Indigenous Mental Health During the COVID-19 Pandemic: A Scoping Review of the Literature and Gendered Analysis of Métis Experiences

by

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Abstract

The COVID-19 pandemic impacted the mental health of the global population. Indigenous Peoples have been disproportionately affected by previous pandemics and already face an increased vulnerability to poor mental health outcomes due to the damaging and enduring effects of colonialism. However, the mental health impact of the COVID-19 pandemic on Indigenous groups is not well known. This thesis aimed to improve the understanding of mental health outcomes among Indigenous Peoples during the pandemic by synthesizing the available literature on this topic and evaluating mental health outcomes among Métis People living in Alberta during the pandemic. A scoping review was conducted to assess the scope and characteristics of the existing literature regarding the mental health outcomes of Indigenous Peoples in Australia, Canada, New Zealand, and the USA during the COVID-19 pandemic and identify research gaps. The review revealed that the mental health of Indigenous Peoples was adversely affected by the pandemic, with higher rates of poor self-rated mental health, depression, anxiety, psychological distress, alcohol/drug misuse, and suicidality. Additionally, the review highlighted studies examining sex/gender differences in mental health outcomes among Indigenous Peoples in Australia, Canada, and the USA. The limited literature focusing on specific Indigenous groups and gender-diverse differences underscored an important gap in research. To bridge this gap, a secondary analysis of a three-waves survey, (Misi Yehewin) conducted among Métis People in Alberta during the COVID-19 pandemic served as the basis of the third chapter of this thesis. The primary objective of the secondary survey analysis was to evaluate the prevalence rates of depression, anxiety and stress symptoms among Métis People living in Alberta during the COVID-19 pandemic. A secondary objective was to identify factors mediating the relationship between gender and mental health among Métis People during the

COVID-19 pandemic. The study included Métis adults, aged 16 and older, citizens of the Métis Nation of Alberta, who completed at least one of the three surveys. The findings revealed that the prevalence rates of depression, stress and anxiety symptoms was higher in Métis women (43%, 36% and 71% respectively) than in Métis men (38%, 26%, and 60% respectively). Women with depression, anxiety, and stress symptoms in the study sample were more likely to be within the lowest income tertile, have a college or university degree, live in a urban settings and were less likely to be in a relationship or married compared to men with the same symptoms. After adjusting for confounders, various social factors significantly mediated the relationship between gender and mental health outcomes. Specifically, income, educational attainment, relationship status, alcohol/drug misuse, experiences of discrimination, and chronic health conditions mediated the relationship between depression, anxiety, and stress to varying degrees. Results from this thesis can be used to identify pandemic-related mental health challenges faced by Indigenous Peoples in countries with similar colonial histories and inform the design of tailored interventions targeted at the unique challenges encountered by Métis women during the COVID-19 pandemic.

Preface

This thesis is an original work by Maryam Adesunkanmi. Part of this thesis received research ethics approval from the University of Alberta Research Ethics Board (REB) 2, Project Name "Métis women's mental health in Alberta during the COVID-19 pandemic", No. Pro00125894, approved 24 Nov 2022. S, Lau, and H. Al-Shamali assisted with article screening, and data collection and verification for the scoping review in Chapter 2. I was responsible for the concept formation, data collection and synthesis of results. The data for the secondary analysis in Chapter 3 was originally collected for a larger research project titled "Misi Yehewin (Big Breath): Understanding Physical and Mental Health and Well-being of Métis in Alberta during the Novel Coronavirus (COVID-19) Pandemic" led by Dr. M.B. Ospina in partnership with the Métis Nation of Alberta (MNA). I was responsible for the data analysis. All other components of this thesis including the literature review in Chapter 1 and the concluding analysis in Chapter 4 are my original work.

No part of this thesis has been previously published.

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Chapter 1: Introduction

1.1 Literature Review

1.1.1 COVID-19 Pandemic

The rapid spread of the novel coronavirus (COVID-19) led the World Health Organization (WHO) to declare the outbreak a global pandemic in 2020.[1] Caused by the highly contagious Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) virus, the disease is characterized by fever, cough, and shortness of breath among other symptoms.[2] In more serious cases, infections may cause respiratory illnesses including pneumonia and ultimately, death.[3] Severe COVID-19 illness and mortality are more common in those with pre-existing conditions including cardiovascular and respiratory diseases.[4,5] Countries around the world advised the public to take safety precautions to minimize the spread of the disease by partaking in recommended public health measures including wearing of face masks, handwashing, physical distancing, and getting vaccinated against the virus after vaccines became available at the end of 2020.[6]

Beyond the spread of the disease with its accompanying illnesses and fatalities, multi-level adverse effects were observed in individuals, national economies, and established financial, healthcare, and educational systems.[4,7-11] Job losses and increased occupational uncertainty led to higher levels of food insecurity, especially among low-income households.[12] Healthcare systems grappled with smaller workforces while burdened with a higher than usual patient population.[9,13] Lockdowns and the fear of the virus led to deterioration in mental health across different communities with increased reports of feelings of isolation, anxiety, and depression across multiple groups.[4,14] Mandatory quarantine and isolation requirements confined adults and children indoors, inhibiting typical human interactions, impeding societal bonding, and leading

to lower quality education and loss of important playtime for children in critical developmental phases of their lives.[10]

The concept of a syndemic was introduced to describe the combination of two or more concurrent epidemics or disease clusters working together to exacerbate the burden of disease in a population.[15] In a syndemic, biological and social interactions between conditons and states work synergistically to additively increase the risk of adverse health outcomes in people.[15] While the COVID-19 virus and disease has had wide-reaching effects, the burden of the resulting pandemic has not been evenly distributed across populations.[14] Certain historically disadvantaged groups face barriers such as poverty, high unemployment, violence, and discrimination that lead to increased diagnoses of chronic conditions and mental illnesses compared to the general population. The pandemic has exacerbated existing inequities in many of these groups, increasing their risk of ill health.[14] The implication is that for populations that already face disparate barriers to good health (poor socioeconomic status, education or housing), the risk for more severe health outcomes is exacerbated during the COVID-19 pandemic. Therefore, health consequences related to the COVID-19 pandemic must be critically understood in the context of groups that are at high risk for its worst effects such as Indigenous populations.

1.1.2 Indigenous Peoples and Experiences with Previous Pandemics

Indigenous Peoples are distinct social and cultural groups with shared collective ancestral ties to the lands and natural resources where they live, occupy, or from which they have been displaced.[16] There are approximately 476 million Indigenous Peoples living in over 90 countries globally, accounting for about 6.2% of the world population.[17]

Australia, New Zealand, United States of America (USA), and Canada have similar colonial histories with their respective Indigenous populations.[18] Each of these countries have Indigenous groups; Aboriginal and Torres Straight Islanders in Australia, Māori in New Zealand, and Alaskan Natives, Native Americans, and American Indians in USA.[18] Indigenous Peoples of Canada are the original inhabitants of the land known today as Canada. The Canadian Constitution recognizes three groups of Indigenous Peoples: First Nations, Inuit, and Métis. According to the 2021 Canadian census, there are over 1.8 million Indigenous Peoples in Canada who identify as Indigenous.[19] According to the same census, First Nations account for over half (58.0%) of the Indigenous population while 34.5% are Métis People, and 3.9% are Inuit people.[19]

During the colonial period, Indigenous Peoples experienced invasion of their ancestral territories by European settlers whose primary goal was to poach valuable resources to Europe using objectionable tactics.[20] Despite their unique cultures, histories and customs, Indigenous Peoples have been marginalized by the dominant Euro-based societies in which they live and typically experience poorer health outcomes.[21-23]

Saddled with the lasting effects of colonialism, Indigenous Peoples encounter barriers in education, housing, socioeconomic opportunities which inhibits access to adequate health and social services and predisposes them to a higher risk of infections and diseases and poorer mental health outcomes.[21,24,25] They are at a higher risk for chronic conditions such as cardiovascular diseases, diabetes and cancer and these underlying medical conditions increase their susceptibility to the most severe outcomes of COVID-19.[5,26-28] Research has also shown that Indigenous Peoples have a higher proportion of mental illnesses including depression and anxiety when compared to the general population or other ethnicities.[22,23,29-31] They are also more likely to have suicidal thoughts and to die of suicide.[32,33]

Due to unique social and cultural determinants of health largely fueled by colonialism, Indigenous Peoples have been disproportionately affected by previous pandemics. During the 1918 Spanish influenza pandemic, Māori people of New Zealand had fatality rates seven times higher than the European population[34] and First Nations people in British Columbia, Canada had eight times the death rate compared to non-indigenous individuals when infected.[35]

In 2009, an outbreak of a new strain of influenza –H1N1– reached pandemic levels and disproportionately affected Indigenous Peoples. Aboriginal people in central Australia had a rate of infection five times higher than the non-Indigenous population.[36] Mortality rates due to the virus were four times higher among American Indian and Alaskan Natives in USA than in other ethnic groups combined.[37] In Canada, First Nations Peoples were eight times more likely to be hospitalized for pH1N1 2009, and six and a half times higher rates of intensive care unit (ICU) admissions compared to non-First Nations Canadians.[38]

Given their susceptibility to chronic diseases and their history with previous pandemics, it can be theorized that Indigenous Peoples would be highly vulnerable to the adverse effects of the COVID-19 pandemic.

1.1.3 Indigenous Peoples during the COVID-19 Pandemic

While vaccinations have helped reduce the number of COVID-19 infections, understanding the current spread of the disease provides essential context for Indigenous populations in countries with similar colonial histories.

Australia reported encouraging outcomes for its Indigenous population. Early in the pandemic, the COVID-19 infection rates among Aboriginal and Torres Strait Islander Peoples was lower than the rest of the general population at 1%, and fatality rates remained relatively low

throughout the pandemic.[39] Other countries reported worse rates of infections and fatalities for Indigenous populations than other ethnic groups during the COVID-19 pandemic. Literature indicates that COVID-19 infection and mortality rates for Native Americans and Alaska Natives in the USA were higher than those in the white population and other ethnic groups (Black, Latino) at different timepoints during the pandemic.[40-42] While one study showed that the rate of hospitalizations was lower in Māori than New Zealand European populations,[43] another study conducted in September 2020 showed that Māori in New Zealand were 2.5 times more likely to be hospitalized and 50% more likely to die than non-Māori after adjusting for age and comorbidities.[44] It is worthy to note, however, that New Zealand had exceptionally low COVID-19 infection and death rates and higher rates of vaccination uptake compared to other countries.[45]

As of 01 December 2022, the rate of infections in First Nations People living on reserves in Canada decreased after peaking in January of 2022.[46] (In Canada, "Reserves" are tracts of Crown land set aside for use by particular First Nations communities[47]). Additionally, over 91% of individuals aged 12 or older in First Nations and Inuit communities in Canadian provinces and territories have received a second dose of the COVID-19 vaccine.[48] In spite of these reports, the lack of consistent Indigenous surveillance data in Canada's core datasets complicates the process of characterizing national COVID-19 rates and responses within First Nations, Inuit, and Métis populations.[49] While national data is not reported on the total number of COVID-19 cases or vaccinations among Indigenous Peoples, a cross-sectional web and phone-based study conducted in 2020 showed that Indigenous Peoples had significantly higher rates of symptoms (49.3% vs 42.9%) than those not reporting this background/identity.[50]

The effects of the COVID-19 pandemic went beyond physical manifestations. Mental health remained a significant part of the COVID-19 pandemic with levels of stress increasing as

restrictions and shutdowns remained in place far longer than originally anticipated and individuals dealt with anxiety, grief, stigma, loneliness, and isolation. In addition to COVID-19 related infection rates and physical symptoms, research studies have examined how the pandemic affected the mental health of Indigenous Peoples.

1.1.4 Mental Health of Indigenous Peoples during the COVID-19 pandemic

Many Indigenous groups subscribe to a relational worldview in which individuals are seen as interconnected with and responsible for their families, communities and larger ecosystems including the living and non-living elements of the land in which they live. Indigenous Peoples practice diverse and complex kinship systems within a land-based framework that values sharing and reciprocity.[51] Traditional First Nations, Inuit, and Métis social organizations practiced mutual cooperation with individuals depending on neighbors and the people around them for their needs.[51,52] Kinship systems ensure community connectedness, family preservation, and the transmission of cultures to future generations.[53] While some kinship terms have been replaced with English terms, the extended family network remains important to Indigenous Peoples today.[51] The COVID-19 pandemic and its accompanying physical distancing and lockdowns created a challenge to this way of life, leading to the decline of interpersonal relationships between individuals and their families and wider communities and amplifying previous health inequities.[54]

Most of the research published on mental health in Indigenous Peoples during the COVID-19 pandemic reinforce the expectation that Indigenous populations would be more susceptible to its adverse mental health effects. Studies found increased social disconnectedness and a higher number of mental-health related emergency visits for American Indian/Alaskan

Native youth living in USA than almost all other ethnic groups.[55,56] Similarly, in Australia, levels of anxiety and mental distress were higher in First Nations when compared to non-First Nation participants in a cross-sectional survey.[57] On the other hand, in New Zealand, one study reported lower incidence of loneliness in Māori compared to the European population although the sample sizes of Māori and Pacific Peoples in the study were much smaller than New Zealand Europeans.[43] In Canada, a few studies have shown increased anxiety, depression and stress levels were highest among Indigenous Peoples living in Alberta during the COVID-19 pandemic.[58,59]

While the effect of the pandemic were widespread, the psychological outcomes arising due to the pandemic have the potential to manifest uniquely for different demographics of Indigenous Peoples including among people of opposite sexes or gender identities.

1.1.5 Sex and Gender

Sex is defined as the biological and physiological characteristics of males and females whereas gender is the socially and culturally constructed concept that encapsulates ideas of what it is to be male, female, or gender diverse in an environment.[60] Gender identity is an individual's intrinsic experience of gender which may or may not be consistent with their physiology and assigned sex at birth. While both concepts are distinct, the effects of sex and gender are usually entwined with each other. Sex is a biological determinant of health that interacts with gender and other social determinants to influence health outcomes.

Gender norms, roles, and relations shape people's health and affect their access to healthcare. Compared to men and boys, women and girls generally face bigger hurdles in accessing health information and services and are at a higher risk for gender-related violence.[60,61] The inequalities experienced by women and girls are influenced by societal constraints including

inadequate access to decision-making power, limited resources, and discriminatory postures exhibited by healthcare providers and other members of the society in which they live.

1.1.6 The Concepts of Sex and Gender in Indigenous Communities

To examine sex/gender differences in health outcomes among Indigenous Peoples, it is crucial to understand how sex and gender are perceived within Indigenous communities.

Gender is a complex construct that has been approached in unique ways by different Indigenous groups. Gender multiplicity and fluidity existed in many traditional Indigenous communities.[62,63] Though gender-based divisions of labor were present in Indigenous communities, these roles were often flexible, allowing for individuals to take on varying responsibilities as needed.[53,62]

Today, Indigenous Peoples have diverse gender identities which influence how they perceive and navigate the world.[64] Despite the socio-cultural diversity among Indigenous societies with respect to sex and gender identities and roles, Indigenous women historically and contemporarily play important political, spiritual, and familial roles within their communities.[65] Indigenous women are often regarded as the guardians of traditions and cultures, entrusted with transmitting unique customs and beliefs to subsequent generations.[66] To fully grasp the effect of the COVID-19 pandemic on the health of Indigenous Peoples, it is vital to consider it in the context of sex and/or gender. These concepts play a significant role in how Indigenous Peoples navigate their contemporaneous lives.[66]

1.1.7 Gendered Differences in Indigenous Peoples during the COVID-19 Pandemic

Several studies have highlighted sex differences in COVID-19 infection and pandemic related disruptions among Indigenous Peoples. Research shows that while men and women were

diagnosed with COVID-19 at comparable rates, men faced a higher risk of severe illness and death from the disease compared to women.[67,68] However, in multiple studies, women were observed to experience worse social disruptions due to the COVID-19 pandemic, including loss of income and education, food insecurities, and diminished personal safety.[69-73] Researchers have also observed COVID-19 related stress and increased anxiety levels in Indigenous women living in Canada.[74] Besides deteriorating mental health outcomes, access to mental health services and resources became limited during the pandemic. As many mental health services transitioned to remote platforms, physicians and therapists began conducting online sessions with patients. However, Indigenous women have expressed discomfort with this mode of communication.[74]

Sex and gender differences in health outcomes of Indigenous Peoples highlight the importance of examining specific subsets of Indigenous populations with unique needs. In Canada, of the 1,348,040 Indigenous Peoples aged 15 and older, 51.6% identify as cis-gender women.[19] Coupled with the lingering impacts of intergenerational trauma and ongoing discrimination, the unique circumstances of Indigenous women in Canada collectively influence their health outcomes.[75]

1.1.8 Canadian Indigenous Women

To understand the contemporary situation of Indigenous women in Canada, it is essential to highlight the devastating history of colonization, a legacy that still echoes in today's society. Prior to colonization, Indigenous women were regarded highly within their communities. They played a central role in managing kinship ties and societal economies, nurturing children, and producing crucial food, clothing, and hunting items. Often, Indigenous women held leadership positions and played decision-making roles within political structures.[51,65,66] "Settler"

colonization profoundly altered Indigenous matrilineal traditions and actively contributed to the normalization of violence against Indigenous women. This was facilitated by the derogatory discourse surrounding the term 'squaw' –a term both sexually and racially offensive, implying that Indigenous women were sexually available and could be violated with impunity. This degrading label not only attached Indigenous women but also their families, communities, and heritage. It paved the way for violent practices against Indigenous women while gaining control over their lands.[65] In addition, policies such as the Indian Act denied Indigenous women of many rights. For instance, if they married non-status men, they lost their own status. They were denied their right to own land and marital property, and were excluded from decision-making roles.[65]

The legacy of colonization continues impacting Indigenous women living in Canada today. Indigenous women experience physical and sexual assaults disproportionate to the general population. Compared to 25% of non-Indigenous women who have experienced intimate partner violence (IPV) in their lifetimes, 44% of Indigenous women in Canada have experienced physical or sexual violence from an intimate partner.[76] As a result, they are more prone to the mental health effects that abuse can produce including depression, anxiety, substance abuse, and suicidality.[75,77-79]

To date, a significant portion of research concerning Indigenous women in Canada has either exclusively focused on First Nations populations or adopted a pan-Indigenous approach, amalgamating data from First Nations, Métis, and Inuit groups. Such an approach constrains a comprehensive understanding of the unique cultures, distinct colonial experiences and the individual lived realities of each Indigenous group.

1.1.9 Métis People of Canada

Métis People are Indigenous Peoples of Canada who are recognized as distinct from First Nations and Inuit in the Constitution Act of 1982.[80] According to the 2021 Canadian census, there are 624,220 self-identified Métis People living in Canada and 298,115 of them are single-identity Métis women and girls.[19] Métis are people of mixed European and First Nations ancestry that set along fur trading routes across the prairies and the Red River. The Métis National Council, a national body representing Métis Nations in Alberta, British Columbia, Saskatchewan, and Ontario, defines Métis as "a person who self-identifies as Métis, is distinct from other Aboriginal Peoples, is of historic Métis Nation Ancestry and who is accepted by the Métis Nation".[81]

Owing to their complicated history with the Canadian government, the Métis People have experienced particularly harmful effects of identity and culture erasures.[81,82] Métis People are exceptionally underrepresented in health research and are often in disadvantaged positions in the enactment of government policies and provision of services specific to their unique needs and experiences.[83,84] Worse yet, Métis People face barriers to accessing healthcare services and are excluded from some Indigenous health benefits such as the Non-Insured Health Benefits (NIHB) reserved for First Nations and Inuit Peoples of Canada and have expressed concerns over accessing conventional healthcare services.[82] Alberta is home to the second largest Métis population in the country, with more than 127,000 Métis People living in the province, 65,690 of whom are women.[19] Alberta is also the only province in Canada with a legislated Métis land base in its provincial statute.[85] The Métis Nation of Alberta (MNA) is the governance body for Métis People in Alberta and works to promote and facilitate the advancement of Métis People through self-reliance, self-determination, and self-management.

1.1.10 Métis Women in Canada

In Métis history, First Nations women were innovators of what is known today as Métis culture, mentoring the fusion of First Nations and European dance, music, clothing, and languages.[53] While both Métis men and women utilized flexible roles and abilities to support and sustain the economies of their communities, many Métis women were prominent in creating an equilibrium between the two worlds they lived in, mentored by older, more experienced women in learning of land-based skills.[86]

Today, burdened by the cumulative and enduring effects of colonial legacies, Métis women in Canada experience worse health outcomes across multiple domains than the general population. With colonialism as the key influence, Métis women are subject to social determinants of health (education, housing, income, disability) that lead to health inequities, and subsequently to a higher risk of infections, chronic diseases, and worse physical and mental health outcomes.[28,79,82]

A *Statistics Canada* study showed that 65% of Métis women have experienced violent victimization in their lifetime.[76] Another study reported a high rate of suicidal ideation in Métis women when compared to Métis men.[33] The intergenerational effects of colonialism, social determinants of health, and healthcare policies that exclude Métis women exacerbate their marginalized status, leaving them ill-equipped for emergent health crises.[33]

Despite the fact that Métis women already carry an elevated risk of chronic diseases, mental illness, and suicide ideation, research is limited on the prevalence of mental health outcomes during the COVID-19 pandemic and mediators of gender and mental health outcomes for Métis People living in Canada.[82] Given that Alberta is home to the second largest Métis

population in Canada, it is imperative to explore how the global pandemic may have affected the mental health of Métis People in Alberta. This examination should consider their distinct history, culture, and other social determinants influencing their health. Additionally, assessing potential sex/gender disparities in mental health outcomes within this group is vital, especially given the vulnerability of Métis women to adverse health outcomes.

1.3 Organization of the Thesis

It is crucial to understand how the global COVID-19 pandemic affected mental health in Indigenous Peoples, and in particular, Métis People who identify as women. This thesis aims to improve the understanding of mental health outcomes and associated sex/gender differences in Indigenous Peoples and Métis People during the COVID-19 pandemic. To address these goals, my thesis is structured in two phases:

1. A scoping review to collate and summarize relevant sources on mental health outcomes in Indigenous Peoples during the COVID-19 pandemic and,
2. A secondary analysis of an online survey to assess sex/gender differences among Métis People in Alberta during the COVID-19 pandemic and potential mediators of their relationship.

1.4 Research Objectives and Questions

1.4.1 Scoping review Research Objectives and Questions

Given the dynamic nature of the pandemic and the intricate history and experiences of Indigenous populations, the topic of Indigenous mental health during this period is well-suited for a scoping review. The objectives of the scoping review are:

1a. To map and summarize the current scientific evidence mental health outcomes in Indigenous populations during the COVID-19 pandemic.

1b. To describe whether sex/gender differences have been examined in the current scientific literature on mental health outcomes in Indigenous Peoples during the COVID-19 pandemic.

More specifically, the following research questions will be addressed:

a. What is the extent and nature of the existing literature on COVID-19 pandemic mental health outcomes experienced by Indigenous Peoples living in Australia, Canada, New Zealand, and USA?

b. How have Indigenous Peoples living in Australia, Canada, New Zealand, and USA during the COVID-19 pandemic fared in four mental health categories (general mental health, mood disorders, substance use and abuse, and self-harm and suicidality) and what measures have been used to assess these outcomes?

c. What does the existing literature reveal about sex/gender differences in mental health outcomes among Indigenous Peoples living in Australia, Canada, New Zealand, and USA during the pandemic?

While undertaking this scoping review on Indigenous mental health during the pandemic, we aimed to identify and categorize various sources pertinent to this topic. This process will synthesize information from existing sources, identify gaps in the research, and characterize key concepts, including but not limited to sex/gender disparities related to the topic.

1.4.2 Secondary Survey Analysis Research Objectives and Questions

For the second part of this thesis, a secondary epidemiological analysis of *Misi Yehewin* will be conducted. *Misi Yehewin* is an online survey of Métis People living in Alberta during the COVID-19 pandemic conducted at three different time points between December 2020 and December 2021. The objectives of the secondary survey analysis are:

a. To assess the presence of sex/gender differences in the prevalence rates of mental health outcomes experienced by Métis living in Alberta during the COVID-19 pandemic.

b. To identify what social factors mediate the relationship between gender and mental health outcomes in Métis People living in Alberta during the COVID-19 pandemic.

Given the limited research in this area, this secondary survey analysis aims to fill the knowledge gap on the mental health of Métis People during the pandemic. More specifically, the following research questions will be addressed:

a. How do the prevalence rates of mental health problems experienced by Métis women in Alberta compare to those experienced by Métis men in Alberta during the COVID-19 pandemic?

b. What social factors significantly mediate the relationship between gender and mental health problems among Métis People in Alberta during the COVID-19 pandemic?

We hypothesize that there are sex/gender differences in the prevalence of mental health outcomes across genders in Métis People living in Alberta and that these differences are significantly mediated by co-occurring social and environmental determinants.

Examining mental health outcomes in Métis Peoples during the COVID-19 pandemic and the significantly associated risk factors will expand our understanding of the socially produced inequities that exacerbate adverse mental health outcomes in this population during pandemics. By avoiding a pan-Indigenous approach, the new knowledge gained from this study can be used by the MNA, policymakers, and healthcare providers to inform more focused response plans for Métis People in current and future pandemics. This research will be conducted in line with the Truth and Reconciliation Commission of Canada (TRC) Call to Action No. 19 which urges "the federal government, in consultation with Aboriginal peoples, to establish measurable goals to identify and close the gaps in health outcomes and assess long term trends".

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Chapter 2: The Mental Health of Indigenous Peoples living in Australia, Canada, New Zealand, and USA during the COVID-19 Pandemic: A Scoping Review

2.1 Background

The World Health Organization (WHO) declared the coronavirus disease (COVID-19) a worldwide pandemic in 2020.[1] The spread of the highly infectious disease and the resulting pandemic had significant effects on the physiological, behavioural, and psychological health of individuals around the world.[2-4] In order to minimize the spread of the disease, governments of countries around the world advised the public to take health safety precautions.[5] Public health measures included lockdowns, the use of face masks, handwashing, social distancing, avoiding nonessential indoor and outdoor spaces, increased testing, quarantining, and testing of contacts with COVID-19.[5]

With the closure of non-essential workplaces and businesses, job losses, and increased occupational uncertainty were at an all-time high.[6] Financial uncertainty was accompanied by elevated levels of food insecurity especially among low-income households.[7] During the pandemic, essential workers, including healthcare professionals, had to carry out their duties with reduced staff, resulting in increased reports of stress and burnout.[4] Social distancing and repeated lockdown measures required children to stay at home and attend classes and lessons via online video sessions with many parents tasked with the requirements of making sure lessons and assignments were up to date. The confinement of children within their homes led to the reduction of typical social interactions resulting in lower quality education and loss of important playtime in critical developmental life stages.[8] Reduced frequencies of societal bonding led to increased feelings of loneliness and isolation in the general population exacerbating levels of anxiety, depression, and other mental illnesses.[9] However, the psychological burden of the COVID-19

pandemic has not been evenly distributed across populations. Historically, disadvantaged groups face barriers that lead to poorer mental health outcomes.[10]

Indigenous Peoples living in countries with similar colonial histories (Australia, Canada, New Zealand, and United States of America [USA]) face an increased risk for many adverse health outcomes.[11] Burdened by the long-term effects of intergenerational trauma and being subjected to marginalization, discrimination, and exclusion from conventional healthcare services, Indigenous Peoples face a higher risk for chronic diseases and poorer mental health outcomes than the general population.[12] Research has shown that Indigenous Peoples have a higher risk of mental illnesses including depression and anxiety when compared to other ethnicities.[13] They are also more likely to have suicidal thoughts and to die of suicide.[14] Before the COVID-19 pandemic, a growing number of studies found that the rate of suicides and mental illnesses such as anxiety and depression were higher in Indigenous Peoples when compared to non-Indigenous Peoples.[13-15] For Indigenous Peoples, the pandemic has potential syndemic effects.[16] This means that due to the transgenerational effects of colonialism, social determinants and barriers to health such as inadequate education and housing, poor socioeconomic status, and insufficient healthcare services have the potential to increase their risk to the worst effects of the pandemic.[17,18]

The mental health outcomes associated with COVID-19 in Indigenous groups may vary across sex/gender categories. Sex (the biological and physiological characteristics of males and females) and gender (the socially and culturally constructed concept that encapsulates ideas of what it is to be male, female or gender diverse in an environment) are important social determinants of health.[19] While both concepts are distinct, their effects are usually intertwined.[19] Before the pandemic, women were observed to have a higher prevalence of mental illnesses

including major depression disorder (MDD) and anxiety disorders.[20] They have been observed to experience worse social and economic disruptions due to pandemics including loss of employment and income, education, food security and personal safety.[21,22]

Given their higher predisposition to poor mental health outcomes, the COVID-19 pandemic has the potential to disproportionately affect the mental health of Indigenous Peoples living in countries with similar colonial histories. This scoping review aims to synthesize the current state of the evidence about the mental health of Indigenous Peoples living in Australia, Canada, New Zealand, and USA during the COVID-19 pandemic. This will be accomplished by identifying and concisely mapping the relevant literature on key mental health outcome domains that would theoretically be exacerbated by the COVID-19 pandemic in Indigenous populations. More specifically, the following research questions were used to guide this scoping review:

1. What is the extent and nature of the existing literature on COVID-19 pandemic mental health outcomes experienced by Indigenous Peoples living in Australia, Canada, New Zealand, and USA?
2. How have Indigenous Peoples living in Australia, Canada, New Zealand, and USA during the COVID-19 pandemic fared in four mental health categories (general mental health, mood disorders, substance use and abuse, and self-harm and suicidality) and what measures have been used to assess these outcomes?
3. What does the existing literature reveal about sex/gender differences in mental health outcomes among Indigenous Peoples living in Australia, Canada, New Zealand, and USA during the pandemic?

The approach utilized in this literature synthesis draws on the scoping review methodology framework published by Arskey and O'Malley to assess the extent and nature of

research activity, summarize research findings related to mental health outcomes of interest in Indigenous populations, and identify gaps in the literature that require further examination.[23]

Saddled with an already higher predisposition for adverse mental health outcomes, we hypothesize that the pandemic would exacerbate poor mental health outcomes in Indigenous Peoples both independently and when compared to other ethnic groups, with varying effects across gender/sex categories.

To our knowledge, only one knowledge synthesis has been published on the impact of COVID-19 on the mental health of Indigenous communities.[24] However, this was published early in the pandemic before vaccines were widely available to the general public. The review will map the most current literature on this topic which will contribute to our understanding of how the global COVID-19 pandemic has affected the mental health of Indigenous Peoples in countries with similar colonial histories. This information can be used to support health policies aimed at improving the health of Indigenous Peoples.

2.2 Methods

This scoping review was conducted in accordance with the Joanna Briggs Institute (JBI) methodology for scoping reviews and informed by the methodological frameworks proposed by Arksey and O'Malley and Levac et al.[23,25,26] The objective of this scoping review was to map empirical research examining mental health outcomes in Indigenous Peoples during the COVID-19 pandemic. Using this objective as a guide, we followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses' reporting guidelines for scoping reviews (PRISMA-ScR) to identify the research question, identify relevant articles, select sources for inclusion, extract data from included articles, and to summarize, analyze, and reporting results.[23] A protocol

for the scoping review was made publicly available in the Open Science Framework (OSF) – (https://osf.io/hfjb8/?view_only=f0bcf986241345989f49b4cd63ccb1b0).

2.2.1 Search strategy

A preliminary search of MEDLINE, PROSPERO, Cochrane Database of Systematic Reviews, JBI Evidence Synthesis, Cochrane Library on May 30, 2022 did not identify current or underway systematic reviews or scoping reviews on the topic. A comprehensive literature search for peer-reviewed publications was conducted in five databases in November 2022, including MEDLINE ALL (OVID Interface), PsycINFO (OVID Interface), EMBASE (OVID Interface), CINHAL Plus with Full text (EBSCOhost Interface), and Scopus to identify qualitative and quantitative observational studies published since 2020 assessing mental health in relation to the COVID-19 of Indigenous Peoples living in Australia, Canada, New Zealand and USA. Grey literature searches were performed in November 2022 in three databases (ProQuest Theses and Dissertations, iPortal [an Indigenous studies portal hosted by the University of Saskatchewan] and Google) to identify publications made by government and non-governmental Indigenous and mental health organizations including annual reports, program evaluations, policy frameworks, and survey data. The search terms and strategy were developed with the assistance of a university health sciences librarian (LD) and adapted for each database and information source. The reference lists of potentially relevant documents were manually searched for additional relevant articles. No language restrictions were applied. The full search strategy for Medline can be found in Appendix I.

2.2.2 Source of evidence screening and selection criteria

References identified through MEDLINE ALL (OVID Interface), PsycINFO (OVID Interface), EMBASE (OVID Interface), CINHAL Plus with Full text (EBSCOhost Interface), Scopus, and ProQuest Theses and Dissertations were uploaded to Covidence for screening. Evidence sources from iPortal and a total of 200 sources from Google were copied into a Microsoft Word document for screening.

Screening for relevant articles was performed in two stages; first, titles and abstracts; second, the full texts of relevant sources. Articles were independently screened by two separate reviewers (MA, SL, HA) and discrepancies were reconciled through discussion and consensus.

Peer-reviewed studies, government or organizational reports utilizing cross-sectional, prospective, or retrospective cohort, case-control, case-series, and case-report study designs were included. Sources were deemed relevant for this review if they quantitatively or qualitatively reported on mental health outcomes associated with COVID-19 pandemic in Indigenous Peoples or groups of all ages and sexes/genders living in Australia, Canada, New Zealand, and/or the USA. For Indigenous identity group, this review includes evidence sources that report on a combination of multiple Indigenous identity groups (pan-Indigenous approach) or specific Indigenous identity groups; Australia (Aboriginal and Torres Straight Islanders), Canada (First Nations, Inuit, and Métis), New Zealand (Māori), and USA (Native Americans, American Indians, and/or Alaskan Natives (AIAN). Indigenous Peoples of all gender identities including cis and trans male or female, non-binary and gender fluid individuals were considered as participants of interest in this review.

Mental health outcome categories considered for inclusion were general mental health reports, mood disorders (depression, anxiety, stress), substance use and abuse (drugs or alcohol),

self-harm and suicidality. Included sources had to report relevant outcomes independently (focusing only on Indigenous Peoples and outcomes assessed during the pandemic period) or compare relevant outcomes to other ethnic groups or the time period before the pandemic.

Evidence sources were excluded if they did not report on Indigenous groups, if they reported mental health outcomes not related to the COVID-19 pandemic, or if they reported on Indigenous health but the Indigenous sample in the source was not distinguishable from other groups in the source. Commentaries, books, or conference proceedings were excluded from the scoping review.

2.2.3 Data extraction

A standardized data extraction guideline adapted from the JBI manual was used to extract information about the study characteristics, methods, participants and criteria for the exposure and outcomes of interest for relevant sources.[25] Specifically, the following information was included: the study design and funding, the time and duration of data collection, the total number of participants, the country and setting of the study, the age, Indigenous group, the gender distribution of the sample, mental health outcomes examined, how mental health was considered in the context of the pandemic, the prevalence of mental health outcomes in the sample and key conclusions. The full guideline for data extraction is available in Appendix II.

Data extraction was conducted independently by one reviewer using Google Forms and exported to Microsoft Excel for accuracy and completeness verification by a second reviewer. Any errors or discrepancies observed were resolved through discussion and consensus by both reviewers.

2.2.4 Analysis and presentation of results

The results from this scoping review are reported according to the PRISMA-ScR guidelines.[27] Evidence tables are used to chart key characteristics pertaining to each evidence source (year of publication, type of source, country), the inclusion criteria (Indigenous group examined, age group, sex/gender, and relevant mental health outcomes), and main results. The time period when mental health outcomes were assessed are presented in a summary chart. Narrative summaries were used to synthesize frequency counts of key characteristics of included sources, Indigenous identity groups, age groups, sex/gender categories, mental health outcomes categories.

Main findings were reported by mental health outcomes in relation to the COVID-19 pandemic sorted into four categories: a) general mental health reports, b) mood disorders – including psychological distress, depression, anxiety, stress (reported based on the use of structured and non-structured assessment tools), c) substance use and abuse – including use of drugs or alcohol, and d) self-harm or suicidality . Sex/gender related findings in mental health outcomes relating to the research question were summarized narratively.

2.3 Results

After database and grey literature searches, a total of 1,085 records were retrieved which included 200 grey literature sources. After duplicates were removed, the remaining 750 records were screened against their titles and abstracts leaving 231 records considered for full-text article retrieval. Full texts were able to be obtained for 228 records with 3 sources either unavailable through interlibrary loans or placed on embargo until a future date. Full text screening of the remaining 228 records resulted in the inclusion of 68 documents for the scoping review (42 peer-

reviewed articles[28-69] and 26 grey literature[70-95]). The source of evidence identification and inclusion decision flowchart can be seen in the PRISMA-ScR diagram in Figure 2.1.

2.3.1 Key characteristics

2.3.1a Document characteristics

The main characteristics of included documents can be found in Table 2.1. The 68 records included in this scoping review were published between 2020 and 2023 with the majority of records being published in 2022 (Table 2.2). Sample sizes ranged from 13 participants to a cohort of 8,227 for a total of 47,718 Indigenous Peoples and 24,592 mental health-related ED visits of Indigenous Peoples reported across fifty-nine documents (Mean = 746, 25th percentile = 86, Median = 166, 75th percentile = 462, IQR = 376.[28,29,31-44,46-51,53-68,70-73,75,77-79,81-84,86-89,91-95] The distribution of sample sizes across the included documents is illustrated with box and whisker plots in Figures 2.2 and 2.3.

The majority of documents (n=31) were published in the USA[29,30,35-40,42-44,48-50,52,57,61,63,65,66,68,69,75-77,79,80,85,86,90,92] 20 records were published in Canada.[31-33,41,45,47,51,53-56,60,62,67,71,72,81,82,84,91] 11 records were published in Australia. [28,46,58,64,73,74,78,87,89,93,95] Six records were published in New Zealand.[34,59,70,83,88,94] The distribution of countries for included documents is illustrated in Figure 2.4.

Eight records reported on Indigenous Peoples living in both urban and rural areas.[31,38,60,69,75,79,81,94] Six documents focused on Indigenous Peoples living in rural areas,[28,35,42,43,48,51] four reported on urban Indigenous Peoples.[32,36,41,77] and the remaining did not specify either region.[29,30,33,34,37,39,40,44-59,61-68,70-74,76,78,80,82-93,95]

Most documents (n=39) examined the Indigenous sample as a subset of a larger group comprising of non-Indigenous Peoples[28-34,37-40,44-47,52,53,55,56,58-62,64,65,69,72-75,78,85,88,90,92-95] while the

remaining twenty-nine documents examined Indigenous Peoples as the primary population of interest.[35,36,41-43,48-51,54,57,63,66-68,70,71,76,77,79-84,86,87,89,91]

Most documents utilized cross-sectional study designs (n=57)[28,30-33,35-45,47-51,53-58,60,62,63,65-68,70-83,85-89,91-94] with nine of those employing a repeated cross-sectional study design to collect information.[47-50,55,57,60,66,68] Five documents utilized a retrospective study design using information from electronic medical records or patient charts to compare outcomes before and during the pandemic.[29,46,59,64,69] Five records used a combination of both cross-sectional and retrospective study design,[34,61,84,90,95] and one document utilized a prospective cohort longitudinal study design.[52]

The majority of records analyzed mental health in Indigenous Peoples only quantitatively and reported on outcomes using frequencies, percentages, or effect measures from regression analyses (n=54).[28-35,37-40,42-50,52,53,55-66,68,69,71-76,78,79,81,82,85,88-92,95] Ten documents reported both quantitative and qualitative analysis of results.[36,54,70,80,83,84,86,87,93,94] Four records exclusively analyzed mental health in Indigenous Peoples using qualitative methods by employing thematic and content analysis techniques to present information obtained from interviews or virtual sharing circles – a sacred Indigenous tradition that allows all involved participants to speak freely about their experiences.[41,51,67,77]

2.3.1b Indigenous identity groups

Indigeneity was self-identified in most cases of the documents assessed. Most documents (n=28) published in the USA reported on American Indian and/or Alaska Natives (AIAN)[29,30,35-40,42-44,48-50,52,57,61,63,66,68,69,75-77,80,85,86,90] though three records did not specify an Indigenous population.[65,79,92] Of the 20 records published in Canada, the majority did not specify an

Indigenous group, describing Indigenous Peoples in broad terms (n=10)[31-33,47,53,55,56,60,62,72] or listing the Indigenous group affiliations of the sample analyzed without conducting subgroup analyses on specific Indigenous groups (n=7).[41,45,67,71,82,84,91] One document published in Canada reported First Nation, Inuit, and Métis People as separate groups[81] and two documents focused on First Nations peoples.[51,54] All eleven records published in Australia reported on Aboriginal and/or Torres Strait Islanders.[28,46,58,64,73,74,78,87,89,93,95] Six records reported on Māori people living in New Zealand.[34,59,70,83,88,94]

2.3.1c Age groups

Most research (n=36) reported on Indigenous Peoples aged 16 years and older,[28,29,31,32,34,37,39-41,43,44,47-50,52,54-60,64,66-68,70-72,75,77,79,81,82,87] one of which focused on the elderly.[34] Children, adolescents and/or young adults were the focus of 17 documents with ages ranging from two to 24. [30,33,35,36,38,42,51,61,63,65,73,74,76,85,89,92,93] 11 of those records centered on adolescents and high school students.[30,35,36,42,51,63,65,73,76,85,93] Nine records had a sample size that included a wide range of ages[45,46,53,62,78,86,88,90,95] with one document reporting on the mental health of both children and their parents.[95] Information on the age of the Indigenous population was unclear or not reported in five documents.[69,80,83,84,91]

2.3.1d Gender distribution

Thirty-four documents described the reported gender of Indigenous participants.[28,31-36,38-43,46,49-51,53,54,57,63,66-68,70,73,75,77,79,81,84,86,87,93] While a majority of documents reported only either boys/men or girls/women,[28,32-36,39-43,46,49,50,53,54,57,66-68,75,77,81,87] eleven documents reported classifications of more than two genders (boys/men and girls/women),[31,38,53,63,70,73,79,84,86,87,93] though

three of these documents were not specific, only listing the remaining gender category as "other".[53,84,87] Overall, the proportion of Indigenous participants who were classified as girl/woman in included documents was higher than other genders (n=22).[28,31-34,36,38,46,49-51,53,54,57,66,68,70,75,77,84,86,87] Three documents focused solely on Indigenous women.[41,43,67]

2.3.1e Time period of data collection

The data collection period for the majority of research included in this review was between 2020 and 2021 before vaccines were widely available (Figure 2.5). Table 1 shows the time period for each individual document.

2.3.2 Mental health outcomes

2.3.2a General mental health

The general mental health of Indigenous Peoples related to the COVID-19 pandemic was assessed in twenty-six documents.[29,41,42,47,51,56,59,68,71,72,74,76-78,80-85,87,89-93] Ten of the documents were published in Canada,[41,47,51,56,71,72,81,82,84,91] nine were published in USA,[29,42,68,76,77,80,85,90,92] five were published in Australia,[74,78,87,89,93] and two were published in New Zealand.[59,83] Seven documents highlighted the general mental health impacts of COVID-19 on Indigenous children and young people,[42,51,74,76,85,89,92,93] 12 reported on general mental health outcomes in Indigenous adults[29,41,47,56,59,68,71,72,77,81,82,87] and the remaining (n=6) either focused on Indigenous Peoples of all ages[78,90] or did not report on the age group of interest (n=3).[80,83,91]

Most documents reported worsening general mental health among Indigenous Peoples during the pandemic. Indigenous children and young people in particular were reported to have poorer general mental health including depression and anxiety during the pandemic compared to

before the pandemic and also when compared to other ethnic groups.[42,51,74,89,92,93] For example, Gerald et al. reported that Native American parents of asthmatic children observed negative changes in their children's mental health as well as their own during the pandemic.[42] During interviews with school administrators and educators from schools in First Nations reserves, participants also reported that the pandemic worsened existing mental health issues in both students and educators.[51] The opposite was observed among a sample of high school students in USA, however, with a lower proportion of non-Hispanic AIAN students reporting poor mental health during the pandemic compared to other racial and ethnic groups.[85]

In Canada, the majority of documents showed that Indigenous Peoples were more likely to report worsening mental health since the onset of the pandemic compared to non-Indigenous Peoples (n=8).[41,51,71,72,81,82,84,91] However, a repeated cross-sectional survey conducted over three rounds by Jenkins et al. revealed that identifying as Indigenous was associated with lower odds of reporting a decline in self-rated mental health.[47] McAuliffe et al. similarly found no significant differences between Indigenous and non-Indigenous Peoples in the odds of reporting worse mental health during the COVID-19 pandemic and related restrictions compared with before the pandemic.[56]

The majority of records published in the USA also documented reports of worse mental health during the COVID-19 pandemic among AIAN individuals (n=7).[29,42,68,76,77,80,90,92]

Similarly, in Australia, most documents reported declines in mental health and decreased ability to cope with stress among Aboriginal people during the COVID-19 pandemic.[74,87,89,93] A government report published by the Victoria Department of Health revealed that more Aboriginal peoples in Victoria received clinical mental health services during the 2020 to 2021

period compared to prior years, even as overrepresentation of Aboriginal people in mental health service usage in this state continues to trend upward.[78]

Findings were more mixed for Māori New Zealanders with Māori respondents in one document reporting more adverse psychological outcomes than positive mental experiences during the pandemic[83] while Ng et al., found that Māori people had a reduction in acute psychiatric service usage compared to pre-pandemic periods.[59]

A general decline in mental health was largely observed among Indigenous Peoples living in Australia, Canada, New Zealand, and USA during the COVID-19 pandemic. The main findings of documents that assessed changes in overall mental health in Indigenous Peoples during the pandemic can be found in Table 2.3.

2.3.2b Mood disorders

Twenty-seven records assessed specific COVID-related mood changes and disorders including anxiety, depression, stress, and psychological distress using structured assessment tools.[31,32,34,36-39,44,45,48-50,52-54,57,58,60,63,65,66,68,70,71,75,88,94] The measurement tool most commonly used was the Generalized Anxiety Disorder Scale (GAD-7) (n=10).[31,36,38,39,44,45,53,60,65,71] A subscale of the GAD was employed in two documents.[32,54] The Patient Health Questionnaire (PHQ) was also highly utilized (n=8) with four documents adapting the PHQ-9[31,38,53,62] and four others utilizing its subscales: PHQ-2,[32,54] PHQ-4,[52] and PHQ-8[36] to measure depression symptoms among Indigenous Peoples. The 20-item Center for Epidemiologic Studies Depression Scale (CES-D) was used in four documents to assess the frequency of depressive symptoms in Indigenous Peoples.[40,65,75,94] The full list of structured assessments utilized in the records included in this review can be found in Table 2.4.

Most of the documents that utilized structured assessments for mental health outcomes were published in the USA (n=15).[36-39,44,48-50,52,57,63,65,66,68,75] Using the CES-D to measure depressive symptoms, two documents reported a high prevalence in Indigenous Americans compared to other respondents.[65,75] However, one study reported that identifying as Native American was not significantly associated with depression symptoms when compared to identifying as non-Native American in a regression model.[39] AIAN people in the USA reported higher prevalence of anxiety symptoms measured using the GAD-7 (n=4). [36,38,44,65] Hofmann et al. reported that Native Americans reported significantly higher anxiety scores on the GAD-7 than Caucasian respondents.[44]

The majority of documents (n=7) published in Canada found a modest to high prevalence of moderate to severe depression, anxiety, and stress symptoms among Indigenous Peoples in Canada as well as higher odds of reporting these symptoms compared to non-Indigenous Peoples.[31,32,45,53,54,60,71] Using the PHQ-9, GAD-7, and PSS-10, Lawal et al. found higher levels of depression, anxiety, and stress respectively among Indigenous Peoples in Alberta during the COVID-19 pandemic.[53] Lee et al. reported comparable results finding that about twenty percent of Indigenous respondents in a cross-sectional survey screened positive for depression and anxiety symptoms on the PHQ-2 and GAD-2, respectively.[54]

Four documents assessing mood-related disorders during the COVID-19 pandemic using structured assessment tools were published in New Zealand,[34,70,88,94] two of which did not find a difference between Māori and non-Māori New Zealanders.[34,94] On the other hand, according to the New Zealand Annual Health Survey, Māori adults experienced higher rates of psychological distress in the 2020 to 2021 period compared to non-Māori New Zealanders.[88] In addition, Māori students reported feeling sadder and more anxious during the COVID-19 pandemic and were

more likely to be classified as having a moderate psychological disorder according to the Kessler Psychological Distress (K-10 scale).[70]

In Australia, one document using the Depression, Anxiety and Stress Symptoms (DASS) 21-item scale found that among Australian adults, Aboriginal and Torres Strait Islander identity predicted worse anxiety and stress levels but not depressive symptoms.[58]

Overall, when using structured assessment tools to assess specific mood disorders including psychological distress, depression, anxiety, and stress among Indigenous Peoples during the COVID-19 pandemic, most documents found that Indigenous Peoples in Australia, Canada, New Zealand, and USA had a higher prevalence of these outcomes compared to non-Indigenous Peoples. The main findings of documents that utilized structured assessment tools can be found in Table 2.5.

Without using structured assessments, 15 records examined changes in mood and mood disorders due to the COVID-19 pandemic in Indigenous Peoples in the form of depression, anxiety, stress, worry, and fear about contracting the virus.[28,29,42,50,56,67,72,73,79,81,85,86,92,93,95] The majority documents utilized a cross-sectional design using survey questions and interviews to assess changes in mood with respondents[28,42,50,56,67,72,73,79,81,85,86,92,93,95] while one document used an administrative database to measure mental health related ED visits during the COVID-19 pandemic.[29]

Six documents published in USA found that AIANs reported, via surveys, changes in mood and mental health issues including self-reports of depression, anxiety, worry and stress during the pandemic.[42,49,79,85,86,92] A report published by The Trevor Project, an LGBTQ foundation, found a particularly high proportion of Indigenous LGBTQ youth experienced

symptoms of generalized anxiety disorder and major depressive disorders during the pandemic period.[92]

Four records published in Australia showed that Aboriginal and Torres Strait Islanders expressed a high prevalence of anxiety, stress, loss of control, worry and perceived danger and vulnerability from the COVID-19 virus during the pandemic.[28,73,93,95]

Four documents in Canada assessed changes in mood due to the pandemic using non-structured assessments and found that the prevalence of mood disorders was heightened among Indigenous Peoples. [56,67,72,81] Indigenous Peoples of Canada reported concerns about contracting the virus or that someone in their family would contract the virus.[72] One document published by the Statistics Canada found that mental health conditions, such as depression and anxiety, were prevalent in First Nations, Inuit, and Métis Peoples though Non-Status First Nations people were less likely than non-Indigenous Peoples to report anxiety, stress, and worry as a result of unmet healthcare needs due to the COVID-19 pandemic.[81] However, McAuliffe et al. reported that identifying as Indigenous was not associated with higher odds of being anxious or worried during the pandemic.[56]

Changes in mood including depression, anxiety, fear, and worry about catching the COVID-19 virus were particularly prevalent among Indigenous Peoples during the pandemic. The main findings of documents that examined mood changes in Indigenous Peoples due to the COVID-19 pandemic using non- structured assessments can be found in Table 2.6.

2.3.2c Alcohol, substance and/or drug use

Changes in alcohol, substance, and drug use during the pandemic among Indigenous Peoples was examined as an outcome in 14 records.[30,33,35,36,41,43,46,47,65,69,88,90,93,95] Six reports focused

on this outcome in young people (≤ 25 years)[30,33,35,36,65,93] and the remaining either focused on adults, [41,43,47,95] people of all ages[46,88,90] or did not report the age group of interest.[69] Most of the documents examined the impact of pandemic on alcohol, substance, and drug consumption behavior using survey questions (n=10). [30,33,35,36,43,47,65,88,90,93,95]

Three documents published in the USA reported increased alcohol, substance and/or drug use during the COVID-19 pandemic[30,33,35] although one study reported low prevalence of substance use among AIAN youth during the COVID-19 pandemic.[36] Binge drinking during the pandemic was observed among a cohort of AIAN women in USA participating in an intervention to reduce risk for alcohol-exposed pregnancy even while most participants reported a decrease in their alcohol consumption during the pandemic.[43]

The Annual New Zealand health survey conducted by the New Zealand government in the 2021/22 period showed higher rates of hazardous drinking in Māori adults than in Asian, Pacific, and European adults.[88]

In Australia, Jefferies et al. noted a significantly increased rate of ED admissions for drug and alcohol related problems among both Indigenous males and females.[46]

Compared to Black and Asian adolescents, Indigenous youth in the USA had a higher risk of alcohol use assessed through the Alcohol Use Disorders Identification Test (AUDIT).[65] Similar findings were observed in Canada[33] and Australia.[93] Chaiton et al. reported that Indigenous youth in Canada had higher odds of increased substance use due to the COVID-19 pandemic compared to their Caucasian counterparts[33] and the 2021 Youth Survey Report drafted by Tiller et al. reported that Aboriginal and Torres Strait Islander youth were twice as likely to consume alcohol to reduce stress as non-Indigenous youth.[93] Similar accounts of alcohol, substance and/or drug use were reported among other age groups.[41,43,46,47,69,88,90,95] During virtual

sharing circle interviews conducted by Flores et al., adult Indigenous women of Canada described an increase in the consumption of alcoholic beverages, cannabis, and tobacco directly tied to the COVID-19 pandemic and lockdown measures to an extent that impacted their ability to pay for living expenses.[41]

These findings largely show that the consumption of alcohol and drug use rose during the pandemic among Indigenous Peoples living in Australia, Canada, New Zealand, and USA. The main findings of documents that assessed alcohol, substance and/or drug use in Indigenous Peoples during the pandemic is located in Table 2.7.

2.3.2d Self-harm and suicidality

Eleven documents assessed suicidality in the context of suicidal ideations, reports of suicide attempts, and suicidal presentations to emergency departments (ED) during the COVID-19 pandemic.[40,47,55,56,61,62,64,85,90-92] Five were published in Canada,[47,55,56,62,91] five in USA[40,61,85,90,92] and one in Australia.[64] Suicidal ideation in adults eighteen years and older was explored in six documents[40,47,55,56,64] while adolescents and young people were the focus of suicidality assessments in three records.[61,85,92]

Suicidality and suicide ideation were measured in Indigenous Peoples during the pandemic by way of self-reports through survey questions (n=8),[47,55,56,62,85,90-92] frequency of suicide related presentations to the ED (n=1),[64] latent classes of "high risk of suicide",[61] and the Suicide Behavior Questionnaire (SBQ-R) - a four item questionnaire that assesses different elements of suicidality (lifetime suicide ideation and attempts, frequency of suicide ideation over the past twelve months, threat of suicide attempt and the likelihood of suicidal behavior in the future).[96]

Indigenous Peoples reported a higher risk of suicidality in seven documents when compared to other ethnicities and racial groups.[40,47,55,62,85,90,92] Fitzpatrick et al. observed that Native Americans had a higher risk of suicidality (SBQ-R score 7+) compared to non-Native Americans. Additionally, the prevalence of suicidal ideation was observed to be high among Two-Spirit and Indigenous 2SLGBTQQIA+ peoples in two documents.[91,92] Runkle et al. examined sociodemographic risks of being characterized as a "high risk of suicide" based on latent classes using data from youth seeking support from a national text-based crisis platform and found that AIAN youth were likely to be classes with a higher risk of help-seeking for suicidal ideation since the pandemic began.[61] Conversely, Sveticic et al. observed a decrease in ED suicidal presentations was observed among Aboriginal and Torres Strait Islanders when comparing periods before and since the COVID-19 outbreak.[64]

Overall, the prevalence and risk of suicidality was increased in Indigenous Peoples living in Canada and USA while a lower frequency of suicidal presentations to the ED was observed in Australia. A summary of the main findings of documents that reported self-harm, suicidality and related presentations are reported in Table 2.8.

2.3.3 Gender differences in mental health outcomes

Thirteen documents reported on gender differences in mental health outcomes among Indigenous Peoples in Canada (n=7),[31,41,54,71,72,81,91] USA (n=4),[43,63,79,80] and Australia (n=1).[46] Among Indigenous Peoples living in Canada, a higher percentage of women than men reported worse mental health including depression, anxiety, stress and worry during the pandemic.[54,71,81] A convenience sample of Indigenous women in Canada expressed through virtual sharing circles that the effect of the pandemic on their mental health was exacerbated due to gendered

responsibilities such as caretaker duties.[41] Conversely, a survey conducted by the Association for Canadian studies found that a greater proportion of Indigenous men than Indigenous women reported fear of contracting the COVID-19 virus.[72] In USA, Fryberg et al. reported that more than half of Indigenous adults who identified as transgender, non-binary, genderqueer or gender non-conforming reported feelings of depression during the pandemic.[79] Additionally, among a sample of reservation-area AI middle and high school students, more female students reported negative mental-health outcomes in relation to the pandemic than male students while students who identified as "other" gender were more likely to be isolated and worry about losing friends compared to female and male students.[63] In Australia, there was an increased rate of drug and alcohol related ED admissions for Indigenous females.[46]

These findings generally indicate the uneven distribution of COVID-19 pandemic-related mental health burden across gender categories among Indigenous Peoples living in Australia, Canada, and USA. The main findings of documents that reported gender-related mental health outcomes can be found in Table 2.9.

2.4 Discussion

This scoping review aimed to explore the existing literature on the mental health of Indigenous Peoples during the COVID-19 pandemic. Overall, we identified sixty-eight documents that investigated the mental health of Indigenous populations in Australia, Canada, New Zealand, and the United States during the COVID-19 pandemic with most documents focusing on the impacts of the pandemic on the mental health of Indigenous youth, women, and older adults.

2.4.1 Key findings

This review found that the COVID-19 pandemic has significantly impacted the mental health of Indigenous populations. Indigenous Peoples in countries with a similar colonial history experienced higher levels of pandemic-related anxiety, depression, stress, fear, and worry than non-Indigenous populations.[32,53,54,71] They were also observed to have lower resilience during the pandemic.[68,75] These effects were attributed to factors such as social isolation, financial uncertainty, lack of cultural activities, loss of family, community and connection and an inability to grieve the loss of loved ones in a traditionally appropriate manner due to restrictions brought on by the pandemic.[36,77,83,86,91]

Findings also revealed an increased intake of alcohol, substance, and drug use among Indigenous Peoples during the pandemic.[35,41,46,47,65,90,93] Before the pandemic, Indigenous Peoples had a high susceptibility to substance use disorders and were also less likely than other populations to receive treatment for these issues.[97,98] Predictably, the social isolation, restrictions, and additional stressors brought on by the pandemic led to an increase in alcohol and substance use in Indigenous Peoples, in some cases, to the extent of not being able to avoid basic living expenses.[41]

Of particular concern were Indigenous children, adolescents, and young people. School closures and online learning led to social isolation, fewer school activities, an inability to interact with friends and worse learning experiences.[99,100] This was even more apparent among students in rural areas where rural isolation and the lack of internet services made virtual education and learning difficult.[86] Several documents found that Indigenous children, adolescents, and students had worse mental health, diminished interpersonal relationships, increased substance use and high rates of suicidal ideation due to the COVID-19 pandemic.[63,67,70,85,92,93]

There was also an increased prevalence in suicidal ideation and attempts among Indigenous Peoples during the pandemic.[40,47,55,61,62,85,90,92] These findings were expected given that one of the most important indications for suicidality is poor mental health (e.g., depression, substance use disorders) which was worsened among Indigenous Peoples during the pandemic.[101]

Social distancing was a major element of the pandemic.[5] Multiple lockdowns restricted people to their homes and shaped their interactions with family, friends, community, and society.[99] Indigenous Peoples saw their interpersonal relationships deteriorate during the pandemic either because of distance from family and friends or conflict from spending significantly more time together.[67,73,80,83,84] In situations where it was not possible to spend quarantine or lockdown with loved ones, high incidence of loneliness was reported.[31,42,67,70,86,87,93] Two documents on Māori people living in New Zealand found that Māori people reported loneliness due to social isolation from the COVID-19 pandemic lockdown and severed connections from personal relationships among family and friends due to the COVID-19 pandemic.[70,83] Indigenous students in Canada also reported loneliness, isolation, and disconnectedness during the pandemic[67,84] and Indigenous residents of British Columbia having higher loneliness scores than those who were non-Indigenous.[31]

Several documents also reported on how the pandemic affected the ability of Indigenous Peoples to access mental health services, further aggravating the mental health consequences of the pandemic especially among Indigenous Peoples with disabilities.[41,81,91] Hahmann et al. found that one in ten First Nations people and Métis were unable to receive required mental health or addiction services including therapy and counselling.[81] Inadequate access to mental health services was a major issue for Indigenous Peoples before the pandemic.[102,103] During the pandemic, most mental health services moved to a virtual format offering only online meetings

between healthcare providers and patients.[104] This transition affected the accessibility of services for Indigenous Peoples with limited resources (e.g., no internet access in rural areas).[105] Indigenous communities have had to rapidly develop strategies to counter the mental health effects of the pandemic.[106]

Twenty documents reported on how resilience, community, and coping affected the mental health of Indigenous Peoples.[32,36,41,42,50,54,67,68,70,75,77,80,83-87,89,91,93] Resilience among AIAN youth decreased during the COVID-19 pandemic.[68,75] Mental health strain was exacerbated by the online transition of cultural supports during the pandemic, putting the learning and connection to culture at risk.[84,86,87,89] In cases where cultural and community supports were available, utilizing family support and community belonging was associated with positive mental health outcomes during the pandemic. Indigenous Peoples were able to rely on support from their families and communities despite restrictions.[32,36,42,50,70,77,83,85,91,93] Analogously, Van Bewer et al. found that the inability to receive support from community and family was associated with increased psychological distress in Indigenous students.[67]

In several documents, care was taken to ethically include Indigenous communities in the research process by reporting on research that was conducted directly by Indigenous organizations or on programs designed specifically for Indigenous Peoples, consulting with community and tribal leaders or recruiting a diverse group of researchers with members who identify as Indigenous (n=27).[28,32,35,36,41-43,50,51,54,57,63,67,68,70,75-77,79,80,83,84,86,87,89,90]

Kannan et al. utilized "The Smart Framework," integrating citizen science with Traditional Indigenous Knowledge and community-based research approach to assess the impact of COVID-19 on rural Indigenous schools in Canada.[51] To the same end, Lee et al. consulted with First Nations community leaders to create and distribute a cross-sectional survey in an

Alberta First Nations community, ensuring through the research process that the First Nations principles of Ownership, Control, Access, and Possession (OCAP) was kept with respect to ownership and presentation of information.[54]

While this review focused on adverse mental health outcomes, several documents highlighted factors that positively impacted the mental health and promoted resilience in Indigenous populations including coping strategies and community and familial support. One cohort of AIAN youth reported feeling closer to their families during the pandemic due to the time spent together as a result of lockdown measures.[36] Cheung et al. observed that Māori aged residential care (ARC) residents had lower rates of loneliness compared to European residents during the COVID-19 pandemic.[34] Positive psychological outcomes were also experienced by Indigenous Peoples who reported the pandemic, and the resulting lockdown gave them an opportunity to mentally recuperate, try new hobbies and live life with less pressure.[83]

2.4.2 Gaps in the literature

This scoping review identified some gaps in the existing literature, which may require further investigation. First, there was a paucity of research on specific Indigenous groups. This was particularly apparent in documents that were published in Canada. Despite having three Indigenous groups recognized by the Canadian constitution, (First Nations, Inuit, and Métis), only one document reported on differences across Indigenous groups.[81] While it is assumed that most analysis on Indigenous Peoples in Canada comprise all three groups, this kind of approach serves to limit the capacity to understand the lived realities of each distinct Indigenous group. This broad view of Indigenous groups in the research provides an opportunity for further exploration. Furthermore, limited research was also observed in New Zealand in some domains.

More specifically, no publications from New Zealand were identified assessing suicidality among Māori people or gender differences in mental health outcomes across the four categories examined, thus, highlighting areas that may require additional investigation.

Secondly, since much of the research was cross-sectional in nature and utilized online surveys that required self-selection, more females than males were represented in the research. Typically, self-selected survey participants are more likely to be female.[107] This impacts the generalizability of results to entire Indigenous populations. On the topic of gender, less than twenty percent of the documents reported on gender differences among Indigenous groups. While most records provided the gender distribution of the Indigenous sample, differences in mental health outcomes across different genders were not typically analyzed.

Additionally, structured assessments were used to assess mental health outcomes in less than half of all included documents which hamper interpretations of mental health impacts. Finally, due to the ongoing and dynamic nature of the pandemic, more longitudinal studies need to be conducted to assess the long-term effects of the pandemic on Indigenous Peoples' mental health.

2.4.3 Strengths and limitations

A strength of this review is the inclusion of a broad range of literature types including grey literature published by governments and Indigenous organizations highlighting the range of available research on the mental health of Indigenous Peoples. We were able to capture the existing literature on mental health outcomes in different populations and sub-groups of Indigenous Peoples including children and LGBTQ+ individuals and identify gender related

differences. Also, this review identified gaps in the literature underlining areas that require additional research.

There were several limitations in this review. While the searches were designed to be as comprehensive as possible, findings are limited by the key words and search terms used. Moreover, certain mental health outcomes including schizophrenia and eating disorders were not included in this review because these types of disorders are often complex requiring formal testing and observation. Additionally, symptoms are likely to have appeared before the onset of the COVID-19 pandemic making them difficult to measure in the context of the research question.

Finally, given that most of the studies were conducted during the early period of the pandemic, the results of this review should be interpreted with caution bearing in mind the timing of data collection. The early lockdown period of the pandemic was characterized by high stress and uncertainty and accompanying poor mental health.[9] As the pandemic evolved, vaccines became widely available, the larger effects of the pandemic declined in some countries. Public health recommendations during the pandemic were highly dynamic with lockdown requirements and public distancing requirements varying widely by region and country. It is important to consider this review's results in context of the data collection time period.

2.5 Conclusions and Recommendations

The current scoping review provides an overview of the available research on the mental health impacts of the COVID-19 pandemic on Indigenous Peoples and highlights important gaps in the literature. The findings from this scoping review highlight the significant impact of the pandemic on the mental health of Indigenous Peoples with this population experiencing

worsening mood disorders, interpersonal relationships, substance use, and suicidality during the pandemic.

This should be an important topic of concern for policymakers and stakeholders given the susceptibility of Indigenous Peoples to the worst effects of previous pandemics.[108] It is important to take into consideration how the effect of the COVID-19 pandemic on the mental health of Indigenous Peoples was exacerbated by social determinants of health such as financial uncertainty and access to mental health services, some of which predated the onset of the pandemic. Resilience and coping strategies rooted in cultural practices, social support, and traditional knowledge play a vital role in the lives of Indigenous Peoples. Further research is needed to develop culturally sensitive and contextually appropriate interventions and mental health services to mitigate the impacts of the pandemic on Indigenous populations.

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Figure 2.1: Preferred Reporting Items for Systematic Reviews and Meta-Analyses Reporting Guidelines for Scoping Reviews (PRISMA-ScR) Flow Diagram for Study Selection

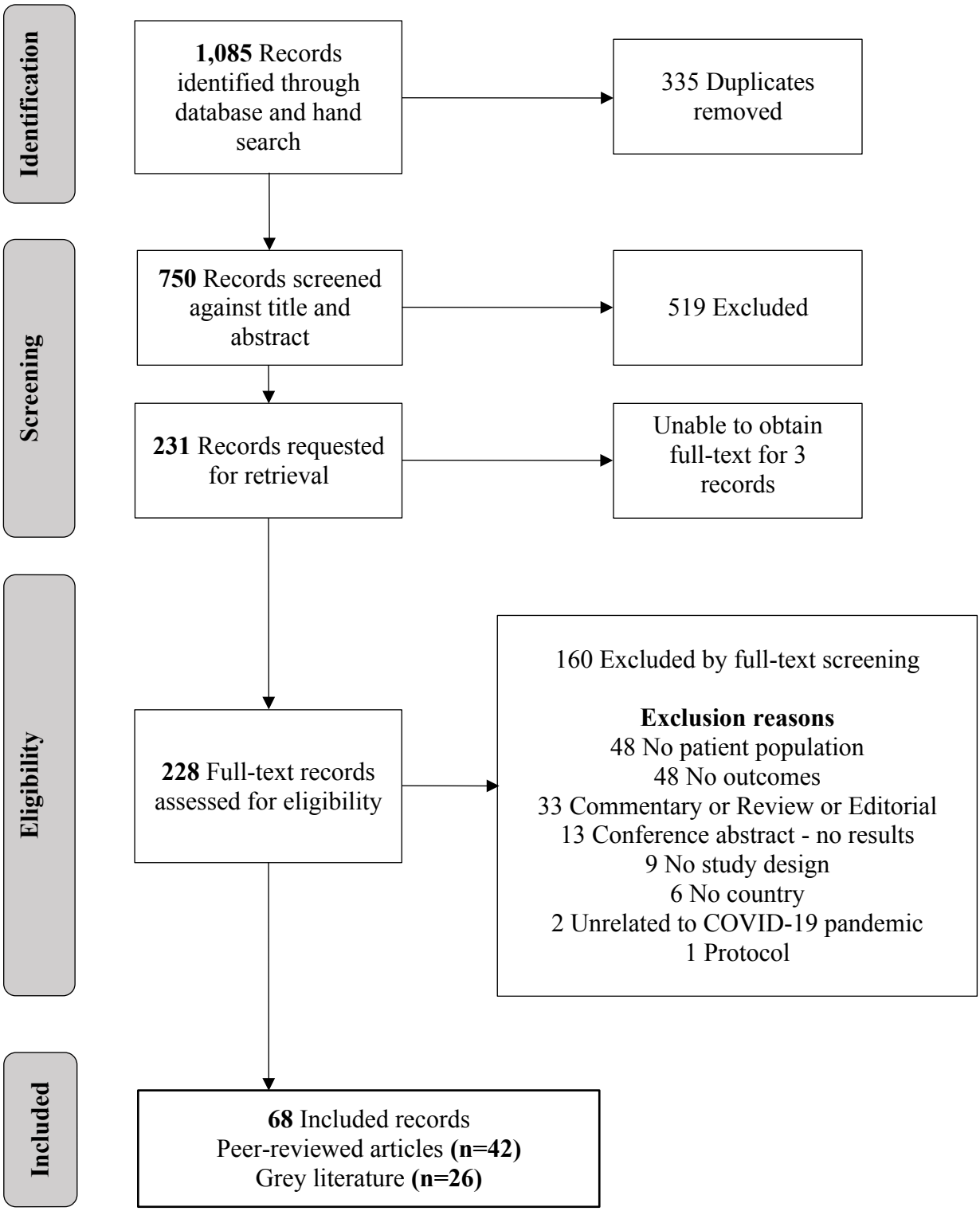

Table 2.1 Main Characteristics of Included Records

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
Akuhata-Huntington, 2020[70]	New Zealand	351	351	Māori	≥16 years	Female: 280 (79.77%) Male: 64 (18.23%) Intersex: 1 (0.28%) Prefer not to answer: 4 (1.14%) Other: 2 (0.57%)	During lockdown after March 25th, 2020	Cross-sectional report based on online survey of Māori university students with quantitative and qualitative analyses	• Mood Disorders • Interpersonal relationships
Allan, 2022[28]	Australia	60	701	Aboriginal and/or Torres Strait Islander	≥ 18 years	First Nations female: 55.4% First Nations male: 34.6%	July to August, 2020	Cross-sectional online and paper survey of rural residents from the western regions of New South Wales (NSW)	• Mood Disorders
Anderson, 2022[29]	USA	24,592 ED visits	107,761,319 ED visits	AIAN	18 – 64 years	NR	January 1, 2019 to August 14, 2021	Cross-sectional study using data from deidentified electronic medical record data on ED visits for USA adults collected via the National Syndromic Surveillance Program (NSSP) to examine changes in MH-Related ED	• Overall mental health • Mood Disorders

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
								Visits During Selected Periods Before and During the COVID-19 Pandemic	
Arriagada, 2020[71]	Canada	1,400	1,400	Indigenous (off-reserve First Nations, Inuit, Métis)	≥ 15 years	NR	April 24 to May 11, 2020	Government report based on cross-sectional online questionnaire of off-reserve First Nations, Inuit and Métis	• Overall mental health • Mood disorders
Association for Canadian Studies (ACS), Leger, 2020[72]	Canada	450	1,959	Unspecified	≥ 18 years	NR	May 1 to May 10th, 2020	Organizational report based on web survey using computer-assisted Web interviewing (CAWI) technology	• Overall mental health • Mood disorders
Australian Human Rights Commission - drafted by Hand, 2022[73]	Australia	199 Children's survey responses 99 parents/guardians and grandparents responses	4,559 Children's survey responses 2,796 parents/guardians and grandparents responses	Aboriginal and/or Torres Strait Islander	9 – 17 years	Children Girl: 88 (44%) Boy: 91 (46%) Did not wish to say: 9 (5%) Non-binary or other: 11 (6%) Parents/ Guardians and Grandparents Woman: 79 (80%)	January 31 to March 20, 2022	Government report by the National Children's Commissioner (NCC) based on surveys with children, parents/guardians and grandparents to understand children's experiences	• Mood disorders • Interpersonal relationships

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
						Man: 16 (16%) Non-binary or other: 1 (1%) Did not wish to say: 3 (3%)		during COVID-19	
Biddle, 2021[74]	Australia	NR	1,368	Aboriginal and/or Torres Strait Islander	2 – 17 years	NR	August 10 to August 23, 2021	Cross-sectional study published by Australian National University (ANU) reporting on an online survey and Computer Assisted Telephone Interviewing (CATI) based on the August 2021 wave of the ANU poll series of surveys, which forms part of the ANU Centre for Social Research and Methods' COVID-19 Impact Monitoring survey program	• Overall mental health
Brener, 2022[30]	USA	NR	7,705	AIAN	NR	NR	January to June 2021	Government Morbidity and Mortality Weekly Report (MMWR) based on cross-	• Substance and/or drug use

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
								sectional online survey of high school students from the Adolescent Behaviors and Experiences Survey (ABES) conducted by the CDC	
Brotto, 2021[31]	Canada	204	6,076	Unspecified	25 – 69 years	Women: 166 (3.2%) Men: 27 (3.6%) Gender diverse: 11 (15.3%)	August 20, 2020 to March 1, 2021	Online survey from previously established cohorts from the COVID-19 Rapid Evidence Study of a Provincial Population-Based Cohort for Gender and Sex (RESPPONSE) study	• Mood Disorders • Interpersonal relationships
Burnett, 2022[32]	Canada	246	246	Unspecified	≥ 16 years	Female: 231 (88%) Male: 23 (9%)	April 23 2020 to November 30 2020	Online cross-sectional survey of urban Indigenous Peoples using data from the cost of COVID study, which aimed to understand the social and emotional impacts of COVID-19	• Mood Disorders

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
Burton, 2020[75]	USA	109	207	AIAN	21 – 75 years Mean: 43.1	Women: 89(81.7%) Men: 20(18.3%)	May to July, 2020	Online cross-sectional survey data from a larger study evaluating stress and coping in populations of color in urban and rural United States during the COVID-19 pandemic	• Mood disorders
California Indian Education for All[76]	USA	NR	NR	AIAN	NR	NR	May to June, 2020	Infographic report using cross-sectional survey data of K-12 students AIAN students living in California	• Overall mental health
Chaiton, 2022[33]	Canada	194	7,651	Unspecified	16 – 25 years	Male: 21%	August 2020 to March 2021	Cross-sectional survey of youth and young adults recruited through Instagram and Facebook advertisements	• Substance and/or drug use
Cheung, 2021[34]	New Zealand	549 in year 2019 538 in year 2020	13,550 in year 2019 12,368 in year 2020	Māori	≥ 60 years	Māori 2019 Female: 331 (60.3) Male: 218 (39.7)	Period 1: 21 March 2020 to 8 June 2020 Period 2: 21	Pre-and-post study examining people living in ARC where residents are assessed using	• Mood disorders • Interpersonal relationships

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
						2020 Female: 313 (58.7) Male: 220 (41.3)	March 2019 to 8 June 2019	interRAI Long-Term Care Facilities (interRAI LTCF), an internationally developed comprehensive geriatric assessment, that provides information on 250 demographic, clinical and psychosocial factors.	
Cordova-Marks, 2020[77]	USA	20	20	AIAN	Caregiver: Mean: 46.5 Recipient of Care: Mean: 66.1	Caregivers: Female: 18 (90%) Male: 2 (10%)	May to July 2020	Qualitative cross-sectional survey and interviews of urban caregivers of American Indians who provided care to their grandparents, parents, spouses/partners, children, or other family members	• Overall mental health
Crabtree, 2022[35]	USA	2,218	2,218	American Indian	Mean (SD): 15 (1.7)	Female: 1153 (52%) Male: 1065 (48%)	Spring 2021	Cross-sectional study of reservation-area American Indian adolescents attending middle and high schools partaking in Our	• Substance and/or drug use

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
								Youth Our Future study	
D'Amico, 2020[36]	USA	52	52	AIAN	12 – 16 years Mean (SD): 14.0 (1.31)	Female: 29 (58%) Male: 21 (42%)	May to July 2020	Cross-sectional survey administered to urban AI/AN youth participating in a study entitled Native American Youth Sleep Health and Wellness (NAYSHAW)	• Mood Disorders • Interpersonal relationships • Substance and/or drug use
Department of Health, Victoria, Australia, 2021[78]	Australia	3, 489	105,741	Aboriginal and/or Torres Strait Islander	All ages	NR	2020-21 compared with previous years	Government report based on cross-sectional analysis of Mental health Client Management Interface Operational Data Store (CMI/ODS).	• Overall mental health
ElTohamy, 2022[37]	USA	357	65,568	AIAN	≥ 18 years	NR	January to early June 2021	Cross-sectional survey of degree-seeking undergraduate students from the American College Health Association – National College Health Assessment III (ACHA-NCHA) survey which	• Mood disorders

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
								assesses various health and behavioral aspects of US college students, including questions and standardized scales that tap into the study participants' physical health, mental health, habits, and perceptions	
Fisher, 2022[38]	USA	86	399	AIAN	18 – 25 years Mean (SD): 21.30 (2.41)	Cisgender female: 46 (53.49%) Cisgender male: 23 (26.74%) Gender minority: 17 (19.77%)	April 2020	Online cross-sectional national survey of young adults	• Mood disorders
Fitzpatrick, 2020 (A)[39]	USA	104	10,368	Native American	≥ 18 years	Female: 51.0 %	Week of March 23, 2020	Online cross-sectional survey administered to a national panel of U.S. residents that participated in the IRB-approved survey	• Mood Disorders
Fitzpatrick, 2020 (B)[40]	USA	104	10,368	Native American	Mean (SD): 47.4 (17.7)	Female: 51% Male: 49%	Survey was released March 23, 2020	Online cross-sectional survey administered to a national panel of U.S. residents that participated	• Suicidality

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
								in the IRB-approved survey	
Flores, 2022[41]	Canada	13	13	Indigenous: Algonquin, White Fish River First Nation Ojibway, Métis, Six Nations, First Nations, Mi'kmaq	22 – 60 years	Female: 100%	Started March 2020	Cross-sectional interviews with Indigenous women included in a larger study on Missing and Murdered Indigenous women in Toronto	• Overall Mental Health • Substance and/or drug use
Fryberg, 2020[79]	USA	6,460	6,460	Unspecified	≥ 18 years	Transgender, non-binary, genderqueer or gender non-conforming: 4%	June 20, 2020 to August 16, 2020	Organizational report by *Indigenous Futures Project* based on the First annual Indigenous Futures Survey focusing on low-income peoples, reservation and rural communities, those who identify outside of the gender binary and college students	• Mood Disorders
Gerald, 2023[42]	USA	64	64	Native American	Child with asthma Mean (SD): 12.33	Female: 24 (37.5%) Male: 40 (62.5%)	September 7, 2020 to January 20, 2021	Cross-sectional interviews of parents of children with asthma from	• Mood Disorders • Overall mental health • Interpersonal

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
					(3.18)			families living on Navajo Nation and participating in the Community Asthma Program	relationships
Great Lakes Inter-Tribal Epidemiology Center (GLITEC), 2021[80]	USA	NR	NR	AIAN	NR	NR	NR	Organizational report based on a needs assessment cross-sectional survey conducted by the Great Lakes-Inter Tribal Epidemiology Center on Pregnant women, Postpartum women, Children and adolescents, Women of reproductive age, Families; and, Clinics and organizations	• Overall mental health • Interpersonal relationships
Hahmann, 2021[82]	Canada	600	600	First Nations, Inuit, Métis	≥ 15 years	NR	June 23 to July 6, 2020	Government report using cross-sectional survey data from the Impacts of COVID-19 on Canadians: Data Collection Series collected on "Living with	• Overall mental health

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
								Long-term Conditions and Disabilities"	
Hahmann, 2022[81]	Canada	4,907 (First Nations: 2,159; Inuit: 198; Métis: 2,504)	4,907	First Nations, Inuit, Métis	Median age First Nations: 40 Inuit: 37 Métis: 43	Women: 51% Men: 49%	March 8 to May 15, 2021	Government report on First Nations people living off reserve, Métis and Inuit people in the provinces from the Survey on Access to Health Care and Pharmaceuticals During the Pandemic (SAHCPDP)	• Mood disorders • Overall mental health
Hanson, 2021[43]	USA	62	62	AIAN	18 – 44 Mean (SD): 31.4 (6.7)	Female: 62 (100%)	October 2020 to January 2021	Cross-sectional study based on surveys collected from AI/AN women with an existing Alcohol-Use disorder who had completed the Native CHOICES (Native Center for Alcohol Research and Education—Changing High-risk Alcohol Use and Increasing	• Substance and/or drug use

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
								Contraception Effectiveness Study) intervention	
Hofmann, 2021[44]	USA	44	878	Native Americans, Native American/ First Peoples/ Indigenous	≥ 18 years	NR	2020, prior to COVID-vaccine being widely available	Cross-sectional analysis of survey data conducted using the Mechanical Turk (MTurk) platform to recruit respondents	• Mood disorders
Houkamau, 2021[83]	New Zealand	3,116	3,116	Māori	NR	NR	29 April to 29 November 2020	Report based on cross-sectional survey from The Māori Identity and Financial Attitudes Study (MIFAS), a longitudinal national probability study of Māori identity, financial attitudes and behavior	• Overall mental heath • Interpersonal relationships
Hrabok, 2021[45]	Canada	NR	6,041	First Nation, Inuit, Métis	All ages	NR	March 23, 2020 to March 30, 2020	Cross-sectional study from a baseline survey completed as part of a supportive texting program (Text4Hope), an	• Mood disorders

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
								intervention designed to offer mental health support at a general population level in an evidence-based manner	
Indspire, 2021[84]	Canada	3,178	3,178	First Nation, Inuit, Métis	NR	Female: 76% Male: 23% Other: 1%	December 17, 2020 to January 12, 2021	Organizational report funded by the government based on survey data collected from Building Brighter Futures: Bursaries, Scholarships, and Awards (BBF) applicants who were enrolled in a post-secondary program in the Summer or Fall of 2020 compared to results from the National Education Survey (NES)	• Overall mental health • Interpersonal relationships
Jefferies, 2022[46]	Australia	Pre-covid phase:105 During-COVID phase: 164	Pre-covid phase: 665 During-COVID phase: 1161	Aboriginal and/or Torres Strait Islander	Pre-covid Phase 14.7 – 78.2 Median: 42.9	Pre-covid Female: 59 (56.2%) Male: 46 (43.8%) During covid	Pre-COVID phase: January 25 to July 25 2019 During-	Retrospective study using electronic medical records for an urban	• Substance and/or drug use

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
					Mean (SD): 41.6 (11.9) During-COVID phase Range: 17.6 – 80.5 Mean (SD): 44.9 (11.9) Median: 46.1	Female: 90 (54.9%) Male: 74 (45.1%)	COVID phase: January 25 to July 25 2020	hospital, Westmead to compare substance use disorder ED admissions data before and during the early phase of the COVID-19 pandemic, when COVID-19 vaccination was not available in Australia	
Jenkins, 2022[47]	Canada	Round 1: 90 Round 2: 88 Round 3: 101	Round 1: 3000 Round 2: 3027 Round 3: 3034	Unspecified	>18 years	NR	Round 1: May 14 to May 19 2020 Round 2: September 14 to September 21 2020 Round 3: January 22 to January 28 2021	Online cross-sectional surveys offered to members of online Canada Voice Panel	• Overall mental health • Substance and/or drug use • Suicidality
John-Henderson, 2021[48]	USA	167	167	American Indian	Mean (SD): 33.99 (7.68)	NR	Wave 1: August 24, 2020 Wave 2: September, 2020 Wave 3: October, 2020 Wave 4:	Cross-sectional online survey of AI adults residing on the Blackfeet reservation	• Mood disorders

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
							November 30, 2020		
John-Henderson, 2020 (A)[49]	USA	210	210	American Indian	30 – 99 years Mean (SD): 55.09 (13.10)	Female: 59.5%	Wave 1: February 2020 Wave 2: April to May 2020	Online cross-sectional survey study of participants recruited from a Qualtrics research panel and social media advertising	• Mood disorders
John-Henderson, 2020 (B)[50]	USA	205	205	American Indian	30 – 99 years Mean (SD): 53 (13)	Female: 59.8% Male: 40.2%	Wave 1: February 2020 Wave 2: April to May 2020	Online cross-sectional survey study of participants recruited from a Qualtrics research panel and social media sites	• Mood disorders
Jones, 2022[85]	USA	NR	7,705	AIAN	NR	NR	January to June 2021	Government report based on cross-sectional survey data from the Adolescent Behaviors and Experiences Survey (ABES) on high School Students in America, grades 9-12	• Mood disorders • Overall mental health • Interpersonal relationships • Suicidality
Kannan, 2021[51]	Canada	22 school administrators and educators	22	First Nation	13 – 18	Female: 16 Male: 6	Sept 2020 & Oct 2020	Mix-methods qualitative study using semi-	• Overall mental health

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
								structured key informant interviews and focus group discussions via Zoom online meeting platform with school administrators and educators from schools in First Nations Reserves	
Kelley, 2022[86]	USA	141	141	AIAN	13 – 73 years Mean (SD): 25.69 (16.73)	Female: 41 (54%) Male: 33 (43%) Non-binary/third gender: 2 (3%)	March 2021	Organizational report based on online cross-sectional survey from Native PRIDE sent to all sites and previous The Good Road of Life attendees to document impacts of ICP and COVID-19	• Mood disorders • Interpersonal relationships
Koltai, 2022[52]	USA	NR	8,090	AIAN	≥ 18 years	NR	March 2020 to June 2021	Longitudinal internet-based surveys of vaccinated and non-vaccinated adults in the Understanding Coronavirus in America study conducted in 28 waves during the pandemic	• Mood disorders

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
Lawal, 2021[53]	Canada	302	8,267	Unspecified	All ages	Female: 263 (87.1%) Male: 32 (10.6%) Other: 7 (2.3%)	March 24 2020 to May 4 2020	Cross-sectional survey of participants from the Text4Hope program consisting of Albertans dealing with mental health concerns due to the COVID-19 pandemic	• Mood disorders
Lee, 2022[54]	Canada	106	106	First Nation	≥ 18 years	Female: 86 (81.1%) Male: 20 (18.9%)	April 24 to June 25, 2020	Cross-sectional online survey of people living in a First Nations community	• Mood disorders
Marumali Program and funded by The Healing Foundation, 2021[87]	Australia	60	60	Aboriginal and/or Torres Strait Islanders	≥ 19 years	Female: 39 (65%) Male: 20 (33%) Neither: 1 (2%)	November 2020	Organizational report based on an online cross-sectional survey of Stolen Generation survivors administered by the Marumali Program and funded by the Healing Foundation	• Overall mental health • Interpersonal relationships
McAuliffe, 2021 (A)[55]	Canada	209	7,002	Unspecified	>18 years	NR	Round 1: May 14 to May 29, 2020 Round 2: September	Survey data from three rounds of a mental health monitoring survey conducted as a part of the	• Suicidality

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
							14 to September 21, 2020 Round 3: January 22 to January 28, 2021	"Assessing the Impacts of COVID-19 on Mental Health" monitoring study	
McAuliffe, 2021 (B)[56]	Canada	85	2,903	Unspecified	≥ 18 years	NR	May 14 to May 29, 2020	Cross-sectional survey data from the first round of multi-round mental health monitoring survey conducted as a part of the "Assessing the Impacts of COVID-19 on Mental Health" monitoring study	• Mood disorders • Overall mental health • Suicidality
McCullen, 2022[57]	USA	210	210	American Indian	≥ 30 years Mean: 55	Female: 125 (59.5%)	Time 1: Feb 2020 Time 2: April 2020	Longitudinal surveys of adults who had participated in a cross-sectional survey before the start of the pandemic	• Mood disorders
New Zealand Ministry of Health, 2022[88]	New Zealand	Children: 416 Adults: 803	Children: 1,323 Adults: 4,434	Māori	All ages	NR	2021 to 2022	New Zealand Health Survey (NZHS) which provides information about the health and wellbeing of New Zealanders	• Mood disorders • Substance and/or drug use

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
Newby, 2020[58]	Australia	77	5,071	Aboriginal and/or Torres Strait Islander	≥ 18 years	NR	March 27 to April 7, 2020	Cross-sectional survey of participants recruited through social media posts	• Mood disorders
Ng, 2022[59]	New Zealand	2019: 40 2020: 24	2019: 115 2020: 116	Māori	≥18 years	NR	Mar 26, 2020 to Apr 27, 2020	Analysis of electronic clinical assessment forms of adult service users who had undergone psychiatric evaluation by the acute mental health team of a New Zealand district health board	• Overall mental health
Plett, 2022[60]	Canada	91	7,008	Unspecified	≥18 years	NR	7 timepoints between May 2020 and March 2021	Online cross-sectional survey data from Centre for Addictions and Mental Health (CAMH) and Methodify by Delvinia study, examining the Impact of COVID-19 on Mental Health and Substance Use among Canadians	• Mood disorders

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
Runkle, 2022[61]	USA	Pandemic Cohort: 2,226 Pre-pandemic cohort: 6,001	Pre-pandemic cohort: 125,826 Pandemic cohort: 53,671	AIAN	≤ 24 years	NR	Prepandemic: January 1, 2017 to March 12, 2020 Pandemic: March 12, 2020 to December 2, 2020	Analysis of data from a Crisis Text Line of youth seeking crisis support	• Suicidality
Sapara, 2021[62]	Canada	198	6,041	Unspecified	All ages	NR	March 23 to March 30 2020	Analysis of a baseline cross-sectional survey completed as part of a supportive texting program, Text4Hope for those seeking mental health support during the COVID-19 pandemic	• Suicidality
Shih, 2022[90]	USA	NR	NR	AIAN	All ages	NR	2019-2020	Report based on pooled data from the 2019 and 2020 California Health Interview Survey (CHIS), a detailed, continuous, state-wide phone and web survey of Californian households	• Overall mental health • Substance and/or drug use • Suicidality

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
SNAICC - Secretariat of National Aboriginal and Islander Child Care, 2021[89]	Australia	110	243	Aboriginal and/or Torres Strait Islanders	NR	NR	October to November 2020	Organizational report based on cross-sectional online survey of representatives of child and family sector organizations	• Overall mental health
Stanley, 2022[63]	USA	2,559	2,559	American Indian	Mean (SD): 14.7 (8.9)	Female: 1284 (50.2%) Male: 1201 (46.9%) Another gender: 70 (2.7%)	Spring 2021	Cross-sectional survey of reservation area students from grade 6 to 12 in schools partaking in Our Youth Our Future study	• Mood disorders
Sveticic, 2021[64]	Australia	Before COVID-19: 206 Since COVID-19: 158	Before COVID-19: 3299 Since COVID-19: 3190	Aboriginal and/or Torres Strait Islander	≥ 18 years	NR	Before COVID-19: March to Aug 2019 Since COVID-19: Mar to Aug 2020	Analyses of suicidal and self-harm presentations to 2 EDs in the Gold Coast Hospital and Health Service (GCHHS) using data from ED Information System and FirstNet	• Suicidality
Sylliboy, 2022[91]	Canada	149	149	First Nations, Inuit	NR	NR	May 20 to June 15, 2020	Cross-sectional survey of Two-Spirit and Indigenous LGBTQQIA+	• Overall mental health • Suicidality
Tao, 2021[65]	USA	79	407	Unspecified	15 – 18	NR	October 2020		• Mood

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
				Indigenous population	years Mean (SD): 16.47 (0.93)		to January 2021	Cross-sectional study based on an online survey of Black, East/Southeast Asian, Indigenous, or Latinx adolescents who had used social media at least 5 days a week in the past moth	disorders • Substance and/or drug use
The Trevor Project, 2021[92]	USA	~1,700	34,759	Unspecified Indigenous population	13 – 24 years	NR	October 12 to December 31 2020	Organizational report based on an online survey of LGBTQ youth	• Mood disorders • Overall mental health • Suicidality
Tiller, 2021[93]	Australia	952 (Aboriginal: 747; Torres Strait Islander: 112; Both: 93)	20,207	Aboriginal and/or Torres Strait Islander	15 – 19 years	Female: 47.4% Male: 44.0% Gender diverse: 7.0% Preferred not to say: 1.6%	April to August 2021	Organizational report based on cross-sectional survey data of young Australians who participated in the Mission Australia Youth Survey, the largest annual survey of young people in Australia.	• Overall mental health • Mood disorders • Interpersonal relationships • Substance and/or drug use
Tyra,, 2021[66]	USA	210	210	American Indian	30 – 99 years Mean	Female: 58.7%	Phase 1: A few weeks before	Longitudinal survey collected at two timepoints	• Mood disorders

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
					(SD): 54.85 (13.08)		pandemic declaration Phase 2: 7-8 weeks after pandemic declaration	before and during the pandemic	
Van Bewer, 2022[67]	Canada	17 (First Nation: 9; Métis: 7 Métis; Both: 1)	17	First Nation, Métis	17 – 50 years	Women: 100%	November 2021	Thematic analysis of Sharing Circle-style virtual interviews of Indigenous Nursing students	• Mood disorders • Interpersonal Relationships
Vreeke, 2022[68]	USA	134	178	AIAN	≥ 18 years	Female: 162 (96.4%) Male: 6 (3.60%)	Fall 2017 to Spring 2021 (Unclear)	Dissertation utilizing cross-sectional survey of Navajo Nation members participating in Yeego! Healthy Eating and Gardening Study	• Overall mental health • Mood disorders
Walker, 2021[94]	New Zealand	498	2,421	Māori	10 – 11 years	NR	May 8 to May 24 2020	Government report/policy brief based on findings from the Growing Up in New Zealand COVID-19 Wellbeing Survey of New Zealand children	• Mood disorders
Westrupp, 2023[95]	Australia	47	2,365	Aboriginal and/or Torres Strait Islander	Parents Mean: 38 Children Mean: 9	NR	April 8 to April 28, 2020	Cross-sectional survey of mothers and fathers who were parents of a child 0-18 years old from the	• Mood disorders • Substance and/or drug use

Study	Country	Indigenous Sample size	Study Sample Size	Indigenous Group	Age for Sample of Interest	Sex/Gender Distribution of Indigenous sample	Time Period for Data Collection	Source Description and/or Sources of Information	Mental Health Domain
								COVID-19 Pandemic Adjustment Survey (CPAS) compared to retrospective data from pre-pandemic population cohort	
Zhu, 2022[69]	USA	NR	3,142 USA Counties	AIAN	NR	NR	Jan 1 2020 to May 31 2020	Retrospective analysis of county-level data from the Centre for Disease Control and Prevention of USA Rural and Urban communities	• Substance and/or drug use

AIAN = American Indian and/or Alaska Native, NR = Not reported; USA = United States of America

Table 2.2 Distribution of Year of Publication for Included Documents

Year of Publication	Number of documents
2020[38,41,42,51,52,60,72-74,77,79,81]	12
2021[33,36,45-47,50,53,55,57,58,64,66-68,76,80,82,84-86,89,91,94-96]	25
2022[30-32,34,35,37,39,40,43,48,49,54,56,59,61-63,65,70,71,75,83,87,88,90,92,93]	28
2023[44,97]	2
Unclear[78]	1

Figure 2.2 Box and Whisker Plot of Sample Sizes for Documents that Reported an Indigenous Sample Size (n=59)

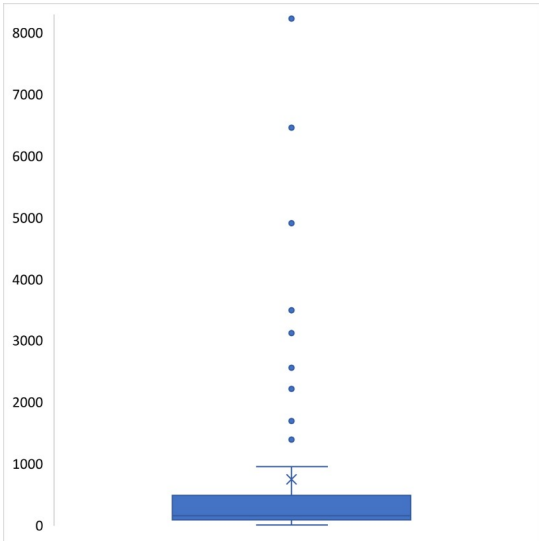

Figure 2.3 Box and Whisker Plot of Sample Sizes for Documents that Reported an Indigenous Sample Size with Outliers Eliminated for Clarity (n=50)

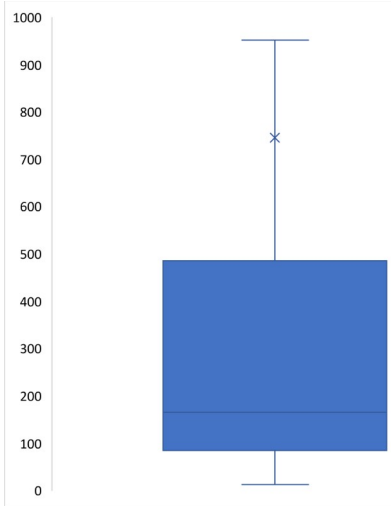

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Figure 2.4 Distribution of Country of Publication for Included Documents

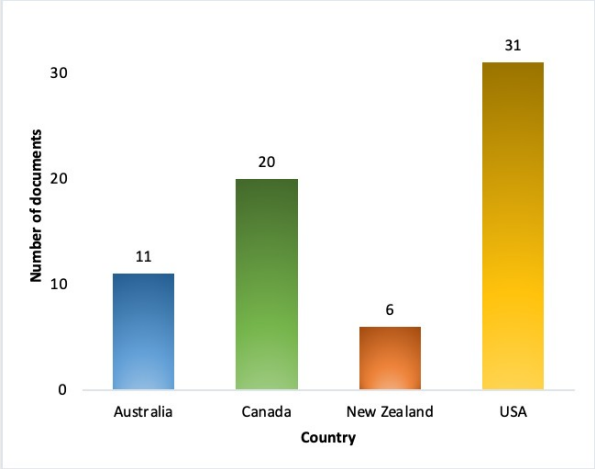

Figure 2.5: Time Periods of Data Collection for Included Documents

Orange = most recent data collection period Green = Periods of data collection for documents utilizing a repeated cross-sectional design, Yellow = Pre-pandemic periods of data collection for documents utilizing a retrospective study design

Table 2.3 Main Findings for Documents that Assessed Overall Mental Health in Indigenous Peoples During the COVID-19 Pandemic

Study	Country	Indigenous Sample size	Entire sample size	Indigenous Identity group	Age for sample of interest	Time period for data Collection	Outcomes	Assessment	Main Findings - Overall Mental Health
Anderson, 2022	USA	24,592 ED visits	107,761,319 ED visits	AIAN	18 – 64 years	January 1, 2019 to August 14, 2021	• Changes MH-related ED-visits during Selected Periods Before and During the COVID-19 Pandemic	• Administrative database	• Among AIAN persons, there was an increase in ED visit counts for all MH-related visits after a COVID-19 case peak (February 14, 2021-March 13, 2021) compared to a pre-pandemic period (February 10, 2019-March 9, 2019) • There was no significant difference in the proportion of MH-related ED visits for AIAN persons in the Delta period (July 18-August 14, 2021) compared with the pre-Delta period (April 18-May 15, 2021)
Arriagada, 2020	Canada	1,400	1,400	Indigenous	≥ 15 years	April 24 to May 11, 2020	• Overall Mental health	• Online questionnaire	• 60% of Indigenous participants reported that their mental health had worsened since the onset of physical distancing compared to 52% of non-Indigenous participants • Among Indigenous crowdsource participants: 38% reported fair or poor

Study	Country	Indigenous Sample size	Entire sample size	Indigenous Identity group	Age for sample of interest	Time period for data Collection	Outcomes	Assessment	Main Findings - Overall Mental Health
									mental health compared to 16% in the pre-pandemic period (2017)
ACS, Leger, 2020	Canada	450	1,959	Unspecified	≥ 18 years	May 1 to May 10th, 2020	• Self-rated mental health	• Online survey questions	• A higher proportion of Indigenous participants rated their mental health as bad (18%) or very bad (5%) since the beginning of the COVID-19 pandemic compared to non-visible minority respondents (12% and 2% respectively)
Biddle, 2021	Australia	Not reported	1,368	Aboriginal and/or Torres Strait Islander	2 – 17 years	August 10 to August 23, 2021	• Overall Mental health	• Survey questions	• While results were mostly neutral, there was indicative evidence that the mental health of children of Aboriginal and Torres Strait Islander parents/carers may have been more impacted by COVID-19 than non-Indigenous students; 71.2% of Aboriginal and/or Torres Strait Islander parents/carers reported that their child had a worsening in mental health outcomes due to COVID-19, compared to 60.2% of children of non-Indigenous

Study	Country	Indigenous Sample size	Entire sample size	Indigenous Identity group	Age for sample of interest	Time period for data Collection	Outcomes	Assessment	Main Findings - Overall Mental Health
									carers.
California Indian Education for All	USA	Not reported	Not reported	AIAN	NR	May to June, 2020	• Overall psychological well-being including feelings of anxiety and depression	• Survey questions	• 36% of AIAN parents/guardians reported that their children's overall psychological well-being, including feelings of anxiety and/or depression was worse than before the COVID-19 pandemic while 54% reported that it was about the same
Cordova-Marks, 2020	USA	20	20	AIAN	Caregiver: Mean: 46.5 Recipient of Care: Mean: 66.1	May to July 2020	• Changes in mental health due to caregiving during a pandemic	• Interview	• During an interview with AIAN caregivers, increased stress during the COVID-19 pandemic was a major theme that emerged with isolation due to the pandemic being a major factor. Caregivers also cited worsening mental health in the form of depression, anxiety, worry, frustration, panic attacks and fear for care recipients.
Department of Health, Victoria, Australia, 2021	Australia	3, 489	105,741	Aboriginal and/or Torres Strait Islander	All ages	2020-21 compared with previous years	• Receiving clinical mental health care • High or very high psychological distress	• Public mental health service data	• In 2020-2021, the number of Aboriginal Victorians receiving clinical mental health services increased compared to prior years. 3.3% of Aboriginal Victorians received mental

Study	Country	Indigenous Sample size	Entire sample size	Indigenous Identity group	Age for sample of interest	Time period for data Collection	Outcomes	Assessment	Main Findings - Overall Mental Health
									health services while making up only 0.5% of the state's population indicating that Aboriginal Victorians continue to be over-represented in clinical mental health services • In 2020, the proportion of Aboriginal adults with high or very high levels of psychological distress was significantly higher than the proportion in all Victorian adults (31.8% compared with 23.5%)
Flores, 2022	Canada	13	13	Indigenous	22 – 60 years	Started March 2020	• Change in mental health	• Interview	• In interviews with Indigenous Canadian women, mental health decline was one of the most prominent themes that emerged. This came in the form of exacerbation of existing mental health issues such as stress, anxiety and PTSD were reported triggered by the lockdown and the risk of contracting the virus
Gerald, 2023	USA	64	64	Native American	Child with asthma	September 7, 2020 to January 20,	• Change in mental health during the	• Interview	• Native American parents of asthmatic children experienced

Study	Country	Indigenous Sample size	Entire sample size	Indigenous Identity group	Age for sample of interest	Time period for data Collection	Outcomes	Assessment	Main Findings - Overall Mental Health
					Mean (SD): 12.33 (3.18)	2021	COVID-19 pandemic		negative changes in their children's mental health (50% of respondents) as well as their own (59.1% %) and household member's mental health (54.6%) during the pandemic
GLITEC, 2021	USA	Not reported	Not reported	AIAN	Not reported	Not reported	• Mental health concerns	• Survey	• Some or large increases in anxiety, depression, or other mental health concerns were reported in AIAN women who were pregnant (86.4%), postpartum (90.0%) or of reproductive age (96.9%)
Hahmann, 2021	Canada	600	600	First Nations, Inuit, Métis	≥ 15 years	June 23 to July 6, 2020	• Mental health during the COVID-19 pandemic	• Survey	• 64% of Indigenous participants reported somewhat or much worse mental health during the COVID-19 pandemic compared to 56% of non-Indigenous participants. • More Indigenous participants with disabilities reported worsened mental health compared to non-Indigenous participants
Hahmann, 2022	Canada	4,907 (First Nations: 2,159; Inuit:	4,907	First Nations, Inuit, Métis	Median age First Nations:	March 8 to May 15, 2021	• Overall Mental health	• Online questionnaire	• More Indigenous (20%) than non-Indigenous adults (10%) reported

Study	Country	Indigenous Sample size	Entire sample size	Indigenous Identity group	Age for sample of interest	Time period for data Collection	Outcomes	Assessment	Main Findings - Overall Mental Health
		198; Métis: 2,504)			40 Inuit: 37 Métis: 43				mental health conditions including depression and anxiety during the COVID-19 pandemic. • 38% of First Nations people, 37% of Métis, and 26% of Inuit people reported "somewhat worse" or "much worse" mental health during the pandemic compared to before compared to 36% of non-Indigenous Peoples
Houkamau, 2021	New Zealand	3,116	3,116	Māori	NR	29 April to 29 November 2020	• Overall Mental health	• Survey questions	• 508 (19.65%) Māori respondents reported adverse psychological outcomes (including stress, anxiety, sadness and in some cases, depression) compared to 342 (17.10%) who reported a positive mental experience during the pandemic. • Respondents reported worry and stress related to adverse financial stress, relationships, work and a decline in their living standards and circumstances during the pandemic
Indspire, 2021	Canada	3,178	3,178	First Nation, Inuit, Métis	NR	December 17, 2020 to January 12,	• Mental health and wellbeing	• Likert scale survey questions	• During the COVID-19 pandemic, there was a significant

Study	Country	Indigenous Sample size	Entire sample size	Indigenous Identity group	Age for sample of interest	Time period for data Collection	Outcomes	Assessment	Main Findings - Overall Mental Health
						2021			increase in mental health strain for Indigenous post-secondary learners • More students strongly agreed that their mental health was a challenge to their education during the pandemic (46%) than before the pandemic (29%) • 89% of students reported increased mental strain, feelings of being overwhelmed and stressed and anxiety and depression during the pandemic • 61% of respondents expressed having a pessimistic outlook on the future
Jenkins, 2022	Canada	Round 1: 90 Round 2: 88 Round 3: 101	Round 1: 3000 Round 2: 3027 Round 3: 3034	Unspecified	>18 years	Round 1: Mary 14 to May 19 2020 Round 2: September 14 to September 21 2020 Round 3: January 22 to January 28 2021	• Self-rated mental health	• Survey questions	• Across all three survey rounds, feeling anxious, worried and hopeless was reported in Indigenous adults • Being Indigenous was associated with a lower likelihood of reporting a decline in self-rated mental health compared to being non-racialized (aOR: 0.71 [95% CI: 0.53, 0.97])
Jones, 2022	USA	Not reported	7,705	AIAN	NR	January to June 2021	• Poor mental health during the	• Survey questions	• A significantly lower percentage of AIAN

Study	Country	Indigenous Sample size	Entire sample size	Indigenous Identity group	Age for sample of interest	Time period for data Collection	Outcomes	Assessment	Main Findings - Overall Mental Health
							pandemic • Poor mental health during the past 30 days		high school students reported poor mental health during the pandemic than Hispanic, non-Hispanic White and non-Hispanic multi-racial high school students • AIAN students did not significantly differ in their reports of poor mental health during the past 30 days
Kannan, 2021	Canada	22 school administrators and educators	21	First Nation	13 – 18	Sept 2020 & Oct 2020	• Overall mental health	• Semi-structured interview	• School administrators from schools in First Nations Reserves reported multiple mental health challenges faced by students and educators during the pandemic including anxiety, stress, fear of the pandemic, fear of death, and social deprivation. The pandemic was reported to have exacerbated existing mental health issues, which included stress and anxiety for students and educators.
Marumali Program/ The Healing	Australia	60	60	Aboriginal and/or Torres Strait Islanders	≥ 19 years	November 2020	• Decline in mental health and wellbeing • Ability to cope	• Survey questions	• 75% of Aboriginal and/or Torres Strait Islander respondents reported a decline in

Study	Country	Indigenous Sample size	Entire sample size	Indigenous Identity group	Age for sample of interest	Time period for data Collection	Outcomes	Assessment	Main Findings - Overall Mental Health
Foundation, 2021							with stress		mental health and wellbeing and 66% reported a decreased ability to cope with stress during the COVID-19 pandemic
McAuliffe, 2021 (B)	Canada	85	2,903	Unspecified	≥ 18 years	May 14 to May 29, 2020	• Mental Health during the pandemic	• Survey questions	• The likelihood of having worse mental health during the COVID-19 pandemic did not differ significantly between Indigenous and non-Indigenous respondents (aOR: 1.25 [95% CI: 0.76, 2.08]
Ng, 2022	New Zealand	2019: 40 2020: 24	2019: 115 2020: 116	Māori	≥18 years	Mar 26, 2020 to Apr 27, 2020	• Acute psychiatric presentations	• Audited data from electronic clinical assessment forms	• Māori had a 14% reduction in service usage from 2019 to the first lockdown while New Zealand European patients experienced a 10% increase in service usage within the same period
Shih, 2022	USA	Not reported	Not reported	AIAN	All ages	2019-2020	• Needed help for Emotional, Mental, or Addiction Problem in Past Year • Sought help and received treatment for self-reported mental/emotional and/or alcohol-drug issue	• Survey questions	• 25% of AIAN respondents reported a need for emotional, mental, or addiction problem during the COVID-19 pandemic. • 42% of AIAN persons reported that the sought help and received treatment for self-reported mental/emotional and/or alcohol-drug

Study	Country	Indigenous Sample size	Entire sample size	Indigenous Identity group	Age for sample of interest	Time period for data Collection	Outcomes	Assessment	Main Findings - Overall Mental Health
							• Suffered physical/mental health problems caring for a care recipient in past 12 months		issues • 22% of non-Hispanic AIAN persons reported that they suffered physical/mental health problems caring for a care recipient in the past 12 months during the COVID-19 pandemic
SNAICC, 2021	Australia	110	243	Aboriginal and/or Torres Strait Islanders	NR	October to November 2020	• COVID-19 impact on mental health and emotional well being	• Survey questions	• 68% of respondents believe COVID-19 had a negative impact on Aboriginal and Torres Strait Islander children's wellbeing with 70.08% reported a high to extreme impact on mental health and emotional wellbeing
Sylliboy, 2022	Canada	149	149	First Nations, Inuit	NR	May 20 to June 15, 2020	• Deterioration of mental health during the COVID-19 pandemic	• Survey questions	• Areas of concern for Two-Spirit individuals and Indigenous 2SLGBTQQIA+ people in Atlantic Canada were deterioration of mental health (56.32%), mental health supports (68.42%), health supports for Two-Spirit people (57.89%), healing gatherings (46.05%), and trans-specific supports (44.74%) as

Study	Country	Indigenous Sample size	Entire sample size	Indigenous Identity group	Age for sample of interest	Time period for data Collection	Outcomes	Assessment	Main Findings - Overall Mental Health
									interventions in fostering Two-Spirit health. • 35.78% of respondents indicated that they were concerned "a great deal" about their mental health during the pandemic • Respondents also indicated potential impacts of COVID-19 including concerns about an increase of depression (59.77%); increased suicidal thoughts (32.18%) a deterioration of individual mental health (56.32%); increased sexual violence (45.98%)
The Trevor Project, 2021	USA	~1,700	34,759	Unspecified	13 – 24 years	October 12 to December 31 2020	• Changes in mental health • Poor mental health status	• Survey questions	• 80% of Native/Indigenous LGBTQ youth reported that COVID-19 negatively impacted their mental health and 77% of Indigenous LGBTQ youth reported that their mental health was "poor" most of the time or always during COVID-19
Tiller, 2021	Australia	952 (Aboriginal: 747; Torres Strait	20,207	Aboriginal and/or Torres Strait Islander	15 – 19 years	April to August 2021	• Stress • Control over life • Concerns of Aboriginal and	• Survey questions	• Aboriginal and Torres Strait Islander young people were extremely or very

Study	Country	Indigenous Sample size	Entire sample size	Indigenous Identity group	Age for sample of interest	Time period for data Collection	Outcomes	Assessment	Main Findings - Overall Mental Health
		Islander: 112; Both: 93)					Torres Strait Islander youth		concerned about mental health (39.2%) and coping with stress (38.4%) • 48.9% of Aboriginal and Torres Strait Islander young people reported that mental health was a major barrier impacting their work or study goals during the COVID-19 pandemic and 45.7% reported that the COVID-19 pandemic had impacted the mental health of young people • About one in five (19.7%) Aboriginal and Torres Strait Islanders rated their mental health and wellbeing as poor
Vreeke, 2022	USA	134	178	AIAN	≥ 18 years	Fall 2017 to Spring 2021 (Unclear)	• Changes in mental health	• Survey questions	• AIAN parents of children in Navajo Nation schools reported that their mental health had gotten worse (14.8%) during the COVID-19 pandemic compared to those who reported that it had gotten better (14.2%) or stayed the same (47.1%) • Mean stress scores were higher among

Study	Country	Indigenous Sample size	Entire sample size	Indigenous Identity group	Age for sample of interest	Time period for data Collection	Outcomes	Assessment	Main Findings - Overall Mental Health
									those with worse mental health

AIAN = American Indian and/or Alaska Native, MH = mental health, ACS = Association for Canadian Studies, GLITEC = Great Lakes Inter-Tribal Epidemiology Center, aOR = adjusted odds ratio

Table 2.4 Structured Assessments Used to Examine Mental Health Outcomes in Included Documents

Measure	Description	Number of Items	Structure	Scoring Range
Alcohol Use Disorders Identification Test (AUDIT)[65]	Measure to assess alcohol use and related problems in the past year	10	10 questions each with a 5-point scale (0-4)	0-40
Brief Encounter Psychosocial Instrument (BEPSI)[75]	Measure of the interactional model of stress used to examine how the stress of COVID-19 impacted individuals and to observe whether the pandemic is perceived as benign or a threat.	6	6 closed ended questions	0-12
Center for Epidemiologic Studies Depression Scale (CES-D)[39,65,75,94]	Self-report measure of frequency of depressive symptoms such as restless sleep, poor appetite, and feelings of loneliness	20	20 questions each with a four-level response (0-3)	0-6-
CoRonavIruS Health Impact Survey (CRISIS V0.3)[31,63]	Survey developed and validated early in the COVID-19 pandemic to provide a general measure of mental distress and resilience due to the COVID-19 pandemic	-	Sections on COVID-19 concerns and impacts, daily behaviors, Emotions/Worries, Open Ended Queries about the COVID-19 pandemic	-
Depression Anxiety Stress Scale (DASS)[58]	Validated measure of depression, anxiety and stress symptoms with 7-item subscales for depression, anxiety and stress	21	21-questions with three 7-item subscales for depression, anxiety and stress. Total scores are obtained by multiplying the scores from each subscale by 2	0-30 for depression, 0-34 for anxiety, 0-38 for stress
Depression Rating scale[34]	Measure for depressive symptoms for nursing-home residents	7	7 item scale for use in nursing homes- created from the Hamilton Depression Scale and Cornell scale	0-14
Generalized Anxiety Disorder (GAD-2)[32,54]	Brief measure used as initial screening tool for generalized anxiety disorder with respondents being asked to estimate the frequency of two symptoms (depression and anhedonia) over	2	2 questions each with a four-level response (0-3)	0-6

	the past two weeks			
Generalized anxiety disorder (GAD-7)[31,36,38,39,44,45,53,60,65,71]	Measure of symptoms of generalized anxiety disorder in the two weeks prior to completing the survey	7	7 questions each with a four-level response (0-3)	0-21
Hospital Anxiety and Depression Scale (HADS)[57,50]	Measure for depression and anxiety with 14 total items - seven tems in the depression subscale, and seven items in the anxiety subscale.	4	4 questions each with a 4-point response category (0–3)	0--21
Impact of Event Scale-Revised (IES-R)[66]	Self-report measure to assess subjective distress caused by traumatic events	22	22 items each with a 5-point scale (0-4)	0-88
Kessler-Psychological Distress Scale (K-6)[37]	Measure of psychological distress based on emotional states in the past month	6	6 questions each with a five-level response (0-4)	0-24
Kessler-Psychological Distress Scale (K-10)[70]	Measure of psychological distress based on 10 questions each with a five-level response scale about emotional states	10	10 questions each with a five-level response (0-4)	10-50
Patient Health Questionnaire (PHQ-2)[32,54]	Self-report screening instrument for symptoms of depression (e.g., little interest or pleasure in doing things, feeling down, depressed, or hopeless) in the two weeks prior to completing the survey	2	2 questions each with a four-level response (0-3)	0-6
Patient Health Questionnaire (PHQ-4)[52]	Self-report screening instrument for symptoms of depression in the two weeks prior to completing the survey	4	4 questions each with a four-level response (0-3)	0-12
Patient Health Questionnaire (PHQ-8)[36]	Self-report screening instrument for symptoms of depression in the two weeks prior to completing the survey	8	8 questions each with a four-level response (0-3)	0-24
Patient Health Questionnaire (PHQ-9)[31,38,53,62]	Self-reported measure symptoms of depression on a Likert scale	9	9 questions each with a four-level response (0-3)	0-27

	from zero (not at all) to three (nearly every day) (Sapara et al. used only question 9 on the PHQ-9 - Thoughts that you would be better off dead, or of hurting yourself in the last two weeks)			
Patient-Reported Outcomes Measurement Information System (PROMIS) Anxiety Scale[94]	Person-centered measures designed to evaluate and monitor, mental health (anxiety) in adults and children.	7	7 items each with a 5-point scale (1-5)	7-35
Perceived Stress Scale (PSS-10)[50,53]	Measure of general perceived psychological stress in the past month	10	10 questions each with a 5-level response (0-4). PSS-10 scores are obtained by reverse scoring responses on the 4 positively stated items and then summing across all 10 items.	2-30
Perceived Stress Scale (PSS-4)[68]	Brief measure of subjective psychological stress in the past month	4	4 responses to a single question (0-3)	0-8
Post-Traumatic Stress Disorder (PTSD) Checklist – Civilian version (PCL-6)[36]	Measure of post-traumatic stress symptoms (e.g., repeated, disturbing memories, thoughts, or images of a stressful experience from the past; feeling very upset when something reminded them of a stressful experience from the past)	6	6-questions each with a five-level response (1-5)	6-30
Suicide Behavior Questionnaire (SBQ-R)[40]	Measure of suicidal ideation and attempts in the previous twelve months	4	4 questions	3-18

Table 2.5 Main Findings for Studies that Used Structured Assessments to Evaluate Mood Disorders in Indigenous Peoples during the COVID-19 Pandemic

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time Period for Data Collection	COVID-19 Pandemic-related Outcomes	Measurement	Validated Measure Findings	Other Main Findings for Studies that Used Validated Measurements to Assess Mood Disorders
Akuhata-Huntington, 2020	New Zealand	351	Māori	≥16 years	During lockdown after March 25th, 2020	• Psychological distress • Emotional impacts of the COVID-19 pandemic	• Psychological distress: K10 scale • Survey questions • Qualitative commentary	• K-10 scale results • The average weighted K-10 score was 27, meaning that on average, students were likely to have a moderate disorder • K-10 scale categorization of students • Likely to have a mild disorder: 63 (21.3%) • Likely to have a moderate disorder: 62 (19.6%) • Likely to have a severe disorder: 109 (37.5%) • Likely to be well: 21.6%	• Māori students reported feeling more anxious (75.5%), sad (52.2%), and worried (83.6%) during the COVID-19 pandemic lockdown in comparison to before
Arriagada, 2020	Canada	1,400	Indigenous	≥ 15 years	April 24 to May 11, 2020	• Anxiety • High stress	• Anxiety: GAD-7 • Online survey questions	• 41% of Indigenous participants reported symptoms consistent with moderate or severe anxiety (GAD-7 ≥ 10) compared with 25% of non-	• 40% of Indigenous participants described most days as “quite a bit stressful” or “extremely stressful”

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time Period for Data Collection	COVID-19 Pandemic-related Outcomes	Measurement	Validated Measure Findings	Other Main Findings for Studies that Used Validated Measurements to Assess Mood Disorders
								Indigenous participants	compared with 27% of non-Indigenous participants
Brotto, 2021	Canada	204	Unspecified	25 – 69 years	August 20, 2020 to March 1, 2021 Pre-COVID: Prior to mid-March 2020 Phase 1: Mid-March 2020 to mid-May 2020 Phase: 2/3: Mid-May 2020 to November 2020 Phase 2/3_2: Mid-May 2020 to August 2020 Phase 4: September 2020 to October 2020	• Depression • Anxiety • Pandemic stress	• Depression: PHQ-9 • Anxiety: GAD-7 • Pandemic stress: CRISIS V0.3.	• Those who identified as Indigenous had significantly higher GAD-7, PHQ-9, CRISIS scores (i.e., more mental health symptoms) than those who did not identify as Indigenous at all timepoints measured during the pandemic.	• Self-identified Indigenous status was a significant predictor of all psychosocial outcomes at all phases during the pandemic (Indigenous individuals experiencing more symptoms, p < .0001) while this difference was not significant during the pre-COVID-19 period.
Burnett, 2022	Canada	246	Unspecified	≥ 16 years	April 23 2020 to November 30 2020	• Depression • Anxiety	• Depression: PHQ-2 • Anxiety: GAD-2	• 99 (40%) reported symptoms of depression • 110 (45%) reported	• There was a high prevalence of self-reported

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time Period for Data Collection	COVID-19 Pandemic-related Outcomes	Measurement	Validated Measure Findings	Other Main Findings for Studies that Used Validated Measurements to Assess Mood Disorders
								symptoms of anxiety	symptoms of depression (40%) and anxiety (45%) among the Indigenous participants the study
Burton, 2020	USA	109	AIAN	21 – 75 years Mean: 43.1	May to July, 2020	• Depression • Anxiety regarding COVID-19 news reports • Stress and fatigue	• Depression: CES-D • Anxiety: survey questions • Stress and fatigue: BEPSI	• CES-D • For AIAN, the mean (SD) CES-D score increased from before COVID-19; 13.38 (11.27) to since COVID-19; 20.50 (12.66). The mean increase in scores for depressive symptoms was 7.12, [95% CI: 4.88, 9.26], p<0.0005 • BEPSI • For AIAN persons, the mean (SD) BEPSI score before COVID-19 was 3.94 (3.07) and since COVID-19 was 5.47 (2.94). The mean increase in overall stress scores was 1.54, [95% CI: 0.92, 2.15], p<0.0005	• Both AIAN and non-Hispanic White populations exhibited significantly more CES-D depressive symptoms (+7.12 and +7.71 respectively) began although overall depression scores for AIAN participants were higher than non-Hispanic whites, both before and since COVID-19. • Higher BEPSI stress scores were observed for both AIAN and non-Hispanic Whites during the COVID-19 pandemic. Stress levels increased by 41% for AIAN persons and 12% for non-Hispanic

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time Period for Data Collection	COVID-19 Pandemic-related Outcomes	Measurement	Validated Measure Findings	Other Main Findings for Studies that Used Validated Measurements to Assess Mood Disorders
									Whites since COVID-19 began
Cheung, 2021	New Zealand	549 in year 2019 538 in year 2020	Māori	≥ 60 years	Period 1: 21 March 2020 to 8 June 2020 Period 2: 21 March 2019 to 8 June 2019	• Depression	• Depression Rating scale	• Depression Rating Scale • Depression Rating Scale categorization of Māori ARC residents • 437 (79.6%) of Māori were classified as no to minimal depression in 2019 compared to 428 (79.6%) in 2020 • 79 (14.4%) of Māori were classified as moderate depression in 2019 while 89 (16.5%) were in this category in 2020 • 33 (6.0%) of Māori were classified as severe depression in 2019 while 21 (3.9%) were in this category in 2020 • There were no significant differences between classifications in 2019 and 2020, p=0.197	• Depression among older Māori Peoples living in ARC was largely unaffected between the first wave of COVID-19 which included a nationwide lockdown and the comparative period (2019). • New Zealand European ARC residents reported more severe depressive symptoms in 2020 than in 2019.
D'Amico, 2020	USA	52	AIAN	12 – 16 years	May to July 2020	• Depression • Anxiety	• Depression: PHQ-8	• 18% of the sample	• AIAN teens reported

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time Period for Data Collection	COVID-19 Pandemic-related Outcomes	Measurement	Validated Measure Findings	Other Main Findings for Studies that Used Validated Measurements to Assess Mood Disorders
				Mean (SD): 14.0 (1.31)		• Post-traumatic stress symptoms (PTSS)	• Anxiety: GAD-7 • PTSS: PCL-6	reported clinically significant anxiety (GAD-7 ≥ 10) • 22% reported clinically significant depression (PHQ-8 ≥ 10) • 28% of youth met criteria for PTSD on the posttraumatic symptom scale (PCL-6 ≥ 14). The average PCL-6 score for the sample was 11.12 (SD 5.58)	significant anxiety and depressive symptoms in the previous two weeks. About one in five met clinically significant thresholds for anxiety and depression, and one in four met criteria for PTSD.
ElTohamy, 2022	USA	357	AIAN	≥ 18 years	January to early June 2021	• Moderate-to-serious psychological distress based on COVID-19 experiences – having tested positive for COVID-19, having lost a loved one to COVID-19, or having experienced financial hardship due to the	• Psychological distress: K-6	• Adjusted OR for having moderate-to-serious psychological distress based on the COVID-19 experiences in American Indian individuals (K-6 ≥ 9): 0.863 (0.616–1.211)	• The adjusted odds ratio of developing psychological distress was not significant in American Indian individuals compared to White individuals after accounting for COVID-19 experiences – having tested positive for COVID-19, having lost a loved one to

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time Period for Data Collection	COVID-19 Pandemic-related Outcomes	Measurement	Validated Measure Findings	Other Main Findings for Studies that Used Validated Measurements to Assess Mood Disorders
						COVID-19 pandemic.			COVID-19, or having experienced financial hardship due to the COVID-19 pandemic.
Fisher, 2022	USA	86	AIAN	18 – 25 years Mean (SD): 21.30 (2.41)	April 2020	• Depression • Anxiety	• Depression: PHQ-9 • Anxiety: GAD-7	• The average PHQ-9 score for AIAN was 1.36 (.83) • The average GAD-7 score for AIAN was 1.47 (.84)	• There were no racial differences for depression but AIAN respondents reported higher levels of anxiety than Asian respondents
Fitzpatrick, 2020 (B)	USA	104	Native American	≥ 18 years	Week of March 23, 2020	• Depression • Anxiety • Fear, worry, and threat of the COVID-19 pandemic	• Depression: CES-D • Anxiety: GAD-7 • Survey questions	• Being Native American compared to being non-Native American was not significantly associated with depression (CES-D ≥ 16) or anxiety (GAD ≥ 15)	• Native Americans respondents reported less fear, worry, and feeling less threat due to COVID-19 than their non-Native American respondents. • Being Native American compared to being non-Native American was not significantly associated with depression or anxiety
Hofmann, 2021	USA	44	Native Americans,	≥ 18 years	2020	• Anxiety	• Anxiety: GAD-7	• GAD-7 Mean Anxiety score	• Indigenous

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time Period for Data Collection	COVID-19 Pandemic-related Outcomes	Measurement	Validated Measure Findings	Other Main Findings for Studies that Used Validated Measurements to Assess Mood Disorders
			Native American/ First Peoples/ Indigenous					• Native American/First Peoples/Indigenous: 16.14 ($p<0.01$ compared to Caucasian (13.43)	respondents along with other BIPOC respondents, reported significantly more anxiety than Caucasian-identified respondents, higher personal and occupational risk of exposure to COVID-19, and more pandemic-related problems across six major areas of daily functioning
Hrabok, 2021	Canada	Not reported	First Nation, Inuit, Métis	All ages	March 23, 2020 to March 30, 2020	• Anxiety	• Anxiety: GAD-7	• Indigenous respondents had a higher likelihood of moderate to high anxiety than other ethnic groups • OR [95% CI]: 1.23 (1.1, 1.75)	• Respondents who identified as Indigenous had a higher likelihood of presenting with moderate to high anxiety compared to Caucasian, Asian and *other* racial groups
John-Henderson, 2021	USA	167	American Indian	Mean (SD): 33.99 (7.68)	Wave 1: August 24, 2020 Wave 2: September, 2020	• Covid-19 specific Psychological stress • Depression and anxiety	• Covid-19 specific Psychological stress: survey questions • Depression	• Mean (SD) COVID Stress over waves • Wave 1:3.08 (1.36) • Wave 2: 3.37 (1.28) • Wave 3: 4.05 (1.45) • Wave 4: 3.66 (1.24)	• Among AI adults on the Blackfeet reservation, COVID-19 psychological stress increased

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time Period for Data Collection	COVID-19 Pandemic-related Outcomes	Measurement	Validated Measure Findings	Other Main Findings for Studies that Used Validated Measurements to Assess Mood Disorders
					Wave 3: October, 2020 Wave 4: November 30, 2020	symptoms	and anxiety symptoms: HADS	• Mean (SD) scores over the study • Depressive Symptoms: 11.17 (1.39) • Anxiety Symptoms: 10.62 (1.90) • COVID Stress: 3.54 (1.19)	from August to October 2020. Better sleep health in this community was correlated with lower anxiety symptoms but not depressive symptoms
John-Henderson, 2020 (A)	USA	210	American Indian	30 – 99 years Mean (SD): 55.09 (13.10)	Wave 1: February 2020 Wave 2: April to May 2020	• COVID-19-specific psychological stress	• Survey questions	• Psychological stress scale	• COVID-19 pandemic-related psychological stress was significantly associated with greater reports of childhood trauma after controlling for age, sex and income ($p < .001$). • Childhood trauma predicted changes in sleep quality associated with COVID-19 pandemic-related stress
John-Henderson, 2020 (B)	USA	205	American Indian	30 – 99 years Mean (SD): 53 (13)	Wave 1: February 2020 Wave 2: April to May 2020	• Psychological stress • COVID-19 specific stress	• Psychological stress: PSS-10 • COVID-19 specific stress: Survey questions • Depression and anxiety	• PSS-10 scores: Mean (SD) • Time 1: 10.74 (5.43) • Time 2: 16.13 (7.50) • Average change from Time 1 to	• AI adults who thought more frequently about historical loss associated with the colonization and genocide of their people were found to

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time Period for Data Collection	COVID-19 Pandemic-related Outcomes	Measurement	Validated Measure Findings	Other Main Findings for Studies that Used Validated Measurements to Assess Mood Disorders
							symptoms: HADS	Time 2 (SD): 4.83 (6.18) • COVID-specific stress: Mean (SD) • 3.31 (1.70) • Anxiety symptoms: Mean (SD): 6.96 (5.22) • Depressive symptoms: Mean (SD): 5.91 (4.68)	experience a significantly higher increase in psychological stress (p=0.001) from Time 1 (before the declaration of COVID-19 as a pandemic) to Time 2 (one month following the declaration of the pandemic) after adjusting for anxiety and depression symptoms at Time 1 • Anxiety and depression symptoms did not predict psychological stress due to the COVID-19 pandemic
Koltai, 2022	USA	Not reported	AIAN	≥ 18 years	March 2020 to June 2021	• Psychological distress	• PHQ-4	• NR	• Non-Hispanic AIAN respondents had the largest declines in psychological distress after vaccination compared to non-Hispanic White and non-Hispanic

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time Period for Data Collection	COVID-19 Pandemic-related Outcomes	Measurement	Validated Measure Findings	Other Main Findings for Studies that Used Validated Measurements to Assess Mood Disorders
									Black respondents ($p<0.001$)
Lawal, 2021	Canada	302	Unspecified	All ages	March 24 2020 to May 4 2020	• Stress symptoms • Depression symptoms • Anxiety symptoms	• Stress symptoms: PSS-10 • Anxiety symptoms: GAD-7 • Depression symptoms: PHQ-9	• Indigenous respondents with moderate or high stress (PSS-10 ≥ 14): 279 (92.1%); Mean (SD): 22.56 (6.36) • Indigenous respondents with anxiety likely (GAD-7 ≥ 10): 144 (51.8%); Mean (SD): 10.56 (5.91) • Indigenous respondents with major disorder likely (PHQ-9 ≥ 10): 149 (52.8%); Mean (SD): 11.10 (6.50)	• Respondents who identified as Indigenous reported higher levels of depression, anxiety, and stress than other ethnic groups in Alberta, Canada as measured by the PHQ-9, GAD-7, and PSS-10, respectively
Lee, 2022	Canada	106	First Nation	≥ 18 years	April 24 to June 25, 2020	• Generalized anxiety • Depressive symptoms	• Depressive symptoms: PHQ-2 • Generalized anxiety: GAD-2	• Indigenous respondents who screened positive for depressive symptoms (PHQ-2 ≥ 3): 18 (18.3%); Mean (SD) – Male: 0.67 (0.84), Female: 1.66 (1.59) • Indigenous respondents who screened positive for anxiety symptoms (GAD-2 ≥ 3): 21 (21.4%);	• 18 (18.3%) of Indigenous respondents who completed the PHQ-2 screened positive for depressive symptoms • No significant differences were found when examining PHQ-2 scores by age, marital status, income,

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time Period for Data Collection	COVID-19 Pandemic-related Outcomes	Measurement	Validated Measure Findings	Other Main Findings for Studies that Used Validated Measurements to Assess Mood Disorders
								Mean (SD) – Male: 1.11 (1.41), Female: 1.85 (1.61)	employment status, education, existing medical condition, or number of people in per household. • 21 (21.4%) of Indigenous respondents who completed the GAD-2 screened positive for anxiety symptoms
McCullen, 2022	USA	210	American Indian	≥ 30 years Mean: 55	Time 1: Feb 2020 Time 2: April 2020	• Psychological stress • Depression and anxiety symptoms	• Psychological stress: PSS-10 • Depression and anxiety symptoms: HADS	• NR	• Among AI adults, changes in both psychological stress and symptoms of depression and anxiety during the COVID-19 pandemic were observed between Time 1 (one month prior to the onset of the COVID-19 pandemic) and Time 2 (one month following the declaration of the pandemic) • These changes were significantly predicted by high levels of childhood

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time Period for Data Collection	COVID-19 Pandemic-related Outcomes	Measurement	Validated Measure Findings	Other Main Findings for Studies that Used Validated Measurements to Assess Mood Disorders
									adversity when moderated by the emotional regulation strategy of expressive suppression (inhibition of emotional expression to an emotion eliciting situation)
New Zealand Ministry of Health, 2022	New Zealand	Adults: 803	Māori	All ages	2021 to 2022	• Psychological distress	• K-10 scale	• NR	• Māori adults were 1.5 times as likely to have experienced psychological distress as non-Māori adults after adjusting for age and gender
Newby, 2020	Australia	77	Aboriginal and/or Torres Strait Islander	≥ 18 years	March 27 to April 7, 2020	• Depression, anxiety, and stress symptoms • Anxiety	• Depression, anxiety and stress symptoms: DASS 21-item	• Identifying as Aboriginal or Torres Strait Islander predicted worse anxiety (p=0.04) and stress levels (p=0.03) but not depression (p=0.11) on the DASS subscales	• Identifying as Aboriginal or Torres Strait Islander predicted worse anxiety and stress levels but not depression on the DASS subscales during the COVID-19 pandemic
Plett, 2022	Canada	91	Unspecified	≥18 years	7 timepoints between May 2020 and March 2021	• Anxiety symptoms	• GAD-7	• Higher severity of anxiety (GAD-7 ≥ 10) was reported among Indigenous and individuals, compared to	• Higher severity of anxiety (GAD-7 ≥ 10) during the COVID-19 pandemic was reported among

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time Period for Data Collection	COVID-19 Pandemic-related Outcomes	Measurement	Validated Measure Findings	Other Main Findings for Studies that Used Validated Measurements to Assess Mood Disorders
								Whites, and less severity was reported by Blacks	Indigenous and individuals, compared to Whites, and less severity was reported by Blacks
Stanley, 2022	USA	2,559	American Indian	Mean (SD): 14.7 (8.9)	Spring 2021	• Feelings of depression • Feelings of anxiety	• CRISIS V0.3	• NR	• 40.2% female AI students reported feeling more depressed during the pandemic than before compared to 24.4% of male AI students and 61% of *other* gender students • 39.2% female AI students reported feeling more anxious during the pandemic than before compared to 21.8% of male AI students and 65.1% of *other* gender students • A significantly greater percentage of male AI students compared with females, reported less negative affect and experiences since COVID-19 began for all

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time Period for Data Collection	COVID-19 Pandemic-related Outcomes	Measurement	Validated Measure Findings	Other Main Findings for Studies that Used Validated Measurements to Assess Mood Disorders
									measures, while females were significantly more likely to report more negative affect and experiences compared with males
Tao, 2021	USA	79	Unspecified	15 – 18 years Mean (SD): 16.47 (0.93)	October 2020 to January 2021	• Depression • Anxiety	• Depression: CES-D • Anxiety: GAD-7	• Indigenous youth who met the clinical cut off score for depression (CES-D > 22): 31 (39.24%); Mean (SD) CES-D: 20.28 (10.47) • Indigenous youth who met the clinical cutoff for severe anxiety (GAD-7 > 14): 27 (34.18%); Mean (SD) GAD-7: 11.11 (6.29)	• Indigenous youth reported significantly higher risks of depressive and anxiety symptoms than black and Asian participants.
Tyra, 2021	USA	210	American Indian	30 – 99 years Mean (SD): 54.85 (13.08)	Phase 1: A few weeks before pandemic declaration Phase 2: 7-8 weeks after pandemic declaration	• COVID-19 related PTSS	• Covid-19-related PTSS: IES-R	• Among AI adults, significantly less PTSS due to the pandemic was reported in individuals who reported greater use of reappraisal as an emotion regulation strategy prior to the pandemic • Conversely, higher	• Among AI adults, significantly less PTSS due to the pandemic was reported in individuals who reported greater use of reappraisal as an emotion regulation strategy prior to the pandemic (p =

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time Period for Data Collection	COVID-19 Pandemic-related Outcomes	Measurement	Validated Measure Findings	Other Main Findings for Studies that Used Validated Measurements to Assess Mood Disorders
								PTSS was reported in AI adults who reported greater use of suppression as a strategy for emotional regulation	0.001) • Conversely, higher PTSS was reported in AI adults who reported greater use of suppression as a strategy for emotional regulation (p=0.003) • Associations were adjusted for age, sex, income, reservation status, alcohol use, anxiety, and depression.
Vreeke, 2022	USA	134	AIAN	≥ 18 years	Fall 2017 to Spring 2021 (Unclear)	• Perceived Stress	• Perceived Stress: PSS-4	• Mean (SD) stress scores – Worse mental health since pandemic: 4.9 (1.41), Same or better mental health since the pandemic: 3.09 (1.46)	• Navajo Nation adults who reported worse mental health during the COVID-19 pandemic had significantly higher mean stress scores
Walker, 2021	New Zealand	498	Māori	10 – 11 years	May 8 to May 24 2020	• Depression • Anxiety	• Depression: CES-DC-10 • Anxiety: PROMIS	• At the time of the Wellbeing survey, mean depression scores for Māori children were not significantly different than those of European children	• The anxiety and depression scores of Māori children did not significantly differ from that of European children at the time of the well-being survey

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time Period for Data Collection	COVID-19 Pandemic-related Outcomes	Measurement	Validated Measure Findings	Other Main Findings for Studies that Used Validated Measurements to Assess Mood Disorders
								• At the time of the Wellbeing survey, mean Anxiety scores for Māori children were, on average, 0.58 less than European children, p=0.331	during the COVID-19 pandemic • Average depression scores decreased over time for Māori children compared to European children (between the time before and during the COVID-19 pandemic) • Average anxiety scores did not significantly differ over time in Māori children compared to European children (between the time before and during the COVID-19 pandemic)

AIAN = American Indian and/or Alaska Native, NR = Not reported

Table 2.6 Main Findings for Studies that Used Other Measurements to Assess Mood Disorders in Indigenous Peoples During the COVID-19 Pandemic

Study	Country	Indigenous Sample size	Indigenous Group	Age for Sample of Interest	Time Period for Data Collection	MH Outcomes	Assessment	Mood Disorders (Without Validated Measures)
Allan, 2022	Australia	60	Aboriginal and/or Torres Strait Islander (First Nation)	≥ 18 years	July to August, 2020	• COVID-19 related anxiety	• Likert scale questions	• A much higher level of anxiety and fatalism was observed amongst First Nations respondents than non-First Nation respondents • First Nations respondents perceived COVID-19 to be more harmful than non-First Nations respondents (78.3% versus 61.1%, p=0.028) and perceived a higher danger and vulnerability from the virus (47.4%, versus 5.6% p=0.000) than non-First Nation respondents
Anderson, 2022	USA	24,592 ED visits	AIAN	18 – 64 years	January 1, 2019 to August 14, 2021	• Anxiety related ED visits • Depression related ED visits • Trauma and stressor related ED visits	• Administrative database	• Among AIAN persons, there were moderate to high increases in ED visit counts for depressive (9.9%) and trauma and stressor-related disorders (42.4%) respectively after a COVID-19 case peak index period to another peak (February 14, 2021-March 13, 2021) to during another peak (December 27, 2020-January 23, 2021). • Anxiety–related ED visit counts remained stable for AIAN persons during the same period • AIAN persons had a decrease in trauma and stressor related

Study	Country	Indigenous Sample size	Indigenous Group	Age for Sample of Interest	Time Period for Data Collection	MH Outcomes	Assessment	Mood Disorders (Without Validated Measures)
								ED visits (−25.0%) but a moderate increase in anxiety related ED visits (9.9%) in the Delta period (July 18-August 14, 2021) compared with a pre-Delta period (April 18-May 15, 2021). • Depressive disorders ED visit counts were stable for in AIAN persons during the same period
ACS, Leger, 2020	Canada	450	Unspecified	≥ 18 years	May 1 to May 10th, 2020	• Fear of contracting the Coronavirus (or that someone in their family will contract the virus)	• Online survey questions	• Indigenous Peoples fared worse than other groups in terms of mental health with a higher proportion of Indigenous males (54%) reporting a higher perceived danger of contracting the COVID-19 virus compared to non-Indigenous males (49%) • A higher proportion of Indigenous males than non-Indigenous males also reported fear that someone in their family would contract the COVID-19 virus (70% versus 60%) • About the same proportion of Indigenous females and non-Indigenous females reported fear of contracting the COVID-19 virus (59% and 61%) and fear that someone in their family would contract the virus (71% and 73% respectively)
Australian	Australia	199	Aboriginal and/or Torres	9 – 17 years	January 31 to March 20,	• Worry about catching or	• Survey questions	• Aboriginal and/or Torres Strait Islander children reported

Study	Country	Indigenous Sample size	Indigenous Group	Age for Sample of Interest	Time Period for Data Collection	MH Outcomes	Assessment	Mood Disorders (Without Validated Measures)
Human Rights Commission - drafted by Hand, 2022			Strait Islander		2022	spreading COVID-19		causes of worry during the COVID-19 pandemic including less time with family and friends in person, missing out on things and worry about catching or spreading COVID-19.
Fryberg, 2020	USA	6,460	Unspecified	≥ 18 years	June 20, 2020 to August 16, 2020	• Depression • Stress	• Survey questions	• 31% of Indigenous participants reported feeling depressed fairly often or very often • 54% of Indigenous participants reported feeling frustrated fairly often or very often • 63% of Indigenous participants reported feeling stressed often or very often • These proportions were increased in participants whose household income was <$44,999 and decreased in participants who lived in rural areas • 40% percent of participants were in college at the time of the pandemic reported that, feeling depressed fairly often or very often while 64% reported feeling frustrated and 74% reported feeling stressed fairly often or very often
Gerald, 2023	USA	64	Native American	Child with asthma Mean (SD): 12.33 (3.18)	September 7, 2020 to January 20, 2021	• Anxiety about getting covid • Feelings of sadness and depression • Felt negative and/or anxious about the future	• Interview	• 47 (73.4%) of Native American parents of asthmatic children reported feeling anxious about getting COVID-19 and 42 (65.6%) reported feeling like they had no control over how COVID-19 affected their lives

Study	Country	Indigenous Sample size	Indigenous Group	Age for Sample of Interest	Time Period for Data Collection	MH Outcomes	Assessment	Mood Disorders (Without Validated Measures)
								• 36 (56.3%) participants reported experiencing feelings of sadness and depression and 30 (46.9%) reported feeling negative about the future
Hahmann, 2022	Canada	4,907 (First Nations: 2,159; Inuit: 198; Métis: 2,504)	First Nations, Inuit, Métis	Median age First Nations: 40 Inuit: 37 Métis: 43	March 8 to May 15, 2021	• Stress, worry and anxiety due to unmet healthcare needs	• Online questionnaire	• One in five Indigenous adults reported mental health conditions such as depression and anxiety • Non-Status First Nations people were less likely than non-Indigenous Peoples to report worry, anxiety or stress impacts (74% compared to 83%) • 38% of First Nations people, 37% of Métis, and 26% of Inuit people reported "somewhat worse" or "much worse" mental health while 36% of non-Indigenous reported this
John-Henderson, 2020 (A)	USA	210	American Indian	30 – 99 years Mean (SD): 55.09 (13.10)	Wave 1: February 2020 Wave 2: April to May 2020	• COVID-19-specific psychological stress	• Survey questions	• COVID-19 pandemic-related psychological stress was significantly associated with greater reports of childhood trauma after controlling for age, sex and income ($p < .001$). • Childhood trauma predicted changes in sleep quality associated with COVID-19 pandemic-related stress
Jones, 2022	USA	Not reported	AIAN	Not reported	January to June 2021	• Persistent feelings of sadness or hopelessness during the past 12 months	• Survey questions	• A higher proportion of AIAN students reported persistent feelings of sadness or hopelessness during the past 12 months (during the COVID-19 pandemic) than non-Hispanic Asian students

Study	Country	Indigenous Sample size	Indigenous Group	Age for Sample of Interest	Time Period for Data Collection	MH Outcomes	Assessment	Mood Disorders (Without Validated Measures)
								and non-Hispanic Black students
Kelley, 2022	USA	141	AIAN	13 – 73 years Mean (SD): 25.69 (16.73)	March 2021	• Anxiety • Depression	• Survey questions	• 16 (12%) of AIAN respondents reported feeling more anxious during the COVID-19 pandemic and 9 (7%) reported feeling more depressed • 6 (5%) reported not feeling positive about the future • Youth respondents expressed challenges related to limits to social activities, feeling depressed, anxious, frustrated and lonely • PTSD was also reported among those recovering from COVID-19
McAuliffe, 2021 (B)	Canada	85	Unspecified	≥ 18 years	May 14 to May 29, 2020	• Emotional responses related to the pandemic including feeling depressed and feeling anxious or worried	• Survey questions	• Identifying as Indigenous was not significantly associated with being anxious or worried (aOR: 1.18 [95% CI: 0.73, 1.92]) or depressed (aOR: 1.33 [95% CI: 0.75, 2.37]) due to the COVID-19 pandemic
The Trevor Project, 2021	USA	~1,700	Unspecified	13 – 24 years	October 12 to December 31 2020	• , Symptoms of generalized anxiety disorder • Symptoms of major depressive disorder	• Survey questions	• 76% of Indigenous LGBTQ youth experienced symptoms of generalized anxiety disorder and 71% of Indigenous LGBTQ youth experienced symptoms of major depressive disorder
Tiller, 2021	Australia	952 (Aboriginal: 747; Torres Strait Islander: 112; Both: 93)	Aboriginal and/or Torres Strait Islander	15 – 19 years	April to August 2021	• Stress • Control over life	• Survey questions	• 43.4% of Aboriginal and Torres Strait Islander young people felt stressed either all of the time or most of the time in the past four weeks during the COVID-19 pandemic • Aboriginal and Torres Strait Islander young people also

Study	Country	Indigenous Sample size	Indigenous Group	Age for Sample of Interest	Time Period for Data Collection	MH Outcomes	Assessment	Mood Disorders (Without Validated Measures)
								reported feeling they had almost no control (19%) or no control (11.5%) over their lives
Van Bewer, 2022	Canada	17 (First Nation: 9; Métis: 7 Métis; Both: 1)	First Nation, Métis	17 – 50 years	November 2021	• Psychological distress • Feelings of stress, anxiety	• Sharing circles/Interview	• Indigenous nursing students reported worsening psychological distress including stress and anxiety due the COVID-19 pandemic. • Some of the reasons cited for the stress and anxiety related to the pandemic were isolation, loss of structure and predictability, fears about family members contracting COVID□19, and fears about transmitting the virus
Westrupp, 2023	Australia	47	Aboriginal and/or Torres Strait Islander	Parents Mean: 38 Children Mean: 9	April 8 to April 28, 2020	• Anxiety	• Survey questions	• Parents who identified as Aboriginal and Torres Strait Islander were more likely to be rated as high on anxiety

AIAN = American Indian and/or Alaska Native, ACS = Association for Canadian Studies, MH = Mental health

Table 2.7 Main Findings for Documents that Assessed Alcohol, Substance, and Drug Use in Indigenous Peoples During the COVID-19 Pandemic

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time period for data Collection	Outcomes	Assessment	Main Findings - Alcohol, Substance, and Drug Use
Brener, 2022	USA	Not reported	AIAN	NR	January to June 2021	• Current substance use • Increase in alcohol or substance use the pandemic	• Survey questions	• The percentage of AIAN students using substances was consistently high when compared to students of other racial or ethnic groups (including current use of any tobacco products electronic vapor products, alcohol, marijuana and opioid) • 14.5% of AIAN students reported drinking more alcohol during the pandemic • 25.2% of AIAN students reported using more drugs during the COVID-19 pandemic
Chaiton, 2022	Canada	194	Unspecified	16 – 25 years	August 2020 to March 2021	• Increase in substance use due to the pandemic	• Survey questions	• Indigenous youth had higher odds of reporting increased substance use due to the COVID-19 pandemic in comparison to Caucasian youth (OR: 3.16 [95% CI: 1.39,7.21], p<0.01)
Crabtree, 2022	USA	2,218	American Indian	Mean (SD): 15 (1.7)	Spring 2021	• Self-reported changes in substance use during the pandemic	• 5-point Likert Scale	• AI youth that were most likely to be characterized by a High Risk profile (characterized by high internal vulnerabilities and external adversities) reported increases in alcohol use, cannabis smoking, and cannabis edibles after the onset of COVID-19 that were significantly different from those of three other profiles (Average Risk and Resilience, High resilience and low resilience profiles).
D'Amico, 2020	USA	52	AIAN	12 – 16 years Mean	May to July 2020	• Substance Use	• Survey questions	• A low percentage of urban AIAN youth reported substance use including alcohol, marijuana,

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time period for data Collection	Outcomes	Assessment	Main Findings - Alcohol, Substance, and Drug Use
				(SD): 14.0 (1.31)				cigarettes, e-cigarettes, inhalants, or prescription medicines (over a month period during the pandemic)
Flores, 2022	Canada	13	Indigenous	22 – 60 years	Started March 2020	• Increased Substance Use	• Interview	• Indigenous women reported an increase in the consumption of alcoholic beverages directly tied to the pandemic, lockdown measures and spending extended periods indoors • Most respondents also reported an increased use of cannabis and tobacco products during the COVID-19 pandemic • Multiple participants reported substance and drinking problems that affected their ability to pay for living expenses like food and rent
Hanson, 2021	USA	62	AIAN	18 – 44 Mean (SD): 31.4 (6.7)	October 2020 to January 2021	• Alcohol Consumption/ drinking behavior	• Survey questions	• Among a cohort of AI women of AI women participating in an intervention to reduce risk for alcohol-exposed pregnancy, approximately half (53.2%) reported a decrease in their alcohol consumption during the pandemic while approximately a quarter (24.2%) reported an increase and a quarter stated they did not change their consumption. • Incidents of binge and heavy drinking during the pandemic was reported with half (50%) of participants reporting having 4 or more standard drinks in a single day since the pandemic began and 54.8% reporting having had 8 or more standard drinks in a week since the pandemic began
Jefferies, 2022	Australia	Pre-covid phase:105	Aboriginal and/or	Pre-covid	Pre-COVID	• Substance Use disorders (SUD)	• Electronic medical	• Among both Indigenous females and males, there was a significant

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time period for data Collection	Outcomes	Assessment	Main Findings - Alcohol, Substance, and Drug Use
		During-COVID phase: 164	Torres Strait Islander	Phase 14.7 – 78.2 Median: 42.9 Mean (SD): 41.6 (11.9) During-COVID phase Range: 17.6 – 80.5 Mean (SD): 44.9 (11.9) Median: 46.1	phase: 25 January 25 to 25 July 25 2019 During-COVID phase: January 25 to July 25 2020	patients - Patients who have active encounter under drug health services.	records	increase in ED admission rates for drug and alcohol related problems. • Alcohol-related ED admission rates increased significantly among Indigenous patients with SUD compared to the 'Pre-COVID' period
Jenkins, 2022	Canada	Round 1: 90 Round 2: 88 Round 3: 101	Unspecified	>18 years	Round 1: May 14 to May 19 2020 Round 2: September 14 to September 21 2020 Round 3: January 22 to January 28 2021	• Impact of pandemic on substance use • Use of substances to cope during the pandemic	• Survey questions	• Indigenous respondents had a higher prevalence of increased alcohol use, increased cannabis use, and use of substances to cope during the pandemic compared to non-racialized respondents (aOR: 1.08 [95% CI: 0.77, 1.53], p<0.05)
New Zealand Ministry of Health,	New Zealand	Children: 416 Adults: 803	Māori	All ages	2021 to 2022	• Hazardous drinking	• Survey questions	• The rate of hazardous drinking was higher in Māori adults than in Asian (6.0%), Pacific (21.7%) and

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time period for data Collection	Outcomes	Assessment	Main Findings - Alcohol, Substance, and Drug Use
2022								European/Other (20.1%) adults
Shih, 2022	USA	Not reported	AIAN	All ages	2019-2020	• Average frequency of marijuana/hashish/THC product use in past 20 days	• Survey questions	• Non-Hispanic AIAN adults reported more average marijuana/hashish/THC product use (in a 20 day period during the COVID-19 pandemic) than other ethnicities
Tao, 2021	USA	79	Unspecified	15 – 18 years Mean (SD): 16.47 (0.93)	October 2020 to January 2021	• Alcohol use disorder • Illicit drug use and problems	• Alcohol Use Disorders Identification Test (AUDIT) • Survey questions	• Indigenous youth reported significantly higher risks of alcohol use disorder (AUD) than Black and Asian youth • A higher rate of illicit drug use problem was observed among Indigenous youth
Tiller, 2021	Australia	952 (Aboriginal: 747; Torres Strait Islander: 112; Both: 93)	Aboriginal and/or Torres Strait Islander	15 – 19 years	April to August 2021	• Alcohol consumption	• Survey questions	• During the COVID-19 pandemic period, a higher proportion of Aboriginal and Torres Strait Islander young people reported consuming alcohol to reduce stress compared to non-Indigenous respondents (22.9% compared to 11.5%)
Westrupp, 2023	Australia	47	Aboriginal and/or Torres Strait Islander	Parents Mean: 38 Children Mean: 9	April 8 to April 28, 2020	• Alcohol consumption	• Survey questions	• Aboriginal or Torres Strait Islander parents consumed alcohol much less regularly than other parents during the COVID-19 pandemic
Zhu, 2022	USA	Not reported	AIAN	Not reported	Jan 1 2020 to May 31 2020	• Opioid Overdose	• Administrative data from CDC	• Higher proportions of AIAN people was a county-level factor that significantly predicted rural counties with high mortality rates for both COVID-19 and opioid overdose (aOR, 1.07, [95%CI, 1.02–1.13])

AIAN = American Indian and/or Alaska Native

Table 2.8 Main Findings for Documents that Assessed Suicidality in Indigenous Peoples During the COVID-19 Pandemic

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time period for data Collection	Outcomes	Method of measurement	Main Findings - Suicidality
Fitzpatrick, 2020 (A)	USA	104	Native American	≥ 18 years Mean (SD): 47.4 (17.7)	Survey released March 23, 2020	• Suicidality	• Suicide Behavior Questionnaire (SBQ-R)	• More Native Americans presented with a high risk of suicidality (SBQ-R ≥ 7) compared to non-Native Americans (36% compared to 18%, p < 0.0001)
Jenkins, 2022	Canada	Round 1: 90 Round 2: 88 Round 3: 101	Unspecified	>18 years	Round 1: Mary 14 to May 19 2020 Round 2: September 14 to September 21 2020 Round 3: January 22 to January 28 2021	• Suicidal ideation and self-harm as a result of the pandemic	Survey questions	• Being Indigenous, was associated with a nearly two-fold increase in the odds of experiencing suicidal thoughts (aOR = 1.84, [95% CI 1.21–2.78]).
Jones, 2022	USA	Not reported	AIAN	Not reported	January to June 2021	• Serious consideration of attempting suicide during the past year • Attempted suicide during the past year	• Survey questions	• There were no ethnic differences in the prevalence of having seriously considered attempting suicide • The prevalence of having attempted suicide was higher among AIAN high school students (20.1%) than White, Black, Hispanic, or Asian students (8.9%, 10.0%, 19.7%, 15.9% respectively)
McAuliffe, 2021 *(A)*	Canada	209	Unspecified	>18 years	Round 1: May 14 to May 29, 2020 Round 2: September 14 to	• Suicidal ideation as a result of the pandemic	• Survey questions	• Having Indigenous origins was significantly associated with increased odds of experiencing COVID-related suicidal thoughts or feelings in the past two weeks (aOR = 1.88, [95% CI: 1.21, 2.92])

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time period for data Collection	Outcomes	Method of measurement	Main Findings - Suicidality
					September 21, 2020 Round 3: January 22 to January 28, 2021			
McAuliffe, 2021 (B)	Canada	85	Unspecified	≥ 18 years	May 14 to May 29, 2020	• Suicidal ideation as a result of the pandemic	• Survey questions	• The likelihood of having experienced suicidal thoughts and feelings as a result of the COVID-19 pandemic did not differ significantly between Indigenous and non-Indigenous respondents (aOR: 0.67 [95% CI: 0.32, 1.42]
Runkle, 2022	USA	Pandemic Cohort: 2,226 Pre-pandemic cohort: 6,001	AIAN	≤ 24 years	Prepandemic: January 1, 2017 to March 12, 2020 Pandemic: March 12, 2020 to December 2, 2020	• Latent Classes of: -Depression/Isolation/ Self-Harm -Interpersonal Stress/Mood-anxiety -Suicidal thoughts/depressed -Adjustment/stress	• Tags of text conversations labelled by Crisis counselors	• Young texters of the crisis text line who identified as AIAN were more likely to be in higher-risk of suicide classes since the pandemic based on latent class analyses (AIAN youth were more likely to belong to Depression/Isolation/Self-harm and Suicidal Thoughts/Depressed classes than Adjusted/Stress classes)
Sapara, 2021	Canada	198	Unspecified Indigenous group	All ages	March 23 to March 30 2020	• Passive death wish/thoughts of self-harm in past 2 weeks	• Question 9 on the PHQ-9	• Compared to Caucasians, Indigenous respondents had a higher likelihood of presenting with a passive death wish and thoughts of self-harm (OR 1.61, [95% CI: 1.04–2.48])
Shih, 2022	USA	Not reported	AIAN	All ages	2019-2020	• Thoughts of committing suicide	• Survey questions	• Non-Hispanic AIAN persons had the highest proportion (25%) of participants who had thought of committing suicide when compared to other ethnicities
Sveticic,	Australia	Before	Aboriginal	≥ 18	Before	• ED suicidal presentations	• ED	• A decrease in suicidal

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Time period for data Collection	Outcomes	Method of measurement	Main Findings - Suicidality
2021		COVID-19: 206 Since COVID-19: 158	and/or Torres Strait Islander	years	COVID-19: March to Aug 2019 Since COVID-19: Mar to Aug 2020		administrative dataset	presentations to the ED department was observed among Indigenous persons when comparing the period before and since the COVID-19 outbreak
Sylliboy, 2022	Canada	149	First Nations, Inuit	Not reported	May 20 to June 15, 2020	• Suicidal thoughts	• Survey questions	• Two-Spirit and Indigenous 2SLGBTQQIA+ reported increased suicidal thoughts during the COVID-19 pandemic (32.18% of respondents)
The Trevor Project, 2021	USA	~1,700	Unspecified	13 – 24 years	October 12 to December 31 2020	• Suicidality	• Survey questions	• A higher proportion of LGBTQ Native/Indigenous (31%) of youth reported that they had attempted suicide in the time period during the COVID-19 pandemic compared to other ethnicities

AIAN = American Indian and/or Alaska Native, aOR = adjusted odds ratio

Table 2.9 Findings for Gender-Related Mental Health Outcomes in Indigenous Peoples During the COVID-19 Pandemic

Study	Country	Indigenous Sample size	Indigenous Group	Age for sample of interest	Sex/Gender distribution of Indigenous sample	Gender-Related Findings
Arriagada, 2020	Canada	1,400	Indigenous	≥18 years	NR	• More Indigenous women (48%) than men (31%) reported symptoms consistent with moderate or severe generalized anxiety (≥ 10 on GAD-7 scale) • Higher percentages of Indigenous women (64%) than Indigenous men (54%) reported that their mental health was "somewhat worse" or "much worse" since the start of physical distancing. • 46% of Indigenous women described most of their days as "quite a bit stressful" or "extremely stressful" compared to 32% of Indigenous men
ACS, Leger, 2020	Canada	450	Unspecified	≥ 18 years	NR	• Indigenous men reported feeling more afraid of contracting the Coronavirus (or that someone in their family would contract the virus) than Indigenous women
Brotto, 2021	Canada	204	Unspecified	25 – 69 years	Women: 166 (3.2%) Men: 27 (3.6%) Gender diverse: 11 (15.3%)	• There was no significant interaction between Indigenous status and gender in predicting psychosocial symptoms during the COVID-19 pandemic (depression, anxiety, stress, loneliness, alcohol use, and cannabis use) suggesting that the higher psychosocial symptoms occur regardless of an Indigenous persons' gender.
Flores, 2022	Canada	13	Indigenous	22 – 60 years	Female: 100%	• Women reported exacerbation of mental health problems due to financial challenges and gendered responsibilities such as providing caretaker duties, homeschooling children, or helping with online education during the COVID-19 pandemic

Fryberg, 2020	USA	6,460	Unspecified	≥ 18 years	Transgender, non-binary, genderqueer or gender non-conforming: 4%	• 57% of participants who identified as transgender, non-binary, genderqueer or gender non-conforming reported that, in the last month, they experienced feelings of depression fairly often or very often and 81% reported feeling stressed
GLITEC, 2021	USA	Not reported	AIAN	Not reported	NR	• Opportunities to create and develop support and community for women who were pregnant or recently gave birth was decreased during the COVID-19 pandemic. • Multiple survey respondents expressed concerns over potential increase in physical abuse or violence during the pandemic with some respondents citing isolation as a potential reason for the increase.
Hahmann, 2022	Canada	4,907 (First Nations: 2,159; Inuit: 198; Métis: 2,504)	First Nations, Inuit, Métis	Median age First Nations: 40 Inuit: 37 Métis: 43	Women: 51% Men: 49%	• A higher proportion of First Nations (25%) and Métis (29%) women reported mental health conditions than First Nations (13%) and Métis (17%) men. • First Nations women were more likely to report worry, anxiety or stress due to unmet healthcare needs than First Nations men • Métis women (47%) were more likely than Métis men (39%) to report difficulties scheduling mental health services.
Hanson, 2021	USA	62	AIAN	18 – 44 Mean (SD): 31.4 (6.7)	Female: 62 (100%)	• Women who reported drinking less during the pandemic compared to before were less often partnered (married or a had a significant other) and more often had children sleeping in their residence than participants who reported drinking the same or more during the pandemic
Jefferies, 2022	Australia	Pre-covid phase:105 During-	Aboriginal and/or Torres Strait Islander	Pre-covid Phase	Pre-covid Female: 59 (56.2%)	• Among Indigenous females, there was a significant increase in ED admission rates for alcohol and drug-related problems in Indigenous females.

		COVID phase: 164		14.7 – 78.2 Median: 42.9 Mean (SD): 41.6 (11.9) During-COVID phase Range: 17.6 – 80.5 Mean (SD): 44.9 (11.9) Median: 46.1	Male: 46 (43.8%) During covid Female: 90 (54.9%) Male: 74 (45.1%)	• Among non-Indigenous males, there was a significant increase in ED admission rates for drugs and alcohol.
Lee, 2022	Canada	106	First Nation	≥ 18 years	Female: 86 (81.1%) Male: 20 (18.9%)	• More females than males screened positive for depression symptoms than males (PHQ-2 ≥ 3) with 100% of males screening negative • No significant differences were found between males and females for anxiety symptoms (GAD-2 ≥ 3)
Stanley, 2022	USA	2,559	American Indian	Mean (SD): 14.7 (8.9)	Female: 1284 (50.2%) Male: 1201 (46.9%) Another gender: 70 (2.7%)	• A significantly larger percentage of AI males, compared with AI females, reported less negative impact and experiences since COVID-19 began for all measures, while females were significantly more likely to report more negative affect and experiences compared with males • More AI female students reported feeling more sad (46.1%) and depressed (40.2%) during the COVID-19 pandemic than before compared to AI male students

						(29.2% felt more sad, 24.4% felt more depressed). • 39.2% of female AI students compared to 21.8% of male AI students reported feeling more anxious during the COVID-19 compared to before • Females were more likely to report more worry, spending more time alone and feeling less socially connected to people than males were the least likely to report greater closeness to their friends • Students who identified as another gender reported spending more time alone than other students and were more likely to report feeling worried over losing friends (58.9%) compared to female (37.2%) or male students (29.5%) • No significant changes in familial relationships were reported by gender
Sylliboy, 2022	Canada	149	First Nations, Inuit	NR	NR	• More Two-Spirit individuals who responded to the survey reported being concerned about their mental health during the pandemic (34.78%) than those who indicated not being concerned (5.43%) • 59.77% of Two-Spirit respondents reported an increase in an increase of depression and 56.32% reported a deterioration of individual mental health • 68.97% of respondents also reported an increase in domestic or family violence and 45.98% reported an increase in sexual violence during the COVID-19 pandemic • A proportion of respondents (32.18%) also reported increased suicidal thoughts, increased transphobia, and increased queerphobia during the COVID-19 pandemic.
Tiller, 2021	Australia	952 (Aboriginal: 747; Torres Strait Islander: 112; Both: 93)	Aboriginal and/or Torres Strait Islander	15 – 19 years	Female: 47.4% Male: 44.0% Gender diverse: 7.0% Preferred	• Aboriginal and Torres Strait Islander young females had more heightened concerns and were more likely to experience negative outcomes in a number of areas, including concerns about mental health and related issues • A notably higher proportion of Aboriginal and Torres

	not to say: 1.6%	Strait Islander females (54.2%) identified their mental health was negatively impacted by COVID-19 compared with males (35.6%). • A higher proportion of Aboriginal and Torres Strait Islander females rated their mental health and wellbeing as poor (23.0% compared with 11.5% males) and reported feeling lonely all or most of the time (35.5% compared with 24.3% of males). • A notably higher proportion of Aboriginal and Torres Strait Islander males rated their mental health and wellbeing as excellent or very good (41.3% compared with 15.4% of females) • A higher proportion of Aboriginal and Torres Strait Islander females indicated they felt very sad/sad (23.3% compared with 16.7% of males) and stressed all of the time or most of the time (53.1% compared with 30.7% of males). • Aboriginal and Torres Strait Islander female respondents reported low levels of feeling happy/very happy (35.8%) and high levels of feeling stressed all or most of the time (53.1%) compared with male Aboriginal and Torres Strait Islanders (52.1% and 30.7% respectively • A higher proportion of Aboriginal and Torres Strait Islander males reported feeling very positive or positive about the future (52.7% compared with 44.2% of females). • One third (33.7%) of Aboriginal and Torres Strait Islander males experienced physical violence (compared with 16.3% of females).

AIAN = American Indian and/or Alaska Native, NR = Not reported, ACS = Association for Canadian Studies, GLITEC = Great Lakes Inter-Tribal Epidemiology Center

Chapter 3: Mediators of Gender on Mental Health Outcomes among Métis in Alberta during the COVID-19 Pandemic

3.1 Introduction

The COVID-19 pandemic, which began in 2020, has profoundly impacted the psychological and mental health of people worldwide.[1,2] The outbreak led countries around the world to institute public health measures such as quarantine, social and physical distancing, and isolation.[3] Mandatory public health requirements confined individuals and families to limited spaces, preventing critical human interactions and societal bonding.[2,4] Amid these measures, inconsistent information about the novel COVID-19 virus, and ongoing uncertainties about the pandemic, there were increased reports of loneliness, distress, and insecurity which affected the mental health of the general population.[1,2] Higher levels of depression, anxiety and stress were reported among members of the public due to multiple restrictions, an inability to interact with family and friends, and financial insecurity.[2] However, the effects of the pandemic have not been evenly distributed across the general population.[5,6] The pandemic's impact has been particularly amplified for populations already vulnerable to adverse mental health outcomes including people with Indigenous heritage. It threatens to intensify existing disparities and health barriers, further increasing the risk of morbidity and mortality resulting from deteriorated mental health.[6]

Métis People represent one of the three Indigenous groups in Canada, alongside the First Nations and Inuit Peoples. They are recognized for their unique history and culture in the Constitution Act of 1982.[7] According to the 2021 Canadian census, there are 624,220 self-identified Métis People living in Canada.[8] Métis People are a unique Indigenous group of mixed European and First Nations ancestry that established fur trading routes across the prairies and the

Red River. Today, the Métis National Council, a national body representing Métis Nations in Alberta, British Columbia, Saskatchewan, and Ontario, defines Métis as "a person who self-identifies as Métis, is distinct from other Aboriginal peoples, is of historic Métis Nation Ancestry and who is accepted by the Métis Nation".[9] Owing to a contentious history with the Canadian government, Métis People continue to experience negative effects of colonization including identity and culture erasures, and loss of land and self-determination.[10]

Métis People are frequently in disadvantaged positions in the implementation of government legislation and provision of services when compared to other Indigenous groups in Canada. For instance, despite experiencing a disproportionately higher burden of disease compared to the general population,[11] Métis People are excluded from the Non-Insured Health Benefits (NIHB) which is reserved for First Nations and Inuit Peoples of Canada.[12] Despite constituting 34.5% of the Indigenous population in Canada, Métis People face significant challenges in both physical and health outcomes. They also encounter distinct barriers when accessing healthcare services. Notably, there is a stark underrepresentation of Métis People, especially in the realm of mental health research.[13]

In Métis history, First Nations women set the tone for what is now known as Métis culture, mentoring the fusion of First Nations and European dance, music, clothing, and languages.[14] Despite the impacts of colonialism, Métis women, today, retain vital roles in Métis communities.[15] Still, the enduring repercussions of colonial legacies have left Métis women grappling with the impact of various social determinants of health, including education, housing, income, disability, and social capital. These determinants contribute to health inequities, placing Métis women at an elevated risk of diseases, violent victimizations, and poor physical and mental health outcomes.[16-18]

Mental health is an important and often overlooked part of overall health. While risk factors for poor mental health have begun to be examined in the general population, research still trails behind for Métis women.[19]

Social determinants of health (SDOH) is a concept that is generally accepted by Métis researchers because it parallels Métis perspectives about health which are principally holistic, encompassing physical, mental, emotional, spiritual, and cultural aspects and viewing humans as related to everything.[20] Social determinants including gender, race, employment status, income, education, area of residence and social capital have the capacity to impact health outcomes.[21] The SDOH approach considers how such social, political, and economic influences affect health. Structural violence is described as social systems ingrained in the social, political, and economic framework of society that jeopardize the wellbeing of individuals and communities.[22] For Métis women, structural violence is characterized by inequitable access to determinants of health which sets the stage for poor mental health.

SDOH factors are intersectional in nature, often interacting with one another to produce a magnified effect on health in affected populations. Gender is an important SDOH in the context of Indigenous health and interacts with other determinants to influence mental health outcomes. For example, Indigenous women may face discrimination based on both gender and race, leading to disparities in employment that further influence their income, place of residence, and access to care. These factors, in turn, can impact their mental health. As such, an intersectional approach is needed to understand the pathways by which social disadvantages can overlap to create poor mental health outcomes.[23]

There is a notable gap in the scientific literature regarding gender-specific mental health outcomes among Métis People during the pandemic, as well as factors that mediate gender

effects on mental health outcomes in this population. Given the distinctive needs and experiences of Métis women and the mental health implications of the COVID-19 pandemic, further research is essential in identifying gender-related and mediating factors that affect mental health outcomes among Métis People.

3.1.1 Significance of this study

Alberta is the only province in Canada with a legislated Métis land base in its provincial statute. It is home to the second largest Métis population in the country, with over 127,000 Métis residents. Of this population, 65,690 are women.[8,24] The Métis Nation of Alberta (MNA) is the governance body for Métis People in Alberta and works to promote and facilitate the advancement of Métis People through self-reliance, self-determination, and self-management. Given that Alberta has the second largest Métis population in Canada, there is a need to understand how the global pandemic may have affected mental health in Métis People in Alberta, taking into account the unique history, culture, and other social determinants that affect the health of this population. It is crucial to assess if sex/gender differences in mental health outcomes are present in this population. Additionally, identifying the factors that mediate potential gender-based disparities in mental health outcomes for Métis individuals is equally important.

This study emerged from a project funded by the Canadian Institute of Health Research (CIHR)., Misi Yehewin, which was conducted in partnership with the MNA and academic partners and arose from a series of MNA-led self-determined responses to mitigate negative impacts of the COVID-19 pandemic. Previous analyses of the Misi Yehewin survey have helped shape various components of the MNA's COVID-19 support strategy including the introduction

of easily accessible mental health services and Canada's inaugural Métis-led COVID-19 clinic program.

In alignment with Article 24.2 of the United Nations Declaration of the Rights of Indigenous Peoples, this secondary survey analysis promotes self-determination and self-governance in all stages of the research process and is situated within a study that uses a strengths-based approach.[25] Meetings were held with MNA representatives ensuring the inclusion of community perspectives and instrumental feedback that greatly influenced the research approach for this study. Furthermore, this study is in line with the Truth and Reconciliation Commission of Canada (TRC) Call to Action No. 19 which calls upon "the federal government, in consultation with Aboriginal peoples, to establish measurable goals to identify and close the gaps in health outcomes and assess long term trends", including a focus on health outcomes and wellness.[26]

3.1.2 Objectives

The objective of this study is to evaluate whether there are sex and gender differences in the prevalence of depression, anxiety and perceived stress among Métis individuals in Alberta during the COVID-19 pandemic. Furthermore, this research aims to investigate whether social factors such as income, employment, education, relationship status, experiences of discrimination, alcohol/drug use, and chronic conditions mediate the effects of sex/gender on depression, anxiety and perceived stress in Métis People in Alberta during the COVID-19 pandemic.

3.2 Methods

This study is a secondary analysis of data collected from *Misi Yehewin* ("big breath" in Michif), a longitudinal study designed to understand the unique challenges and experiences of Métis People in Alberta during the COVID-19 pandemic. It delves into how health, well-being, social determinants, cultural expressions, and community, kinship and family support were impacted by the COVID-19 pandemic, as well as the associated public health orders. The original study emerged from a collaborative effort between the MNA and academic partners, ensuring the inclusion of community perspectives. The University of Alberta Research Ethics Board (REB) 2 granted ethics approval for this secondary analysis (Pro00125894).

3.2.1 Sample and procedures

A repeated-measures online cross-sectional survey was conducted at three timepoints during the COVID-19 pandemic to explore the experiences and perspectives of Métis People in Alberta with the COVID-19 pandemic over the past three months prior to the launch of each survey. The first wave was conducted from December 2020 to January 2021. Responses for wave 2 were obtained from March to April 2021. The final survey was conducted between November and December 2021. Respondents were recruited through a multimodal strategy using social media and Métis Nation of Alberta (MNA) newsletters. Survey responses were entered onto a Research Electronic Data Capture (REDCap) database held at a secure server at the University of Alberta and later at Queen's University.

The study population included participants 16 years old and older who self-identified as Métis, including both MNA citizens and Métis People not affiliated with the MNA, all of whom

residing in Alberta during the COVID-19 pandemic. Surveys for the three waves captured sociodemographic characteristics of participants including age and gender identity and items related to Métis experiences with the COVID-19 pandemic, and impacts of the pandemic on physical, mental health and health behaviors.

3.2.2 Explanatory measure

Self-identified gender identity was considered the explanatory variable and was assessed based on participants response to the question "How would you describe yourself?" Respondents were given the options – "man", "woman", "Two-spirit", "different identity" or "prefer not to say". Due to the small sample size of the "Two-spirit", "different identity" and "prefer not to say categories", analyses were conducted for self-identified gender identity as a nominal variable with two categories – man and woman. Information on the sexes of participants was not collected on the survey.

3.2.3 Outcome measures

The outcomes of interest were mental health outcomes including depression, anxiety, and stress. Depressive symptoms were assessed using the Patient Health Questionnaire-2 (PHQ-2) to evaluate the frequency of depressed mood over the past two weeks.[27] The PHQ-2 has two items with each item scored between 0 (not at all) and 3 (nearly every day). Total PHQ-2 scores ranged from 0 to 6 with higher scores indicating higher levels of depression. Kroenke et al. reported that a cut-off score of ≥ 3 on the PHQ-2 is sufficient for detecting depression in adults with 78% specificity and 87% sensitivity.[28] Therefore, scores were dichotomized using a cut off of ≥ 3 for participants with major depression symptoms.

Anxiety symptoms were evaluated using the Generalized Anxiety Disorder Questionnaire-7 (GAD-7) to screen for participants' anxiety symptoms over the previous two weeks before the survey was completed.[29] The GAD-7 scores ranged from 0 to 21 with higher scores denoting higher anxiety levels. A cut off-score of ≥ 10 has a sensitivity of 89% and specificity of 82% in adults and has been used to detect possible cases of anxiety requiring further evaluation for generalized anxiety disorder.[29,30] GAD-7 scores in this study were dichotomized using a cut off of ≥ 10 for participants with moderate to severe anxiety symptoms.

Participants' stress over the previous month before survey completion was examined using the Perceived Stress Symptoms-4 (PSS-4) scale. Each of the four items on the PSS-4 scale was scored from 0 (never) to 4 (very often). Total scores ranged from 0 to 16 with higher scores indicating higher levels of stress. A cut off score of ≥ 6 was used to dichotomize PSS-4 scores for participants with perceived stress symptoms in line with previous literature.[31]

3.2.4 Potential mediator variables

Mediator variables assessed were income, employment status, education, relationship status, alcohol/drug use, presence of chronic conditions, survey wave, and experiences of discrimination as self-reported in the surveys.

Income was classified into three tertiles based on respondents' perception of their current average annual household income relative to others in Alberta. Employment information was collected based on if the participants were "employed", "unemployed", "students", "homemakers", "retired" or "other". For clarity, only the "employed" and "unemployed" categories were used for the mediation analyses. Education was self-reported based on participants' highest level of educational attainment and was analyzed as an ordinal variable.

"Primary/elementary school or less" was regarded as the minimum education level and "graduate or professional degree" was regarded as the maximum education level. Relationship status was collected from respondents using checkbox items in the questionnaire. Participants reported if they were "single", "separated/divorced/widowed," or "in a relationship/married." Relationship status was treated as an ordinal variable with "single" status regarded as a less protective relationship and "in a relationship/married" status considered a more protective relationship. The Cut-Annoyed-Guilty-Eye (CAGE) questionnaire was used to screen for problems with alcohol use over the past three months. Participants' scores, which could range from 0 to 4, were dichotomized using a cut-off of ≥ 1 to classify participants with potential alcohol use problems.[32]

To prevent ambiguity due to sex-skewedness of specific chronic conditions, the presence of chronic conditions among participants was categorized based on sex-dominance into two classes: Class A chronic conditions encompass those typically observed at higher frequencies in females than males, such as asthma, obesity, and autoimmune diseases.[33-35] Responses were coded as "yes" if respondents reported having had a physician's diagnosis of asthma, obesity, or autoimmune diseases, and "no" otherwise. Class-B chronic conditions included conditions more frequently diagnosed in males such as cancer, chronic pulmonary obstructive disease, diabetes, high blood pressure and heart disease.[36-40] Responses were coded as "yes" if participants had reported being diagnosed with any of the specified conditions and "no" otherwise.

Participants' experiences of discrimination were classified as "yes" or "no" based on the report of any discrimination due to Indigenous identity, ethnicity or culture, race or skin color, religion, language, accent, physical appearance, sex, sexual orientation, gender identity or expression, age, physical or mental disability.

3.2.5 Statistical analysis

Descriptive statistics were reported for all study variables using frequencies and percentages for categorical data and means and standard deviation (SD) for continuous variables. Sociodemographic characteristics of women and men (area of residence, income level, employment status, education, relationship status, and experiences of racism and discrimination) with and without the outcomes of interest (depression, anxiety, and perceived stress) were compared using chi-squared tests.

The crude prevalence rates of depression, anxiety, and stress was reported as a percentage of the number of individuals with a positive response for each outcome divided by the total number of responses for that outcome. Due to differences in the age distribution between men and women in the study population, the prevalence of mental health outcomes by gender and survey wave was directly age-standardized with a statistical analysis software using the 2021 Canada census data as the reference population.[41] For the direct standardization, using census data, the population weight for each age group was calculated by dividing the number of people from each age group by the total population based on the sample distribution. The population weights for each age group were multiplied by the crude prevalence for each age group for males and females respectively. Finally, the age-stratified prevalence of each gender was added up to obtain the age standardized rate and multiplied by 100 to obtain the prevalence percentages for males and females.[42]

The association between self-identified gender and each study outcome was determined by conducting simple logistic regressions using “men” as the gender reference category. Odds ratios (ORs) and 95% confidence intervals (CIs) were used to report the associations for each

study outcome. ORs were considered significant if the corresponding 95% CIs did not include zero.

A direct acyclic graph (DAG) was constructed in order to identify candidate confounders in the relationship between the exposure (self-identified gender), mediators (social, economic, and lifestyle factors), and mental-health outcomes (depression, anxiety, and stress).[43] Potential confounders assessed were age, area of residence, smoking status, health service use, COVID-19 diagnosis, and COVID-19 vaccination status. Information on age was collected as a continuous variable and stratified into three categories for the analyses – youth (aged 16-24), adults (aged 25-64), and seniors (aged 65 and older). Area of residence was regarded as an ordinal variable with respondents reporting if they lived in a "city", "small town", "rural area", or "remote area". Living in a populated area with many resources was considered more protective than living in a remote area. Smoking status, health service use, COVID-19 diagnosis, and vaccination status were analyzed as dichotomous variables with 0=no and 1=yes.

Candidate confounders identified from the DAG were tested using the change in estimate rule with a cut off of 15%. The change in estimate rule is used to statistically ascertain the presence of confounding using a cut-off (15% in our case) by calculating the change in the coefficient between an exposure and an outcome after the confounder has been added to the model.[44] If the difference is 15% or greater, then it can be presumed that confounding is present. The formula for the change in estimate rule is: $\Delta ß = |ß \text{ with } C – ß(hat) \text{ without } C| / ß(hat) \text{ with } C * 100 > 15\%$. Where Δ – Delta is used to denote the difference between two parameters, ß is beta – the regression coefficient for the relationship between the exposure and the outcome in each model and C is the confounder being assessed. The regression coefficient is the expected change in log odds of having the outcome per unit change in exposure.

Multiple structural equation models (SEM) were built to assess the indirect (i.e., mediated) effects of gender on the study outcomes: a. depression, b. anxiety, c. perceived stress.[45] Potential mediators were income, employment status, education, relationship status, area of residence, alcohol/drug use, smoking, presence of chronic conditions, and experiences of discrimination. Binary variables included employment status (0= unemployed, 1=employed), discrimination, alcohol/drug use, Class-A and Class-B chronic conditions categorized as 0=no and 1=yes. Ranked ordinal variables were income (1. bottom tertile, 2. middle tertile, 3. top tertile), education (1. primary/elementary school or less, 2. secondary or high school, 3. Red Seal/trades certificate, 4. college or university degree, 5. graduate or professional degree), relationship status (1. single, 2. separated/divorced or widowed, 3. in a relationship/married).

Mediation was considered to have occurred if a) the association between the exposure and the mediator was significant ($p \leq 0.05$) - Path A and b) if the association between the mediator and the outcome was significant ($p \leq 0.05$) - Path B. If both conditions were met, the indirect (mediated) effect of the exposure on the outcome were calculated and reported. The mediation effect of a variable was considered to be a partial if the direct association between the exposure and the outcome (Path C – Figure 3.1) was significant. Full mediation was determined to have taken place when Path C displayed insignificance within the mediation model. A variable was considered to be a statistically significant mediator if the 95% CIs for the indirect effect OR did not include zero and p-values were less than 0.05.[45] The SEM was estimated using the maximum likelihood estimation (MLE) for binary outcomes and no continuous variables were used in the mediation models.[45] If confounders were present, both unadjusted and adjusted mediation results were reported.

Statistical analyses were conducted using STATA Statistical Software Release 17 and 18 (StataCorp., College Station, U.S.A.). SEM models were built with the SEM builder in STATA using the generalized structural equation model (GSEM) option which allows generalized linear response variables for logistic, multinomial, and ordinal models.

3.3 Results

3.3.1 Study characteristics

A total of 3,052 respondents completed at least one of the three survey waves, of which 1,508 participants participated in the first wave, 749 in the second, and 795 in the third survey wave. After excluding invalid surveys, a total of 2,403 surveys were included in the analysis. Of these, 1,662 participants self-identified their gender as "Woman", while 621 participants self-reported their gender as "Man". Participants who identified under the "Two-Spirit" and "other" gender categories were excluded from the analysis because of their small sample sizes. The study flow chart and the reasons for exclusion are presented in Figure 3.2.

Participants' ages ranged from 17 to 90 years, with a mean age of 45.6 years (standard deviation [SD] = 13.4). The age distribution for all participants by gender is illustrated in Figure 3.3. Most participants were married or in a relationship (69.4%), resided in urban areas (59.0%), were employed (56.2%), and had a college or university degree or higher (55.2%).

Métis women in the sample were more likely to be single, have a college/university degree or higher, be vaccinated and experience discrimination when compared to Métis men and less likely to be in the top third income tertile or have alcohol use problems (CAGE $\geq$ 1). Métis women were also more likely to report a diagnosis of chronic conditions seen at higher frequencies in females than males and less likely to have male-dominated chronic conditions

when compared to Métis men. The proportion of men and women did not significantly vary with respect to experiences of racism, smoking status, COVID-19 diagnosis, and health service use (Table 3.1).

Participants reported generally low depression (PHQ-2 mean = 2.4 ± 1.9) and anxiety scores (GAD-7 mean = 7.3 ± 5.1) and slightly elevated stress scores (PSS-4 mean = 7.0 ± 3.5) (Table 3.2). The distribution of mental health outcomes by gender across survey waves is illustrated in Figure 3.4.

3.3.2 Depression

A total of 2,197 respondents completed the PHQ-2 depression questionnaire with an average PHQ-2 score of 2.5 (SD = 1.9) across the entire sample. The mean PHQ-2 score for women was 2.5 (SD = 1.9) and 2.2 (SD = 1.9) for men (Table 3.2). After dichotomizing the PHQ-2 scores with a cutoff of ≥ 3 for respondents with symptoms of major depression and < 3 for respondents with no symptoms, the crude prevalence rates of depression symptoms were 42.7% in women and 37.9% in men (Table 3.3). After age standardizations using the 2021 Canada census data, the prevalence of depression symptoms in women decreased to 42.2% and the prevalence for men increased to 40.2%. The unadjusted association between gender and depression was significant (1.22 [95% CI: 1.01, 1.48]; ref: men) (Table 3.4).

Demographic and socioeconomic factors of men and women with and without depression symptoms are presented in Table 3.5. Women with depressive symptoms were more likely to be in the bottom third income tertile, have a college or university degree, live in urban areas, and were less likely to be employed or in a relationship/married compared to men with depressive symptoms.

The constructed DAG (Appendix 5) identified area of residence as the sole candidate confounder for the mediation analyses. The change in estimate rule calculation determined that area of residence was a significant confounder in the association between gender and depression ($\Delta ß \geq 15\%$). As such, both unadjusted and adjusted mediation results were reported for depression.

Unadjusted mediation analyses were conducted for each potential mediator (Table 3.6). For each univariate mediation, the association between gender and each mediator was determined (Path A). Identifying as a woman was significantly associated with lower income tertiles, higher levels of education, and decreased likelihood of having a relationship with a higher social network (i.e., women respondents were more likely than men to be single, separated, divorced, or widowed). Additionally, women were more likely to be discriminated against and have Class A chronic conditions. They were also less likely than men to have alcohol use problems and Class-B chronic conditions.

For the next step of the mediation analyses, the effect of each mediator on the presence of depression symptoms was determined (Path B). The presence of depression symptoms was significantly associated with lower income tertiles, higher education, being unemployed, and having less social relationships (i.e., single, or separated/divorced/widowed). Respondents who experienced discrimination, had a CAGE score ≥ 1, and had Class-A chronic conditions were also more likely to be classified as having depression symptoms.

In unadjusted univariate mediation analyses, several significant mediators were identified (Table 3.6). Mediators were associated both with identifying as a woman (Path A) and the presence of depressive symptoms (Path B). The effect of gender on depression was partially mediated by education since Path C was significant in the mediation model. Full mediation

effects of gender on depression were detected through income tertiles, relationship status, the presence of discrimination, Class-A chronic conditions, and problems with alcohol use (CAGE ≥ 1). In instances of full mediation, Path C did not show significance in the respective mediation model.

Indirect effects were statistically significant when both paths A and B were significant. Métis women were significantly more likely to be in a lower income tertile which significantly mediated their risk of having depression symptoms. Conversely, higher education and having lower odds of alcohol/drug use problems had a protective effect on the relationship between identifying as a woman and having depression symptoms. In addition, experiencing discrimination, having Class-A chronic conditions and being in a relationship with less social capital were mediating risk factors in the relationship between identifying as a woman and having depression symptoms. There was no indirect effect of gender on depression through employment status or the presence of Class-B chronic conditions. Mediation analyses results were similar or were slightly attenuated in adjusted analyses controlling for area of residence (Table 3.7).

3.3.3 Anxiety

A total of 2,055 respondents completed the GAD-7 anxiety questionnaire with an average GAD-7 score of 7.4 (SD = 5.1) across the entire sample. The mean GAD-7 score for women was 7.8 (SD = 5.0) and 6.1 (SD = 5.1) for men (Table 3.2). After dichotomizing the GAD-7 scores with a cutoff of ≥ 10 for respondents with symptoms of generalized anxiety and < 10 for respondents with no anxiety symptoms, the crude prevalence rates of anxiety were 36.3% in women and 26.4% in men. After age standardizations using the 2021 Canada census data, the

prevalence of anxiety symptoms in women was 34.4% and the prevalence for men was 27.8% (Table 3.3). Demographic, socioeconomic, and lifestyle factors of men and women with and without anxiety symptoms are presented in Table 3.8. Women with anxiety symptoms were more likely to be in a lower income tertile, have a college or university degree, live in a city and less likely to be employed or be in a relationship or married compared to men with anxiety symptoms (Table 3.8).

The direct unadjusted association between gender and anxiety was significant (OR: 1.59 [95% CI:1.28, 1.98]; ref: men) (Table 3.4) and remained significant in subsequent mediation models.

The relationship between gender and potential mediators (Path A) remained consistent with what was observed in depression mediation models. For Path B, the presence of anxiety symptoms was significantly associated with lower income tertiles and less social relationships. Experiencing discrimination, being unemployed, having potential alcohol/drug use problems and Class-A chronic conditions were also associated with anxiety symptoms. There were no significant associations between anxiety and education, and the presence of Class-B chronic conditions so indirect effects of gender on anxiety were not calculated for those variables (Table 3.9).

Significant partial indirect effects of gender on anxiety were observed through income tertiles, relationship status, experiences of discrimination, alcohol/drug use problems, and the presence of Class-A conditions (female-dominant chronic conditions). As observed with depression, identifying as a woman was significantly associated with being in a lower income tertile which in turn, was a significant risk factor having anxiety symptoms. Similarly, having lower social capital within a relationship, encountering discrimination, and being affected by

Class A chronic conditions emerged as risk factors in the association between identifying as a Métis woman and experiencing symptoms of anxiety. In contrast, the absence of alcohol/drug use issues served as a protective mediating factor against anxiety symptoms for Métis women (Table 3.9).

Area of residence was not a significant confounder in the association between gender and anxiety ($\Delta ß < 15\%$) so only unadjusted mediation results were reported.

3.3.4 Stress

A total of 2,055 respondents completed the PSS-4 stress questionnaire with an average PSS-4 score of 7.0 (SD = 3.5) across the entire sample. The mean PSS-4 score for women was 7.2 (SD = 3.4) and 6.3 (SD = 3.6) for men (Table 3.2). After dichotomizing the PSS-4 scores with a cutoff of ≥ 3 for respondents with perceived stress symptoms and < 3 for respondents with no symptoms, the crude prevalence of stress was 71.4% in women and 59.6% in men. After age standardizations using the 2021 Canada census data, the prevalence of stress symptoms in women decreased to 69.3% and the prevalence for men was 59.0% (Table 3.3). Women with stress symptoms were more likely to be in the bottom third income tertile, have a college or university degree or higher, live in a city, and be in a relationship compared to men with stress symptoms. They were also less likely to be employed compared to men with stress symptoms (Table 3.10).

The unadjusted direct association between gender and stress was statistically significant (OR: 1.68 [95% CI:1.38, 3.05]; ref: men) (Table 3.4) and remained significant in all subsequent mediation models (Table 3.11).

In univariate analyses, the association between gender and potential mediators (Path A) remained unchanged from what was observed in depression and anxiety mediation models. For Path B, the presence of stress symptoms was significantly correlated with income, employment, discrimination, CAGE score ≥ 1, and the presence of Class A conditions. Path A was not significant for employment status so the indirect effect was not reported for this variable.

The indirect effect of gender on stress symptoms was significant for income, discrimination, CAGE score ≥ 1, and the presence of Class A conditions. Being in a lower income tertile, once again, acted as a significant risk factor for depression in participants who identified as women. Métis women were also more likely to report being discriminated against and having Class A chronic conditions than Métis men which served as risk factors in the likelihood of having stress symptoms. On the other hand, identifying as a woman was associated with a decreased likelihood of having potential problems with alcohol/drug use which in turn, had a protective effect against stress symptoms. There was no indirect effect of gender on stress symptoms through education, relationship or employment status or the presence of Class-B chronic conditions (Table 3.11).

As observed with anxiety, area of residence was not a significant confounder in the relationship between gender and stress ($\Delta ß < 15\%$) so only unadjusted mediation results were reported.

3.4 Discussion

The aim of this study was to evaluate the prevalence rates of three mental health outcomes – depression, anxiety, and stress, among Métis People living in Alberta during the COVID-19 pandemic and determine whether social characteristics mediated these differences. In

the sample examined, Métis women had a higher prevalence rates of depressive, anxiety and stress symptoms during the COVID-19 pandemic compared to men. The association between self-identified gender and mental health outcomes was mediated by a number of social and economic factors. The relationship between gender and depression was mediated by income, education, relationship status, experiences of discrimination, alcohol/drug use problems and the presence of Class-A chronic conditions. The gender-anxiety relationship was mediated by income, relationship status, discrimination, alcohol/drug problems, and the presence of Class-A chronic conditions. The association between gender and stress was mediated by income, experiences of discrimination, alcohol/drug use problems and the presence of Class-A chronic conditions.

This study found that the prevalence of depression, anxiety and stress was higher among Métis women than men which is consistent with previous publications on gender disparities in mental health. A study published in 2019 by Levesque and Quesnel-Vallée found that First Nations and Métis women had a higher likelihood of reporting fair/poor self-rated mental health than male respondents.[46] High prevalence of anxiety and stress symptoms among women of all ethnicities have also been reported in the literature.[47-49]

However, when measured against the general Canadian population, both Métis men and women exhibited a greater prevalence of depression anxiety, and stress. Studies conducted by Statistics Canada during the COVID-19 pandemic found that the prevalence of moderate to severe depression, anxiety, and stress symptoms was 18%, 16%, and 27% among Canadian women and 13%, 10%, and 23% among Canadian men respectively.[50-52] In the current study, the rates of depression, anxiety, and stresss within the Métis sample were notably higher, showing prevalence rates of 42%, 36%, and 69% among Métis women, and 40%, 28%, and 59% among

Métis men for these respective outcomes. The results from this study highlight the disproportionate burden that Métis People experience in terms of mental health outcomes compared to the general population.

While the pandemic has undoubtedly impacted the mental health of both men and women, our findings indicate that Métis women may be experiencing heightened levels of psychological distress due to the COVID-19 pandemic. Gender dynamics and cultural and social contexts play a significant role in understanding these differences. The pandemic can be particularly stressful for Indigenous women who already face socioeconomic disparities including earning lower incomes than their male counterparts.[53-55] Several studies have described women having higher levels of employment loss and additional caretaking responsibilities than men during the pandemic due to school and business closures.[56] Quarantine requirements during the pandemic also likely contributed to increased reports of domestic violence among women which is of particular concern for Métis women who have one of the highest rates of violent victimizations in the country.[57,58] Pregnant women and post-partum women also experienced undue psychological stress because of the pandemic.[59] It is important to understand the intersection of cultural, historical, and socioeconomic factors that influence gender differences in how Métis People experience and express mental health challenges.

In logistic analyses, identifying as a woman was significantly associated with lower income tertiles, higher levels of education, lower likelihood of alcohol/drug use problems, increased likelihood of being in a relationship with lower social network, and having experiences of discrimination. These results align with broader research on gender disparities which often point to women facing an array of biases and reporting lower income despite higher education levels.[53,54,60-62] Similarly, previous literature has shown higher prevalence of alcohol abuse among

men than women.[63] While reports are conflicting on a gendered genetic predisposition for alcohol use disorders, it has been speculated that women may experience a more of a disincentive to drink than men due to the extent to which they experience negative physiological and sociological effects of alcohol.[64] As expected, having chronic conditions that are more prevalent in women was also positively associated with identifying as a woman and vice-versa.[33-35]

Our study also found that several factors mediated the relationship between gender and depression, anxiety, and stress. Consistent mediators across all three mental health outcomes were lower income, experiences of discrimination, no alcohol use problems (CAGE score ≥ 1), and the presence of chronic conditions more commonly seen in females. Additionally, the gender-depression relationship was mediated by lower education level and being in less-protective relationships. Being in a less social relationship also mediated the association between gender and anxiety. These findings are consistent with prior research which show that social factors mediate the relationship between gender and mental health outcomes.[65,66]

Métis People often face disparities in education, employment, and housing which can amplify the risk of poor mental health outcomes.[10,18] Being in lower income tertiles mediated the relationship between gender and all three mental health outcomes. Put differently, woman had increased the odds of being in a lower income tertile which increased their odds of having depression, anxiety, and stress. This mirrors past findings which indicate that having a higher income provides an ability to purchase goods and services that enhance mental health or improve social position which in turn leads to fewer depression symptoms.[67] Thus, in our sample, Métis women who were earning a relatively low income during the pandemic were at a higher risk for depression.[68] This study also found education to be a significant mediator between gender and

depression. Métis women in this study were more likely to have a higher education which had a protective effect on the presence of depression symptoms. This is in line with reports from Statistics Canada which show that Métis men are more likely to have trade certificates while Métis women are more likely to have a college diploma or university degree.[69]

In our sample of Métis People living in Alberta, experiences of discrimination and being diagnosed female-dominant chronic conditions significantly mediated the relationship between identifying as a Métis woman and having depression, anxiety, and stress symptoms during the COVID-19 pandemic. The presence of chronic conditions and experiences of discrimination can intersect with gender-specific stressors, resulting in varying levels of vulnerability to depression, anxiety, and stress. Experiences of discrimination have also been previously linked to chronic conditions and depression through the weathering hypothesis which posits that repeated experiences of discrimination act as psychological stressors that eventually create a physiologic response in the body.[70,71] Previously published literature has shown that the COVID-19 pandemic increased the stress of people with chronic conditions who were at a high risk for its negative physiological effects.[72]

Métis women respondents had lower odds of having an alcohol/drug use problem than Métis men which provided significantly protective effect in the mediation relationship between gender and mental health outcomes. While previous research has shown that alcohol use in men is higher than in women, in general, substance use in Indigenous Peoples has been linked to the enduring and damaging effects of colonialism.[73] The higher rates of alcohol/drug use seen in our sample of Métis men may be linked to a variety of stressors including the responsibility of providing for their families, maintaining cultural traditions, and confronting systemic inequalities. Alcohol/drug use may have provided a temporary respite from these stressors during

the COVID-19 pandemic. The expectation to display strength and resilience could also contribute to suppressed feelings of depression, anxiety and stress which could trigger the use of alcohol/drug use as a coping strategy.[64]

Relationship status was used as a proxy for social capital. Social capital can be conceptualized as the accessible networks of relationships, communities, and norms, that individuals can use to achieve their goals.[74] In our study of Métis People in Alberta, being in a relationship with a lower perceived social capital was significantly associated both with identifying as a woman and having depression and anxiety symptoms. Conversely, being married or in a relationship had a protective influence on the effects of depression and anxiety symptoms among Métis women. Previous studies have found a link between Indigenous social capital and mental health outcomes.[46] The pandemic period was laden with social isolation, public distancing, and quarantine requirements.[3] Having a partner during uncertain times could have helped alleviate the mental health burden associated with the pandemic. Métis People who were single, widowed or divorced may have been lacking the social support to help prevent poor mental health outcomes during a period of time fraught with confusion, isolation, and loneliness. While personal relationship status was the only proxy for social capital in this study, it is important to note that community ties and integration are more significant indicators of social capital among Métis People. The holistic view of wellbeing among Métis People encompasses several components including connections to the land and the strength of interpersonal and communal relationships.[20,46]

Being unemployed and having male-dominant chronic conditions were not significant mediators of the relationship between gender and any mental health outcome which is not consistent with the previous literature.[36-40] This may be explained by the sample sizes for these

variables. The employment variable only focused on employed and unemployed respondents without considering students, full-time homemakers, and those who were retired.

In general, our findings suggest that the socioeconomic disparities encountered by Métis People living in Alberta during the pandemic are experienced differently by men and women and influenced by their respective roles in their communities which in turn, produce alternate paths to mental health outcomes. These findings highlight the importance of considering the intersection of both gender, cultural, and socioeconomic factors when examining mental health disparities within Métis communities.

3.4.1 Strengths and limitations

This is the first study to evaluate the prevalence of mental health outcomes among Métis People during the pandemic. It is also the first study to identify mediators of the relationship between gender and mental health outcomes in this population. This study was a repeated measures cross-sectional study conducted at three timepoints during the pandemic. The repeated nature of the survey used in this analysis allowed for a comprehensive capture of mental health outcomes over the course of the entire pandemic. The use of a DAG to identify potential confounders prevented overadjustment in mediation models. The use of structured assessment tools was also a strength of this study. While these tools are not formal diagnoses, they serve as an important basis on which additional diagnoses can be made.

However, this secondary survey analysis is not free from potential biases. The first is selection bias - in this study, those who did not complete or respond to the surveys may be systematically different than those who did leading to the potential for non-response bias.[75] Since participants of the study were recruited through convenience sampling, it was not possible to

profile the characteristics of those who did not respond to the study. Another possibility for selection bias is in the exclusion of those with "Two-spirit" or "different" gender identity who may have had different study characteristics than the included respondents. However, due to the small sample size, no conclusions could be drawn for this subset of the population. Additionally, the mental health outcomes, while assessed with structured assessment tools, are subject to measurement error, recall, and social desirability bias. For instance, the impassiveness expected of Métis men could lead to an under reporting of depression, anxiety, and stress symptoms.

Another type of bias that may have resulted in the mediation analysis is collider bias. This type of bias occurs when both the exposure and outcome influence a common third variable.[76] For instance, an alternate pathway could be drawn in a way that both gender and depression influence a social factor such as alcohol and drug misuse. Collider bias is often controlled for during analysis, however, due to the intercorrelation of social factors and the direction of the research question, this bias was not accounted for in the mediation analysis. Furthermore, the study's focus on Métis People living in Alberta limits the generalizability of findings to other provinces and Indigenous groups. Each Indigenous group in Canada faces unique needs and challenges associated with their distinct histories of colonization with the Canadian government and how that history factors into their experiences during the COVID-19 pandemic. While correlation can be inferred by the analyses conducted, we are not able to infer causal relationships due to the cross-sectional nature of the study. It is conceivable that other causal patterns can be drawn through to describe alternative mediation effects between gender, socioeconomic factors, and mental health outcomes due to the interrelatedness of these components.

Finally, social factors such as the transmission of intergenerational trauma and protective factors including community ties and networks, resilience, and access to mental health services were not assessed in this study. These factors are important in Métis-specific contexts and could potentially mediate the relationship between gender and mental health outcomes and should serve as a basis for future research. A strength-based approach such as the one underpinning the original study is instrumental in recognizing the important relations and roles that both Métis men and women have in their communities.

3.5 Conclusions

This study identified gender differences in the prevalence and mediators of mental health outcomes among Métis People during the pandemic. Our findings highlight the need to consider the complex intersection of cultural, historical, and socioeconomic factors in future research and when designing strategies for this population. Targeted interventions and culturally appropriate mental health services should be designed to acknowledge the unique experiences of Métis men and women during care delivery.

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Figure 3.1: Template for Mediation Models

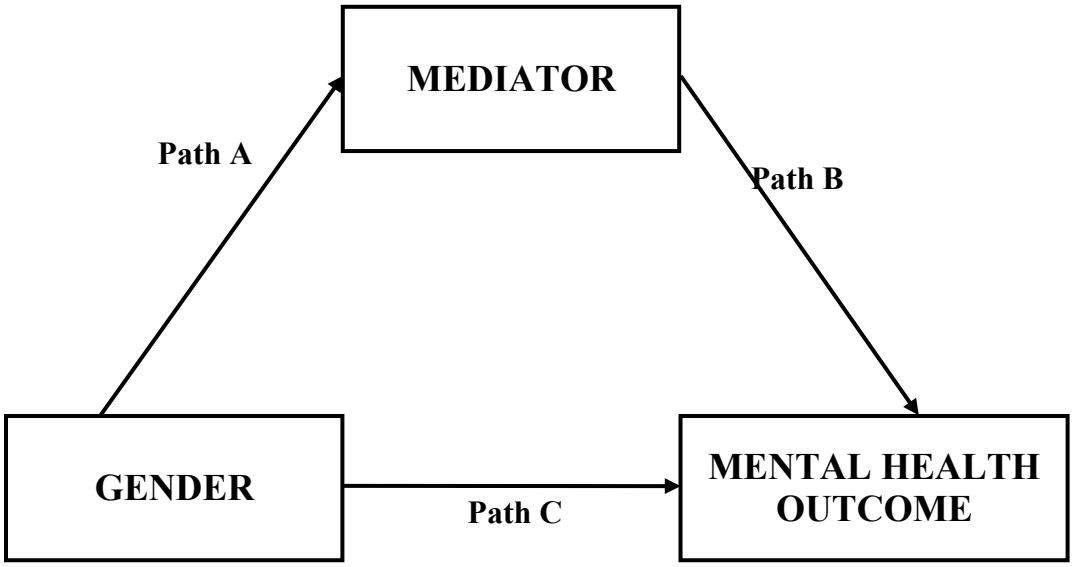

Figure 3.2: Flow Diagram for Participant Inclusion in Analyses

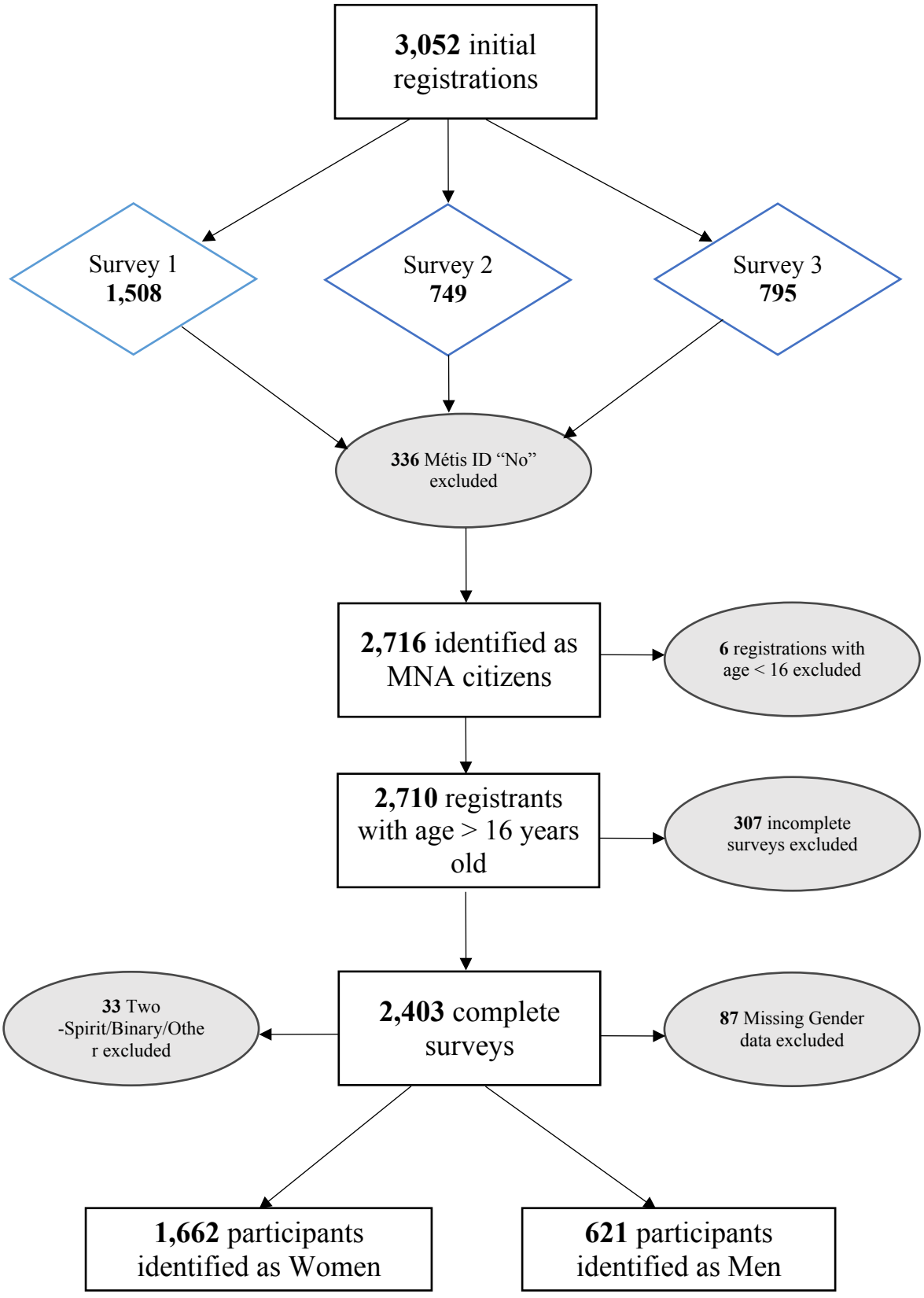

Figure 3.3 Distribution of Age Groups by Self-Identified Gender

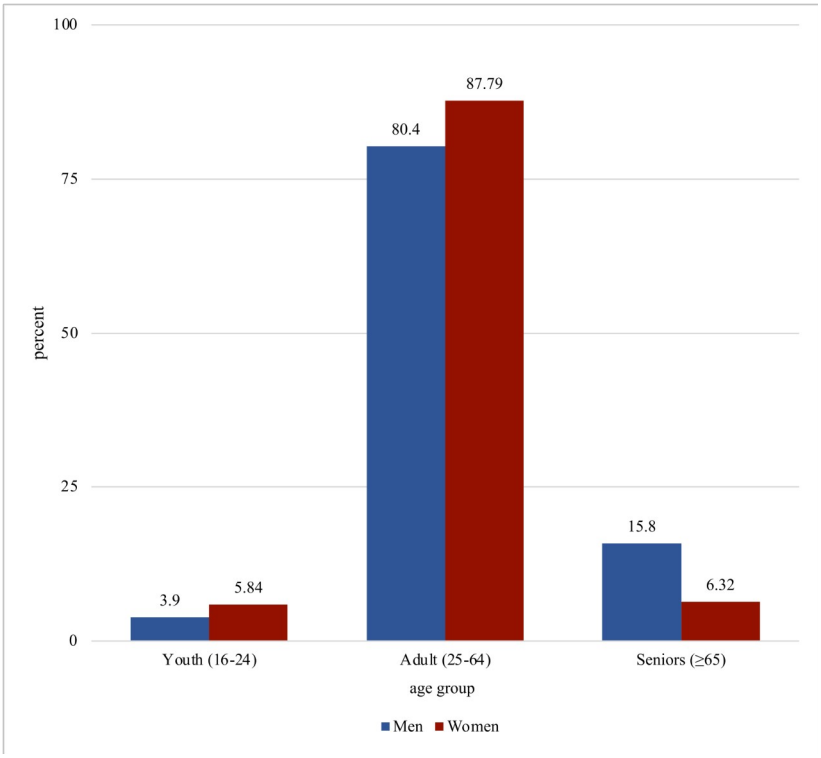

Figure 3.4 Mental Outcomes across Self-Identified Gender by Survey Wave

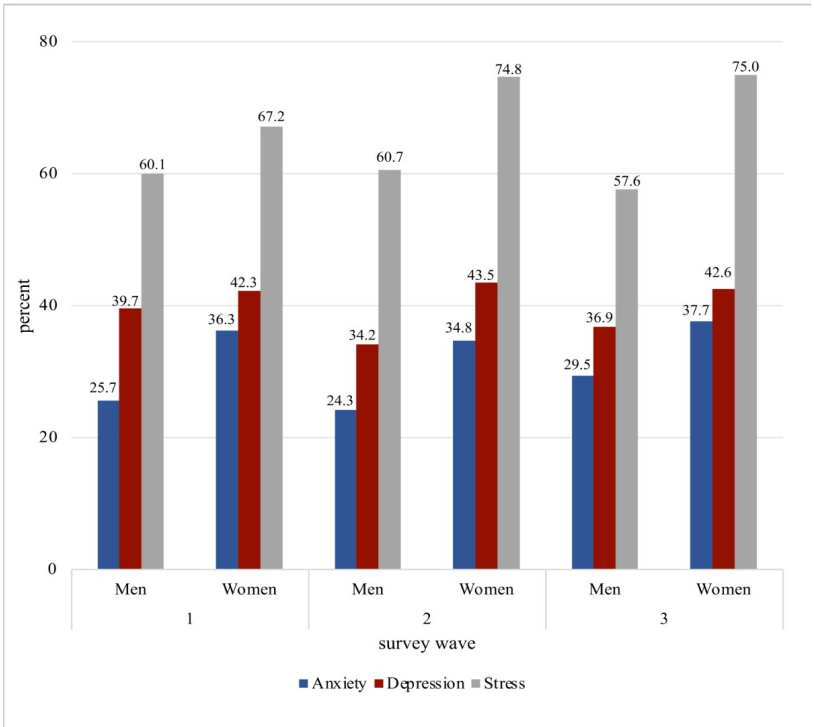

Table 3.1 Study Characteristics for Categorical Variables

Variable	Total N = 2,283	Men N = 621	Woman N = 1,662
Age			
Youth (16-24)	5.3 (121)	3.9 (24)	5.8 (97)
Adult (25-64)	85.8 (1,958)	80.4 (499)	87.8 (1,459)
Seniors (65 and over)	8.9 (203)	15.8 (98)	6.3 (105)
Missing	0 (1)	0 (0)	1 (0.1)
Income Tertiles			
Bottom third	26.3 (600)	22.5 (140)	27.7 (460)
Middle third	32.5 (743)	33.8 (210)	32.1 (533)
Top third	16.3 (371)	22.9 (142)	13.8 (229)
Missing	24.9 (569)	20.8 (129)	26.5 (440)
Employment status			
Employed	58.3 (1,331)	61.2 (380)	57.2 (951)
Unemployed	15.3 (349)	13.7 (85)	15.9 (264)
Student	7.2 (165)	6.8 (42)	7.4 (123)
Homemaker/full-time parent	6.0 (136)	0.2 (1)	8.1 (135)
Retired	9.8 (224)	16.1 (100)	7.5 (124)
Other	3.4 (78)	2.1 (13)	3.9 (65)
Missing	0 (0)	0 (0)	0 (0)
Education			
Primary/elementary school or less	1.5 (33)	3.2 (20)	0.8 (13)
Secondary/High school	30.8 (703)	28.7 (178)	31.6 (525)
Red Seal/Trades certificate	11.6 (264)	25.0 (155)	6.6 (109)
College or University degree	45.0 (1,028)	32.9 (204)	49.6 (824)
Graduate or Professional degree	9.5 (217)	8.7 (54)	9.8 (163)
Missing	1.7 (38)	1.6 (10)	1.7 (28)
Marital status			
Single	18.1 (413)	13.0 (81)	20.0 (332)
Separated/Divorced or Widowed	11.9 (272)	8.7 (54)	13.1 (218)
In a relationship/Married	67.8 (1,547)	75.9 (471)	64.7 (1,076)
Missing	2.2 (51)	2.4 (15)	2.2 (36)
Area of residence			
In a city	55.9 (1,275)	51.2 (318)	57.6 (957)
In a small town	22.2 (506)	23.8 (148)	21.5 (358)
In a rural area	16.6 (379)	20.1 (125)	15.3 (254)
In a remote area	0.9 (20)	1.1 (7)	0.8 (13)
Missing	4.5 (103)	3.7 (23)	4.8 (80)
Experiences of racism			
No	46.7 (1,067)	47.3 (294)	46.5 (773)
Yes	23.2 (530)	22.2 (138)	23.6 (392)
Missing/Undefined	30.1 (686)	30.4 (189)	29.9 (497)
Experiences of discrimination			
No	51.4 (1,174)	54.9 (341)	50.1 (833)
Yes	39.9 (911)	36.6 (227)	41.2 (684)
Missing	8.7 (198)	8.5 (53)	8.7 (145)
Smoking status			
No	71.8 (1,640)	73.4 (456)	71.2 (1,184)

Yes	8.5 (194)	8.9 (55)	8.4 (139)
Missing	19.7 (449)	17.7 (110)	20.4 (339)
Alcohol and drug use			
No (CAGE < 1)	48.6 (1,110)	49.3 (306)	48.4 (804)
Yes (CAGE ≥ 1)	22.7 (519)	28.7 (178)	20.5 (341)
Missing	28.7 (654)	22.1 (137)	31.1 (517)
Presence of Class A chronic conditions			
No	56.5 (1,289)	68.3 (424)	52.1 (865)
Yes	38.7 (884)	27.7 (172)	42.8 (712)
Missing	4.8 (110)	4.0 (25)	5.1 (85)
Presence of Class B chronic conditions			
No	63.3 (1,445)	55.2 (343)	66.3 (1,102)
Yes	31.9 (728)	40.7 (253)	28.6 (475)
Missing	4.8 (110)	4.0 (25)	5.1 (85)
COVID-19 diagnosis			
No	82.3 (1,879)	82.1 (510)	82.4 (1,369)
Yes	9.9 (226)	7.9 (49)	10.7 (177)
Missing	7.8 (178)	10.0 (62)	7.0 (116)
Vaccination status			
No	16.4 (375)	15.9 (99)	16.6 (276)
Yes	33.1 (756)	27.4 (170)	35.3 (586)
Missing	50.5 (1,152)	56.7 (352)	48.1 (800)
Health service use			
No	43.0 (982)	39.8 (247)	44.2 (735)
Yes	3.2 (72)	2.2 (13)	3.6 (59)
Missing	53.8 (1,229)	58.1 (362)	52.2 (868)
Depression symptoms			
No	55.2 (1,260)	58.1 (361)	54.1 (899)
Yes	38.9 (889)	35.4 (220)	40.3 (669)
Missing	5.9 (134)	6.4 (40)	5.7 (94)
Anxiety symptoms			
No	58.4 (1,334)	64.3 (399)	56.3 (935)
Yes	29.7 (677)	23.0 (143)	32.1 (534)
Missing	11.9 (272)	12.7 (79)	11.6 (193)
Perceived Stress			
No	30.4 (693)	38.7 (240)	27.3 453)
Yes	64.8 (1,480)	57.0 (354)	67.8 (1,126)
Missing	4.8 (110)	4.4 (27)	5.0 (83)

*percentages may not total 100 due to rounding

Table 3.2 Study Characteristics for Continuous Variables

	Total N = 2,283	**Women N = 1,662**	**Men N = 621**
Age			
Mean (SD)	45.6 (13.3)	44.6 (12.9)	48.6 (14.0)
Range	17-90	17-80	17-90
PHQ-2 Score (0-6)			
Mean (SD)	2.4 (1.9)	2.5 (1.9)	2.2 (1.9)

GAD-7 Score (0-18) Mean (SD)	7.3 (5.1)	7.8 (5.0)	6.1 (5.1)
PSS-4 Score (0-16) Mean (SD)	7.0 (3.5)	7.2 (3.4)	6.3 (3.6)
CAGE Score (0-4) Mean (SD)	0.6 (1.0)	0.6 (1.0)	0.6 (1.0)

Table 3.3 Prevalence Rates of Depression, Anxiety and Stress among Métis Men and Women

	Men	**Women**
Depression		
Crude*	37.9%	42.7%
Age Standardized	40.2%	42.2%
Anxiety		
Crude*	26.4%	36.3%
Age Standardized	27.8%	34.4%
Stress		
Crude*	59.6%	71.4%
Age Standardized	59.0%	69.3%

* $p < 0.05$

Table 3.4 Odds Ratios for Depression, Anxiety and Stress among Métis Men and Women

	Unadjusted OR (95% CI)	Adjusted OR[a] (95% CI)
Depression		
Men	Ref	Ref
Women	1.22 (1.01, 1.48)	1.17 (0.96, 1.43)
Anxiety		
Men	Ref	Ref
Women	1.59 (1.28, 1.98)	1.57 (1.26, 1.97)
Stress		
Men	Ref	Ref
Women	1.68 (1.38, 3.05)	1.64 (1.34, 2.01)

[a]Adjusted for area of residence
OR = odds ratio

Table 3.5 Bivariate Comparison of Study Characteristics in Men and Women by Presence and Absence of Depressive Symptoms

	No Depression Symptoms			Depression Symptoms		
	Men N=361	**Women N=899**	**P value**	**Men N=220**	**Women N=669**	**P value**
Age			**< 0.001**			**0.002**
Youth (16-24)	1.4 (5)	4.2 (38)		7.3 (16)	8.5 (57)	
Adult (25-64)	79.8 (288)	88.0 (791)		84.1 (185)	86.9 (57)	
Seniors (65 and over)	18.8 (68)	7.7 (69)		8.6 (19)	4.6 (31)	
Missing	0 (0)	0.1 (1)		0 (0)	0 (0)	
Income Tertiles			**0.001**			**<0.001**
Bottom third	9.1 (69)	22.8 (205)		26.4 (58)	34.5 (231)	
Middle third	35.2 (127)	36.0 (324)		34.1 (75)	28.6 (191)	
Top third	26.0 (94)	16.0 (144)		18.6 (41)	11.4 (76)	
Missing	19.7 (71)	25.1 (226)		20.9 (46)	25.6 (171)	
Employment status			**< 0.001**			**<0.001**
Employed	63.4 (229)	61.9 (556)		59.6 (131)	52.9 (354)	
Unemployed	9.7 (35)	12.9 (116)		19.1 (42)	20.2 (135)	
Student	4.2 (15)	5.8 (52)		11.4 (25)	9.9 (66)	
Homemaker/full-time parent	0.3 (1)	8.1 (73)		0 (0)	8.2 (55)	
Retired	20.8 (75)	8.7 (78)		18.2 (18)	5.4 (36)	
Other	1.7 (6)	2.7 (24)		1.8 (4)	3.4 (23)	
Missing	0 (0)	0 (0)		0 (0)	0 (0)	
Education			**< 0.001**			**<0.001**
Primary/elementary or less	1.9 (7)	0.8 (7)		5.0 (11)	0.9 (6)	
Secondary/high school	28.3 (102)	30.1 (271)		30.0 (66)	34.1 (228)	
Red Seal/trades certificate	25.2 (91)	6.7 (60)		23.2 (51)	6.7 (45)	
College/university degree	34.9 (126)	50.7 (456)		31.8 (70)	47.7 (319)	
Graduate/Professional degree	8.0 (29)	10.6 (95)		9.1 (20)	8.5 (57)	
Missing	1.7 (6)	1.1 (10)		0.9 (2)	2.1 (14)	

Relationship status			**< 0.001**			0.090
Single	10.8 (39)	16.8 (151)		18.2 (40)	23. 5 (157)	
	7.5 (27)	11.9 (107)		11.4 (25)	14.7 (98)	
Separated/Divorced/Widowed						
In a relationship/Married	79.8 (288)	70.1 (630)		67.3 (148)	58.7 (393)	
Missing	1.9 (7)	1.2 (11)		3.2 (7)	3.1 (21)	
Area of residence			**< 0.001**			**0.016**
In a city	50.7 (183)	55.7 (501)		54.1 (119)	59.8 (400)	
In a small town	23.0 (83)	22.4 (201)		24.6 (54)	20.8 (139)	
In a rural area	21.9 (79)	17.1 (154)		16.4 (36)	13.0 (87)	
In a remote area	0.8 (3)	1.0 (9)		1.4 (3)	0.6 (4)	
Missing	3.6 (13)	3.8 (34)		3.6 (8)	5.8 (39)	
Experiences of racism			0.214			**0.030**
No	55.4 (200)	53.2 (478)		37.7 (83)	39.9 (267)	
Yes	16.3 (59)	19.5 (175)		30.0 (66)	29.5 (197)	
Missing/Undefined	28.3 (102)	27.4 (246)		32.3 (71)	30.6 (205)	
Experiences of discrimination			**0.026**			**0.003**
No	62.6 (226)	58.5 (526)		44.1 (97)	40.4 (97)	
Yes	28.3 (102)	33.3 (299)		50.5 (111)	52.0 (348)	
Missing	9.1 (33)	8.2 (74)		5.5 (12)	7.6 (51)	
Smoking status			0.219			0.402
No	71.8 (259)	73.8 (663)		76.4 (168)	69.4 (464)	
Yes	9.1 (33)	5.9 (53)		9.1 (20)	11.7 (78)	
Missing	19.1 (69)	20.4 (183)		14.6 (32)	19.0 (127)	
Alcohol and drug misuse			**0.022**			**0.010**
No (CAGE < 1)	55.1 (199)	54.2 (487)		41.4 (91)	41.3 (276)	
Yes (CAGE ≥ 1)	24.4 (88)	17.8 (160)		35.5 (78)	24.8 (166)	
Missing	20.5 (74)	28.0 (252)		23.2 (51)	33.9 (227)	
Class A chronic conditions			**0.002**			**<0.001**
No	71.2 (257)	58.7 (528)		63.6 (140)	44.8 (300)	
Yes	24.5 (89)	36.5 (328)		33.2 (73)	51.9 (347)	
Missing	4.2 (15)	4.8 (43)		3.2 (7)	3.3 (22)	
Class B chronic conditions			**<0.001**			0.257

No	54.9 (198)	67.9 (611)		58.2 (128)	66.2 (443)	
Yes	41.0 (148)	27.3 (245)		38.6 (85)	30.5 (204)	
Missing	4.2 (15)	4.8 (43)		3.2 (7)	3.3 (22)	
COVID-19 diagnosis			0.168			0.059
No	85.0 (307)	84.3 (758)		79.1 (174)	82.2 (550)	
Yes	6.9 (25)	10.3 (93)		9.6 (21)	11.4 (76)	
Missing	8.0 (29)	5.3 (48)		11.4 (25)	6.4 (43)	
Vaccination status			0.060			**0.029**
No	15.8 (57)	16.4 (147)		17.3 (38)	17.2 (115)	
Yes	29.6 (107)	35.8 (322)		24.1 (53)	35.4 (237)	
Missing/Blank/Other	54.5 (197)	47.8 (430)		58.6 (129)	47.4 (317)	
Health service use			0.100			0.499
No	42.1 (152)	45.4 (408)		38.2 (84)	43.4 (290)	
Yes	2.2 (8)	3.7 (33)		2.3 (5)	3.4 (23)	
Missing	55.7 (201)	51.0 (458)		59.6 (131)	53.2 (356)	
Depression symptoms			NA			NA
No	100 (361)	100 (899)		0 (0)	0 (0)	
Yes	0 (0)	0 (0)		100 (220)	100 (669)	
Missing	0 (0)	0 (0)		0 (0)	0 (0)	
Anxiety symptoms			**< 0.001**			**0.034**
No	88.4 (319)	81.2 (730)		31.8 (70)	26.8 (179)	
Yes	3.9 (14)	12.4 (111)		57.3 (126)	61.9 (414)	
Missing	7.8 (28)	6.5 (58)		10.9 (24)	11.4 (76)	
Perceived Stress Symptoms			**0.002**			**0.027**
No	56.2 (203)	44.1 (396)		11.4 (25)	5.5 (37)	
Yes	41.0 (148)	53.1 (477)		85.5 (188)	90.4 (605)	
Missing	2.8 (10)	2.9 (26)		3.2 (7)	4.0 (27)	

*percentages may not total 100 due to rounding

Table 3.6 Unadjusted Univariate Mediation Effects for Gender Differences in Depression among Métis People in Alberta

Mediating variable	n	Direct effect Gender → Depression OR (95% CI)†	Gender → Mediator OR (95% CI)	Mediator → Depression OR (95% CI)	Indirect effect Gender→Mediator→Depression OR (95% CI)
Income tertiles (bottom to top)	1,714	1.14 (0.91, 1.43)	0.62 (0.51, 0.75)**	0.67 (0.58, 0.77)**	1.21 (1.09, 1.34)**
Education (low to high)	2,245	1.22 (1.01, 1.49)*	1.48 (1.25, 1.75)**	0.91 (0.84, 0.99)*	0.96 (0.93, 0.99)*
Relationship status (less to more social)	2,232	1.16 (0.95, 1.41)	0.57 (0.46, 0.70)**	0.75 (0.67, 0.83)**	1.18 (1.08, 1.29)**
Employment status (0, 1)	1,680	1.08 (0.86, 1.36)	0.81 (0.61, 1.06)	0.53 (0.41, 0.68)**	NS
Discrimination (0,1)	2,085	1.14 (0.92, 1.40)	1.23 (1.01, 1.50)*	2.33 (1.94, 2.80)**	1.09 (1.01, 1.42)*
Alcohol/drug use (0,1)	1,629	1.21 (0.97, 1.52)	0.73 (0.58, 0.91)*	1.86 (1.50, 2.32)**	0.82 (0.70, 0.96)*
Class-A conditions (0,1)	2,173	1.12 (0.92, 1.38)	2.03 (1.66, 2.49)**	1.77 (1.48, 2.12)**	1.50 (1.26, 1.78)**
Class-B conditions (0,1)	2,173	1.24 (1.01, 1.51)*	0.58 (0.48, 0.71)**	1.07 (0.88, 1.29)	NS

Gender reference is men.
Scales in brackets
†Direct effect adjusted for mediator
OR = odds ratio; CI = confidence interval; NS = non-significant – indirect effects were not calculated if *Gender → Mediat*or or *Mediator → MH-outcome* paths were not significant in the mediation model at $p<0.05$.
* = $p<0.05$, ** = $p<0.001$

Table 3.7 Adjusted Univariate Mediation Effects for Gender Differences in Depression among Métis People in Alberta

Mediating variable	n	Direct effect Gender → Depression OR (95% CI)[†a]	Gender → Mediator OR (95% CI)	Mediator → Depression OR (95% CI)[a]	Indirect effect Gender→Mediator→Depression OR (95% CI)[a]
Income tertiles (bottom to top)	1,714	1.09 (0.86, 1.37)	0.62 (0.50, 0.75)**	0.66 (0.58, 0.77)**	1.22 (1.09, 1.36)**
Education (low to high)	2,245	1.18 (0.96, 1.44)	1.48 (1.25, 1.74)**	0.90 (0.82, 0.98)*	0.96 (0.92, 0.99)*
Relationship status (less to more social)	2,232	1.11 (0.91, 1.37)	0.57 (0.46, 0.70)**	0.76 (0.68, 0.86)**	1.17 (1.07, 1.27)*
Employment status (0, 1)	1,680	1.05 (0.84, 1.33)	0.81 (0.61, 1.06)	0.54 (0.42, 0.70)**	NS
Discrimination (0,1)	2,085	1.10 (0.89, 1.36)	1.23 (1.01, 1.50)*	2.41 (2.00, 2.91)**	1.20 (1.01, 1.44)*
Alcohol/drug misuse (0,1)	1,629	1.14 (0.90, 1.45)	0.73 (0.58, 0.91)*	1.81 (1.45, 2.27)**	0.83 (0.71, 0.96)*
Class-A conditions (0,1)	2,173	1.07 (0.87, 1.31)	2.03 (1.66, 2.49)**	1.82 (1.51, 2.19)**	1.53 (1.28, 1.83)**
Class-B conditions (0,1)	2,173	1.18 (0.96, 1.45)	0.58 (0.48, 0.71)**	1.07 (0.88, 1.30)	NS

Gender reference is men.
Scales in brackets
[†]Direct effect adjusted for mediator
[a] adjusted for area of residence
OR = odds ratio; CI = confidence interval; NS = non-significant – indirect effects were not calculated if *Gender → Mediat*or or *Mediator → MH-outcome* paths were not significant in the mediation model at $p<0.05$.
* = $p<0.05$, ** = $p<0.001$

Table 3.8 Bivariate Comparison of Study Characteristics in Men and Women by Presence and Absence of Anxiety Symptoms

	No Anxiety Symptoms			Anxiety Symptoms		
	Men N=399	**Women N=935**	**P-value**	**Men N=143**	**Women N=534**	**P-value**
Age			**<0.001**			**0.017**
Youth (16-24)	2.3 (9)	4.1 (38)		8.4 (12)	9.9 (53)	
Adult (25-64)	79.0 (315)	87.8 (821)		86.7 (124)	87.5 (467)	
Seniors (65 and over)	18.8 (75)	8.1 (76)		4.9 (7)	2.4 (13)	
Missing	0 (0)	0 (0)		0 (0)	0.2 (1)	
Income Tertiles			**<0.001**			**<0.001**
Bottom third	20.6 (82)	23.9 (223)		23.8 (34)	32.8 (175)	
Middle third	34.8 (139)	36.8 (344)		35.0 (50)	27.9 (149)	
Top third	25.8 (103)	14.8 (138)		19.6 (28)	13.7 (73)	
Missing	18.8 (75)	24.6 (230)		21.7 (31)	25.7 (137)	
Employment status			**<0.001**			**<0.001**
Employed	61.2 (244)	62.0 (580)		66.4 (95)	53.4 (285)	
Unemployed	12.0 (48)	13.6 (127)		15.4 (22)	19.3 (103)	
Student	4.8 (19)	6.0 (56)		13.3 (19)	9.6 (51)	
Homemaker/full-time parent	0 (0)	7.2 (67)		0.7 (1)	9.7 (52)	
Retired	20.3 (81)	9.0 (84)		3.5 (5)	3.6 (19)	
Other	1.8 (7)	2.3 (21)		0.7 (1)	4.5 (24)	
Missing	0 (0)	0 (0)		0 (0)	0 (0)	
Education			**<0.001**			**<0.001**
Primary/elementary or less	2.0 (8)	0.8 (7)		4.9 (7)	0.9 (5)	
Secondary/High school	29.1 (116)	29.2 (273)		28.0 (40)	34.1 (182)	
Red Seal/Trades certificate	24.8 (99)	6.0 (56)		21.0 (30)	7.3 (39)	
College/University degree	35.1 (140)	52.6 (492)		32.2 (46)	46.1 (246)	
Graduate/Professional degree	7.5 (30)	10.0 (93)		12.6 (18)	10.3 (55)	
Missing	1.5 (6)	1.5 (14)		1.4 (2)	1.3 (7)	
Relationship status			**<0.001**			**0.044**

Single	11.3 (45)	18.1 (169)		16.1 (23)	22.3 (119)	
	8.3 (33)	12.3 (115)		9.1 (13)	13.1 (70)	
Separated/Divorced/Widowed						
In a relationship/Married	78.5 (313)	68.1 (637)		71.3 (102)	62.2 (332)	
Missing	2.0 (8)	1.5 (14)		3.5 (5)	2.4 (13)	
Area of residence			**<0.001**			**0.006**
In a city	50.6 (202)	57.3 (536)		53.9 (77)	58.6 (313)	
In a small town	22.6 (90)	22.0 (206)		25.2 (36)	20.4 (109)	
In a rural area	21.8 (87)	15.4 (144)		16.1 (23)	15.2 (81)	
In a remote area	1.0 (4)	0.6 (6)		1.4 (2)	1.1 (6)	
Missing	4.0 (16)	4.6 (43)		3.5 (5)	4.7 (25)	
Experiences of racism			0.216			0.124
No	54.9 (219)	53.5 (500)		32.9 (47)	37.3 (199)	
Yes	16.3 (65)	20.3 (190)		34.3 (49)	30.7 (164)	
Missing/Undefined	28.8 (115)	26.2 (245)		32.9 (47)	32.0 (171)	
Experiences of discrimination			0.090			**0.007**
No	62.7 (250)	58.7 (549)		42.7 (61)	35.2 (188)	
Yes	29.3 (117)	34.0 (318)		51.1 (73)	56.7 (303)	
Missing	8.0 (32)	7.3 (68)		6.3 (9)	8.1 (43)	
Smoking status			0.452			0.365
No	73.7 (294)	72.1 (674)		79.0 (113)	71.4 (381)	
Yes	8.0 (32)	6.2 (58)		9.1 (13)	11.2 (60)	
Missing	18.3 (73)	21.7 (203)		11.9 (17)	17.4 (93)	
Alcohol and drug misuse			**0.001**			0.063
No (CAGE < 1)	52.1 (208)	52.4 (490)		44.8 (64)	42.9 (229)	
Yes (CAGE ≥ 1)	26.3 (105)	17.9 (167)		35.7 (51)	27.3 (146)	
Missing	21.6 (86)	29.7 (278)		19.6 (28)	29.8 (159)	
Class A chronic conditions			**<0.001**			**0.022**
No	71.9 (287)	57.5 (538)		60.1 (86)	45.3 (242)	
Yes	24.1 (96)	38.3 (358)		37.1 (53)	51.3 (274)	
Missing	4.0 (16)	4.2 (39)		2.8 (4)	3.4 (18)	
Class B chronic conditions			**0.001**			0.240
No	55.1 (220)	67.1 (627)		61.5 (88)	68.4 (365)	

Yes	40.9 (163)	28.8 (269)		35.7 (51)	28.3 (151)	
Missing	4.0 (16)	4.2 (39)		2.8 (4)	3.4 (18)	
COVID-19 diagnosis			**0.025**			0.101
No	85.5 (341)	83.9 (784)		74.8 (107)	83.2 (444)	
Yes	6.3 (25)	10.7 (100)		14.0 (20)	10.3 (55)	
Missing	8.3 (33)	5.5 (51)		11.2 (16)	6.6 (35)	
Vaccination status			**0.008**			0.604
No	15.3 (61)	16.8 (157)		18.2 (26)	17.0 (91)	
Yes	28.3 (113)	36.0 (337)		28.7 (41)	35.8 (191)	
Missing/Blank/Other	56.4 (225)	47.2 (441)		53.2 (76)	47.2 (252)	
Health service use			0.058			0.456
No	40.4 (161)	45.9 (429)		42.0 (60)	43.1 (230)	
Yes	2.3 (9)	3.4 (32)		2.1 (3)	4.1 (22)	
Missing	57.4 (229)	50.7 (474)		55.9 (80)	52.8 (282)	
Depression symptoms			0.510			**0.044**
No	80.0 (319)	78.1 (730)		9.8 (14)	20.8 (111)	
Yes	17.5 (70)	19.1 (179)		88.1 (126)	77.5 (414)	
Missing	2.5 (10)	2.8 (26)		2.1 (3)	1.7 (9)	
Anxiety symptoms			NA			NA
No	100 (399)	0 (0)		100 (143)	100 (534)	
Yes	0 (0)	100 (935)		0 (0)	0 (0)	
Missing	0 (0)	0 (0)		0 (0)	0 (0)	
Perceived Stress Symptoms			**0.002**			0.545
No	54.1 (216)	42.3 (395)		6.3 (9)	4.3 (23)	
Yes	43.4 (173)	55.2 (516)		91.6 (131)	91.8 (490)	
Missing	2.5 (10)	2.6 (24)		2.1 (3)	3.9 (21)	

*percentages may not total 100 due to rounding

Table 3.9 Adjusted Univariate Mediation Effects for Gender Differences in Anxiety among Métis People in Alberta

		Direct effect			Indirect effect
Mediating variable	**n**	**Gender → Anxiety OR (95% CI)†**	**Gender → Mediator OR (95% CI)**	**Mediator → Anxiety OR (95% CI)**	**Gender→Mediator→Anxiety OR (95% CI)**
Income tertiles (bottom to top)	1,714	1.55 (1.21, 2.00)*	0.62 (0.50, 0.75)**	0.78 (0.67, 0.91)*	1.13 (1.03, 1.23)*
Education (low to high)	2,245	1.62 (1.30, 2.02)**	1.48 (1.25, 1.74)**	0.93 (0.85, 1.02)	NS
Relationship status (less to more social)	2,232	1.56 (1.24, 1.95)**	0.57 (0.46, 0.70)**	0.85 (0.75, 0.95)*	1.10 (1.02, 1.18)*
Employment status (0, 1)	1,680	1.34 (1.05, 1.73)*	0.81 (0.61, 1.06)	0.65 (0.50, 0.85)*	NS
Discrimination (0,1)	2,085	1.46 (1.16, 1.85)*	1.23 (1.01, 1.50)*	2.72 (2.23, 3.33)**	1.23 (1.01, 1.51)*
Alcohol/drug misuse (0,1)	1,629	1.62 (1.26, 2.09)**	0.73 (0.58, 0.91)*	1.78 (1.42, 2.25)**	0.83 (0.72, 0.97)*
Class A conditions (0,1)	2,173	1.46 (1.16, 1.83)*	2.03 (1.66, 2.49)**	1.73 (1.43, 2.10)**	1.47 (1.23, 1.76)**
Class-B conditions (0,1)	2,173	1.57 (1.26, 1.96)**	0.58 (0.48, 0.71)**	0.91 (0.74, 1.12)	NS

Gender reference is men.
Scales in brackets
†Direct effect adjusted for mediator
OR = odds ratio; CI = confidence interval; NS = non-significant – indirect effects were not calculated if *Gender → Mediat*or or *Mediator → MH-outcome* paths were not significant in the mediation model at $p<0.05$.
* = $p<0.05$, ** = $p<0.001$

Table 3.10 Bivariate Comparison of Study Characteristics in Men and Women by Presence and Absence of Stress Symptoms

	No Stress Symptoms			Stress Symptoms		
	Men N=240	**Women N=453**	**P value**	**Men N=354**	**Women N=1,126**	**P value**
Age			**<0.001**			**<0.001**
Youth (16-24)	2.5 (6)	2.2 (10)		4.5 (16)	7.3 (82)	
Adult (25-64)	73.4 (177)	87.0 (394)		85.6 (303)	88.5 (996)	
Seniors (65 and over)	23.8 (57)	10.6 (48)		9.9 (35)	4.3 (48)	
Missing	0 (0)	0.2 (1)		0 (0)	0 (0)	
Income Tertiles			**0.021**			**<0.001**
Bottom third	16.7 (40)	22.5 (102)		26.3 (93)	30.1 (339)	
Middle third	38.8 (93)	33.6 (152)		31.6 (112)	32.4 (365)	
Top third	25.8 (62)	17.4 (79)		21.5 (76)	12.5 (141)	
Missing	18.8 (45)	26.5 (120)		20.6 (73)	25.0 (281)	
Employment status			**<0.001**			**<0.001**
Employed	61.3 (147)	59.2 (268)		61.9 (219)	57.6 (648)	
Unemployed	9.2 (22)	11.3 (51)		16.7 (59)	17.9 (202)	
Student	2.9 (7)	4.6 (21)		9.3 (33)	8.9 (100)	
Homemaker/full-time parent	0 (0)	8.8 (40)		0.3 (1)	7.6 (85)	
Retired	25.4 (61)	13.9 (63)		10.5 (37)	4.7 (53)	
Other	1.3 (3)	2.2 (10)		1.4 (5)	3.4 (38)	
Missing	0 (0)	0 (0)		0 (0)	0 (0)	
Education			**<0.001**			**<0.001**
Primary/elementary or less	3.3 (8)	0 (0)		2.8 (10)	1.0 (11)	
Secondary/High school	27.9 (67)	29.8 (135)		29.1 (103)	32.4 (365)	
Red Seal/Trades certificate	27.5 (66)	5.1 (23)		22.9 (81)	7.1 (80)	
College or University degree	33.8 (81)	52.3 (237)		32.5 (115)	48.9 (551)	
Graduate/Professional degree	7.1 (17)	11.7 (53)		10.2 (36)	9.1 (102)	
Missing	0.4 (1)	1.1 (5)		2.5 (9)	1.5 (17)	
Relationship status			**<0.001**			**0.001**
Single	10.8 (26)	19.7 (89)		15.0 (53)	20.1 (226)	
	5.8 (14)	11.5 (52)		10.5 (37)	14.0 (158)	

Separated/Divorced/Widowed						
In a relationship/Married	81.7 (196)	67.6 (306)		71.8 (254)	63.8 (718)	
Missing	1.7 (4)	1.3 (6)		2.8 (10)	2.1 (24)	
Area of residence			**0.008**			**<0.001**
In a city	45.8 (110)	57.4 (260)		54.8 (194)	58.2 (655)	
In a small town	24.6 (59)	21.2 (96)		23.2 (82)	21.2 (239)	
In a rural area	25.4 (61)	16.8 (76)		16.7 (59)	14.7 (166)	
In a remote area	0 (0)	0.4 (2)		1.7 (6)	1.0 (11)	
Missing	4.2 (10)	4.2 (19)		3.7 (13)	4.9 (55)	
Experiences of racism			0.181			**0.016**
No	60.8 (146)	57.8 (262)		39.8 (141)	43.4 (489)	
Yes	13.3 (32)	17.0 (77)		28.0 (99)	26.4 (297)	
Missing/Undefined	25.8 (62)	25.2 (114)		32.2 (114)	30.2 (340)	
Experiences of discrimination			0.190			**<0.001**
No	66.3 (159)	66.2 (300)		49.2 (174)	44.9 (505)	
Yes	25.0 (60)	28.3 (128)		44.4 (157)	46.5 (524)	
Missing	8.8 (21)	5.5 (25)		6.5 (23)	8.6 (97)	
Smoking status			0.562			0.345
No	75.4 (181)	75.7 (343)		72.6 (257)	70.1 (789)	
Yes	7.1 (17)	4.9 (22)		10.5 (37)	10.0 (112)	
Missing	17.5 (42)	19.4 (88)		17.0 (60)	20.0 (225)	
Alcohol and drug misuse			**0.042**			**0.001**
No (CAGE < 1)	59.6 (143)	57.6 (261)		42.1 (149)	45.6 (513)	
Yes (CAGE ≥ 1)	22.5 (54)	15.5 (70)		33.9 (120)	23.2 (261)	
Missing	17.9 (43)	26.9 (122)		24.0 (85)	31.3 (352)	
Class A chronic conditions			**0.009**			**<0.001**
No	72.1 (173)	58.5 (265)		66.1 (234)	50.1 (564)	
Yes	24.2 (58)	37.5 (170)		30.5 (108)	45.6 (513)	
Missing	3.8 (9)	4.0 (18)		3.4 (12)	4.4 (49)	
Class B chronic conditions			**0.004**			**0.010**
No	52.1 (125)	66.0 (299)		58.5 (207)	67.6 (761)	
Yes	44.2 (106)	30.0 (136)		38.1 (135)	28.1 (316)	
Missing	3.8 (9)	4.0 (18)		3.4 (12)	4.4 (49)	

COVID-19 diagnosis			0.664			**0.001**
No	87.5 (210)	84.3 (382)		79.7 (282)	82.8 (932)	
Yes	7.1 (17)	10.2 (46)		8.2 (29)	10.9 (123)	
Missing	5.4 (13)	5.5 (25)		12.2 (43)	6.3 (71)	
Vaccination status			0.479			**0.002**
No	15.4 (37)	11.7 (53)		17.0 (60)	19.3 (217)	
Yes	28.8 (69)	34.4 (156)		26.8 (95)	36.2 (408)	
Missing/Blank/Other	55.8 (134)	53.9 (244)		56.2 (199)	44.5 (501)	
Health service use			0.272			**0.023**
No	42.5 (102)	40.8 (185)		38.7 (137)	46.8 (527)	
Yes	1.3 (3)	3.5 (16)		2.8 (10)	3.6 (41)	
Missing	56.3 (135)	55.6 (252)		58.5 (207)	49.6 (558)	
Depression symptoms			0.604			0.671
No	84.6 (203)	87.4 (396)		41.8 (148)	42.4 (477)	
Yes	10.4 (25)	8.2 (37)		53.1 (188)	53.7 (605)	
Missing	5.0 (12)	4.4 (20)		5.1 (18)	3.9 (44)	
Anxiety symptoms			0.637			**0.004**
No	90.0 (216)	87.2 (395)		48.9 (173)	45.8 (516)	
Yes	3.8 (9)	5.1 (23)		37.0 (131)	43.5 (490)	
Missing	6.3 (15)	7.7 (35)		14.1 (50)	10.7 (120)	
Perceived Stress Symptoms			NA			NA
No	100 (240)	100 (453)		0 (0)	0 (0)	
Yes	0 (0)	0 (0)		100 (354)	100 (1,126)	
Missing	0 (0)	0 (0)		0 (0)	0 (0)	

*percentages may not total 100 due to rounding

Table 3.11 Adjusted Univariate Mediation Effects for Gender Differences in Stress among Métis People in Alberta

Mediating variable	n	Direct effect	Indirect effect		
		Gender → Stress	Gender → Mediator	Mediator → Stress	Gender→Mediator→Stress
		OR (95% CI)†	OR (95% CI)	OR (95% CI)	OR (95% CI)
Income tertiles (bottom to top)	1,714	1.67 (1.33, 2.09)**	0.62 (0.50, 0.75)**	0.73 (0.64, 0.84)**	1.16 (1.06, 1.27)*
Education (low to high)	2,245	1.74 (1.43, 2.12)**	1.48 (1.25, 1.74)**	0.93 (0.86, 1.02)	NS
Relationship status (less to more social)	2,232	1.66 (1.36, 2.03)**	0.57 (0.46, 0.70)**	0.89 (0.79, 1.01)	NS
Employment status (0, 1)	1,680	1.60 (1.27, 2.01)**	0.81 (0.61, 1.06)	0.59 (0.45, 0.79)*	NS
Discrimination (0,1)	2,085	1.55 (1.26, 1.91)**	1.23 (1.01, 1.50)*	2.42 (1.98, 2.96)**	1.20 (1.01, 1.44)*
Alcohol/drug misuse (0,1)	1,629	1.82 (1.45, 2.29)**	0.73 (0.58, 0.91)*	1.98 (1.56, 2.52)**	0.81 (0.69, 0.96)*
Class A conditions (0,1)	2,173	1.59 (1.30, 1.95)**	2.03 (1.66, 2.49)**	1.41 (1.16, 1.71)*	1.27 (1.09, 1.49)*
Class-B conditions (0,1)	2,173	1.64 (1.34, 2.01)**	0.58 (0.48, 0.71)**	0.86 (0.71, 1.05)	NS

Gender reference is men.
F-dominant = female dominant chronic conditions; M-dominant = male dominant chronic conditions; OR = odds ratio; CI = confidence interval
Scales in brackets
†Direct effect adjusted for mediator
NS = non-significant – indirect effects were not calculated if *Gender → Mediat*or or *Mediator → MH-outcome* paths were not significant in the mediation model at $p<0.05$.
* = $p<0.05$, ** = $p<0.001$

Chapter 4: Discussion, Implications, Limitations and Future Research Directions

4.1 Overview

The goal of this thesis was to create a better understanding of mental health outcomes in Indigenous Peoples during the COVID-19 pandemic. The first part of this thesis was a scoping review to examine the existing literature on mental health outcomes in Indigenous Peoples living in Australia, Canada, New Zealand, and the USA during the COVID-19 pandemic and to identify gender-related outcomes. The second part of this thesis was a secondary analysis of a longitudinal survey conducted to evaluate gender differences in the prevalence of depression, anxiety and perceived stress among Métis People in Alberta and identify social factors that mediate gender effects on mental health outcomes. This chapter will summarize the results from both studies, identify the limitations and implications of each study, and directions for future research.

4.2 Scoping Review

4.2.1 Summary of Scoping Review Results

The scoping review comprising sixty-eight documents across four countries generally found that the mental health of Indigenous Peoples was significantly impacted during the COVID-19 pandemic. Study analyses in the included documents were conducted and published in the USA (n=31), Canada (n=20), Australia (n=11) and New Zealand (n=6). Most of the documents employed a cross-sectional study design for data collection (n=57). Other study designs utilized were retrospective (n=10) and prospective cohort (n=10) designs. Mental health

outcomes comprised of mood disorders, alcohol, substance, and drug use, and suicidality which were examined to varying degrees using different tools of measurement.

The scoping review highlighted several themes. There was a general decline in the overall mental health of Indigenous Peoples living in Australia, Canada, New Zealand and the USA as reported in 26 documents. The rates and prevalence of mood disorders related to the pandemic including depression, anxiety, and psychological distress were reported using standard assessment tools in several documents (n=27). The documents revealed that the levels, rates and prevalence of these disorders were elevated among Indigenous Peoples during the pandemic. Several documents (n=15) that utilized survey questions, interviews and other methodologies instead of standardized tools observed similar findings. Documents (n=14) also revealed that Indigenous Peoples increased their consumption of alcohol, drug and substance consumption during the pandemic or had relatively higher rates of consumption of controlled substances compared to people of other races or ethnicities. High prevalence of suicidal ideation and attempts was also documented within included records (n=11). Finally, the scoping review highlighted the presence of gender differences in the prevalence and manifestation of poor mental health outcomes among Indigenous Peoples. In general, the pandemic had a negative effect on Indigenous Peoples living in Australia, Canada, New Zealand, and the USA.

4.2.2 Limitations of the Scoping Review

The scoping review was conducted according to the JBI methodology and the frameworks proposed by Arksey and O'Malley and Levac et al.[1,2] To our knowledge, it is the first systematic evidence synthesis of this scale that has been published on the mental health of Indigenous Peoples during the COVID-19 pandemic. A comprehensive search strategy and well-

defined inclusion and exclusion guidelines were crucial in ensuring suitable documents were analyzed for this scoping review. However, the scoping review is not without its limitations.

The empirical evidence included in this review is limited by the search terms and methodology utilized. The resulting potential selection bias was accounted for by using both broad and narrow search terms and ensuring the criteria for inclusion or exclusion were clearly defined. While the searches were conducted thoroughly, it is possible that documents were not included because they were outside the scope of searches at the time they were conducted. Due to the recency of the pandemic and its ever-evolving nature, findings yet to be published may have been missed. An updated evidence synthesis may be required in the future to have the most up-to-date information on how the COVID-19 pandemic affected the mental health of Indigenous Peoples.

The scoping review is also vulnerable to publication bias in which authors or journals may choose not to publish non-statistically significant results.[3] This was accounted for in our scoping review by conducting a comprehensive search that consisted of the inclusion of grey literature with a focus on documents published by governmental bodies and Indigenous organizations. Future syntheses should consider performing risk of bias assessments to evaluate the quality of included evidence.

4.2.4 Gaps in the Literature and Future Research Directions

This scoping review identified several gaps in the literature. First, there was a scarcity of documents in several domains and components of the outcomes assessed. Only 14 documents were identified across four countries that examined the consumption of controlled substances and only 11 documents looked at suicidality in Indigenous Peoples during the COVID-19 pandemic.

There was also a limited number of records (n=12) that focused on gender differences in mental health outcomes. No documents published in New Zealand were identified assessing suicidality among Indigenous Peoples. The paucity of research in these areas highlights the need for further research to better understand the specific context surrounding these outcomes and develop corresponding tailored interventions.

Secondly, the cross-sectional nature of most of the included studies precluded the longitudinal collection of information as the pandemic progressed. Given the evolution of the pandemic, there is a need to understand the long-term and current effects of the COVID-19 pandemic on the mental health of Indigenous Peoples.

Future research needs to take into account the fact that Indigenous groups have been subject to the worst effects of previous pandemics. The use of a pan-Indigenous approach by most documents prevented the unique challenges faced by specific Indigenous groups from being highlighted. The unique effects of colonialism and challenges faced by each Indigenous group must be taken into account when conducting future research related to Indigenous populations.

Finally, less than half of the documents utilized standardized tools in the evaluation of mental health outcomes resulting. The use of standardized tools in future publications can prevent information bias and help to promptly identify individuals that require further diagnosis and intervention.

4.2.3 Public Health Implications of the Scoping Review

Our scoping review shows that the pandemic negatively impacted the mental health of Indigenous Peoples living in Australia, Canada, New Zealand, and the USA. Given the enduring effects of colonialism on their communities and the socioeconomic challenges they face today,

Indigenous Peoples have an increased susceptibility to poor mental health outcomes. Before the pandemic, they experienced disproportionately higher rates of depression, anxiety, substance use disorders and suicidal ideation and had lower likelihood of receiving treatment.[4-6] The social isolation, restrictions, and uncertainties surrounding the COVID-19 pandemic may have exacerbated these underlying vulnerabilities leading to negative mental health outcomes. Some individuals turned to alcohol as a coping mechanism inducing additional financial problems.[7] The pandemic interacts with socioeconomic factors through complex pathways to increase disadvantaged populations' susceptibility to poor mental health outcomes.[8]

Mental illness, when left untreated, can manifest physically and biologically and lead to even more serious emotional and behavioral problems.[9] Timely detection and treatment can help counter its compounding effects. Consequently, interventions that address mental health must be put into place in Indigenous communities. In spite of the global widespread implementation of an array of mental health supports such as telehealth services, Indigenous Peoples still encounter multiple barriers to accessing healthcare. Barriers to mental healthcare access should be tackled by designing and implementing policies and interventions in partnership with Indigenous groups and communities.

Furthermore, public health practitioners and stakeholders should be aware of the complex factors at play within Indigenous communities. Structural determinants of health can increase the risk of poor mental health outcomes. However, as highlighted by several documents in the scoping review, traditional cultural practices and strong community ties serve as protective factors that can mitigate the effects of the pandemic on mental health outcomes. Limited access to healthcare, treatment programs, and facilities continues to impede efforts to address poor mental health outcomes that arose during the pandemic. By understanding the unique challenges

and strengths of these communities, policymakers, healthcare providers, and researchers can develop effective, culturally sensitive strategies to support the well-being of indigenous individuals and promote better mental health outcomes.

Ethical considerations always need to be paramount when undertaking research aimed at Indigenous populations. Given the history of colonization and exploitation experienced by many indigenous communities, it is important that all research respects cultural values, obtains informed consent, and includes community engagement. Most of the included documents ethically involved Indigenous communities in the research conducted by reporting on research conducted directly by Indigenous organizations, consulting with community members and leaders, or recruiting a diverse group of researchers consisting of Indigenous members.

4.3 Secondary Survey Analysis

Given the paucity of research on gender differences in mental health outcomes for specific Indigenous groups identified in the scoping review, it is imperative that research be conducted in order to fill this gap. The pursuit of this bid informed the second part of this thesis. The secondary survey analysis focused on gender differences in mental health outcomes among Métis People living in Alberta.

4.3.1 Summary of Results from Secondary Survey Analysis

The first objective of the secondary analysis of the *Misi Yehewin* survey conducted in Chapter 3 was to determine the prevalence of three mental health outcomes – depression, anxiety, and stress – among Métis men and women during the COVID-19 pandemic. The study also aimed to evaluate what social and economic factors mediated the relationship between

gender and depression, anxiety, and stress. The sample size included 2,234 Métis People who are citizens of the MNA. Participants in the study were between the ages of 17 and 90 and were mostly women (71.5%). The study found that the prevalence rates of depression, anxiety and stress symptoms were higher in Métis women than Métis men during the COVID-19 pandemic. Additionally, mediation analysis showed that income, education, relationship status, experiences of discrimination, the absence of alcohol/drug misuse, and the presence of chronic conditions mediated the association between gender and mental health outcomes.

The higher prevalence of symptoms of poor mental health outcomes among Métis women observed in our study is consistent with previous studies which show that women have a higher rate of being formally diagnosed with unipolar depression and anxiety disorders than men,[10,11] and score higher on self-report depression and anxiety scales during the pandemic.[12,13] Another study has found that Métis women, in particular, were more likely to report poor mental health than Métis men.[14] The study results suggest that gender is an important factor in experiences related to the pandemic and its impact on mental health outcomes. Métis women play central roles in maintaining family and community connections and the additional responsibilities of caregiving, financial stress, social isolation, and increased threat of violence brought on by the pandemic could contribute to the elevated prevalence of depression, anxiety, and stress symptoms.[15-17]

While Métis women in this study had a higher prevalence of poor mental health outcomes, when compared to the broader Canadian population, a higher burden of depression, anxiety, and stress was observed among both Métis men and women.[18-20] Métis woman in this study had higher depression (42%), anxiety (36%), and stress rates (69%) compared to women in the general Canadian population (18%, 16%, and 27% respectively). Similarly, depression,

anxiety, and stress prevalence rates were elevated for Métis men (40%, 28%, and 59%), compared to men in the general Canadian population (13%, 10%, and 23%). The unequal distribution of depression, anxiety, and stress symptoms experienced by Métis People compared to the general population emphasizes the unique needs of this population.

In mediation analysis, four socioeconomic variables were observed to mediate the relationship between gender and all three mental health outcomes among Métis women during the COVID-19 pandemic. Results from the analyses suggest that socioeconomic factors including low income, alcohol/drug misuse, discrimination, and the presence of chronic conditions contribute to the presence of depression, anxiety and stress symptoms in Métis women. In addition, the association between gender and depression was mediated by education level. Relationship status was also found to mediate the gender-depression and gender-anxiety relationship.

These findings are consistent with past research which indicate that women are more likely to earn lower incomes and attain higher levels of education than men and that lower income is correlated with depression symptoms.[21-27] Keeping in line with previous literature, the decreased odds of having alcohol/drug misuse problems (CAGE score ≥ 1) had a protective effect against poor mental health outcomes in Métis women in our study.[28,29]

The presence of chronic conditions mediating the relationship between gender and mental health outcomes also mirrors previously published literature. The chronic conditions mediating this relationship were more prevalent in women and the presence of chronic conditions has previously been linked to depression and anxiety.[30-35] In our study, women had higher odds of having asthma, obesity and/or autoimmune diseases. People with chronic conditions were at

increased susceptibility to higher morbidity due to the COVID-19 virus and this could further heighten their anxiety and stress levels.[36]

Discrimination was another consistent mediator. Indigenous women have reported facing discrimination due to both gender and ethnicity and experiencing discrimination has previously been linked to postpartum depression symptoms.[25,34,37] Experiencing discrimination during the pandemic, a time characterized by social isolation and increased needs could exacerbate mental health challenges among Métis women.[25]

Finally, relationship status also mediated the relationship between gender and depression and gender and anxiety. Métis women in our study were more likely to be in less protective relationships. The stability of relationships and family ties, while applicable to both genders, could manifest differently for women ameliorating some of the stressors associated with the pandemic.

4.3.2 Limitations of the Secondary Survey Analysis

While the originality of this study provides insightful contributions to a sparse field, it is not without its limitations. Cross-sectional studies are vulnerable to multiple kinds of bias. The method of recruitment introduces the possibility of selection bias. Respondents who completed the survey may have been more likely to have certain characteristics. As we saw in our sample, participants in the surveys were skewed towards women, those who were employed, and in a relationship/married. Since participants of the study were recruited through convenience sampling, the characteristics of non-respondents could not be identified. However, the repeated nature of the original study allowed for a wider range of participants to be included in the study.

We also accounted for selection bias in our analyses by excluding surveys with incomplete data and conducting age-weighted adjustments for prevalence estimates.[38]

Secondly, the presence of confounding can obfuscate the real relationship between an exposure and an outcome. In order to address this, candidate confounders were identified by constructing a DAG. After potential confounders were identified through biologically plausible relationships, they were tested in regression models to ensure that they had an effect on the relationship between gender and mental health outcomes in our sample. When confounders had an effect ≥ 15% on regression coefficients, they were adjusted for in mediation models to measure a more accurate representation of the relationship between gender, mental health outcomes and mediators.[39]

The nature of the study also opens it up to measurement bias in which the outcome is not accurately measured. This was accounted for in our study by the use of structured assessment tools that have previously been validated. The mental health outcomes assessed were also dichotomized based on previous quality assessments that showed high sensitivity and specificity for detecting the outcomes with the cut-offs used.[40-43]

As discussed in Chapter 3, the generalizability of the studies is limited due to the research question's focus on identifying the unique needs and challenges of Métis People living in Alberta.

4.3.3 Future Research Directions

This study aimed to identify socioeconomic and lifestyle factors that require further research. While the secondary survey analysis focused on multiple factors in the mediation analysis between gender and mental health outcomes, our list is not exhaustive. A number of

social determinants of health and protective factors which could be mediators of mental health outcomes were not included in this study. Future research should delve into the specific mechanisms through which other socioeconomic and lifestyle factors interact with gender to influence mental health outcomes in Métis People.

Additionally, our study only focused on three mental health outcomes. Future studies can expand on this, conducting research on other mental health outcomes and affective disorders and the interplay of the cultural, socioeconomic, and lifestyle factors that influence them. Further longitudinal studies could also provide insights into the evolving dynamics of this relationship post-pandemic.

Finally, our analyses only focused on the univariate relationship between gender, mediators and outcomes. Due to the complex interplay of socioeconomic factors, in future studies, it is important to consider how socioeconomic and lifestyle factors react in the presence of one another. While this was beyond the scope of our research question, future studies should include multiple risk and protective factors in a single mediation model, considering the intersection of gender, socioeconomic, and lifestyle factors on mental health outcomes and additional confounding effects.

4.3.4 Public Health Implications of the Secondary Survey Analysis

Our study showed that depression, anxiety, and stress symptoms during the pandemic was disproportionately higher among both Métis men and women compared to the general Canadian population. Additionally, the prevalence rates of mental outcomes were significantly different across self-identified gender and identified socioeconomic and lifestyle factors that mediated this relationship.

The history of colonialism leaves Métis People vulnerable to inadequate social resources and poor mental health outcomes.[44] Our findings suggest that while the burden of poor mental health is elevated for both Métis men and women, these disparities might be experienced differently by men and women, influenced by their respective roles in their communities. The additional stressors of the COVID-19 pandemic have the potential to target and exacerbate these disparities. Public health practitioners should be aware of the interactions between these factors in order to design more effective support and care for Métis People who might be at higher risk for the negative effects of the pandemic than the general population.

Métis People are a unique Indigenous group who have different needs from other Indigenous groups in Canada. The mental health services urgently required by this population should be provided with attentiveness to their distinct cultural needs. By recognizing and addressing the nuanced relationships between gender, mental health outcomes and unique experiences of Métis People, interventions can be developed to provide more effective support and care, ultimately improving the mental wellbeing on Métis women and men.

4.4 Knowledge Translation

The secondary survey analysis was conducted in partnership with the MNA. The results from this study will be shared with citizens of the community through presentations, reports, and publications using appropriate protocols set out in collaboration with the MNA.

4.5 Concluding Remarks

This thesis explored the literature on the mental health of Indigenous Peoples from countries with similar colonial histories during the COVID-19 pandemic and evaluated mediators of the relationship between gender and mental health outcomes among Métis People in

Alberta. Our scoping review showed that the mental health of Indigenous Peoples was significantly impacted by the pandemic with increased reports of mood disorders, alcohol use, and suicidality and a general decline in self-rated mental health. Limited studies evaluated mental health outcomes among specific Indigenous groups, especially in North America – Canada and the USA. The secondary survey analysis was targeted toward understanding the gender differences in the prevalence rates of mental health outcomes during the pandemic and what socioeconomic and lifestyle factors mediated these outcomes. A number of important factors through which Métis individuals are unequally disadvantaged were identified; these factors acted as mediators in the relationship between gender and depression, anxiety, and stress. Among the factors were income, education, relationship status, alcohol/drug misuse, experiences of discrimination and the presence of chronic conditions. These findings underscore the need for gender-sensitive and culturally appropriate interventions to tackle poor mental health outcomes in Indigenous communities. The results from both studies will be useful to inform strategies that consider the complex interplay of cultural, historical, and socioeconomic factors, while also acknowledging the diverse experiences of Indigenous men and women.

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Appendices

Appendix I: Search strategy for MEDLINE

1. COVID-19/ or SARS-CoV-2/
2. Coronavirus* or corona-virus* or 2019-ncov or ncov-19 or n-cov-19 or covid or “covid’s” or covid-19 or covid19 or SARS-CoV* or SARSCov*).mp.
3. 1 or 2
4. exp american native continental ancestry group/ or oceanic ancestry group/
5. ((Native* adj1 (American* or Canadian* or Alaska*)) or (Natives not digital natives) or Tribes or Indigenous or Aborigin* or Inuit* or Inuk or Inupiat* or First Nation or First Nations or Metis or Eskimo* or Aleut* or Amerindian* or (Indian* adj3 America*) or Cree* or Navaj* or Cheroke* or Blackfoot* Blackfeet* Mohawk* Sioux* or Apache* or Cherokee* Paiut* or Comanch* or Osage* or Seminol* or Canadian Indian* or first people* or autochthonous people* or Torres strait islander* or Maori* or Pacifika or Native Hawaiian or Pacific islanders).mp.
6. 4 or 5
7. exp mental disorders/ or exp mental health services/ or exp mental health/ or exp psychotherapy/ or (mental health or mental* ill* or mental disorder* or psychiatric or depression or depressive or dysthymic or anxiety or adhd or attention deficit or suicid* or schizophreni* or psychosis or pyschotic or psychoses or compulsive disorder* or OCD or behavio* disorder* or conduct disorder* or anorexi* or bulimi* or eating disorder* or binge-eating or bipolar or mania or adjustment disorder* or traumatic stress or ptsd or ptsi or panic disorder* or panic attack* or mood disorder* or ((stimulant* or substance* or opioid* or cocaine or heroin or illicit-drug* or fentanyl) adj3 ("use" or user* or usage or abuse* or misuse* or addict*)) or ((marijuana or cannabis or alcohol) adj3 (abuse* or misuse* or addict*)) or alcoholic*).mp. or ("Mental* health*" or "psych* disorder*" or "psych* condition*" or "mental* ill*" or "psych* ill*" or "mental* well*" or depress* or anxiet* or anxious* or "stress* disorder*" or PTSD or "Substance use*" or "substance abuse*" or addict* or alcoholi* or "binge drink*").mp.
8. 3 and 6 and 7
9. limit 7 to yr=”2020 -Current”

Appendix II: Guidelines for Data Extraction for the Scoping Review

General guidelines

- If item is not reported, enter NR; if not applicable: NA

Name: First name of individual completing the form

General Information

1. Study number
2. Author(s)
    - Last name and first initial of authors in format Adesunkanmi, M., Lau, S.
3. Title of the study
4. Year of publication
5. Type of evidence
    - Journal article
    - Dissertation
    - Government report
    - Organizational report
6. Journal: Full journal name
7. Type of Funding
    - Government
    - Industry
    - Private
    - Internal Funds
    - NGO/Not-for-profit/Charity
    - Academic Society
    - Combination
    - No funding
    - Not reported
8. Other:

Study Characteristics

9. Country where study was conducted
10. Study Objectives
11. State the objectives of the study
12. Study Design
    - Prospective cohort study: Analytical observational study that follows a group of participants over time to assess outcomes.
    - Retrospective cohort study: Observational study that uses medical or other records to compare individuals for a particular outcome
    - Cross-sectional study: Observational study where a group of individuals are evaluated at a single point in time for both exposure and outcome
    - Case-control study: An observational study in which two groups differing in outcome are identified and compared on the basis of an exposure. Usually retrospective in nature

13. Study Period
    - Indicate the data collection period as stated in the study
14. Study length
    - Indicate how long the study took to complete
15. Study Setting:
    - Clinical or community
16. Study Location
    - Indicate if the study was conducted in an urban or rural setting, and if it was regional or national
17. If regional, specify region
    - Indicate the location in which the study was conducted
18. Data source
    - Describe the data sources used in the study to collect information on the exposure and the outcome e.g. surveys, questionnaires, patient charts, regional database

Sample and Exposure Characteristics

19. Indigenous group examined
    - Australia - Aboriginal
    - Australia - Torres Straight Islanders
    - Australia - Unspecified Indigenous population
    - Canada - First Nations
    - Canada - Inuit
    - Canada - Métis
    - Canada - Unspecified Indigenous population
    - New Zealand - Maori
    - New Zealand - Unspecified Indigenous Population
    - USA - American Indian
    - USA - Native Americans
    - USA - Alaskan Natives
    - USA - Unspecified Indigenous Population
    - Other
20. Total sample size and breakdown
    - Total number of individuals sampled or analyzed and number of individuals in each indicated category
    - E.g. (Total Indigenous sample: 300 Métis - 100, First Nations - 200)
21. Age
    - Mean, SD, Median, IQR
22. Sex/Gender
    - Male, female, transgender, gender non-binary, agender, gender fluid
23. Featured group examined
    - Did the study examine a specific subset of an Indigenous group e.g. adolescents, two-spirit people, LGBTQIA+
24. Comparison group

- If present, indicate how the Indigenous sample assessed was compared to any other populations

25. If yes, what comparison groups were used?

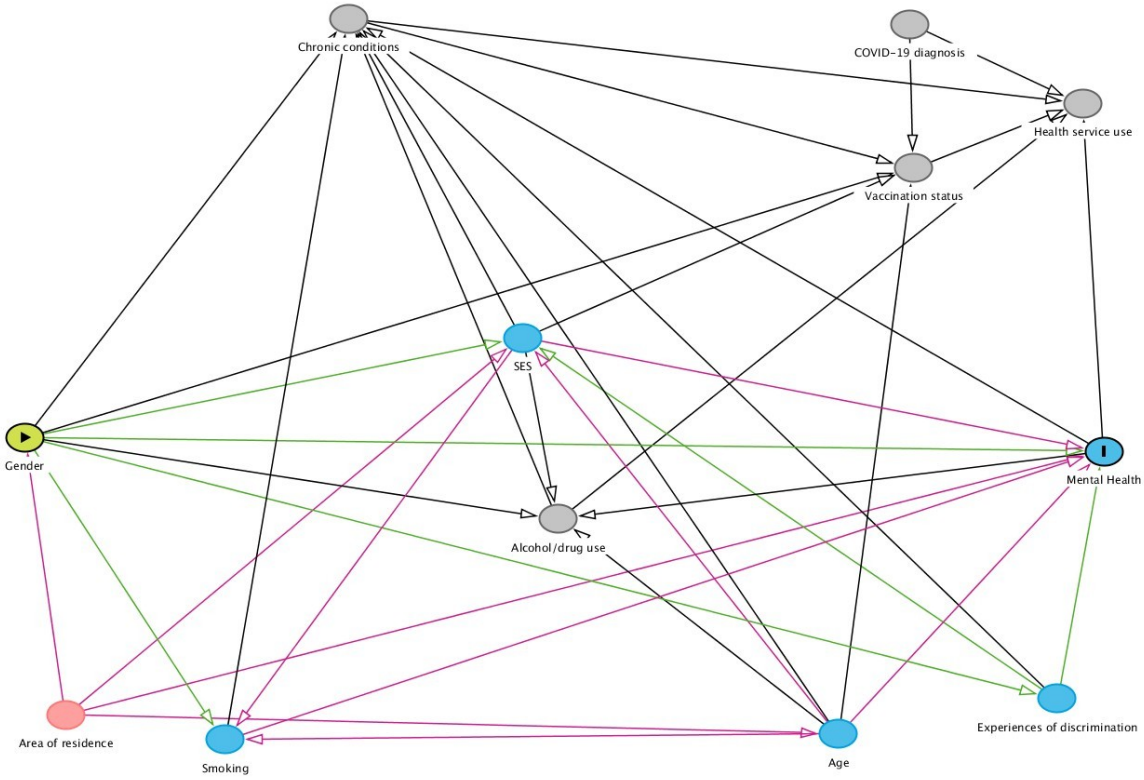
Outcomes

26. Mental health outcomes assessed
    - State the mental health outcomes examined, e.g. depression, anxiety, stress, suicidality and how it was defined in the study
27. Tools used to assess outcomes
    - Describe the tools used the measure the examined outcomes
28. For quantitative studies: report n(%) and scores for each outcome
29. For qualitative studies, describe the key findings
30. Main conclusions
    - State the key findings related to each outcome
31. Connection to the pandemic
    - How does the study relate to the COVID-19 pandemic? Does it measure outcomes during the pandemic period? Does it measure outcomes directly related to the pandemic? Does it compare outcomes pre-pandemic and during the pandemic?

Additional information

32. Controlled for any factors
    - Did the study adjust for any potential factors: yes/no
33. Factors controlled
    - If yes, what factors were controlled for?
34. Method(s) of analysis
    - Indicate what measures were used to analyze the data present including statistical methods
35. Additional information or comments
    - State any additional information that will be useful in synthesizing the results for this study

Appendix III: Directed Acyclic Graph (DAG) showing Relationship between Gender, Mediators, Outcome and Potential Confounders



*According to the daggity program, the minimum sufficient adjustment to estimate the total effect of gender on mental health outcomes is: Area of Residence
SES = socioeconomic factors