic and the social determinants of health. *BMJ, 372*, 129.

Pool, U., & Dooris, M. (2021). Prevalence of food security in the UK measured by the food insecurity experience scale. *Journal of Public Health.*

Ravindran, S., & Shah, M. (2020). *Unintended consequences of lockdowns: Covid-19 and the shadow pandemic (0898–2937).*

Rollins, C., Glass, N. E., Perrin, N. A., Billhardt, K. A., Clough, A., Barnes, J., Hanson, G. C., & Bloom, T. L. (2012). Housing instability is as strong a predictor of poor health outcomes as level of danger in an abusive relationship: Findings from the SHARE study. *Journal of Interpersonal Violence, 27*(4), 623–643.

Silva, D. S. (2020). COVID-19 in the public housing towers of Melbourne: Upholding social justice when invoking precaution. *Australian and New Zealand Journal of Public Health, 44*(5), 430.

Sim, K., & Chua, H. C. (2004). The psychological impact of SARS: A matter of heart and mind. *CMAJ, 170*(5), 811–812.

Simon, J., Helter, T. M., White, R. G., van der Boor, C., & Łaszewska, A. (2021). Impacts of the Covid-19 lockdown and relevant vulnerabilities on capability well-being, mental health and social support: An Austrian survey study. *BMC Public Health, 21*(1), 1–12.

Usher, K., Bhullar, N., & Jackson, D. (2020). Life in the pandemic: Social isolation and mental health. *Wiley Online Library.*

WHO Commission on Social Determinants of Health. (2008). *Closing the gap in a generation: Health equity through action on the social determinants of health: Commission on social determinants of health final report.* World Health Organization.

Wolfson, J. A., & Leung, C. W. (2020). Food insecurity during COVID-19: An acute crisis with long-term health implications. *American Public Health Association, 110*, 1763–1765.

World Health Organization. (2020). COVID 19 public health emergency of international concern (PHEIC). Global research and innovation forum: towards a research roadmap.

Yu, H., Li, M., Li, Z., Xiang, W., Yuan, Y., Liu, Y., Li, Z., & Xiong, Z. (2020). Coping style, social support and psychological distress in the general Chinese population in the early stages of the COVID-19 epidemic. *BMC Psychiatry, 20*(1), 1–11.

354

ⓘ Flag for follow up.

N   no-reply@copyright.com
     To: Heidi Green (South Eastern Sydney LHD)   Fri 03/06/2022 23:00

CCC
Copyright Clearance Center

Dear Heidi Green,

John <mark>Wiley</mark> & Sons - Books has approved your recent request. Before you can use this content, you must accept the license fee and terms set by the publisher.

Use this link to accept (or decline) the publisher's fee and terms for this order.

Request Summary:
Submit date: 03-Jun-2022
Request ID: 600082708
Publication: Health & social care in the community
Title: Well-being and social determinants of health among Australian adults: A national cross-sectional study
Type of Use: Republish in a thesis/dissertation

Please do not reply to this message.

To speak with a Customer Service Representative, call +1-855-239-3415 toll free or +1-978-646-2600 (24 hours a day), or email your questions and comments to support@copyright.com.

Sincerely,

Appendix 8 - Economic wellbeing publication and permission

PHN PUBLIC HEALTH NURSING WILEY

Association between economic wellbeing and ethnicity, socioeconomic status, and remoteness during the COVID-19 pandemic

Heidi Green BN, MPH, PhD Candidate[1,2,3] | Catherine MacPhail BA, PhD Associate Professor[4] | Ibrahim Alananzeh RN, PhD[5] | Ritin Fernandez MN, PhD Professor[1,2,3]

[1]Centre for Research in Nursing and Health, St George Hospital, Kogarah, New South Wales, Australia

[2]School of Nursing, University of Wollongong, Wollongong, New South Wales, Australia

[3]Illawarra Health and Medical Research Institute, University of Wollongong, Wollongong, Australia

[4]School of Health and Society, University of Wollongong, Wollongong, New South Wales, Australia

[5]School of Humanities, University of Wollongong Dubai, Dubai, United Arab Emirates

Correspondence
Heidi Green, Centre for Research in Nursing and Health, Level 1, Research and Education Building, St George Hospital, 4–10 South Street, Kogarah NSW, Australia.
Email: Heidi.Lord@health.nsw.gov.au

Abstract

Objective: The aim of this study is to explore the association between economic wellbeing and ethnicity, socioeconomic status, and remoteness during the COVID-19 pandemic.

Design: A cross-sectional study via SurveyMonkey was conducted in Australia between August 2020 and October 2020. Descriptive and inferential statistics were used to analyze the data.

Results: A total of 1211 individuals responded to the survey. Income loss was significantly associated with those from low socioeconomic status (OR = 1.65; 95% CI 1.01–2.68). Access of superannuation was significantly associated with those in outer regional (OR = 3.61; 95% CI 0.81–16.03) and low socioeconomic status (OR = 2.72; 95% CI 1.34–5.53). Financial inability to pay for services was significantly associated with living in remote areas (OR = 2.26; 95% CI 0.88–5.80).

Conclusions: The economic wellbeing of people who identify as Aboriginal and Torres Strait Islander, live in regional or remote areas, and reside in low socioeconomic areas have been substantially impacted during the pandemic. Findings call for policies to address the underlying social determinants of health.

KEYWORDS
COVID-19, economic wellbeing, health disparities, pandemic, social determinants of health, sustainable development goals

1 | INTRODUCTION

As the public health burden of COVID-19 and its numerous variants, spreads globally, countries continue to implement public health measures to suppress transmission (Leung et al., 2021). In addition to health and medical actions such as symptomatic and comprehensive testing, contact tracing and treating infected individuals, measures to alleviate the spread of COVID-19 have included restrictions on human mobil-

ity, often referred to as "lockdown," quarantining, social distancing, and cancellation of large-scale gatherings (Singh et al., 2021; Tran et al., 2020). The aim of this study is to explore the association between economic wellbeing and ethnicity, socioeconomic status, and remoteness in adults during the COVID-19 pandemic.

In Australia, the government, under the direction of the Australian Health Protection Principal Committee (AHPPC), designed various strategies and directives to manage the pandemic, including guidelines

356

on the protective behaviors that should be adopted by the general population (Van Nguyen et al., 2021). Border controls, travel restrictions and a national lockdown were all public health measures that were imposed by March 25, 2020, within Australia, and necessitated the closure of many businesses, and encouragement of individuals to work from home where possible.

While public health measures such as lockdown have shown to be effective at slowing the spread of infectious diseases, they do have implications for many aspects of individuals' daily lives (Corpuz, 2021). Population groups that have lost employment, are unable to work from home and are living in poverty experience unequal impacts. As financial support provided by the government has been described as an economic abandonment, limiting an individual's ability to pay rent, purchase food and meet utility bills (O'Keeffe et al., 2021; O'Sullivan et al., 2020). Indeed, the literature shows that in the early stages of the COVID-19 pandemic there were disparities between different population groups, with those from certain minority ethnic groups, low-income earners and those living in the lowest socioeconomic status areas most affected (Green et al., 2021a). The resultant social, economic, and psychological impacts of the restrictions imposed during COVID-19 have magnified existing health and social inequalities. The economic consequences of lockdowns to contain infectious diseases are well known. As a consequence of lockdown measures due to COVID-19, job losses in the United States (US) reached record levels in April 2020 with the unemployment rate increasing to 14.7% and with some evidence suggesting it rose as high as 20% (Martin et al., 2020). During the Severe Acute Respiratory Syndrome (SARS) outbreak in 2003, the majority of the cases occurred within South East Asia and Canada (Felix Castillo, 2021). Evidence in the literature highlights the significant economic impact that SARS had in these countries with businesses closed and tourism non-existent. As a result, people employed in tourism, retail and hospitality sectors were most affected financially, through bankruptcy and job losses (Felix Castillo, 2021). Literature has also shown the detrimental effects of infectious disease outbreaks on household incomes (United Nations Development Programme, 2014). During the Ebola outbreak, the economic effects were vast with income losses in Sierra Leone reaching 30% and 35% in Liberia (United Nations Development Programme, 2014).

Throughout the US, minority ethnic population groups have particularly experienced the negative economic impacts of the COVID-19 pandemic. Those who identify as Asian, Hispanic and Black American have been demonstrated to be at higher risk of job and income loss and are often employed in roles that do not lend themselves to work from home arrangements (Clark et al., 2020). In contrast, there is a scarcity of evidence of the economic impacts on ethnic groups within Australia. However, a study conducted in western Sydney identified that unemployed culturally and linguistically diverse populations were perceived to experience a significantly higher impact of the COVID-19 pandemic (Mude et al., 2021). Australia is an ethnically diverse nation, with the 2016 Australian census data revealing that while England was the most common birthplace following Australia (Australian Bureau of Statistics, 2017), there has been a steady increase in the proportion of migrants from China, India and the Middle East (Australian Bureau of Statis-

tics, 2017). Aboriginal and Torres Strait Islander people accounted for 2.8% of the Australian population in 2016 and have a much younger age profile than non-indigenous Australians, with a mean age of 23 years compared to 38 years for non-Indigenous Australians (Australian Institute of Health and Welfare, 2021a).

The impact of the COVID-19 pandemic on individuals is affected by their experience of the social determinants of health. Health inequalities stem from the underlying social determinants of health, which are defined as "*the circumstances in which people grow, live, work, and age, and the systems put in place to deal with illness. The conditions in which people live and die are, in turn, shaped by political, social, and economic forces*" (Solar & Irwin, 2010). This leads to what is often referred to as the social gradient, whereby those who are most disadvantaged are inclined to have the worst health (Marmot & Commission on Social Determinants of Health, 2007). Those higher on the social gradient have greater access to food, housing, higher incomes, more employment opportunities, and access to health care. These social determinants of health can serve as a protective factor against illness and chronic disease. In contrast, those lower on the social gradient have limited resources and hence at greater risk of poorer health outcomes (Lathrop, 2013). When considered in the context of COVID-19, these individuals are most vulnerable to the social and economic effects of the pandemic. Social determinants of health can also impact on individuals' wellbeing (physical, emotional, spiritual and psychological wellbeing), including their economic or financial wellbeing (La Placa et al., 2013). With the rise in focus on the social determinants of health and being a key strategy in prevention and treatment of disease, public health professionals including nurses, are ideally situated to promote equity through health promotion initiatives, educational programs and targeted interventions (J. Phillips, Richard, et al., 2020).

In Australia, the government responded to the potential economic impact of the pandemic by introducing financial support packages to secure employment, support business and mitigate loss of income (Chen & Langwasser, 2021). One such measure under this support package was to allow individuals to access up to $20,000 AUD from their superannuation (Australian Government Treasury, 2021a). In Australia, superannuation is a compulsory privately funded retirement income scheme, whereby employers are obliged to make a compulsory contribution to all employees' superannuation schemes (Worthington, 2005). Additionally, in response to the rapid closure of many businesses during the lockdown, the Australian government introduced a financial support package called "Job Keeper." Job Keeper was a payment to provide income support, paid to businesses and not for profit organizations of $1500 AUD per fortnight to cover the cost of employee wages. Designed to support business and preserve employment, Job Keeper was initially implemented from March 30 to September 27, 2020, with a second phase initiated from September 28, 2020 to March 28, 2021 with payment tapering over this period (Australian Government Treasury, 2021b). However, it is important to note that Job Keeper was not available across all economic sectors and through all employers.

While coordinating this population-wide economic response may be effective for some, the influence nationally may not be equitable. This may especially be the case for individuals who live in regional

and remote areas, those who reside in lower socioeconomic areas and certain ethnic groups. Additionally, as Australia has not previously experienced an infectious disease outbreak of this magnitude in the 21st century, it is timely to investigate the impact.

2 | METHODS

2.1 | Study design

This study is part of a larger mixed-methods study consisting of both a cross-sectional survey and qualitative interviews, therefore the results of this study are reported in several papers. This study uses the World Health Organisation's (WHO) CSDH as the theoretical foundation (Solar & Irwin, 2010). The structural determinants of health used in this study are income, employment, ethnicity, socio-economic status and remoteness. The intermediary determinants, or the downstream factors that shape health, used in this study are psychosocial circumstances including stressors and material circumstances such as financial means to buy food and pay for housing (Solar & Irwin, 2010). This paper is reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

2.2 | Study setting and participants

A cross-sectional national study using an online method via Survey-Monkey was conducted between August 2020 and October 2020. Adults aged 18 years and over, with the ability to read English and residing in any State or Territory within Australia were recruited into the study using social media. Two methods within social media were used: (1) the no-cost option, which included the first author joining existing community noticeboard groups within Facebook; and (2) the paid option, which included placing an advertisement on Facebook and Instagram. In both options, a study image with a link to the survey was placed. With the paid option, the study image and link were sent to target specific groups within Facebook and Instagram. A comprehensive description of the recruitment process has been published elsewhere (Green et al., 2021b). Sample size calculation was derived by using the Australian estimated population of 25,499,844, using a 95% confidence level and a 3% margin of error, the sample size required for this study was 1067 participants (Charan & Biswas, 2013).

2.3 | Data collection

Data were collected using SurveyMonkey, the first page of the survey included a participant information sheet, and participants were instructed to click the "yes" box if they agreed to participate in the survey and to indicate they had read the study information. Data were collected on participants' demographics (age, gender, ethnicity, postcodes), employment status both before and during the COVID-19 pandemic, income before and during the COVID-19 pandemic, access to superannuation, and financial inability to pay for services during

the COVID-19 pandemic. Postcodes were used to indicate socioeconomic status based on the Australian Bureau of Statistics (ABS) and the Socio-Economic Indexes for Areas (SEIFA) and remoteness configuration using the ABS Accessibility and Remoteness Index of Australia (ARIA+). SEIFA was developed by the Australian Bureau of Statistics and is a summary measure of the various social and economic circumstances of suburbs and postcodes within Australia and are measured using a set of variables including income, education, occupation, and access to material and social resources (Australian Bureau of Statistics, 2018). The survey took 10–20 min to complete, and participants were invited to enter a draw to win one of ten $50 shopping gift cards. Ethics approval to conduct the study was received from the Human Research and Ethics Committee at the University of Wollongong approval number 2020/306.

2.4 | Statistical analysis

Data were directly exported from SurveyMonkey into SPSS version 25 to perform statistical analysis. In the context of this analysis, the relevant social determinants of health were socioeconomic status using SEIFA, ethnicity, and remoteness. Economic wellbeing was measured by employment loss, income loss, access to superannuation and financial inability to pay for services. Descriptive statistics including frequencies and percentages were used to summarize the data. Cross-tabulations were used to compare economic wellbeing and social determinants of health. Binary logistic regression was conducted to examine the social determinants of health associated with economic wellbeing, that is employment loss, income loss, access to superannuation and financial ability to pay for services. Assumptions of logistic regression were verified including, the dependant variable being ordinal, independence of observations and lack of multicollinearity between the independent variables. Statistical significance was set at $p < .05$. Due to missing data accounting for only 5%, missing data were not imputed.

3 | RESULTS

In total, 1211 participants responded to the survey, with non-responders accounting for 5% of missing data. Most of the participants were female 938 (80.7%) and the age range of the participants was between 18 and 90 years. Ethnicity was reflective of the Australian population with 53% ($n = 608$), identifying as Caucasian (Australian, Canadian, American, New Zealander) (Table 1).

3.1 | Employment loss

Overall, 13.7% ($n = 150$) of all participants reported a loss of employment during the pandemic. Of these, the highest loss in major cities 55% ($n = 82$). Participants in the low socioeconomic status reported the highest employment loss during the COVID-19 pandemic with 26.7% ($n = 40$). Among ethnic groups, Caucasian and European participants

358

TABLE 1 Demographic table

Demographics	Frequency (%)
Age	
18-24	118 (9.7)
25-39	413 (34.1)
40-59	464 (38.3)
60-74	135 (11.1)
75+	7 (0.6)
Gender	
Woman	938 (80.7)
Man	194 (16.7)
Transgender/non-binary	30 (2.6)
Socioeconomic status	
Lowest (most disadvantaged)	157 (13.8)
Low	252 (22.1)
Middle	210 (18.4)
High	193 (16.9)
Highest (most advantaged)	328 (28.8)
Remoteness	
Major cities	709 (62.1)
Inner regional	256 (22.4)
Outer regional	112 (9.8)
Remote	20 (1.8)
Very remote	45 (3.9)
Ethnicity	
European	332 (28.9)
Caucasian	608 (53.0)
Aboriginal	34 (3.0)
Asian	98 (8.5)
Others	75 (6.5)

reported the highest employment loss of 57.3% (n = 86), and 26.7% (n = 13), respectively (Table 2).

3.2 | Income loss

Income loss among all participants during the pandemic was 24.1% (n = 260). Of these, income loss in major cities was 57.7% (n = 150), inner regional areas was 26.5% (n = 69), outer Within the socioeconomic status category, income loss was highest among those in the low socioeconomic status with 23.8% (n = 62). Among the ethnic groups, income loss 56.9% (n = 148) for Caucasians and 25.4% for Europeans (Table 2).

3.3 | Access to superannuation

Overall, 11.9% (n = 142) of all participants accessed their superannuation during the pandemic, of these the majority were from major cities

50% (n = 71). Within the socioeconomic status category, the highest access to superannuation during the pandemic came from participants in the low socioeconomic status 35.2% (n = 50). Among the ethnic groups, the superannuation was accessed the highest from Caucasian 54.2% (n = 77) and European 24.6% (n = 35) participants.

3.4 | Financial inability to pay for services

A total of 24.9% (n = 265) of all participants reported concerns over meeting their financial commitments during the pandemic. Financial inability to pay for services was highest in major cities (55.9%, n = 148). Within the socioeconomic status category, concerns about financial inability to pay for services during the pandemic was highest among those who lived in the low socioeconomic status (25.3%, n = 67). Among the ethnic groups, concern about financial inability to pay for services was highest among Caucasian participants (58.1%, n = 154) (Table 2).

3.5 | Association between the economic wellbeing and ethnicity, socioeconomic status, and remoteness

During the COVID-19 pandemic those who identified as Caucasian (OR = 0.49; 95% CI 0.27, 0.90), or other (OR = 0.40; 95% CI 0.19, 0.88) had significantly higher odds of not losing income. Those in the low socioeconomic status category (OR = 1.65; 95% CI 1.01, 2.68) and those in the high socioeconomic status category (OR = 1.63; 95% CI 1.06, 2.51) had significantly higher odds of experiencing an income loss during the COVID-19 pandemic. Access to superannuation during the COVID-19 pandemic was associated with a significantly higher odds of living in outer regional areas (OR = 3.6; 95% CI 0.81, 16.03). Living in outer regional areas, middle socioeconomic status category (OR = 3.55; 95% CI 1.87, 6.73), and a high socioeconomic status category (OR = 3.42; 95% CI 1.82, 6.42) were associated with a significantly higher odds of accessing superannuation during the COVID-19 pandemic. Financial inability to pay for services was associated with significantly higher odds of living in remote areas (OR = 2.26; 95% CI 0.88, 5.80) (Table 3).

4 | DISCUSSION

Despite the COVID-19 pandemic being initially labelled as the great equalizer, the social and economic impacts are unequally felt. The results of this study have demonstrated that employment loss was most likely to occur among those residing in regional and remote areas, among those within the middle socioeconomic status group and in individuals who ethnically identify as Caucasian or Asian. Moreover, income loss was highest in individuals who were from remote and inner regional areas, and from the low socioeconomic status category. Those who identified as Caucasian were most likely not to lose income during the pandemic. Furthermore, the results demonstrate that individuals who accessed their superannuation during the COVID-19 pandemic

TABLE 2 The relationship between economic wellbeing and remoteness, socio-economic status, and ethnicity

	Economic Wellbeing			
	Employment loss (n = 150) N (%)	Income loss (n = 260) N (%)	Access to super (n = 142) N (%)	Financial inability to pay for services (n = 265) N (%)
Remoteness				
Major cities	82 (55.0)	150 (57.7)	71 (50.0)	148 (55.9)
Inner regional	44 (29.0)	69 (26.5)	44 (31.0)	68 (25.6)
Outer regional	18 (12.0)	27 (10.4)	20 (14.0)	38 (14.3)
Remote	3 (2.0)	5 (1.9)	5 (3.5)	3 (1.1)
Very remote	3 (2.0)	9 (3.5)	2 (1.5)	8 (3.1)
Socio-economic status				
Lowest	19 (12.7)	43 (16.5)	21 (14.8)	35 (13.2)
Low	40 (26.7)	62 (23.8)	50 (35.2)	67 (25.3)
Middle	30 (20.0)	55 (21.2)	31 (21.8)	53 (20.0)
High	25 (16.6)	39 (15)	22 (15.5)	46 (17.4)
Highest	36 (24.0)	61 (23.5)	18 (12.7)	64 (24.1)
Ethnicity				
European	40 (26.7)	66 (25.4)	35 (24.6)	58 (21.9)
Caucasian	86 (57.3)	148 (56.9)	77 (54.2)	154 (58.1)
Aboriginal	3 (2.0)	6 (2.3)	5 (3.5)	12 (4.5)
Asian	13 (8.6)	15 (5.8)	13 (9.2)	23 (8.7)
Others	8 (5.4)	25 (9.6)	12 (8.5)	18 (6.8)

were most represented by those who lived in remote areas, resided in the low socioeconomic areas, and ethnically identified as Aboriginal or Torres Strait Islander. Finally, Australians who had concerns about the financial inability to pay for services during the COVID-19 pandemic were individuals who lived in outer regional and remote areas, were from low and middle socioeconomic areas and identified as Aboriginal and Torres Strait Islander.

Overall, employment loss during the pandemic in this study was 13.7% and is comparable to research conducted in the US with employment loss reported as 15% (Parker et al., 2020). Similarly, a study exploring employment loss in the European Union found this to be 17% (Aljazeera, 2021). The results of this study demonstrate that employment loss was more prevalent in outer regional and remote areas, with one suggested reason for this prevalence being that most individuals within these areas are employed in jobs that cannot be conducted from home. Additionally, individuals who reside in regional areas of Australia are also less likely to have completed high school (76%) compared to those in major cities (92.1%) (Australian Institute of Health and Welfare, 2021b), with this having a significant effect on obtaining secure employment. Overall, employment rates in regional Australia are worse than major cities, while the population in some regional areas continues to grow, particularly attracting immigrants as the proportion of the population born overseas is higher in regional Australia than in major cities (Daley et al., 2017). This reflects the Australian government refugee policy to focus resettlement of refugee populations

within regional and rural Australia (Wood et al., 2019), however reveals the lack of government policy to provide a safety net for migrants and refugees experiencing large scale negative events such as a pandemic. This aligns with the findings of this study that demonstrates employment loss associated with regional areas, and that migrant and refugee populations are therefore more vulnerable to economic challenges. This is an important insight for public health nurses' who care for individuals from regional and rural areas who will be central to identifying disparities and committed to the health of vulnerable populations. Precarious employment and population growth within regional Australia, especially among migrant and refugee populations, calls for policy change and action to address and generate long term employment options.

Despite the Australian government implementing the Job Keeper payment, overall income loss was found to be high with approximately a quarter of Australians in this study reporting an income loss during the pandemic. Similarly, a study in the US indicated that a third of individuals lost their income during the pandemic (Parker et al., 2020). Reported levels of income loss could be related to Job Keeper not matching an individual's pre-pandemic income levels (Kaine, 2020; Walkowiak, 2021), which would specifically be the case for individuals in high income areas or with higher paid employment. Moreover, Job Keeper was not provided to every sector or industry with some, such as higher education, excluded from this economic package (Lam & Kenworthy, 2021). The findings of this study indicate that there

TABLE 3 Association between economic wellbeing and ethnicity, remoteness and socioeconomic status

	Wald	Exp (B) (Odds Ratio)	95% CI	P value
Employment loss				
Ethnicity				
European (Ref)	1.53	-	-	.82
Caucasian	0.01	1.04	0.44, 2.50	.92
Aboriginal	0.15	1.18	0.51, 2.75	.70
Asian	0.30	0.67	0.16, 2.86	.59
Others	0.36	1.36	0.50, 3.67	.55
Remoteness				
Major cities (ref)	3.46	-	-	.49
Inner regional	0.61	1.63	0.48, 5.53	.43
Outer regional	1.62	2.26	0.81, 16.03	.20
Remote	2.47	2.36	0.64, 8.72	.12
Very remote	0.83	2.26	0.40, 13.03	.36
Socioeconomic status				
Lowest (Ref)	2.13	-	-	.71
Low	0.17	1.14	0.61, 2.14	.68
Middle	0.01	1.04	0.59, 1.83	.91
High	1.83	1.44	0.85, 2.46	.18
Highest	0.13	1.11	0.63, 1.95	.72
Income loss				
Ethnicity				
European (Ref)	8.79	-	-	.07
Caucasian	5.22	0.49	0.27, 0.90	.02*
Aboriginal	2.45	0.63	0.35, 1.12	.12
Asian	3.60	0.36	0.13, 1.03	.06
Others	5.29	0.40	0.19, 0.88	.02*
Remoteness				
Major cities (ref)	1.06	-	-	.90
Inner regional	0.06	1.10	0.50, 2.45	.81
Outer regional	0.368	1.30	0.56, 3.00	.54
Remote	0.01	1.06	0.43, 2.60	.91
Very remote	0.19	1.34	0.36, 5.00	.66
Socioeconomic status				
Lowest (Ref)	7.66	-	-	.11
Low	4.02	1.65	1.01, 2.68	.04*
Middle	0.30	1.14	0.71, 1.82	.58
High	4.99	1.63	1.06, 2.51	.03*
Highest	0.20	1.11	0.70, 1.77	.65

(Continues)

TABLE 3 (Continued)

	Wald	Exp (B) (Odds Ratio)	95% CI	P value
Access to Superannuation				
Ethnicity				
European (Ref)	2.31	-	-	.68
Caucasian	1.36	0.62	0.28, 1.38	.24
Aboriginal	0.98	0.68	0.32, 1.46	.32
Asian	0.29	0.72	0.21, 2.41	.60
Others	0.01	0.95	0.38, 2.41	.92
Remoteness				
Major cities (ref)	4.45	-	-	.35
Inner regional	1.77	2.70	0.63, 11.64	.18
Outer regional	2.84	3.61	0.81, 16.03	.03*
Remote	2.47	3.42	0.74, 15.82	.12
Very remote	3.13	5.06	0.84, 30.51	.08
Socioeconomic status				
Lowest (Ref)	18.82	-	-	.001*
Low	7.67	2.72	1.34, 5.53	.006*
Middle	15.06	3.55	1.87, 6.73	.000*
High	14.61	3.42	1.82, 6.42	.000*
Highest	5.19	2.20	1.12, 4.32	.023*
Financial inability to pay for services				
Ethnicity				
European (Ref)	8.95	-	-	.62
Caucasian	2.44	0.59	0.31, 1.14	.12
Aboriginal	0.10	0.90	0.49, 1.68	.75
Asian	0.60	1.45	0.56, 3.74	.44
Others	0.00	0.98	0.46, 2.10	.95
Remoteness				
Major cities (ref)	7.19	-	-	.13
Inner regional	0.27	1.26	0.53, 2.99	.61
Outer regional	0.77	1.50	0.61, 3.70	.38
Remote	2.85	2.26	0.88, 5.80	.04*
Very remote	0.07	0.81	0.18, 3.70	.79
Socioeconomic status				
Lowest (Ref)	2.91	-	-	.57
Low	0.02	0.97	0.58, 1.61	.90
Middle	0.12	1.08	0.69, 1.71	.73
High	2.20	1.39	0.90, 2.14	.14
Highest	0.45	1.17	0.74, 1.83	.50

*Indicates significant $P < 0.05$

361

is a significant association between income loss and residing in low or high socioeconomic areas, with people in low socioeconomic areas and those causally employed likely to be impacted more by income loss. Whereas for those who live in the high socioeconomic areas of Australia, income loss may be attributed to compulsory reductions in wages as occurred in the university sector or business owners who lost income due to lockdown and business closure. The aim of the Job Keeper payment was to provide a wage subsidy to assist businesses, with employers being paid to help retain their employees, however there were inherent flaws with this payment scheme (Cassells & Duncan, 2020). Firstly, a business had to demonstrate a turnover loss of 30% in comparison to 2019, this relied on the assumption that the business was in operation in 2019 (Australian Government Treasury, 2020). Additionally, the scheme did not apply to temporary migrant workers, including individuals from New Zealand. It also was paid to employers to pass onto their employees, with anecdotal evidence suggesting that some business employers profited from this payment (Walkowiak, 2021). Moreover, not all sectors could benefit from this scheme, such as the university sector despite staff having compulsory wages reduction (B. Phillips, Gray, et al., 2020). For many individuals who were self-employed, such as those in the music industry, a 30% turnover loss was difficult to demonstrate (Kaine, 2020). While the Job keeper scheme injected a mass of public funds, this payment ceased as of March 28, 2021 (Walkowiak, 2021), despite the pandemic and lockdown measures continuing. Job Keeper has only supported the economic wellbeing of Australians in the short term. However, there is an ongoing need to ensure social cash transfers are adequate and keep up with the rate of inflation as these are vital to ensuring Australians do not continue to live in poverty. Such an approach needs to be targeted and measured.

Superannuation is a compulsory payment made by an employer on behalf of the employee for their retirement and only accessible to the employee at retirement or in specific circumstances (Worthington, 2005). During the COVID-19 pandemic, the Australian government allowed Australians to temporarily access their superannuation savings if they were in financial distress (Australian Government Treasury, 2021a). The results of this study revealed that 11.9% of Australians accessed their superannuation during the pandemic. Accessing superannuation was associated with individuals living in outer regional areas and was more prevalent among those who identify as Aboriginal and Torres Strait Islander. It is important to note that while some Australians did access their superannuation, this is dependent upon having any superannuation available, and is therefore not available to everyone. Indeed, the Australian superannuation scheme is inadequate and inequitable, particularly for women (Feng et al., 2019). Periods of unemployment, low wages, and time out of the workforce due to illness or caring roles affect the capacity of Australians, especially women, to achieve sufficient superannuation funds (Broomhill et al., 2021). While the Australian government addressed the immediate needs of individuals during COVID-19, this was at the expense of financial security at a later stage in their lives. A well-structured policy and financial package are critical to the sustainability of a healthy society.

Along with employment and income loss, many Australians had concerns about meeting their financial commitments during the pandemic. The results of this study found that a quarter of Australians had concerns about the financial stability to pay for services during the pandemic, which is similar to a study in the US that reported 27% of individuals in the US frequently worried about paying their bills (Horowitz et al., 2021). Concerns about financial inability to pay for services were more prevalent among individuals who identify as Aboriginal and Torres Strait Islander and associated with those who live in remote areas. Recognizing and taking policy action to increase emergency funding for bill relief specifically for Aboriginal and Torres Strait Islander people and those who live in remote areas, is imperative to address health inequalities. In Australia, with a lifetime of disempowerment and segregation, the gap between Aboriginal and Torres Strait Islanders and non-Indigenous populations is well established, with a life expectancy of 20 years less than other Australians (Dodson, 2010).The forcible removal of Aboriginal and Torres Strait Islander children from their families, referred to as the Stolen Generation, continue to leave an impact of intergenerational trauma on Aboriginal and Torres Strait Islander families (Lord et al., 2021). Such trauma leads to disruptions in health and ability for economic participation (Lord et al., 2021). Regarding education, 38% fewer Aboriginal and Torres Strait Islanders complete schooling and the employment rate is 24% lower than non-Indigenous Australians (Dodson, 2010), thus making Aboriginal and Torres Strait Islander Australians potentially more vulnerable to the economic shocks of the COVID-19 pandemic. Additionally, Aboriginal and Torres Strait Islander people are in higher concentration within remote areas of Australia, comprising of 15% and 49% of remote and very remote populations respectively (Australian Institute of Family Studies, 2011). Therefore, the association with the financial inability to pay for services and remoteness and the Aboriginal and Torres Strait Islander population is mediating.

4.1 | Implications for public health and future research

With COVID-19 disturbing the economic framework of Australian society, it is now more necessary than ever that Australian emerges as a more healthy and equitable nation. Indeed, the findings of this study indicate that COVID-19 has presented an opportunity to join in solidarity and have a renewed approach to the implementation of the United Nations (UN) Sustainable Development Goals (SDGs). Addressing the social determinants of health in all policies will ensure social and health disparities do not continue to widen. Public health professionals, including nurses, need to focus on the social determinants of health, becoming involved in health promotion strategies, lobbying governments, educating policy makers and promoting health and social equity through interdisciplinary collaboration and community partnerships. A commitment to addressing the economic wellbeing of Australians and disparities starts with increasing income support payments, employment securities with a less causal workforce, recognition of Aboriginal and Torres Strait Islanders and their leadership,

partnering with communities and investment in social infrastructure. Further large-scale research is required to understand the long-term implications of the COVID-19 pandemic on economic wellbeing and the social determinants of health.

4.2 | Limitations

While this study employed robust methods, it is important to acknowledge some limitations. A potential limitation and cause of recruitment bias may be the method used to recruit participants into this survey, as not all Australians have access to the internet or social media accounts, including the elderly and those financial insecure who went without the internet during the pandemic. However, according to the Australian and Communications Authority 91% of Australians have access to the internet (Australian Communications and Media Authority, 2020), demonstrating a high rate of accessibility. Recruitment via social media is also in keeping with a method that is most suitable for the lockdown periods in Australia during the pandemic and keeping within the budget constraints of the study. Additionally, online self-administered surveys are known to produce responder bias. This study also displays a gender bias with more participants identifying as female responding to the survey, this can also be said of ethnicity, with more participants who were Caucasian responding. Moreover, participants who felt impacted by the pandemic or perceived it as a threat may have been more inclined to respond.

CONCLUSION

This study has demonstrated that the economic wellbeing of people who live in regional or remote areas, in low socioeconomic areas and who are Aboriginal and Torres Strait Islander people have been impacted during the pandemic. Along with high rates of employment and income loss, having accessed superannuation and financial instability during the pandemic will have long lasted effects on these populations groups and potentially widen social and health inequalities. Such disparities between population groups, call for policies to address the underlying social determinants of health, which can be achieved through renewed action of the UNs Sustainable Development Goals.

CONFLICT OF INTEREST
None.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ORCID

Heidi Green BN, MPH, PhD Candidate ⬤ https://orcid.org/0000-0002-7908-3819

REFERENCES

Aljazeera. (2021). COVID-19 has already wiped out 6 million jobs, EU study finds. Retrieved from https://www.aljazeera.com/news/2021/3/11/covid-19-has-already-wiped-out-6-million-jobs-eu-study-finds

Australian Bureau of Statistics. (2017). Cultural diversity in Australia. Retrieved from https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2071.0~2016~Main%20Features~Cultural%20Diversity%20Data%20Summary~30

Australian Bureau of Statistics. (2018). Census of population and housing: Socio-economic indexes for areas (SEIFA), Australia, 2016. Retrieved from https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2033.0.55.001~2016~Main%20Features~IRSAD~20

Australian Communications and Media Authority. (2020). Communications report 2018–19. Retrieved from https://www.acma.gov.au/publications/2020-02/report/communications-report-2018-19

Australian Government Treasury. (2020). The JobKeeper payment: Three-month review. Retrieved from https://treasury.gov.au/sites/default/files/2020-07/jobkeeper-review-2020.pdf

Australian Government Treasury. (2021a). Early access to superannuation. Retrieved from https://treasury.gov.au/sites/default/files/2020-10/Fact_sheet-Early_Access_to_Super.pdf

Australian Government Treasury. (2021b). JobKeeper payment. Retrieved from https://treasury.gov.au/coronavirus/jobkeeper

Australian Institute of Family Studies. (2011). Families in regional, rural and remote Australia. Retrieved from https://apo.org.au/sites/default/files/resource-files/2011-01/apo-nid152646.pdf

Australian Institute of Health and Welfare. (2021a). Indigenous Australians. Retrieved from https://www.aihw.gov.au/reports-data/population-groups/indigenous-australians/about

Australian Institute of Health and Welfare. (2021b). Secondary education: School retention and completion. Retrieved from https://www.aihw.gov.au/reports/australias-welfare/secondary-education-school-retention-completion

Broomhill, R., Costa, M., Austen, S., & Sharp, R. (2021). What went wrong with super? Australian Political Economy, 9, 71–94.

Cassells, R., & Duncan, A. (2020). Job keepers and job seekers: How many workers will lose and how many will gain. Bankwest Curtin Economics Centre COVID-19 Research Brief, 3, 1–6.

Charan, J., & Biswas, T. (2013). How to calculate sample size for different study designs in medical research? Indian Journal of Psychological Medicine, 35(2), 121–126.

Chen, J., & Langwasser, K. (2021). COVID-19 stimulus payments and the reserve bank's transactional banking services.

Clark, E., Fredricks, K., Woc-Colburn, L., Bottazzi, M. E., & Weatherhead, J. (2020). Disproportionate impact of the COVID-19 pandemic on immigrant communities in the United States. PLoS Neglected Tropical Diseases, 14(7), e0008484.

Corpuz, J. C. G. (2021). Adapting to the culture of 'new normal': An emerging response to COVID-19. Journal of Public Health, 43(2), e344–e345.

Daley, J., Wood, D., & Chivers, C. (2017). Regional patterns of Australia's economy and population. Grattan Institute.

Dodson, M. (2010). Challenges and opportunities in Australian Indigenous education. In Closing the gap in education: Improving outcomes in southern world societies. Monash University Publishing.

Felix Castillo, C. (2021). A comparison of the economic impact between SARS 2003 and SARS 2019. In Europe and China. Bachelor of Economics (honors)).

Feng, J., Gerrans, P., Moulang, C., Whiteside, N., & Strydom, M. (2019). Why women have lower retirement savings: The Australian case. Feminist Economics, 25(1), 145–173.

Green, H., Fernandez, R., & MacPhail, C. (2021a). The social determinants of health and health outcomes among adults during the COVID-19 pandemic: A systematic review. *Public Health Nursing*, *38*, 942–952.

Green, H., Fernandez, R., & MacPhail, C. (2021b). Social media as a platform for recruitment to a national survey during the COVID-19 pandemic: Feasibility and cost analysis. *JMIR Formative Research*, *5*(7), e28656.

Horowitz, J. M., Brown, A., & Minkin, R. (2021). *A year into the pandemic, long-term financial impact weighs heavily on many Americans*. Retrieved from https://www.pewresearch.org/social-trends/2021/03/05/a-year-into-the-pandemic-long-term-financial-impact-weighs-heavily-on-many-americans/

Kaine, S. (2020). Australian industrial relations and COVID-19. *Journal of Australian Political Economy*, *85*, 130–137.

La Placa, V., McNaught, A., & Knight, A. (2013). Discourse on wellbeing in research and practice. *International Journal of Wellbeing*, *3*(1), 116–125.

Lam, D., & Kenworthy, L. (2021). JobKeeper payment for January 2021 and beyond: What you need to know. *Governance Directions*, *73*(1), 30–32.

Lathrop, B. (2013). Nursing leadership in addressing the social determinants of health. *Policy, Politics, & Nursing Practice*, *14*(1), 41–47.

Leung, K., Wu, J. T., & Leung, G. M. (2021). Effects of adjusting public health, travel, and social measures during the roll-out of COVID-19 vaccination: A modelling study. *The Lancet Public Health*, *6*(9), e674–e682.

Lord, H., MacPhail, C., Cherry, J., & Fernandez, R. (2021). Perceptions of Aboriginal and Torres Strait Islander Australians toward cardiovascular primary prevention programs: A qualitative systematic review. *Public Health Nursing*, *38*(2), 197–211.

Marmot, M., & Commission on Social Determinants of Health. (2007). Achieving health equity: From root causes to fair outcomes. *The Lancet*, *370*(9593), 1153–1163.

Martin, A., Markhvida, M., Hallegatte, S., & Walsh, B. (2020). Socio-economic impacts of COVID-19 on household consumption and poverty. *Economics of Disasters and Climate Change*, *4*(3), 453–479.

Mude, W., Meru, C., Njue, C., & Fanany, R. (2021). A cross-sectional study of COVID-19 impacts in culturally and linguistically diverse communities in greater Western Sydney, Australia. *BMC Public Health*, *21*(1), 1–11.

O'Keeffe, P., Johnson, B., & Daley, K. (2021). Continuing the precedent: Financially disadvantaging young people in "unprecedented" COVID-19 times. *Australian Journal of Social Issues*, *57*(1), 70–87.

O'Sullivan, D., Rahamathulla, M., & Pawar, M. (2020). The impact and implications of COVID-19: An Australian perspective. *The International Journal of Community and Social Development*, *2*(2), 134–151.

Parker, K., Minkin, R., & Bennett, J. (2020). *Economic fallout from COVID-19 continues to hit lower-income Americans the hardest*. Retrieved from https://www.pewresearch.org/social-trends/2020/09/24/economic-fallout-from-covid-19-continues-to-hit-lower-income-americans-the-hardest/

Phillips, B., Gray, M., & Biddle, N. (2020). *COVID-19 JobKeeper and JobSeeker impacts on poverty and housing stress under current and alternative economic and policy scenarios*. Retrieved from Canberra:.

Phillips, J., Richard, A., Mayer, K. M., Shilkaitis, M., Fogg, L. F., & Vondracek, H. (2020). Integrating the social determinants of health into nursing practice: Nurses' perspectives. *Journal of Nursing Scholarship*, *52*(5), 497–505.

Singh, K., Kondal, D., Mohan, S., Jaganathan, S., Deepa, M., Venkateshmurthy, N. S., Jarhyan, P., Anjana, R. M., Narayan, K. M. V., Mohan, V., Tandon, N., Ali, M. K., Prabhakaran, D., & Eggleston, K. (2021). Health, psychosocial, and economic impacts of the COVID-19 pandemic on people with chronic conditions in India: A mixed methods study. *BMC Public Health*, *21*(1), 1–15.

Solar, O., & Irwin, A. (2010). *A conceptual framework for action on the social determinants of health*.

Tran, B. X., Nguyen, H. T., Le, H. T., Latkin, C. A., Pham, H. Q., Vu, L. G., Le, X. T. T., Nguyen, T. T., Pham, Q. T., Ta, N. T. K., Nguyen, Q. T., Ho, C. S. H., & Ho, R. C. M. (2020). Impact of COVID-19 on economic well-being and quality of life of the Vietnamese during the National social distancing. *Frontiers in Psychology*, *11*, 565153.

United Nations Development Programme. (2014). *Socio-economic impact of the Ebola Virus Disease in Guinea, Liberia and Sierra Leone*. Retrieved from https://www.undp.org/content/dam/rba/docs/Reports/UNDP%20Policy%20note%20EN_web.pdf

Van Nguyen, H., Lan Nguyen, H., Thi Minh Dao, A., Van Nguyen, T., The Nguyen, P., Mai Le, P., Duy Vu, K., Thi Ngoc Tran, A., Kim Dao, P., Thi Nguyen, C., & Debattista, J. (2021). The COVID-19 pandemic in Australia: Public health responses, opportunities and challenges. *The International Journal of Health Planning and Management*, *37*(1), 5–13.

Walkowiak, E. (2021). JobKeeper: The Australian short-time work program. *Australian Journal of Public Administration*, *80*(4), 1046–1053.

Wood, N., Charlwood, G., Zecchin, C., Hansen, V., Douglas, M., & Pit, S. W. (2019). Qualitative exploration of the impact of employment and volunteering upon the health and wellbeing of African refugees settled in regional Australia: A refugee perspective. *BMC Public Health*, *19*(1), 1–15.

Worthington, A. C. (2005). *Coverage, knowledge and perceptions of superannuation in Australia*.

no-reply@copyright.com

RESPONSE REQUIRED for Your Request to John Wiley & Sons - Books

To ■ Heidi Green (South Eastern Sydney LHD)

Copyright Clearance Center

Dear Heidi Green,

John Wiley & Sons - Books has approved your recent request. Before you can use this content, you must accept the license fee and terms set by the publisher.

Use this link to accept (or decline) the publisher's fee and terms for this order.

Request Summary:
Submit date: 03-Oct-2022
Request ID: 600096700
Publication: Public health nursing
Title: Association between economic wellbeing and ethnicity, socioeconomic status, and remoteness during the COVID-19 pandemic
Type of Use: Republish in a thesis/dissertation

Please do not reply to this message.

To speak with a Customer Service Representative, call +1-855-239-3415 toll free or +1-978-646-2600 (24 hours a day), or email your questions and comments to support@copyright.com.

Sincerely,

Copyright Clearance Center