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Women's Mental Health during the COVID-19 Pandemic: A Mixed-Methods Sequential Explanatory Analysis of the Role of Sex, Gender, and Parenthood in the Experiences of Depression and Anxiety

Hoda Seens, *Western University*

Supervisor: MacDermid, Joy C., *The University of Western Ontario*

A thesis submitted in partial fulfillment of the requirements for the Doctor of Philosophy degree in Health and Rehabilitation Sciences

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Abstract

Research Questions

We examined the mental health experiences of women and gender-diverse people during the pandemic by answering three research questions. **Q1.** How did the levels of depressive and anxiety symptoms change during the pandemic by sex and gender? **Q2.** What individual and intersectional factors were related to experiencing the greatest levels of depressive and anxiety symptoms following the start of the pandemic? **Q3.** Why did some individuals experience more negative mental health outcomes?

Methods

This was a two-part mixed methods study. The first part was a quantitative study using an online survey; the second part was a qualitative explanatory study. The survey consisted of demographic, homelife, and mental health questions. We asked participants to complete the Patient Health Questionnaire-9 (PHQ-9) and the Generalized Anxiety Disorder-2 (GAD-2) scales, and to describe how they were feeling during the pandemic.

Results

A total of 1847 participants (43 countries) completed the study and revealed that depressive and anxiety symptoms increased by 74.2% and 57.1%, respectively. **Q1.** Women and gender nonconforming people had significantly higher levels of depression and anxiety than men. In man, woman, and other genders, for PHQ-9 (maximum: 27) scores increased by 3.3, 4.8, and 6.5 and for GAD-2 (maximum: 6) scores increased by 0.9, 1.3, and 1.6, respectively. **Q2.** We examined various aspects of participants' lives and found that an interaction between gender (non-man) and having a child(ren) were variables of significance ($p < 0.05$) in predicting post-pandemic PHQ-9 and GAD-2 scores. **Q3.** Using the groups revealed in Q2, we developed seven themes and a theory that adjusting to changes caused by the pandemic (such

as caring for children at home) combined with a loss of control culminated in worse mental health outcomes for mothers and gender nonconforming parents.

Conclusion and Significance

Depressive and anxiety symptoms increased after the start of the pandemic among women and gender-diverse people more than men. This increase was related to parenthood where mothers and gender nonconforming parents had negative mental health outcomes. Finding that women and gender-diverse individuals were most at-risk highlights the need for clinicians, psychiatrists, and policy makers to adopt gender-sensitive screening, treatment, and policy.

Keywords

mental health, women's health, depression and anxiety, pandemic, sex and gender, mothers and parents

Summary for Lay Audience

The COVID-19 pandemic has negatively affected mental health for many people, with women and gender-diverse people experiencing a greater burden. When the pandemic first began, much of the research conducted was on the virus and its physical effects. Even though researchers started to examine mental health, they did not assess the impact for people of different sexes and genders.

To learn more about mental health during the pandemic, we designed a study to examine depression and anxiety. In a two-part study, we asked participants to pick ratings on standardized depression and anxiety scales and to answer open-ended questions about how they were feeling. We also asked demographic questions, including participants' identification of their sex and gender.

We wanted to answer three research questions. First, what was the change during the pandemic in mental health measures by sex and gender? Second, what aspects of a person's life were related to having worse mental health outcomes during the pandemic. Third, why did some individuals experience worse mental health during the pandemic?

In total, 1847 participants completed the online study. We found that all people experienced more depression (74% more) and anxiety (57% more) after the start of the pandemic. Even though depression and anxiety increased for everyone, women and gender-diverse people had significantly higher levels than men. Next, we examined what type of personal characteristics were related to experiencing depression and anxiety during the pandemic. We found that being a mother or gender nonconforming parent was related to increased depression and anxiety during the pandemic. To answer the third question, we looked at what mothers and gender-diverse people told us about their mental health during the pandemic. We found that trying to adjust to the many changes of the pandemic (such as taking care of children at home) plus a loss of control was distressing to these parents.

Through our research, we found that women and gender-diverse people's mental health was negatively impacted during the pandemic, especially those who were parents. Health care providers should be ready to screen women and gender-diverse people for depression and anxiety and provide gender-appropriate supports and treatment.

Co-Authorship Statement

Dr. Joy C MacDermid, as supervisor, provided personnel and operating funding, ongoing oversight to the project and academic progression, design/analysis support, access to clinical facilities /labs, interpretation and writing support including editing multiple versions of manuscripts.

Dr. Ruby Grewal and Dr. David Walton, as members of the academic advisory committee, provided regular review of the project and academic progression, and advice on design/analysis, interpretation, and writing.

Additional contributions are listed below by chapter.

Chapter 1: Grand Introduction

Writing: Hoda Seens

Editing: Joy MacDermid, Ruby Grewal, David Walton

Chapter 2: Seens, H., Modarresi, S., Fraser, J., MacDermid, J. C., Walton, D. M., & Grewal, R. (2021). The role of sex and gender in the changing levels of anxiety and depression during the COVID-19 pandemic: A cross-sectional study. *Women's Health*. <https://doi.org/10.1177/17455065211062964>

Study Design: Hoda Seens, Joy MacDermid, David Walton, Ruby Grewal

Ethics Application: Hoda Seens

Qualtrics Survey: Hoda Seens, James Fraser

Participant Recruitment: Hoda Seens

Data Extraction and Analysis: Shirin Modarresi, Hoda Seens, James Fraser

Writing: Hoda Seens

Editing: Hoda Seens, Shirin Modarresi, James Fraser, Joy MacDermid, David Walton, Ruby Grewal

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Study Design: Hoda Seens, Joy MacDermid, David Walton, Ruby Grewal

Ethics Application: Hoda Seens

Qualtrics Survey: Hoda Seens, James Fraser

Participant Recruitment: Hoda Seens

Data Extraction and Analysis: Steve (Ze) Lu, Hoda Seens, James Fraser

Writing: Hoda Seens

Editing: Hoda Seens, Steve (Ze) Lu, James Fraser, Joy MacDermid, David Walton, Ruby Grewal

Chapter 4: Experiences of depression and anxiety among mothers and gender nonconforming parents during the COVID-19 pandemic

Study Design: Hoda Seens, Joy MacDermid, David Walton, Ruby Grewal

Ethics Application: Hoda Seens

Qualtrics Survey: Hoda Seens, James Fraser

Participant Recruitment: Hoda Seens

Data Extraction and Analysis: Hoda Seens, Javad Raeesi, James Fraser

Qualitative Analysis: Hoda Seens

Theme Presentation: Javad Raeesi

Writing: Hoda Seens

Editing: Hoda Seens, James Fraser, Javad Raeesi, Joy MacDermid, David Walton, Ruby Grewal

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Editing: Joy MacDermid, Ruby Grewal, David Walton

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1. `Abdu'l-Bahá. *Paris Talks: Addresses Given by `Abdu'l-Bahá in Paris in 1911-1912*. 11th ed. London: Bahá'í Publishing Trust, 1979

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Chapter 1

1 Grand Introduction

Science and medicine have a long history of systematically neglecting half of the population. For centuries studies were conducted on men and assumed that the results could be applied with uniformity to women. As such, women have received substandard care¹. Increasing evidence suggests that there is a significant difference between men and women in the incidence of disease² and response to treatment³ owing to both sex as well as gender².

In Canada, mood disorder diagnoses are twice as high among women in certain age groups as their male counterparts⁴. Because sex and gender have a significant impact on the prevalence and experience of disease and illness, it is important to examine the relationship between sex/gender and the experiences of various diseases, including mental health conditions. This analysis must also distinguish between the effects of sex and those of gender – how sex and gender are different and how they may interact with one another. Additionally important in this examination is recognizing that other parts of a person's identify (such as race, age, wealth, job status, and responsibilities) can intersect with sex/gender to produce unique experiences of health, illness, treatment, and health care.

1.1 Sex and Gender

Sex and gender are separate and distinct entities and ways in which individuals identify and, as such, there must be a distinction made between them. In 2001, the Institute of Medicine of the National Academy of Sciences published a report on “Exploring the Biological Contributions to Human Health: Does Sex Matter?”⁵ The authors asserted that

the terms “sex” and “gender” are often inconsistently used in scientific literature and endeavoured to define them. They defined sex as:

“The classification of living things as man or woman according to their reproductive organs and functions assigned by chromosomal complement”⁶.

Whereas, they defined gender as:

“A person’s self-representation as man or woman, or how that person is responded to by social institutions based on the individual’s gender presentation. Gender is rooted in biology and shaped by environment and experience”⁶.

These definitions highlight the distinct yet complementary roles of sex and gender in identity classification.

In addition to the classification of sex as different sets of chromosomes (generally XX for females and XY for males) and reproductive organs, sex includes the different levels of sexual hormones between men and women and the higher percentage of body fat in women. Gender, in addition to being shaped by one’s environment and experiences, is associated with behaviour and lifestyle. Gender also determines access to and utilization of health services and the attitudes of health practitioners towards individuals⁷.

In practice, it is difficult to separate the influence of sex versus gender on health. Sex can influence health by modifying behavior while gender-specific behaviour can modify biological factors that affect health⁷. For example, testosterone can cause aggressive and risk-seeking behaviour and lead to the neglect of one’s health. On the other hand, exposure to stress or poor nutrition (which can be gender-related) can induce genomic and epigenetic changes in adults, children, and fetuses. Since DNA repair and epigenetic mechanisms are modified by sex hormones, the physiological effects of these modifications are different in men and women⁷.

1.1.1 Importance of Studying Sex and Gender Differences

It is important to study sex differences because it can provide important insights into underlying biological mechanisms⁵. This knowledge can then be utilized to improve our understanding of health and medicine and to provide better care to individuals of both sexes. In addition to sex differences, the World Health Organization (WHO) states that gender and gender norms can influence an individual's susceptibility to various diseases and affect his or her physical and mental wellbeing⁸. Gender can also influence a person's access to and use of healthcare. WHO distinguishes between gender equality and gender equity in health. Gender equality is equality in opportunities for men and women. On the other hand, gender equity goes further than equality in opportunities to include the different needs and preferences of men and women. That is, gender equity is equality in results for men and women, rather than simply equality in opportunities⁸. Applying this to health, gender equity translates into reducing unjust and avoidable inequality in health status and health care⁵. Therefore, it is important to study both sex and gender differences in health in order to provide the best care to all individuals.

1.1.2 Historical Perspectives on the Exclusion of Women

Historically, women have been excluded from research studies and recent evidence demonstrates that women older than 65 years continue to be excluded. This exclusion has detrimental effects on women's health because scientific research is the foundation that informs medicine and healthcare². When conducting scientific research, it was assumed that women were "little men." Therefore, women's inclusion in studies was not deemed necessary unless the research pertained to their reproductive system. It was thought that differences in health outcomes outside of the reproductive system could be explained by such variations as weight, height, and body fat percentage. However, researchers are now realizing that every human organ, not merely the reproductive ones, is capable of different responses based on the chromosomal and hormonal differences of sex⁹.

This tendency to use men as the standard subjects in studies, “the male norm”⁶, is a historical reason for the exclusion of women from scientific studies. The second form of gender bias and reason for the exclusion of women from studies is referred to as “male bias”⁶. Male bias is a form of observer bias created by adopting a male perspective and lens through which to observe the world.

1.1.3 Intersectionality

An intersectional approach to health (and mental health) is crucial because it acknowledges the complex interplay between various social identities and systems of oppression, and how they intersect to shape individuals' experiences of health and well-being. Individuals hold multiple social identities such as race, gender, sexuality, socioeconomic status, and disability. Kimberlé Crenshaw coined the term intersectionality and emphasized that these identities intersect and interact in ways that cannot be understood by looking at each identity separately¹⁰. Intersectionality demonstrates how multiple forms of oppression can compound and exacerbate mental health disparities. Using an intersectional approach highlights disparities in access to mental health resources and services based on intersecting identities. An intersectional lens is crucial for developing policies and interventions that address the diverse needs of marginalized communities, including those based on gender¹¹.

Traditional gender roles and societal expectations often place different pressures on mothers and gender nonconforming parents. Research suggests that mothers and gender nonconforming parents may face greater pressures to fulfill caregiving responsibilities, leading to increased stress and risk of mental health issues¹². Balancing work and family responsibilities can be particularly challenging for parents, especially in societies where gender norms dictate unequal division of labour. Studies have also shown that conflict between paid and unpaid work is associated with higher levels of stress and poorer mental health outcomes¹³.

1.1.4 Sex and Gender in Mental Health

It should be noted that even in our discussion of mental health below, it is difficult to separate sex and gender when relying on current literature. We have endeavoured to be cognizant of the differences between sex and gender and to include in this analysis those populations who are not binary in sex and/or gender. Nonetheless, in discussing epidemiology, etiology, diagnosis, and management of mental health conditions in our background information, we must rely on what is currently available in research and literature. The Diagnostic and Statistical Manual of Mental Disorders (DSM)¹⁴ has evolved to include a discussion of “Gender-Related Diagnostic Issues” under its classification of various mental health conditions. However, they interchangeably use the terms “female” and “woman,” and offer discourse on issues of sex owing to genetic and hormonal differences while presenting epidemiologic findings based on binary gender. This is not a critique of the DSM as they too must rely on available literature on the role of sex and gender in mental health disorders. This is an indication of the necessity of increasing our collective understanding of how sex and gender – as different concepts, their many forms, and their intersection with other patient characteristics – can affect the experience of mental health conditions.

1.2 The COVID-19 Pandemic

The COVID-19 pandemic, caused by the novel coronavirus SARS-CoV-2, emerged in December 2019¹⁵ in Wuhan, China, and rapidly spread worldwide, leading to unprecedented public health, social, and economic challenges. This new coronavirus was dubbed “COVID-19” by WHO on February 11, 2020¹⁵. The first cases of a “pneumonia of unknown cause” were reported to the WHO Country Office in China on December 31, 2019¹⁵. On March 11, 2020, WHO Director-General characterized COVID-19 as a pandemic¹⁶.

COVID-19 caused a spectrum of illnesses ranging from mild respiratory symptoms to severe pneumonia, acute respiratory distress syndrome, multi-organ failure, and death.

Vulnerable populations, including older adults and those with underlying health conditions, were at increased risk of severe illness and mortality. Governments implemented various public health measures to control the spread of the virus, including lockdowns, quarantine, social distancing, mask mandates, travel restrictions, and vaccination campaigns. The COVID-19 pandemic continues to evolve, with ongoing efforts to control transmission, mitigate the impact on health and society, and recover from its devastating effects.

The tendency to neglect sex and gender differences in health research continues with this recent pandemic. When analyzing the impact of the COVID-19 pandemic, it is critical to remain cognizant of differences in sex and gender and how these differences can influence the levels of depression and anxiety among individuals, communities, and populations.

1.3 Depression and Anxiety

1.3.1 Depression

Depressive symptoms can manifest in various mental health conditions, including major depressive disorder (MDD), bipolar disorders, persistent depressive disorder, and premenstrual dysphoric disorder¹⁴. “Depression” is often used interchangeably with MDD, which is a mental health disorder characterized by persistent feelings of sadness, hopelessness, and loss of interest or pleasure in activities. It can affect how a person thinks, feels, and behaves, leading to a variety of emotional and physical symptoms¹⁴.

MDD can occur at any age, but it often first appears during adolescence or early adulthood. According to WHO, depression affects more than 264 million people globally, and its incidence is increasing. The etiology of depression is multifactorial and involves a complex interplay of genetic, biological, environmental, and psychological factors. Some common risk factors for depression include genetic predisposition, neurochemical imbalances, life stressors, chronic illnesses, and environmental factors¹⁷.

Women tend to have higher rates of depression compared to men. In Canada, women are almost twice as likely as men to experience depression in their lifetime¹⁸. Women may also experience different symptoms of depression than men. While women often report feelings of sadness, guilt, and worthlessness, men may exhibit symptoms like irritability, anger, and substance abuse¹⁹. Some research suggests that women may respond differently to certain antidepressant medications compared to men. Factors such as hormonal fluctuations and genetic differences may contribute to these variations in treatment response²⁰.

1.3.2 Anxiety

Anxiety symptoms can manifest in various mental health disorders, including generalized anxiety disorder (GAD), panic disorder, social anxiety disorder, and obsessive-compulsive disorder. Anxiety is characterized by excessive worry, fear, or apprehension about future events or situations. It can manifest as persistent and uncontrollable thoughts, physical symptoms such as rapid heartbeat and sweating, and avoidance behaviours¹⁴.

The incidence of anxiety disorders varies across different age groups and populations. Research indicates that anxiety disorders often emerge during childhood, adolescence, or early adulthood, with approximately 1 in 3 individuals experiencing an anxiety disorder at some point in their lives²¹. The prevalence of anxiety disorders varies across different regions and demographic groups. Globally, it is estimated that around 301 million people suffer from anxiety disorders, making it the most common mental health condition²². The etiology of anxiety disorders is multifactorial and involves a combination of genetic, biological, environmental, and psychological factors. Common risk factors for anxiety disorders include genetics, brain chemistry, personality traits, life experiences, and trauma²³.

Women tend to have higher rates of anxiety disorders compared to men. Women may experience different symptoms of anxiety compared to men. While women often report

symptoms such as excessive worry and rumination, men may exhibit symptoms like irritability, agitation, and risk-taking behaviors²⁴. Similar to depression, women may respond differently to treatments for anxiety disorders compared to men. Again, factors such as hormonal fluctuations and genetic differences may influence these treatment outcomes²⁴.

1.3.3 Measuring Depression and Anxiety

There are various scales available for measuring symptoms associated with depressive disorders and supporting diagnosis, including the Patient Health Questionnaire-9 (PHQ-9)²⁵, the Beck Depression Inventory²⁶, and the Hamilton Rating Scale for Depression²⁷. There are also a number of scales for measuring symptoms associated with anxiety disorders, including the Generalized Anxiety Disorder-2 (GAD-2)²⁸, the Beck Anxiety Inventory²⁹, and the Hamilton Rating Scale for Anxiety³⁰. The aim of these scales is to capture and, to some extent, quantify depressive and anxiety disorders. The criteria used in diagnosing these disorders are outlined in detail in the DSM and the International Classification of Diseases. It must be noted, however, that these scales cannot diagnose depressive or anxiety disorders on their own – they are merely tools to assist in diagnosis. Diagnosing depression or anxiety requires clinical judgement and an assessment by a health practitioner, such as a such as psychiatrist, clinical psychologist, or a primary care physician. Below, we will discuss the scales we used in our study, PHQ-9 and GAD-2.

1.3.3.1 Patient Health Questionnaire-9

The PHQ-9 is a screening tool for MDD and may also be used to diagnose it or measure its severity³¹. Respondents answer nine questions choosing “not at all,” “several days,” “more than half the days,” and “nearly every day.” On a four-point Likert scale (0 to 3), the responses on the questionnaire are summed (ranges between 0 and 27)³¹. Total PHQ-9 scores can be used to represent MDD severity with 5, 10, 15, and 20 indicating mild,

moderate, moderately severe, and severe depression, respectively. For scores between 5 and 9, it is recommended that respondents are monitored for changing levels of depressive symptoms²⁵. With a score of 10 or greater, the PHQ-9 scale's sensitivity and specificity are both 88%²⁵.

1.3.3.2 Generalized Anxiety Disorder-2

GAD-2 is a patient-reported screening tool for GAD²⁸ with two items where respondents answer “not at all,” “several days,” “more than half the days,” and “nearly every day” to each item. As is the case with the PHQ-9, the items are then rated on a four-point Likert scale (0 to 3) and added together to arrive at a total score (ranges between 0 and 6)²⁸. A score of 3 or greater indicates a clinically relevant anxiety disorder with a sensitivity and specificity of 86% and 83%, respectively²⁸.

1.4 Mental Health during the Pandemic

The COVID-19 pandemic not only affected physical health of individuals and populations in a variety of ways³², it has negatively impacted mental health worldwide³³⁻⁴⁰. The mental health effects have been varied and affected individuals and communities in different manners. Females (sex) and women (gender) have experienced greater levels of depression and anxiety than males (sex) and men (gender)^{37,41-43}. In terms of age, some studies found that younger adults (ages 18 to 30 years) experienced greater levels of psychological distress^{37,42,43}. A Canadian study found high levels of anxiety and poor self-perceived mental health among those who were 15 to 24 years old, with decreasing levels of anxiety as age increased, until the age of 65 years at which point anxiety and poor self-perception of mental health increased again⁴⁴. Other variables associated with poor mental health outcomes during the pandemic were pre-existing health conditions (both physical and mental)⁴² and working in healthcare setting during the pandemic^{45,46}. Although stressors during the pandemic negatively affected many facets of mental health,

depression and anxiety are two measures of mental health that were profoundly impacted and studied⁴⁷⁻⁵¹.

1.5 This Study

In March 2020, with the start of the COVID-19 pandemic, my research and clinical education were paused; I started quarantining at home with my two young children. As I spoke to friends and colleagues, I realized my challenges and distress were not unique. Many individuals were experiencing stressful life events, with women seemingly assuming even greater family responsibilities during the pandemic. I decided to approach my PhD supervisor, Dr. MacDermid, with the idea of conducting a study on the impact of the pandemic on women's mental health. With her mentorship, I developed a cross-sectional study to examine anxiety, depression, and family role responsibilities.

1.5.1 Research Design

We designed a mixed methods sequential explanatory study. A mixed methods sequential design offers a robust approach to research by combining the strengths of quantitative and qualitative methodologies, providing a more comprehensive understanding of complex research questions or phenomena⁵². The design involves collecting and analyzing quantitative and qualitative data in two distinct phases, with the qualitative phase used to explain or elaborate on findings from the quantitative phase. Part 1 (P1) of our study was the quantitative survey while Part 2 (P2) was a qualitative explanatory analysis to explain our findings from the quantitative component.

In developing and administering our survey, we adhered to recommendations set forth in *The Checklist for Reporting Results of Internet E-Surveys (CHERRIES)*⁵³. We also aimed to follow *The Sex and Gender Equity in Research (SAGER)* guidelines⁵⁴ to ensure that we included specific questions on sex and gender in our study design and analysis. Additionally, we have adhered to the *Standards for Reporting Qualitative Research (SRQR)*⁵⁵ for the qualitative component.

1.5.2 Research Questions

In examining the role of sex and gender in mental health during the pandemic, we wanted to answer three specific questions. **Q1.** How did the levels of depressive and anxiety symptoms change during the pandemic by sex and gender? **Q2.** What individual and intersectional factors were related to experiencing the greatest levels of depressive and anxiety symptoms following the start of the pandemic? **Q3.** Why did some individuals experience more negative mental health outcomes?

1.5.3 Part 1

1.5.3.1 Survey

We developed a survey consisting of questions in the following categories: demographics, mental health, and homelife (Appendix A). We combined standard and previously validated scales (PHQ-9 and GAD-2) with survey-specific questions. We administered the survey in English on the Qualtrics platform version June-July-August, 2020 (Qualtrics, Provo, UT). After transferring the survey into Qualtrics, we ensured survey functionality through pre-testing by graduate students with clinical and methodologic expertise.

The survey questions were administered in the same order to all respondents. Some questions had adaptive parts and were conditionally displayed (based on a response to a previous item). Other than the first question seeking informed consent, participants could leave blanks or skip questions if they wished to do so. Respondents were also able to go back in the survey and change answers to previous questions and had up to two weeks to return and complete the survey. We ensured there were no duplicate entries from respondents through Qualtrics' use of internet protocol addresses.

We applied for research ethics approval to Western University's Health Sciences Research Ethics Board. They approved the study (project identification number: 115790) on June 25, 2020 (Appendix B). We asked all respondents to read through a letter of information describing the study. Obtaining consent was the first question on the survey and its completion was required before survey questions would be displayed. At the end of the survey, respondents were able to enter a draw to win one of three Amazon gift cards (35 USD each). We administered the survey between June 26, 2020 and August 31, 2020.

1.5.3.2 Participants

Participant inclusion criteria were being 18 years of age or older and the ability to read and respond in English. As described above, participants had to provide informed consent to the letter of information to be included in the study. Respondent anonymity was maintained throughout the study.

We used various online channels for participant recruitment. We used community websites (Kijiji and Craigslist), social media sites (Facebook, Instagram, and Twitter), and Whatsapp groups and email listservs. We decided not to limit the survey to any geographic location for two reasons. First, the pandemic had a global reach and affected people throughout the world. As such, we did not want to limit its scope to any particular group; we wanted to include all experiences and voices. Second, the survey was completed anonymously online; limiting the study's administration to a certain country may have elicited responses inconsistent with the true location of participants, which we endeavoured to avoid.

1.5.3.3 Measures of Independent Variables

We began the survey with a set of demographic questions. First, we asked respondents to state where they lived by picking their country and state/province from a drop-down

menu and writing in the name of their city of residence. We also asked about respondents' current employment status, marital status, and the number of individuals living in their homes.

For work status, we asked, "which statement best describes your current employment status?" Participants could choose between paid employee, self-employed, laid off, stay-at-home parent/caretaker, student, retired, unable to work due to a disability, and other (with a write-in option). Depending on what respondents selected, they were given follow up questions. For marital status, we asked participants, "What is your marital status?" Respondents could select single, common-law, married, divorced, widowed, and other (with a write-in option). We asked participants about the number of individuals living in their homes. For having children, participants were asked "how many children (who are dependent on you) currently live in your home?" Respondents were presented with a drop-down menu ranging from 0 children to more than 10, in increments of 1 child.

Included in the demographic questions that we asked participants was age, biological sex, gender identity, and ethnic origin(s). For biological sex, respondents could choose male, female, or other (with a write-in option). For gender identify, respondents could choose man, woman, non-binary, agender, or other (with a write-in option).

1.5.4 Part 2

1.5.4.1 Qualitative Research Paradigm

Before delving into the methods undertaken in P2, we will describe the philosophical underpinnings of the qualitative study. In conducting qualitative studies, researchers should choose a paradigm that fits with their beliefs about reality⁵⁶. In deciding on the paradigm for this study, first I reflected on epistemology, which is concerned with the constitution of knowledge. I determined how I know what I know by asking what I am trying to learn and determining my role (as a researcher) within the study⁵⁷. I concluded that, as a researcher, I am part of the research process rather than an objective observer⁵⁶.

Second, I considered ontology – whether to believe in a realist or relativist existence. I introspected if there is a real world where objects and structures have a cause-effect relationship or if there can be diverse interpretations of the world⁵⁷. I concluded that there is no ultimate truth and that the world has multiple realities that are influenced by context⁵⁶, which can be shaped by the political and economic realities of society⁵⁸. Finally, I believe that these political and economic conditions have different effects for people based on their genders. Therefore, based on my beliefs in a subjective epistemology and relative ontology, my paradigm of inquiry is critical feminist theory.

Critical feminist theory is rooted in both critical theory and feminism. Critical feminist theory seeks to understand how gender intersects with other systems of domination (including race, class, and sexuality) to lead to inequality and injustice. Critical theory emerged as a philosophical and interdisciplinary framework within the Frankfurt School of social theory in the early to mid-20th century. It is characterized by a critical examination of society with the goal of understanding and transforming social structures of domination and oppression⁵⁹. Although there is no unified definition of feminist theory, there are three common elements among the various forms⁶⁰. First, feminism positions gender as socially created rather than innately determined – gender is a complex interplay between biology and culture (as described earlier in this chapter). Second, in feminism, gender is a central aspect in the social world. Third, feminism recognizes that the consequences of gender inequality do not have the same effect on all individuals of the same gender – gender inequality intersects with other types of inequality to affect individuals and groups in different ways and extents⁶⁰.

Critical feminist theory emphasizes the importance of reflexivity, intersectionality, and social change in its analysis of gender relations and strives to uncover and dismantle systems of privilege and marginalization⁶¹. Therefore, in taking a critical feminist theory approach, I believe that gender intersects with other forms of power and oppression that must be examined and critiqued to bring about change – including change in mental health and mental health care.

1.5.5 Analysis

1.5.5.1 Study 1

This is the first study of Part 1. The full study is found in Chapter 2. The aim of this study was to answer Research Question 1: How did the levels of depressive and anxiety symptoms change during the pandemic by sex and gender?

To obtain measures of depression and anxiety symptoms, we used the PHQ-9 and GAD-2 scales, respectively. We asked respondents to complete two copies of each scale. The first copy represented an average two-week period preceding the start of the pandemic (pre-pandemic scores) and the second copy captured an average two-week period following the start of the pandemic (post-pandemic scores). We used March 11, 2020 as the start date of the pandemic.

We conducted paired sample t-tests to compare levels of depression and anxiety symptoms before and after the start of the pandemic. We used mixed-model factorial analysis of variance to evaluate changes in both depression and anxiety scores between sex groups (male, female, other) and gender groups (man, woman, nonbinary, agender, other).

1.5.5.2 Study 2

This is the second study of Part 1. The full study is found in Chapter 3. The aim of this study was to answer Research Question 2: What individual and intersectional factors were related to experiencing the greatest levels of depressive and anxiety symptoms following the start of the pandemic?

Similar to study 1, to obtain measures of depression and anxiety symptoms, we used the PHQ-9 and GAD-2 scales, respectively. We asked respondents to complete two copies of each scale. The first copy represented an average two-week period preceding the start of the pandemic (pre-pandemic scores) and the second copy captured an average two-week

period following the start of the pandemic (post-pandemic scores). We used March 11, 2020 as the start date of the pandemic.

We conducted hierarchical (stepwise) multiple linear regression to determine the optimal regression models for PHQ-9 and GAD-2 post-pandemic states. We used three steps to insert various independent variables from the survey into depression and anxiety models (including single demographic variables and conjunct variables). The significance level of entry into the stepwise model was set to $p < 0.05$; while removal was set to $p > 0.10$ in order to investigate all potential independent variables.

1.5.5.3 Study 3

This study is Part 2. The full study is found in Chapter 4. The aim of this study was to answer Research Question 3: Why did some individuals experience more negative mental health outcomes? Based on the findings from study 2, those who identified as women or gender nonconforming and had a child(ren) living at home experienced significantly greater levels of depressive and anxiety symptoms after the start of the pandemic. Therefore, in study 3, we examined the lived experiences of mothers and gender nonconforming parents. The qualitative analysis is based on responses that participants provided to an open-ended question in the study: “We would like to know how the pandemic has affected your life. Please tell us how you are feeling, how you are coping, or anything else you would like to share.”

We used criterion sampling to select participants based on pre-identified factors⁶². Participants had to have answered all questions on both copies of PHQ-9 and GAD-2 as well as the qualitative question. They had to self-identify as woman, nonbinary, agender, or other. Their post-pandemic scores on PHQ-9 or GAD-2 had to be greater than 10 or 3, respectively. Finally, their scores following the start of the pandemic had to be greater than pre-pandemic scores on the PHQ-9 or GAD-2 scales. Then we organized the data into three respondent groups: those who met the sampling criteria based on PHQ-9 scores, those who met the sampling criteria based on GAD-2 scores, and those who met

the criteria based on both their PHQ-9 and GAD-2 scores. Before coding, we became familiar with the data by reading through all responses. We conducted three rounds of coding (December 2023 to March 2024) to arrive at codes, subcategories, categories, themes, and a theory.

We ensured four important measures of qualitative research quality were met: credibility, transferability, dependability, and confirmability⁶². We have achieved this through triangulation of the findings and peer exam by several researchers. We used thick and rich descriptions in presenting the findings, and have maintained an audit trail⁶². By asking participants to anonymously share their experiences, we have negated several types of biases inherent in qualitative research, such as interviewer bias, courtesy bias, and social desirability bias⁶³. Finally, we have ensured saturation in our findings⁶⁴.

1.6 Thesis Goals

This thesis is not merely an academic endeavour for me; it has been a labour of love in route to achieving my career goals. My goal in completing my PhD has been to contribute to creating knowledge that can advance the mental health of women and contribute to improving health for marginalized populations. Consistent with this goal, in the next three chapters I will present my studies and findings on the mental health experiences of women and gender diverse people during the pandemic.

1.7 References

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Chapter 2

2 The Role of Sex and Gender in the Changing Levels of Anxiety and Depression during the COVID-19 Pandemic

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Seens, H., Modarresi, S., Fraser, J., MacDermid, J. C., Walton, D. M., & Grewal, R. (2021). The role of sex and gender in the changing levels of anxiety and depression during the COVID-19 pandemic: A cross-sectional study. *Women's Health*. <https://doi.org/10.1177/17455065211062964>

2.1 Abstract

Background: Several studies have assessed the impact of the COVID-19 pandemic on anxiety and depression, but have not focused on the role of sex and gender. This study compared changes in the levels of anxiety and depression (pre- and post-COVID) experienced by individuals of various sexes and genders.

Methods: We used a cross-sectional online survey that assessed pre- and post-COVID symptoms of anxiety (Generalized Anxiety Disorder-2) and depression (Patient Health Questionnaire-9). General Linear Modeling (fixed model factorial analysis of variance) was used to evaluate changes in anxiety and depression between pre- and post-pandemic periods and explore differential effects of sex and gender on those changes.

Results: Our study included 1847 participants from 43 countries and demonstrated a percentage increase of 57.1% and 74.2% in anxiety and depression, respectively. For the Generalized Anxiety Disorder-2 scale (maximum score 6), there was a mean increase in anxiety by sex for male, female, and other of 1.0, 1.2, and 1.4, respectively; and by gender for man, woman, and others of 0.9, 1.3, and 1.6, respectively. For the Patient Health Questionnaire-9 (maximum score 27), there was a mean increase in depressive symptoms by sex for male, female, and other of 3.6, 4.7, and 5.5 respectively; and by gender for man, woman, and others of 3.3, 4.8, 6.5, respectively.

Conclusions: During COVID-19, there was an increase in anxiety and depressive symptoms for all sexes and genders, with the greatest increases reported by those identifying as non-male and non-men.

2.2 Introduction

The novel coronavirus, dubbed “COVID-19” by the World Health Organization (WHO) on February 11, 2020 [1], was declared a pandemic on March 11, 2020 [2]. The research community in basic, clinical, and social sciences have all rushed to study the rapid physical and social perturbations. It has been demonstrated that the pandemic has led to negative psychological and social effects, and that some groups are more susceptible to the negative impacts than others. For example, Pfefferbaum and North [3] found that those who contract the virus, those with pre-existing medical or psychiatric issues, and healthcare providers were at higher risk of experiencing negative mental health as a result of the pandemic.

Sex and gender are important determinants of health. As such, both sex and gender must be considered given the biologic and social aspects of the pandemic. While the following studies have examined either sex or gender in mental health changes during the pandemic, they have not adequately distinguished between sex as a biological factor and gender as a socially constructed factor in their analysis. Wang et al. [4] stated that “female gender” was significantly associated with greater impact on stress, anxiety, and

depression levels. Mazza et al. [5] also identified “female gender” to be associated with higher levels of stress, anxiety, and depression. Qiu et al. [6] found that female respondents experienced higher levels of psychological distress. In a Canadian report by the Centre for Addiction and Mental Health [7], researchers identified that women were among a group who were more vulnerable to the symptoms of anxiety and depression during the pandemic. In a study of adults in the United States, the authors asserted that when “gender” is “female,” individuals were more susceptible to stressors during the pandemic [8].

While these studies reinforce the need to consider sex and gender in mental health and wellness research, they have three areas of weakness. First, these studies have conflated the concept of sex and gender, often using the terms interchangeably without identifying which they have actually examined. This likely means that these separate constructs were not correctly defined or measured. Second, the studies have assumed a dichotomous classification of sex and gender while ignoring those individuals who do not identify with a binary label or who have transitioned from male to female or female to male. Finally, these studies have focused on mental health status (as measured through stress, anxiety, and depression) following the pandemic (one time point). This type of analysis merely correlates sex/gender to stressors without examining the function of the pandemic in the changing levels of stressors for those of different sexes and genders. Overall, studies have overlooked some individuals based on their gender identity and have inadequately defined sex and gender, which undermines our confidence in the findings.

Science and medicine have a long history of inadequately addressing the health needs of women and an even poorer record when it comes to genders that exist outside the classic boundaries of “men and women.” For centuries studies were conducted on men and assumed that the results could be applied with uniformity to women. As such, women have received substandard care [9]. Increasing evidence suggests that there is a significant difference between men and women in the incidence of many diseases [10] and response to treatment [11]. In the arena of mental health, women have also been excluded from research because it was believed (falsely) that they were mentally inferior to men [12].

Sex and gender are not synonymous. While sex typically refers to biological differences (that is, genetic composition, reproductive organs, and hormones), gender is a social construct that includes the influence of environment and culture. Gender identity refers to a person's sense of gender, and may or may not correspond to the prevailing sociocultural norms attributed with one's sex as assigned at birth [13]. It has been suggested that socially constructed differences in roles and responsibilities interact with biological differences to create differences in the nature of mental health problems for men and women [14]. It has also been found that women suffer more than men from internalizing disorders, which can manifest in anxiety and depression [15].

When discussing sex and gender in mental health, we must be cognizant to include more than those who identify as binary and cisgender (whose gender identity corresponds to their sex assigned at birth) [13]. There is limited research on anxiety and depression among individuals who are not cisgender and whose gender identification could be classified as transgender. However, according to Dickey [16], those who do not fall into the traditional "cisgender" categories suffered from higher levels of anxiety and depression prior to the pandemic.

Knowledge of sex and gender differences in the experience of the pandemic is essential for physicians who will continue to treat patients with the mental health consequences of the pandemic. Sex and gender are important and highly personal aspects of patients' identity and physicians must be aware of how these are related to symptoms of anxiety and depression resulting from the pandemic. Therefore, it is imperative that pandemic-related mental health research includes those who do not identify in traditionally dichotomous sex and gender classifications.

In this study, we explored differences between participants' current ratings of anxiety and depression (which we refer to as post-COVID) and their recall of those same constructs prior to the COVID-19 pandemic (pre-COVID). We also aimed to identify how the levels of anxiety and depression have changed among individuals of various sexes and genders during the pandemic.

2.3 Methods

2.3.1 Study Design

We designed the study as a cross-sectional survey to be conducted online. In sections of the questionnaire where we aimed to examine changes during the pandemic, we asked respondents to answer the questions twice – first for their pre-COVID state and then for their state following the COVID-19 pandemic. We drafted the survey consisting of demographic, mental health, and homelife sections that combined standard and previously validated scales with survey-specific questions, as will be discussed below.

We designed the survey to be administered in English on the Qualtrics platform version June-July-August, 2020 [17]. The study was approved by Western University's Health Sciences Research Ethics Board (project identification number: 115790) on June 25, 2020. For reporting transparency, we are adhering to the reporting guidelines recommended by Eysenbach [18] in *The Checklist for Reporting Results of Internet E-Surveys (CHERRIES)*. After transferring the survey into its web-based platform, its functionality was pre-tested by graduate students with clinical and methodologic expertise.

The survey was administered with the same questions, in the same order, to all participants. There were some questions with adaptive parts that were conditionally displayed depending on a response to a previous item. Other than question 1, providing informed consent to the letter of information, respondents could leave answers blank if they did not wish to answer. Respondents were able to go back in the survey to change their answers to previous questions. The Qualtrics platform uses internet protocol addresses as a means to prevent duplicate entries from respondents. Our survey did not have a time limit for completion and respondents were given up to a two-week period to return, complete, and submit their surveys. Respondents were also given the opportunity to enter a draw to win one of three Amazon gift cards (35 USD each).

2.3.2 Participants

We used various online platforms to recruit participants between June 26, 2020 and August 31, 2020. We used social media sites (Facebook, Instagram, and Twitter), Whatsapp groups and email listservs, and community websites (Kijiji and Craigslist). Our inclusion criteria were participants who: (a) were at least 18 years of age, (b) could read and respond in English, and (c) could provide informed consent. Respondents remained anonymous throughout the study.

2.3.3 Sample Size

Sample size requirements were driven by our plan to conduct analysis of variance. We anticipated 3 groups in each of the 2 subsets (sex and gender), composed of the following groups: male, female, other sex, man, woman, and other gender. In order for participant groups to have sufficient power (0.8) and based on a moderate effect size (0.5) and traditionally acceptable significance level in medical research (0.05), each of the 3 groups in sex required 14 participants (total of 42 in sex) and each group in gender required 14 participants (total of 42 in gender) for a total of 84 participants.

We anticipated that not all participants would respond to all of the survey questions. Since we would not have contact information for participants, we needed to recruit a sufficient number of participants to account for approximately 50% of participants completing all necessary fields for analysis. With this more conservative estimate, we required 168 participants.

After we collected 120 questionnaires, we found the following breakdown by gender: 29 men (24.1%), 89 women (74.2%), and 2 other genders (specifically: non-binary) (1.7%). In the case of men and women, the respondents' sex corresponded to male and female, respectively. We re-assessed our recruitment strategy at this point in the survey administration. Our goal was to obtain a sample that was diverse in sex and gender identification. Therefore, on July 7, 2020, we extended our online recruitment strategy to

sex and gender diverse individuals through specific Facebook groups. Assuming a continuous of the same rate of respondents in other genders, in order to increase the number of respondents from 2 to 14, we would need to increase the sample size to 840. In order to obtain individuals in other sex, we would need to expand our sample even further. Our final sample size approval from Western University's Health Sciences Research Ethics Board was 1847 participants.

2.3.4 Measures

The survey consisted of the following sections: (a) consent, (b) location and job description, (c) marital status and household numbers, (d) age, sex, and gender, (e) Home and Family Work Roles Questionnaire, (f) substance use, (g) anxiety scale (Generalized Anxiety Disorder 2 (GAD-2)), (h) depression scale (Patient Health Questionnaire – 9 (PHQ-9)), (i) personal COVID-19 experience, (j) physical and mental health diagnoses (Self-administered Comorbidity Questionnaire (SCQ)), and (k) additional comments and follow-up.

Some question sets were designed for this study and pilot tested. Namely, we designed sections (a) through (d), (f), (i), and (k) for this study. The Home and Family Work Roles Questionnaire (e) has been validated in an unpublished manuscript. The original version of the questionnaire contains 18 items and the version administered during the pandemic consisted of 19 items. The questionnaire examines the distribution of household responsibilities within the home by asking respondents to estimate how much of the work listed in an item they typically complete for their home or family. The GAD-2 (g) and PHQ-9 (h) scales will be discussed in detail below. SCQ (j) asks respondents to indicate if they experience a health condition from a list of common health conditions or, if not listed, to write in their health condition. If respondents pick a health condition, they would be asked if they receive treatment for it, and then if it limits their activities. This scale is widely used and has been previously validated [19].

For this study, we analyzed the responses in GAD-2 and PHQ-9 by sex and gender. The components of GAD-2 and PHQ-9 and how we administered them will be discussed below. For the question on sex, respondents were asked “What is your sex?” The answer options were: “male,” “female,” and “other (specify if you wish).” For the question on gender, respondents were asked “With which gender do you identify?” The answer options were: “man,” “woman,” “non-binary,” “agender,” and “other (specify if you wish).”

2.3.4.1 Anxiety

We asked respondents to complete the Generalized Anxiety Disorder-2 (GAD-2) scale, which contains two items. Based on this questionnaire, participants’ responses of “not at all,” “several days,” “more than half the days,” and “nearly every day,” is rated on a four-point Likert scale (0 to 3). The item scores were then added together to arrive at a total score (ranges between 0 and 6). GAD-2 is a brief patient-reported tool for screening generalized anxiety disorder (GAD) [20]. A score of 3 or more is indicative of a clinically relevant anxiety disorder with sensitivity and specificity of 86% and 83%, respectively [20]. In addition to screening for GAD, GAD-2 has specificity (>80%) for panic disorder, social anxiety disorder, posttraumatic stress disorder, and other anxiety disorders [20].

We asked respondents to complete two copies of GAD-2. Respondents were instructed to fill the first copy to represent an average two-week period before the start of the COVID-19 pandemic and the second copy to represent an average two-week period after the start of the pandemic. We used March 11, 2020 to delineate the start of the pandemic.

2.3.4.2 Depression

We asked respondents to complete the Patient Health Questionnaire-9 (PHQ-9), which contains nine items. The PHQ-9 is a screening tool for major depressive disorder (MDD), and is also used for diagnosing MDD and measuring its severity [20]. Participants

respond “not at all,” “several days,” “more than half the days,” and “nearly every day” to the items (similar to GAD-2), and the questionnaire is scored 0 to 27 [21].

Total scores in PHQ-9 may be used to indicate the severity of depression. A score of 5, 10, 15, and 20 are cut-off points for mild, moderate, moderately severe, and severe depression, respectively. When there is mild severity (scores between 5 and 9), “watchful waiting” is the proposed action [21]. For a score of 10 or more (indicative of moderate MDD), both the sensitivity and specificity of the PHQ-9 are 88% [22]. The PHQ-9 is also sensitive to change and able to detect when an individual’s level of MDD changes [21]. Similar to GAD-2, we asked participants to fill two copies of PHQ-9 – one for their state prior to the pandemic and the second for their state following the start of the pandemic.

2.3.5 Statistical Analysis

We compared participants’ level of anxiety and depression before and after the start of the COVID-19 pandemic using paired samples t-test. To evaluate the change in anxiety between different sexes and genders, we conducted mixed-model factorial analysis of variance. In this model, mean GAD-2 scores before and after (repeated measure – dependent variable) are the within-subject factors, and sex (or gender) is the between-subject factor (independent variable). If we observed a significant difference, we performed a post-hoc Tukey test to assess between-group differences. We completed the same procedure for PHQ-9 scores.

We conducted all analyses using the Statistical Package for the Social Sciences (SPSS) version 26.0 program [23]. A *p*-value of 0.05 or less was assumed to indicate statistical significance.

2.4 Results

2.4.1 Sample Characteristics

The study included a total of 1847 consenting participants and a completion rate of 75.6%. We included participants with complete data for pre- and post-COVID-19 GAD-2 scales ($n = 1379$) and PHQ-9 scales ($n = 1287$) in the analysis for this paper. Participants represented 43 countries of habitation, as displayed in Table 1. The age range of the sample was 18 to 79 years with a mean of 30.3 (± 13.3) years for GAD-2 participants and 30.4 (± 13.5) years for PHQ-9 participants, respectively.

2.4.2 Anxiety Scale

The mean GAD-2 score was 2.1 (95% confidence interval (CI) 2.0 to 2.2) prior to March 11, 2020 and increased to 3.3 (95% CI 3.2 to 3.4) after that date, as displayed in Table 2. This represents a mean difference of 1.2 (out of a possible 6 points) and a percentage increase of 57.1%. There was a significant difference between anxiety levels before and after the start of COVID-19 ($p < 0.001$).

In the categories of sex, the frequency of respondents who reported they were male, female, and other were 21.0%, 78.4%, and 0.6%, respectively, as summarized in Table 3. The increase in anxiety scores by sex for males, females, and others was 1.0, 1.2, and 1.4 (out of a possible score of 6). In pre- and post-pandemic GAD-2 scores, males were found to have the lowest levels [from 1.8 (95% CI 1.6 to 2.0) to 2.8 (95% CI 2.6 to 3.0)], followed by females [from 2.2 (95% CI 2.1 to 2.3) to 3.4 (95% CI 3.3 to 3.6)], and the highest levels were found among those who identified as other sex [2.9 (95% CI 1.8 to 4.0) to 4.3 (95% CI 3.0 to 5.5)]. This represented a significant sex difference in the change in GAD-2 scores ($p < 0.001$) with post-hoc analysis indicating that the change in anxiety score for females (1.2) ($p < 0.001$) and those of individuals who identified as other sex (1.4) ($p = 0.05$) was significantly greater than that reported by males (1.0). There was no significant difference between change in anxiety scores of females (1.2) (p

= 0.31) and those in the other sex category (1.4). Figure 1 illustrates a bar chart for GAD-2 scores of each sex before and after the beginning of the COVID-19 pandemic.

For gender, the frequency of respondents who reported identifying as men, women, and other genders (including non-binary, agender, other) was 20.6%, 77.1%, and 2.6%, respectively. The increase in GAD-2 scores by gender for men, women, and other genders was 0.9, 1.3, and 1.5 (out of a possible 6 points), respectively. In pre- and post-pandemic GAD-2 scores, men were found to have the lowest levels [from 1.8 (95% CI 1.6 to 2.0) to 2.7 (95% CI 2.5 to 3.0)], followed by women [from 2.1 (95% CI 2.0 to 2.2) to 3.4 (95% CI 3.3 to 3.5)], and the highest levels were found among those who identified as other genders [2.7 (95% CI 2.2 to 3.3) to 4.3 (95% CI 3.6 to 4.9)]. There was a significant gender difference in the change in GAD-2 scores ($p < 0.001$). Post-hoc analysis revealed that the change in anxiety score for women (1.3) ($p < 0.001$) and those of people who identified in other genders (1.6) ($p < 0.001$) was significantly larger than that reported by men (0.9). Other genders' change in GAD-2 scores (1.6) ($p = 0.02$) was significantly greater than that reported by women (1.3). Figure 2 illustrates a bar chart for GAD-2 scores of each gender before and after the beginning of the COVID-19 pandemic.

2.4.3 Depression Scale

The mean PHQ-9 score was 6.2 (95% CI 6.0 to 6.6) prior to March 11, 2020 and increased to 10.8 (95% CI 10.4 to 11.1) after that date, as displayed in Table 2. This represents a mean difference of 4.6 (out of a possible 27 points) and a percentage increase of 74.2%. There was a significant difference between depression levels before and after the start of COVID-19 ($p < 0.001$).

In the categories of sex, the frequency of respondents who reported they were male, female, and other were 21.3%, 78.1%, and 0.6%, respectively, as summarized in Table 3. The increase in depression scores by sex for males, females, and others was 3.6, 4.7, and 5.5 (out of a possible score of 27). In pre- and post-pandemic PHQ-9 scores, males were

found to have the lowest levels [from 6.0 (95% CI 5.4 to 6.7) to 9.6 (95% 8.8 to 10.3)], followed by females [from 6.3 (95% CI 5.9 to 6.6) to 11.0 (95% CI 10.6 to 11.5)], and the highest levels were found among those who identified as other sex [10.8 (95% CI 7.0 to 14.5) to 16.3 (95% CI 11.6 to 20.9)]. This represents a significant sex difference in the change in PHQ-9 scores ($p = 0.001$) with post-hoc analysis indicating that change in levels of depression for females (4.7) ($p = 0.04$) and those of people that identified as other sex (5.5) ($p = 0.007$) was significantly greater than that reported by males (3.6). There was also a significant difference between depression scores of other sex (5.5) ($p = 0.03$) and females (4.7). Figure 3 illustrates a bar chart for PHQ-9 scores of each sex before and after the beginning of the COVID-19 pandemic.

For gender, the frequency of respondents who reported identifying as men, women, and other genders was 20.9%, 76.9%, and 2.2%, respectively. The increase in PHQ-9 scores by gender for men, women, and other genders was 3.3, 4.8, and 6.5 (out of a possible 27 points), respectively. In pre- and post-pandemic PHQ-9 scores, men were found to have the lowest levels [from 6.1 (95% CI 5.4 to 6.7) to 9.4 (95% 8.6 to 10.2)], followed by women [from 6.2 (95% CI 5.9 to 6.5) to 11.0 (95% CI 10.5 to 11.4)], and the highest levels were found among those who identified as other genders [9.8 (95% CI 7.8 to 11.7) to 16.3 (95% CI 13.9 to 18.8)]. There was a significant gender difference in change in PHQ-9 scores ($p < 0.001$). Post-hoc analysis revealed that women's increase in depression (4.8) ($p = 0.05$) and those of other genders (6.5) ($p < 0.001$) was significantly more than that reported by men (3.3). Other genders' change in PHQ-9 scores (6.5) ($p < 0.001$) was significantly greater than that reported by women (4.8). Figure 4 illustrates a bar chart for PHQ-9 scores of each gender before and after the beginning of the COVID-19 pandemic.

2.5 Discussion

2.5.1 Implications

Our results indicate that the levels of anxiety have increased following the pandemic by 57.1% for the study sample when comparing pre- and post-COVID scores. The mean GAD-2 score increased from 2.1 to 3.3 for respondents. Based on a cut-point score of 3 for GAD-2 [20], our results indicate the clinical significance of this finding since it suggests a mean increase from an absence of anxiety to the presence of anxiety, in pre-post pandemic scores. Our results also indicate an increased level of depression of 74.2% in the study sample. The mean PHQ-9 score increased from 6.2 to 10.8 for respondents. Based on a cut-point score of 10 (requiring treatment for depression) for PHQ-9 [22], our results also indicate the clinical significance of this finding since it suggests a mean increase from no treatment required to treatment required, in pre-post pandemic scores.

Our findings that anxiety and depression have increased during the pandemic are consistent with many other population-based studies [4-6, 8, 24-25]. What this study adds is new data on sex and gender differences in changes in mental health. After the start of the pandemic, all sexes except males and all genders except men met the cut-off for having an anxiety disorder. This is both due to higher pre-COVID levels among non-male and non-man respondents and a greater mean difference in scores. A similar trend in the increased levels of depression exists among the sexes and genders with respect to depression following the pandemic, with non-male and non-man categories meeting the cut-off for moderate MDD (signaling a clinical shift).

Although the literature often conflates sex and gender [13], we know that females experience anxiety and depression at a higher prevalence than males [26]. We also know that it can be difficult to separate the biological sex factors from the social gender factors that, individually or in combination, affect mental health. However, since the differences in anxiety and depressive scores were generally larger for gender subgroups than sex subgroups, this indicates that social factors are important. This does not preclude sex

differences in susceptibility to anxiety and depression that might arise due to hormonal, brain structure and function, or other factors.

We hypothesized that females and women might be experiencing greater increases in anxiety and depressive symptoms during the pandemic because of the feminine tendency in mental health towards internalizing disorders [15]. If this trend at internalization versus externalization remains consistent during the pandemic, it may be expected that males and men will have greater use of substances (such as alcohol and recreational drugs) following the pandemic, which we will examine in future studies. Another contributing factor to our observed trends may be that, with school closures and families being at home, the historically gendered roles of childcare and home-making have fallen more heavily on those who do not self-report as being males or men. Finally, women may be more dependent on social support and opportunities to talk to other adults outside their immediate household. Research indicates that women are more likely than men to care for those outside of their own homes [27]. As such, women may be more accustomed to interactions outside of the immediate household for maintenance of mental health, and social isolation may more directly impacting this coping mechanism.

Our findings indicate that those who identified as other in sex and gender had the greatest mean difference in GAD-2 and PHQ-9 scores following the pandemic even though they also had the highest pre-COVID scores. This may be explained, in part, by the Minority Stress Model [28] where individuals who have minority status (including in sex and gender) may experience stigma, discrimination, and oppression compared to their majority counterparts. This, in turn, can increase levels of distress and contribute to mental health disorders. Additionally, during the pandemic, many individuals may have had a sense of isolation as they spend time at home and in their households. In a study of sexual and gender minority individuals, community connectedness had a moderating effect on anxiety and depression [29]. Therefore, isolation may have been especially distressing to sex and gender marginalized individuals if it disrupted social circles or forced segregation with unsupportive families.

2.5.2 Strengths and Limitations

Our study has several strengths including its large sample, which includes diversity in geography, sex, gender, and age. Our survey was anonymously administered to minimize stigma or social desirability bias in responses. However, our results should also be interpreted considering some limitations. First, the study was completed on the internet where there is a risk of selection bias, for example: exclusion of those from lower socioeconomic, older, or less educated subgroups of the population. Second, the study was designed as a cross-sectional survey with a retrospective component and participants had to report their pre-pandemic status retrospectively. This has the potential for recall bias, although we were most interested in their change scores and it is likely that participants calibrated their response to how much they felt their status had changed. Third, although we used a variety of strategies to facilitate recruitment of non-binary sexes and genders and gathered data from individuals with various gender identifications (non-binary, agender, other), we were only able to analyze the data by grouping these various genders into one “other” category because we did not achieve sufficient power for more definitive description. For sex, we were unable to achieve our predetermined power (0.8) with the sample of respondents (n=8) who identified in the other sex category. However, we chose to present these findings in our results. Although the sample in the other sex category may be small, it is an important and often marginalized group that has been historically ignored in research. Ethically, we maintained the findings from this group as a separate and distinct category in our results. Fourth, respondent’s culture (both their country of habitation and ethnic identification) may be closely intertwined with sex and gender identification and experiences, which we did not analyze in this study.

2.6 Conclusions

Our research has determined that individuals of varying sexes and genders are experiencing increased symptoms of anxiety and depression when comparing pre- and

post-COVID status (as measured through GAD-2 and PHQ-9). It also indicates that more marginalized genders had greater increases in symptoms. Therefore, we need to be aware of these differences, identify their underlying causes, and work to help individuals achieve the best state of mental health during and after the pandemic.

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Table 2-1: Location of Participants

Location (country/continent*)	Anxiety (GAD-2) n (%)	Depression (PHQ-9) n (%)
Canada	1023	951
USA	264	248
Europe	35	33
Asia	35	33
Americas	11	11
Oceania	7	7
Africa	4	4
Total	1379	1287

*Europe (Croatia, France, Germany, Ireland, Italy, Netherlands, Romania, Slovakia, Spain, Sweden, Switzerland, United Kingdom), Asia (China, India, Iran, Israel, Japan, Kazakhstan, Malaysia, Oman, Pakistan, Philippines, Qatar, Saudi Arabia, Singapore, United Arab Emirates), Americas (Antigua and Barbuda, Argentina, Bahamas, Honduras, Jamaica, Peru, Saint Kitts and Nevis), Oceania (Australia, New Zealand), Africa (Ethiopia, Namibia, Nigeria, South Africa)

Table 2-2: Symptoms of Anxiety and Depression

Anxiety (GAD-2)					
N	Before (95% CI) (out of 6)	After (95% CI) (out of 6)	Mean Difference	Percentage Change	p-value
1379	2.1 (2.0 to 2.2)	3.3 (3.2 to 3.4)	1.2	57.1%	<0.001
Depression (PHQ-9)					
N	Before (95% CI) (out of 27)	After (95% CI) (out of 27)	Mean Difference	Percentage Change	p-value
1287	6.2 (6.0 to 6.6)	10.8 (10.4 to 11.1)	4.6	74.2%	<0.001

Note: Mean and standard deviation values for anxiety and depression scores before and after the start of the COVID-19 pandemic for all the included participants (that is, all participants with full data for GAD-2 and PHQ-9 scales). Numbers in parentheses are 95% CIs.

Table 2-3: Symptoms of Anxiety and Depression by Sex and Gender

Anxiety (GAD-2)						
n (Frequency)	Before (95% CI) (out of 6)	After (95% CI) (out of 6)	Mean Difference	Percentage Change	p-value (over time)	p-value (between groups)
Male: 289 (21.0%)	1.8 (1.6 to 2.0)	2.8 (2.6 to 3.0)	1.0	55.6%	< 0.001	<0.001 ^a
Female: 1076 (78.4%)	2.2 (2.1 to 2.3)	3.4 (3.3 to 3.6)	1.2	54.5%	< 0.001	0.31 ^b
Other: 8 (0.6%)	2.9 (1.8 to 4.0)	4.3 (3.0 to 5.5)	1.4	48.3%	0.05	0.05 ^c
Man: 283 (20.6%)	1.8 (1.6 to 2.0)	2.7 (2.5 to 3.0)	0.9	50.0%	< 0.001	<0.001 ^d
Woman: 1058 (77.1%)	2.1 (2.0 to 2.2)	3.4 (3.3 to 3.5)	1.3	61.9%	< 0.001	0.02 ^e
Other genders: 31 (2.6%)	2.7 (2.2 to 3.3)	4.3 (3.6 to 4.9)	1.6	59.3%	< 0.001	<0.001 ^f
Depression (PHQ-9)						
n (Frequency)	Before (95% CI) (out of 27)	After (95% CI) (out of 27)	Mean Difference	Percentage Change	p-value (over time)	p-value (between groups)
Male: 273 (21.3%)	6.0 (5.4 to 6.7)	9.6 (8.8 to 10.3)	3.6	60.0%	< 0.001	0.04 ^a
Female: 1000 (78.1%)	6.3 (5.9 to 6.6)	11.0 (10.6 to 11.5)	4.7	74.6%	< 0.001	0.03 ^b
Other: 8 (0.6%)	10.8 (7.0 to 14.5)	16.3 (11.6 to 20.9)	5.5	50.9%	0.05	0.007 ^c
Man: 268 (20.9%)	6.1 (5.4 to 6.7)	9.4 (8.6 to 10.2)	3.3	54.1%	< 0.001	0.05 ^d
Woman: 984 (76.9%)	6.2 (5.9 to 6.5)	11.0 (10.5 to 11.4)	4.8	77.4%	< 0.001	<0.001 ^e
Other genders: 28 (2.2%)	9.8 (7.8 to 11.7)	16.3 (13.9 to 18.8)	6.5	66.3%	< 0.001	<0.001 ^f

Note: Mean and standard deviation values for anxiety and depression scores before and after the start of the COVID-19 pandemic by sex and gender. Numbers in parentheses are 95% CIs. ^a between male and female; ^b between female and other; ^c between other and male; ^d between man and woman; ^e between woman and other genders; ^f between other gender and man

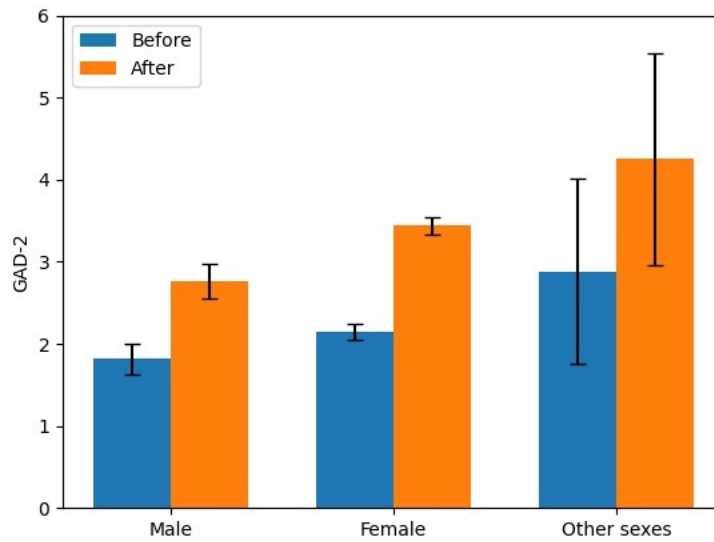
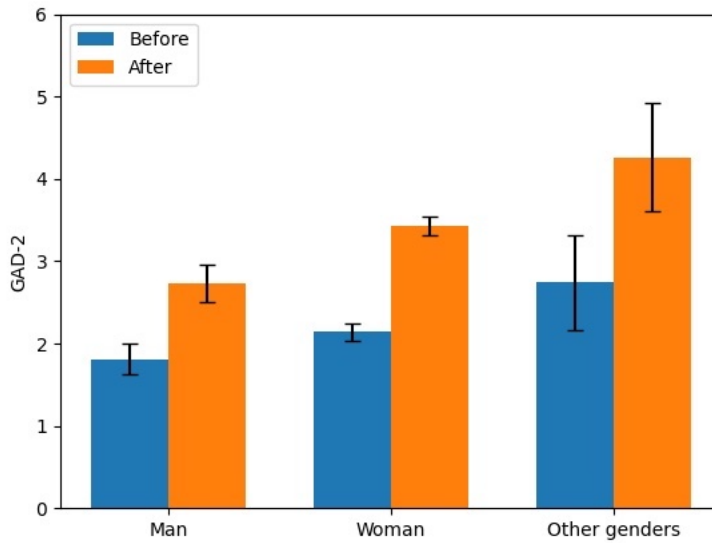
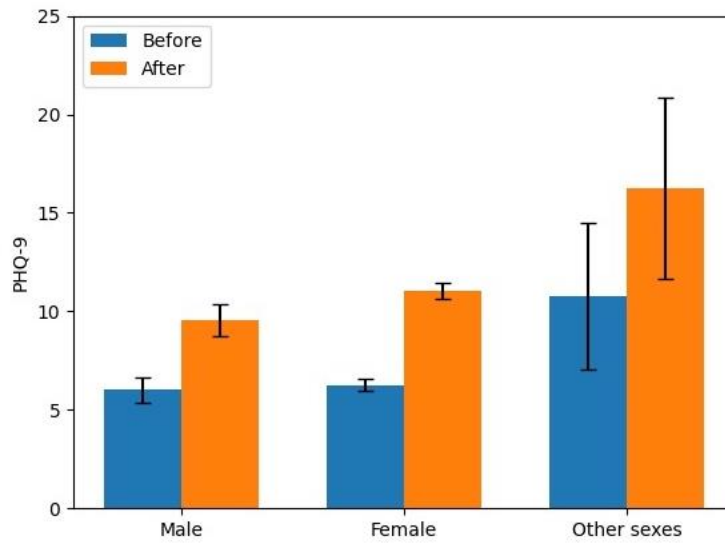
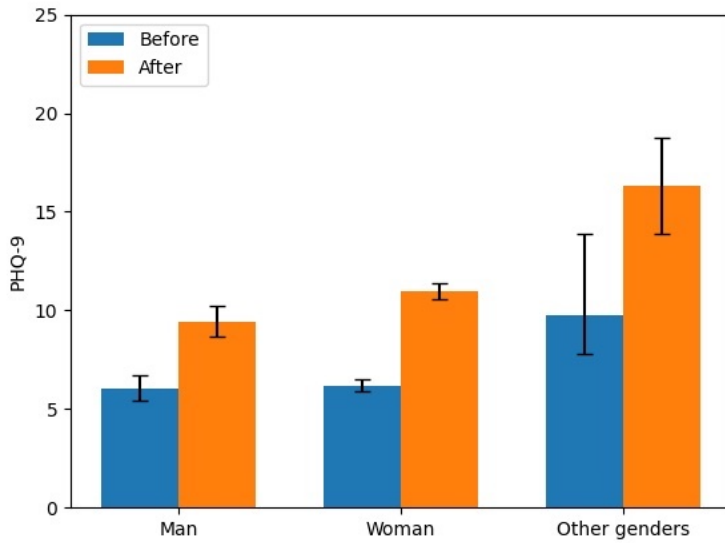
Figure 2-1: Symptoms of Anxiety by Sex, Pre- and Post-COVID-19**Figure 2-2: Symptoms of Anxiety by Gender, Pre- and Post-COVID-19**

Figure 2-3: Symptoms of Depression by Sex, Pre- and Post-COVID-19**Figure 2-4: Symptoms of Depression by Gender, Pre- and Post-COVID-19**

Chapter 3

3 An intersectional approach to identifying factors associated with anxiety and depression following the COVID-19 pandemic

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3.1 Abstract

The COVID-19 pandemic is impacting mental health, with some populations bearing a greater burden. In this cross-sectional online study, we examined the personal and intersectional factors associated with increased symptoms of anxiety and depression following the COVID-19 pandemic. We assessed pre- and post-pandemic levels of anxiety and depressive symptoms using the Generalized Anxiety Disorder-2 (GAD-2) and Patient Health Questionnaire-9 (PHQ-9) scales, respectively. The study included 1847 participants, with an age range of 18 to 79 years and representing 43 countries.

Variables with significance ($p < 0.05$) in predicting post-pandemic GAD-2 and PHQ-9 scores were pre-pandemic scores on the same scales, an interaction between increasing age and non-man gender, and an interaction between non-man gender and having children. Health practitioners, psychiatrists, and policy makers need to be aware and respond to the mental health burden of the pandemic on women and other gendered individuals, especially those who care for children.

3.2 Introduction

Cases of the novel coronavirus (2019-nCoV) were first reported on December 29, 2019 as a “pneumonia of unknown etiology” [1]. The World Health Organization called this new coronavirus “COVID-19” and deemed it a pandemic on March 11, 2020 [2]. Early in the pandemic, researchers demonstrated the negative mental health consequences and psychological distress it was having on populations [3–6].

Similar to its varied physical effects on individuals and communities [7], the virus and pandemic affect the mental health of individuals and groups in differing ways. For example, women and females have experienced greater levels of anxiety and depression than men and males [8–11]. Another widely examined relationship is age and mental health during the pandemic. One study, conducted in China, found that younger adults (ages 18 to 30 years) experienced greater levels of psychological distress [10]. An Italian study found greater stress levels among young people working outside of the home [9]. A Canadian analysis determined an increased likelihood of anxiety and depression among the younger segments of the population [11]. Another Canadian study found increased levels of anxiety and poor self-perceived mental health among those who were 15 to 24 years of age, with decreasing levels of anxiety as age increased, until the age of 65 years at which point anxiety and poor self-perception of mental health increased again [12]. A study of an American population found decreasing levels of anxiety and depression among older adults [13].

The impact of the pandemic has been examined in relationship to other individual variables, such as education levels, previous morbidities, and healthcare occupation. Those with higher levels of education, such as post-secondary education or above, have experienced greater psychological distress during the pandemic [10,14]. Those with pre-existing medical conditions have reported greater levels of anxiety and depression during the COVID-19 pandemic [9]. There have also been greater levels of distress reported among healthcare workers [14], and increased levels of anxiety reported among physicians [15]. One study found increased levels of anxiety among family members of healthcare workers, especially those healthcare workers in direct contact with COVID-19 patients [16].

3.2.1 Work and Family Life During the Pandemic

In addition to the demographic variables associated with psychological distress during the COVID-19 pandemic, personal and life circumstances can impact the levels of distress that individuals are experiencing. With changes in patterns of work, wherein some previously-employed workers have lost their jobs, others began working from home, and some undertook greater risk to their personal health, an individual's work and work location can have an impact on psychological distress, including levels of anxiety and depression [17–19]. Likewise, numerous jurisdictions worldwide closed in-person schools for children in efforts to mitigate the spread of the virus. School closures left many parents caring for their children at home, home-schooling, and/or working from home while also caring for school-aged children. This led to increased reported levels of caregiver distress and parental burnout [5,20].

3.2.2 Intersectionality in Mental Health

The term “intersectionality” was first coined by Kimberlé Crenshaw in 1989 to refer to the interplay between a person's various identities, which are influenced to different extents by dominance and oppression [21]. Intersectionality moves beyond individual

factors (such as gender, age, and race) to examine the interaction between these factors, and assess how the health of populations are shaped [22]. Despite the complexities of the determinants of an individual's mental health, research about intersectionality in mental health is limited and methodologically unstandardized [23]. In our study, we endeavored to examine mental health holistically by taking into account the interplay between various identifies.

3.2.3 Study Objectives

Our first objective was to understand the personal factors that are correlated with post-COVID-19 levels of anxiety and depressive symptoms. Our second objective was to investigate how the post-pandemic levels of anxiety and depression have been affected by intersectional factors, namely the interactions between age and gender, age and marital status, gender and having a child(ren), gender and working from home, and working from home and having a child(ren). We used March 11, 2020 as the beginning of the COVID-19 pandemic and refer to any date after March 11, 2020 as “post-pandemic.”

3.3 Methods

3.3.1 Study design

For transparency, we have adhered to recommendations set forth in *The Checklist for Reporting Results of Internet E-Surveys (CHERRIES)* [24]. Additionally, we aimed to follow *The Sex and Gender Equity in Research (SAGER)* guidelines [25] to ensure that we included specific questions on sex and gender in our study design. We also remained cognizant of the importance of sex and gender factors throughout our analyses and the reporting of findings.

We developed the survey consisting of questions in the following categories: demographics, mental health, and homelife questions. We combined standard and

previously validated scales with survey-specific questions. The survey was designed and administered in English on the Qualtrics platform version June-July-August, 2020 (Qualtrics, Provo, UT). After transferring the survey into the web platform, we ensured survey functionality through pre-testing by graduate students with clinical and methodologic expertise.

Western University's Health Sciences Research Ethics Board approved this study (project identification number: 115790) on June 25, 2020. All respondents were asked to read through a letter of information describing the study and providing informed consent. Consent was the first question on the survey and its completion was required prior to the display of the survey questions. At the end of the survey, respondents were able to enter a draw to win one of three Amazon gift cards (35 USD each).

The survey questions were administered to all respondents in the same order. Some survey questions had adaptive parts and were conditionally displayed depending on a response to a previous item. Other than the question seeking informed consent, participants could leave blanks or skip items if they did not desire to give an answer. If they wished, respondents were also able to change answers to previous questions. Participants had up to two weeks to return and complete their responses. Qualtrics uses internet protocol addresses to prevent duplicate entries from respondents.

3.3.2 Participants and data collection

Inclusion criteria for participants were being 18 years of age or older and able to read and respond in English. As described above, participants had to provide informed consent to the letter of information to be included in the study. As with other online surveys completed from home, participants had to use a device with internet access. Respondent anonymity was maintained throughout the study.

We used various online channels to recruit participants. We used community websites (Kijiji and Craigslist), social media sites (Facebook, Instagram, and Twitter), and

Whatsapp groups and email listservs. We began data collection on June 26, 2020 and closed the survey on August 31, 2020. Therefore, data was collected for approximately ten weeks.

3.3.3 Measures of independent variables

3.3.3.1 Demographics

The survey began with a set of demographic questions. First, we asked respondents to state where they lived by picking their country and state/province from a drop-down menu and writing in the name of their city of residence. Next, we asked about respondents' current employment status, marital status, and the number of individuals living in their homes (including the number of dependent children). Age, biological sex, gender identity, and ethnic origin(s) were then collected by selection from pre-defined fields, with an "other" option for sex, gender, and ethnicity.

3.3.3.2 Marital, child, and work status

In terms of their marital status, the survey asked respondents to choose between single, common-law, married, divorced, widowed, and other in response to the question: "What is your marital status?" For having children, participants were asked "how many children (who are dependent on you) currently live in your home?" Respondents were presented with a drop-down menu ranging from 0 children to more than 10, in increments of 1 child.

For work status, we asked, "Which statement best describes your current employment status?" Participants could choose between paid employee, self-employed, laid off, stay-at-home parent/caretaker, student, retired, unable to work due to a disability, and other. If

respondents answered that they were a paid employee or self-employed, they would be presented with a follow-up question asking them to write their job title. If respondents chose that they were laid off, they would be asked to write in what their job used to be. If respondents answered that they were students, they were asked to write what they study. Then respondents were asked about changes to their job status as a result of the pandemic.

Finally, respondents were asked if “As a result of the pandemic, do you have to work from home?” The options were “with a similar workload” (1), “with a greater workload” (2), “with a lighter workload” (3), “I still go into my work place” (4), “I lost my job” (5), and “I have always worked from home” (6). In our analysis of workplace location, we categorized working from home as a response to items 1, 2, 3, or 6; working outside of the home is a response to item 4; and, job loss is a response to item 5.

3.3.3.3 Measures of dependent variables

3.3.3.4 Anxiety symptoms

Respondents were asked to complete two copies of the Generalized Anxiety Disorder-2 (GAD-2) scale corresponding to their pre- and post-pandemic states. We asked respondents to fill the first copy to represent an average two-week period before the start of the pandemic (March 11, 2020) and the second copy to represent an average two-week period after the start of the COVID-19 pandemic. That is, respondents were asked to recall their average state for both the pre- and post-COVID-19 timepoints.

GAD-2 is a patient-reported tool for screening generalized anxiety disorder (GAD) [26] with two items where respondents answer “not at all,” “several days,” “more than half the days,” and “nearly every day” to each item. The items are then rated on a four-point Likert scale (0 to 3), which is added together to arrive at a total score (ranges between 0 and 6) [27]. A total score of 3 or greater indicates a clinically relevant anxiety disorder and has a sensitivity and specificity of 86% and 83%, respectively [26]. Tests of

reliability for GAD-2 demonstrated internal consistency of 0.81 (Cronbach's alpha) and test-retest reliability 0.81 [28].

3.3.3.5 Depressive symptoms

We asked respondents to also complete two copies of the Patient Health Questionnaire-9 (PHQ-9) representing their pre- and post-pandemic states. Similar to GAD-2, participants were asked to fill the first copy to represent an average two-week period before the start of the pandemic (March 11, 2020) and the second copy to represent an average two-week period after the start of the COVID-19 pandemic.

The PHQ-9 is a screening tool for major depressive disorder (MDD), and may also be used to diagnose MDD or measure its severity [28]. Similar to GAD-2, respondents answer all questions choosing "not at all," "several days," "more than half the days," and "nearly every day." On a four-point Likert scale (0 to 3), the responses on the questionnaire are summed (ranges between 0 and 27) [28]. Total PHQ-9 scores can be used to denote MDD severity with 5, 10, 15, and 20 indicating mild, moderate, moderately severe, and severe depression, respectively. For scores between 5 and 9, it is recommended that individuals are monitored for changing levels of depressive symptoms [29]. When the PHQ-9 score is 10 or greater, the scale's sensitivity and specificity are both 88% [29]. Tests of reliability for PHQ-9 demonstrated internal consistency of 0.89 (Cronbach's alpha) and test-retest reliability 0.84 [30].

3.3.4 Statistical Analysis

We performed hierarchical (stepwise) multiple linear regression to determine the optimal regression model for both GAD-2 and PHQ-9 post-pandemic states. We did this in three steps by inserting the following into the two models: (1) personal demographic factors, (2) personal demographic factors and working location, and (3) personal demographic factors, working location, and conjunct variables.

Personal demographic variables that we considered in the model were: country of residence, gender (man, woman, non-binary, agender, or other), marital status (single, common-law, married, divorced, widowed, or other), having a child(ren) (yes or no), age, and pre-pandemic mental health scores (either GAD-2 or PHQ-9). Working location factors that we considered were: work from home, still go to work, or lost one's job. The variables of country, gender, marital status, having a child(ren), and working location were treated as dummy variables. That is, they were categorical variables with no meaningful order. Age (years) and pre-pandemic mental health scores (GAD-2 and PHQ-9) were continuous variables in the models. As part of step 3, we created conjunct variables to further explore the interactions between personal indicators. We created the following conjunct variables: age \times gender, age \times marital status, gender \times child (yes/no), gender \times working location, and working location \times child.

To investigate all the potential independent variables, the significant level for entrance into the stepwise model was set at $p < 0.05$; while for removal, it was set as $p > 0.10$. Regression diagnostics were performed to check the assumptions of multivariate linear regression. As part of the assumption validation process, the variance inflation check indicated that there was no collinearity in the independent variables. The assumption of constant variance across the independent variables was also confirmed using the Breusch-Pagan test. All statistical tests were 2-tailed, and an effect was considered significant if $p < 0.05$. All analysis was performed by IBM SPSS statistics, Version 25.0 (IBM Corporation, Armonk, NY).

3.4 Results

3.4.1 Demographic characteristics

The overall study included 1847 consenting participants, of whom 1397 respondents (75.6%) completed the survey. In the analysis of this study, we have included the subset

of participants who have complete data for pre- and post-pandemic GAD-2 ($n = 1379$) and PHQ-9 ($n = 1287$) scales. The age range for participants is 18 to 79 years, with a mean of 30.3 (± 13.3) years for GAD-2 participants and 30.4 (± 13.5) years for PHQ-9 participants, respectively, and includes 43 countries of residence (as displayed in Table 1). The gender representation for man, woman, and other genders (non-binary, agender, and other) for GAD-2 respondents who reported gender is 283 (20.6%), 1058 (77.1%), and 31 (2.6%), respectively; and for PHQ-9 respondents who reported gender is 268 (20.9%), 984 (76.9%), and 28 (2.2%), respectively.

3.4.2 Anxiety symptoms

The mean pre-pandemic GAD-2 score was 2.1 (95% confidence interval (CI) 2.0 to 2.2) and increased to 3.3 (95% CI 3.2 to 3.4) following the pandemic (after March 11, 2020). This change represents a mean difference of 1.2 (out of a possible 6 points) and a percentage increase of 57%. Our final regression model predicts 25% of post-pandemic GAD-2 score variance (adjusted $R^2 = 0.25$) (see Table 2). The final GAD-2 regression equation is: post-pandemic GAD-2 score = $0.50 \times \text{pre-pandemic GAD-2 score} + 0.14 \times (\text{age} \times \text{gender}) + 0.12 \times (\text{gender} \times \text{child}) + 1.55$. That is, our model indicates that of the possible variables, the ones with a significance ($p < 0.05$) in predicting post-pandemic GAD-2 scores are pre-pandemic GAD-2 scores, the interaction between age and gender, and the interaction between gender and having to care for a child(ren) (see Table 3).

For the conjunct variable of age and gender, our analysis indicates that an interaction between increasing age and non-man gender (that is, identifying as a woman or other gender) is associated with increased levels of post-pandemic GAD-2 scores. For the conjunct variable of gender and having a child(ren), our analysis indicates that the interaction between identifying as non-man in gender and having one or more children in the home is associated with increased levels of post-pandemic GAD-2 scores.

3.4.3 Depressive symptoms

The mean pre-pandemic PHQ-9 score was 6.2 (95% CI 6.0 to 6.6) and increased to 10.8 (95% CI 10.4 to 11.1) following the pandemic (after March 11, 2020). This change represents a mean difference of 4.6 (out of a possible 27 points) and a percentage increase of 74%. Our final regression model predicts 32% of post-pandemic PHQ-9 score variance (adjusted $R^2 = 0.32$) (see Table 4). The final PHQ-9 regression equation is: post-pandemic PHQ-9 score = $0.58 \times \text{pre-pandemic PHQ-9 score} + 0.10 \times (\text{age} \times \text{gender}) + 0.09 \times (\text{gender} \times \text{child}) + 3.92$. That is, our model indicates that of the possible variables, the ones with a significance ($p < 0.05$) in predicting post-pandemic PHQ-9 scores are pre-pandemic PHQ-9 scores, the interaction between age and gender, and the interaction between gender and having to care for a child(ren) (see Table 5).

For the conjunct variable of age and gender, our analysis indicates that an interaction between increasing age and non-man gender (that is, identifying as a woman or other gender) is associated with increased levels of post-pandemic PHQ-9 scores. For the conjunct variable of gender and having a child(ren), our analysis indicates that an interaction between identifying as non-man in gender and having one or more children in the home is associated with increased levels of post-pandemic PHQ-9 scores.

3.5 Discussion

Drawing upon literature of what can impact mental health during the COVID-19 pandemic, we tested several variables that could contribute to post-pandemic levels of anxiety and depressive symptoms. Among the variables we tested were the intersectional variables of age \times gender, age \times marital status, gender \times child (yes/no), gender \times working location, and working location \times child (yes/no). Of these variables, what we found to affect post-pandemic levels in GAD-2 and PHQ-9 scores were pre-pandemic GAD-2 and PHQ-9 scores, respectively, along with the intersection of age and gender and the intersection of gender and having a child(ren) in the home.

As mentioned, several other studies have found that women are experiencing greater levels of anxiety and depression following the COVID-19 pandemic [8–11], which is consistent with non-man participants in our sample intersecting with age to lead to increased post-pandemic levels of GAD-2 and PHQ-9. However, current COVID-19 pandemic research mainly indicates decreasing levels of distress among older adults [9–13]. There are a few possible reasons for this finding. The distribution of age in our sample is skewed towards younger participants with GAD-2 participants having a mean age of 30.3 (\pm 13.3) years and PHQ-9 participants having a mean age of 30.4 (\pm 13.5) years. This is a limitation and could present a masking effect on the true impact of age in this conjunct variable. However, it is also possible that when age and gender intersect, rather than examining age in isolation, the effect of age on anxiety and depressive symptoms is seemingly the opposite of what it would be in isolation.

Working from home as it interacts with either gender or having a child(ren) was not a predictor of post-pandemic levels of anxiety or depressive symptoms, based on our findings. Although it may seem that working from home would contribute to poor mental health, our study indicates that this is not the case with anxiety or depression. A possible reason for this finding is that those working from home did not lose their jobs or livelihood due to the pandemic. Household income has consistently been identified as a social determinant of mental health with individuals from lower socio-economic status having a higher prevalence of anxiety and depressed mood [31]. Therefore, financial security and maintenance of family income or jobs could be facilitating better mental health outcomes following the COVID-19 pandemic. Other studies reinforce the results identified in this study that those who stopped working as a result of the pandemic have increased levels of distress [18,19].

Although it may be expected that those parents working from home would have higher levels of mental distress during the pandemic, our findings indicated that working from home while having a child(ren) was not a predictor of either higher GAD-2 or PHQ-9 scores following the pandemic. There are several possible explanations for this finding, which future research could address. Our study did not look at the age of the child(ren). Having to care for a preschooler, supervise a child in elementary school, or having a high

school student at home can be very different scenarios for a working parent. Further investigation could also explore how working from home with a child(ren) presents differently among those with varying degrees of support, such as having another caretaker in the home. Finally, a child's personal needs can have varying impacts on a working parent. A study on parental burnout during the COVID-19 pandemic found increasing levels of burnout among parents who had children with special needs [20].

It must be noted, other than pre-pandemic levels of GAD-2 and PHQ-9 scores, the two variables that have significance in predicting post-pandemic levels of anxiety and depressive symptoms are those that are intersectional with gender (age x gender and gender x child). In addition to having statistical significance, this finding has high clinical significance. Health care providers, especially mental health professionals, need to be aware and able to help women and those who identify as other genders (non-binary, agender, other) during and following the pandemic.

3.5.1 Limitations

Two potential limitations of the study are recall bias and selection bias. Our study was designed as a cross-sectional survey that asked respondents to recall their pre-pandemic state to complete GAD-2 and PHQ-9. This method could have led to recall bias as respondents aimed to remember how they were feeling prior to the start of the pandemic. However, our study was conducted in the early months of the pandemic and asked respondents to recall only a few months earlier for their pre-pandemic scores.

A second limitation of the study was the risk for selection bias. Accessing the internet and use of technology may have excluded elders and skewed representation in the sample to a lower age. Additionally, those from lower socioeconomic groups and transient populations could be less represented due to barriers in internet access. However, the online design may have decreased social desirability bias and enabled respondents to freely and openly respond to sensitive survey questions.

3.6 Conclusions

Our research has determined several factors that predict post-pandemic (following March 11, 2020) levels of anxiety and depressive symptoms among the general population, as measured through GAD-2 and PHQ-9. Namely, these factors are pre-pandemic levels of GAD-2 and PHQ-9 scores, for post-pandemic levels of GAD-2 and PHQ-9, respectively, along with the intersection of age and gender and gender and having a child(ren). Health care practitioners, especially those working in psychiatry and mental health, need to be aware of the extra burden of the pandemic on women and those who identify as other genders, especially those who are parents or care for children in their homes.

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Table 3-1: Demographic Characteristics

Demographic	GAD-2 n (%) / mean (SD)	PHQ-9 n (%) / mean (SD)
Sex	1373	1281
Male	289 (21.0%)	273(78.1%)
Female	1076 (78.4%)	1000(21.3%)
Other	8(0.6%)	8(0.6%)
Gender	1372	1280
Man	283 (20.6%)	268(20.9%)
Woman	1058(77.1%)	984(76.9%)
Others*	31 (2.2%)	28(2.2%)
Age	1367	1276
Mean (SD)	30.3 (13.3) years	30.4 (13.5) years
Location (country/continent**)	1379	1287
Canada	1023 (74.2%)	951(73.9%)
USA	264(19.1%)	248(19.3%)
Europe	35(2.5%)	33(2.6%)
Asia	35(2.5%)	33(2.6%)
Americas	11(0.8%)	11(0.9%)
Oceania	7(0.5%)	7(0.5%)
Africa	4(0.3%)	4(0.3%)
Marital Status	1347	1257
Single	838 (62.2%)	778(61.9%)
Common-law	84(6.2%)	77(6.1%)
Married	368(27.3%)	350(27.8%)
Divorced	50(3.7%)	45(3.6%)
Widowed	7(0.5%)	7(0.6%)
Child(ren)	1370	1280
yes	358(26.1%)	342(26.7%)
no	1012(73.9%)	938(73.3%)
Working Location	696	644
At home	376(54.0%)	353(54.8%)
Outside of home	304(43.7%)	276(42.9%)
Lost job	16(2.3%)	15(2.3%)

*Other genders includes participants who responded: non-binary, agender, and other.

**Europe (Croatia, France, Germany, Ireland, Italy, Netherlands, Romania, Slovakia, Spain, Sweden, Switzerland, United Kingdom), Asia (China, India, Iran, Israel, Japan, Kazakhstan, Malaysia, Oman, Pakistan, Philippines, Qatar, Saudi Arabia, Singapore, United Arab Emirates), Americas (Antigua and Barbuda, Argentina, Bahamas, Honduras, Jamaica, Peru, Saint Kitts and Nevis), Oceania (Australia, New Zealand), Africa (Ethiopia, Namibia, Nigeria, South Africa).

Table 3-2: GAD-2 Regression Model Summary

Model	R	R ²	Adjusted R ²	Standard Error of the Estimate
1	0.45*	0.21	0.21	1.68
2	0.49**	0.24	0.24	1.64
3	0.50***	0.25	0.25	1.63

*Predictors: (constant), Pre-GAD-2 sum

**Predictors: (constant), Pre-GAD-2 sum, age x gender

***Predictors: (constant), Pre-GAD-2 sum, age x gender, gender x child

Table 3-3: GAD-2 Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	Significance	95% Confidence Interval for Beta	
		Beta	Standard Error	Beta	p-value	Lower Bound	Upper Bound
1	(constant)	2.26	0.11		<0.001	2.06	2.47
	Pre-GAD-2 sum	0.54	0.04	0.45	<0.001	0.46	0.62
2	(constant)	1.40	0.19		<0.001	1.04	1.77
	Pre-GAD-2 sum	0.58	0.04	0.49	<0.001	0.50	0.66
	age x gender	0.01	0.00	0.19	<0.001	0.01	0.02
3	(constant)	1.45	0.19			1.09	1.81
	Pre-GAD-2 sum	0.59	0.04	0.50	<0.001	0.51	0.67
	age x gender	0.01	0.00	0.14	<0.001	0.00	0.02
	gender x child	0.25	0.08	0.12	0.003	0.09	0.42

Table 3-4: PHQ-9 Regression Model Summary

Model	R	R ²	Adjusted R ²	Standard Error of the Estimate
1	0.55*	0.30	0.30	5.58
2	0.56**	0.32	0.32	5.50
3	0.57***	0.33	0.32	5.48

*Predictors: (constant), Pre-PHQ-9 sum

**Predictors: (constant), Pre-PHQ-9 sum, age x gender

***Predictors: (constant), Pre-PHQ-9 sum, age x gender, gender x child

Table 3-5: PHQ-9 Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	Significance	95% Confidence Interval for Beta	
		Beta	Standard Error	Beta	p-value	Lower Bound	Upper Bound
1	(constant)	6.00	0.35		<0.001	5.32	6.68
	Pre-PHQ-9 sum	0.72	0.05	0.55	<0.001	0.64	0.81
2	(constant)	3.72	0.63			2.47	4.97
	Pre-PHQ-9 sum	0.76	0.05	0.57	<0.001	0.67	0.84
	age x gender	0.04	0.01	0.14	<0.001	0.02	0.06
3	(constant)	3.92	0.64			2.67	5.17
	Pre-PHQ-9 sum	0.76	0.05	0.58	<0.001	0.68	0.85
	age x gender	0.03	0.01	0.10	0.010	0.01	0.05
	gender x child	0.72	0.29	0.09	0.014	0.15	1.29

Chapter 4

4 Experiences of depression and anxiety among mothers and gender nonconforming parents during the COVID-19 pandemic

4.1 Abstract

Importance: Despite increasing evidence that women and gender nonconforming people had poor mental health outcomes compared to men during the pandemic, the specific reasons for these differences remained unknown.

Objective: To explain why mothers and gender nonconforming parents experience high levels of depression and anxiety following the pandemic.

Design, Setting, and Participants: We used criterion sampling to select participants from among those who participated in a prior survey study between June 26, 2020 and August 31, 2020). The quantitative results from the survey revealed that the interplay of gender (non-man) and being a parent was associated with the highest levels of post-pandemic depression and anxiety symptoms. Therefore, we used the following preidentified factors to select respondents: (1) full responses to the Patient Health Questionnaire-9 (PHQ-9) and Generalized Anxiety Disorder-2 (GAD-2) scales; (2) identifying gender as woman, nonbinary, agender, or other; (3) post-pandemic scores on PHQ-9 of 10 or greater or GAD-2 of 3 or greater; (4) responding to the open-ended question; and (5) post-pandemic scores greater than pre-pandemic scores.

Main Outcomes and Measures: Through a critical feminist theory approach, we analyzed participant responses to develop themes and use those to create an explanatory theory.

Results: Our sample consisted of 147 participants – 142 identified as women, 3 as nonbinary, 1 as agender, and 1 as nonbinary femme. The mean (SD) age of the sample was 39.2 (8.5) years. The participants were divided into three subgroups based on scores on PHQ-9 and GAD-2: depression (9), anxiety (33), and depression & anxiety (105). Through our qualitative analysis, we identified 7 themes and 7 concepts. The 7 concepts were: helpless, lonely, angry, overwhelmed, worried, substance use and problem sleep, and challenges associated with parenting children with special needs.

Conclusions and Relevance: Mothers and gender nonconforming parents experienced disruptions during the pandemic arising from the intersectional demands of their genders and family responsibilities. These new demands combined with a loss of control and uncertainty led to high levels of depression and anxiety symptoms. We need to understand why mothers and gender nonconforming parents had poor mental health outcomes following the pandemic to identify who is at risk during times of crisis and to intervene with social supports, child care, and health care.

4.2 Introduction

In December 2019, the first cases of the novel coronavirus (2019-nCoV) were reported¹. The World Health Organization called this new strain COVID-19², and deemed it a pandemic on March 11, 2020³. Early in the pandemic, the negative mental health impacts and psychologic distress were evident and captured in numerous studies⁴⁻⁷. Although it was popularized over social media that “we’re in this together,” researchers demonstrated that not every person or population’s mental health was affected equally during the pandemic^{8,9}.

The pandemic affected many aspects of mental health and wellbeing, including negatively impacting sleep¹⁰⁻¹² and increasing the experiences of post-traumatic stress disorder¹³⁻¹⁵. Although stressors during the pandemic negatively affected many facets of mental health, depression and anxiety are two measures of mental health that were heavily impacted and studied^{9,16-20}. Our previous research revealed that depression and anxiety symptoms increased by 74.2% and 57.1%, respectively, following the start of the pandemic²¹. In examining these findings, it is evident that not all people nor populations experienced the same increases in depression and anxiety. There are individual characteristics and personal circumstances that were highly associated with an increased susceptibility to mental harm during the pandemic. Researchers have demonstrated that gender, age, location, occupation, education, marital status, and comorbidities are all significant factors impacting increases in depression and anxiety during the pandemic^{8,22,23}.

Our quantitative study of mental health during the pandemic revealed the significant role of sex and gender in the experiences of depression and anxiety – knowledge that has been corroborated by several other studies^{19,24,25}. We determined that women and gender nonconforming individuals experienced greater increases in depression and anxiety symptoms when compared to those who self-identified as men²¹. With further analysis, we identified that parenthood was a significant factor in its interplay with gender in experiencing greater increases of depression and anxiety symptoms. We found that identifying as woman or gender nonconforming and having a child(ren) was significantly correlated with experiencing increased depression or anxiety following the start of the pandemic²⁶. To most effectively shape policy and health care practice, we must understand “why” this phenomenon is occurring. The aim of this qualitative study was to explain why mothers and gender nonconforming parents experienced higher levels of depression and anxiety following the start of the pandemic.

4.3 Methods

Qualitative research can be used independently or in a mixed-methods design to complement quantitative research; it can explore or it can explain phenomena²⁷. In our study, we are using qualitative inquiry in a mixed-methods research design to leverage its explanatory function by using a sequential explanatory design²⁸. We have adhered to the *Standards for Reporting Qualitative Research (SRQR)*²⁹.

The first part (P1) was a quantitative study using an online survey design; the second part (P2) is a qualitative explanatory study. The quantitative study component shaped the qualitative approach and the question being answered in this paper. The objective of this study (P2) is to explain why mothers and gender nonconforming parents experienced the largest increases in depression and anxiety symptoms following the start of the pandemic by examining the lived experiences of these participants. To understand how P2 was conducted, we will briefly describe P1.

4.3.1 Part 1 – Procedures, Participants, and Analyses

We developed a study consisting of demographic, mental health, and homelife questions by combining survey-specific questions with standard scales. We administered the survey in English through the Qualtrics platform version June-July-August, 2020 (Qualtrics, Provo, UT). We adhered to recommendations set forth in *The Checklist for Reporting Results of Internet E-Surveys (CHERRIES)*³⁰ and followed *The Sex and Gender Equity in Research (SAGER)* guidelines³¹. Western University's Health Sciences Research Ethics Board approved the study (project identification number: 115790). We used various online channels to recruit participants, and administered the survey between June 26, 2020 and August 31, 2020. To participate, respondents had to be 18 years of age or older and able to read and respond in English.

After obtaining consent, the study began with a set of demographic questions including participant's location of residence, sex, gender, age, ethnicity, number of children,

marital status, and occupation and occupational changes during the pandemic. In the sex question, participants were able to choose male, female, or other (with an option to specify). In the gender identification question, participants were able to choose man, woman, non-binary, agender, or other (with an option to specify). To obtain measures of depression and anxiety, we used the Patient Health Questionnaire-9 (PHQ-9) and the Generalized Anxiety Disorder-2 (GAD-2) scale, respectively. We asked respondents to complete two copies of each scale – the first to recall pre-pandemic states and the second for their current states. The PHQ-9 is a screening tool for major depressive disorder (MDD), and may be used to diagnose MDD or measure its severity³². Total PHQ-9 scores can be used to denote MDD severity with 5, 10, 15, and 20 indicating mild, moderate, moderately severe, and severe depression, respectively³². The GAD-2 is a patient-reported tool for screening generalized anxiety disorder (GAD)³³. A score of 3 or greater on GAD-2 indicates a clinically relevant anxiety disorder³³.

In the first stage of quantitative analysis, we conducted paired sample t-tests to compare levels of depression and anxiety symptoms before and after the start of the pandemic and mixed-model factorial analysis of variance to evaluate changes between sex groups and gender groups. In the second stage, we used stepwise multiple regression to determine independent variables of significance (including single demographic variables and conjunct variables). For both PHQ-9 and GAD-2, we found that women and gender nonconforming participants had greater increases in symptom levels than men; these increases were significantly greater than those experienced by men²¹. In the second stage, we found that the variables of significance in post-pandemic depression and anxiety symptoms were pre-pandemic scores, the interaction between gender (non-men) and increasing age, and the interaction between gender (non-men) and taking care of child(ren)²⁶. Considering the unreliability of the relationship between age (as a single or conjunct variable) with depression and anxiety experienced during the pandemic⁸, we will focus our qualitative analysis on the conjunct variable of gender and having a child(ren).

4.3.2 Part 2 – Procedures and Participants

Consistent with the primary author's belief in a relativist reality³⁴ and her role in shaping research rather than acting as an objective observer³⁵, the research philosophy of this study is based on critical theory. The authors also acknowledge that sex and gender differences can lead to inequities contributing to the experiences of illness; therefore, they selected a critical feminist theory approach to data analysis³⁶. There are numerous ways to acquire data for qualitative analysis, including interviews and document study²⁷. We invited participants to share their experiences through an open-ended comment section at the end of the survey. The question stated, "We would like to know how the pandemic has affected your life. Please tell us how you are feeling, how you are coping, or anything else you would like to share."

We used criterion sampling to select participants based on pre-identified factors³⁷. Participants had to meet five criteria. First, having answered all questions on both copies of PHQ-9 and GAD-2. Second, identifying gender as woman, nonbinary, agender, or other. Third, post-pandemic scores on PHQ-9 of 10 or greater or GAD-2 of 3 or greater, which are clinically significant as described above. Fourth, responding to the open-ended question to provide data for qualitative analysis. Fifth, post-pandemic scores greater than pre-pandemic scores on PHQ-9 or GAD-2 scales to indicate that mental health worsened.

4.3.3 Analysis

We organized the data into three respondent groups: those who met the sampling criteria based on PHQ-9 scores, those who met the sampling criteria based on GAD-2 scores, and those who met the criteria based on both their PHQ-9 and GAD-2 scores. We first became familiar with the data by reading through all responses. In the first round of coding, we began open coding using descriptive tags to label segments of participants' responses. In the second round, we used axial coding to better identify relationships between codes. After these two rounds, we developed a set of codes, categories, and themes from the data. We conducted one final round of coding in which we identified

subcategories for more detailed representation of the findings. HS was responsible for initial coding and met with JR and JM for triangulation between coding rounds. Coding took place December 2023 and March 2024. All authors reviewed preliminary findings and met regularly to discuss themes until a theory was developed with consensus agreement by all authors.

4.4 Results

There were 244 participants with full responses to the PHQ-9 and GAD-2 scales that self-identified as non-man. Of these, 161 had completed the qualitative component of the study. Of the respondents completing the qualitative study, 147 participants had experienced increased levels of depression (9), anxiety (33), and depression & anxiety (105) symptoms. The mean (SD) age of the study sample was 39.2 (8.5) years (Table 1). In total, 142 participants identified as women, 3 as nonbinary, 1 as agender, and 1 as other (nonbinary femme). We found sufficient overlap among responses to suggest that thematic saturation had been reached. Through the analysis, we developed seven themes, with some themes repeating between the subgroups (Figure 1). We provide illustrative participant quotations for the various themes, by subgroup (Table 2). Additionally, we conducted a count of relevant words (and word groups), by subgroup (Table 3). We also present the codes, subcategories, and categories that comprise each theme, by subgroup (Figure 2) and visually illustrate the overarching theme (Figure 3).

4.4.1 Theme 1: Loss of control leading to a sense of helplessness

This theme was unique to the group of participants experiencing symptoms of depression. While respondents in this group expressed some of the same challenges as other respondents (such as challenges in their routines and having to care for children while working from home), what distinguished this theme was the notion of feeling absolutely powerless to change the situation and ultimately accepting the despair. A 39-year-old

woman with two children (participant 255) stated, “The world as we knew it is over. All we can do is keep going through the motions ...”

4.4.2 Theme 2: Lack of social connection leading to loneliness

Feeling lonely from a lack of social connection was a theme in the depression and depression & anxiety subgroups. Some participants expressed yearning for physical touch from those who were not in their households. A 30-year-old woman with three children (participant 130) stated, “... feeling very touch starved and overwhelmed with my kids ...” Others expressed missing being able to visit loved ones, which was especially difficult when loved ones were elders in nursing homes. Some participants felt that they had to exercise greater caution in maintaining distance and isolating themselves if they or a loved one was immunocompromised. A 36-year-old nonbinary person with one child (participant 109) stated, “The social isolation is horrible. I haven't been able to see my family or friends. I miss everyone so much. I'm terrified to leave the house because I'm immunocompromised.”

4.4.3 Theme 3: Changes in responsibilities leading to feeling overwhelmed

Participants in the anxiety and depression & anxiety subgroups expressed feeling overwhelmed from changes in their daily responsibilities (unpaid family roles, paid jobs, and having to balance competing roles). With many schools and child care facilities closed during the pandemic, children were at home. This created a logistical challenge for mothers and gender nonconforming parents who were responsible for the majority of childcare roles³⁸ while having to continue their paid work from inside or outside of the home. A 31-year-old woman with one child (participant 132), stated

“I'm a single parent 100% of the time. Not being able to hire a babysitter, or drop her off with family has made parenting harder. I'm less patient, quicker to

anger/frustration because I don't get a break at all. I'm either working or parenting 24/7. It's beginning to get exhausting.”

A subcategory within theme 3 related to participants' type of paid work during the pandemic. Those participants who worked in healthcare or teaching jobs (work that is predominately done by women) expressed additional distress over their work. Healthcare workers commented about the burnout associated with being on the frontlines of the fight against COVID-19. Teachers expressed being worried for their health upon returning to crowded schoolrooms, and bringing the virus back to their families.

4.4.4 Theme 4: Fears of infection and uncertainty leading to vigilance and worry

Participants in the anxiety and depression & anxiety subgroups conveyed fears of contracting the COVID-19 virus and becoming ill. Participants feared this illness for themselves and loved ones (most commonly their children and elder parents). A 44-year-old woman with two children (participant 392), stated

“As a middle school teacher ... I am deeply afraid of returning to the classroom and bringing home this virus. My mother lives with us, and she is in her 70s, and my children also have conditions that make them susceptible. I am doing everything I can to get healthier so I am more likely to survive, and keeping my children home now and in the fall ... but I am afraid I will bring this home to them, and they will end up in the ICU or dead.”

The fear of infection also led many participants to change their habits and daily routines. For example, participants stated going to grocery stores at certain times or being responsible for protective measures for their families. A 43-year-old woman with one child (participant 719) stated,

“I have constant stress about letting my daughter go out to play, as the neighbor kids are playing too, but I don't have it in me to fight to keep her inside. I spend

my days reminding her, relentlessly, to keep her distance. Additionally, we share a home with my [68-year-old] mother, so I am constantly terrified of her getting sick.”

In addition to creating a sense of vigilance and causing respondents to be constantly mindful and protective of themselves and their families, the fear of infection led to a sense of worry. Not knowing exactly how to protect against the virus and the sense of uncertainty about the future contributed to participants’ worry. A 53-year-old woman with one child (participant 205) states, “[I’m] very anxious, heartbroken at [the] poor management of this pandemic, afraid for our future.”

4.4.5 Theme 5: Reaction to regulations and others’ disregard for guidelines leading to anger

A common theme expressed by those in the anxiety and depression & anxiety subgroups was anger by government pandemic regulations and others’ responses to these regulations. Participants expressed frustration both with too many and too few regulations; with the majority of respondents thinking that governments were mishandling the pandemic. Another reason contributing to participant anger was the perceived resistance among others in the community to follow pandemic guidelines. Participants felt that others were being selfish and not taking proper precautions to stop the spread of the virus. Many respondents were angry by seeing others on social media or on the news being careless and prolonging the pandemic. A 36-year-old non-binary respondent (participant 109) stated,

“I am SO SO angry at everyone for refusing to wear masks and keeping us in this hell for so much longer than we need to be. My best friend's daughter tried to kill herself last week because her mental health deteriorated so much to the point where she couldn't handle it anymore. I'm so incredibly angry, anxious, and depressed, and so is everyone I know.”

4.4.6 Theme 6: Distress leading to substance use and problems with sleep

Participants experiencing both depression & anxiety reported using drugs and alcohol to cope with the distress. A 33-year-old woman with one child (participant 740) stated, “I lean on alcohol to turn my brain off and relax ...I feel terrible all the time and have no idea what to do about it.” Many participants also described having to take substances during the pandemic to cope with changes in sleep. A 22-year-old woman with one child (participant 466) stated, “It has been difficult to fall asleep at night. My stress levels and anxiety has been extremely high since the pandemic and I have started using recreational marijuana more often than I’d have prior to the pandemic.” In addition to using alcohol and drugs for sleep problems during the pandemic, participants also indicated using prescription and over-the-counter medications. A 43-year-old woman with three children (participant 322) stated, “I cannot sleep without chemical help...I use [diphenhydramine] for that. I’ve tried to go without it, but that leads to days and days of 3-4 hours of sleep a night and an intense feeling of restlessness.” The problems with sleep reported including trouble falling asleep, trouble staying asleep, and needing to sleep more than usual.

4.4.7 Theme 7: Having children with special needs leading to additional distress

A final theme in the depression & anxiety subgroup was participants’ distress with the pandemic’s effects on their children with special needs. The special needs included both mental health concerns (such as neurodivergence) and physical health concerns (such as being immunocompromised). Participants voiced access barriers to resources as a result of the pandemic, which made their already fragile situations worse. A 41-year-old woman with two children stated,

“I have two neurodivergent children. It is IMPOSSIBLE to give proper care to children [while] being expected to work at home like it was just my choice. The changes caused huge impacts in mental health of both my children to the point of seeking (and failing to achieve) psychiatric help. There must be better supports for special needs families because we were barely hanging on to begin with.”

4.5 Discussion

This qualitative study found several themes that contribute to explaining the increased levels of depressive and anxiety symptoms in mothers and gender nonconforming parents following the start of the pandemic. When combined, these themes support a theory for the phenomenon observed. Women and gender nonconforming parents experienced changes in their lives and daily routines during the pandemic. At the intersection of their identities of gender and family responsibility, these individuals' lives were affected to a larger extent than others. Having to adjust to the many changes of the pandemic (such as an inability to see loved ones or allow their children from seeing loved ones, having children at home full time to whom they felt they could not provide adequate care, and having additional responsibilities such as infection control for their families) combined with a loss of control (such as an uncertain future, disrupted routines, and government-dictated behaviors) led mothers and gender nonconforming parents to experience high levels of depression and anxiety symptoms.

Consistent with this theory is the traditional social norm that women are responsible for most child care responsibilities, which were disrupted during the pandemic³⁹. Women are also predominately responsible for the health of their families and taking care of others when they are ill, which was challenging during a pandemic³⁹. Additionally, women do the majority of planning, scheduling, and logistics for family activities and routines³⁸ – an aspect of family life that was greatly disrupted by the pandemic.

We did not identify meaningful differences in the developed themes and theory between women and gender nonconforming parents. This may be because both groups are

marginalized and lack power in social relations and society^{40,41}. A traditional lack of power could have contributed to both groups feeling a greater loss of control during the pandemic, which led to the negative mental health outcomes for the two groups. Although the study did not directly ask participants about children or family (other than partners), respondents frequently mentioned their children and family members. Family words were mentioned 17, 101, and 147 times (Table 3) by the 9, 33, and 105 participants of the depression, anxiety, and depression & anxiety subgroups, respectively (a mean of 1.98 mentions per participant). This is indicative of the important role of children and family to the identify of mothers and gender nonconforming parents.

In addition to the themes, we noted other differences in outcomes between the three subgroups. The responses among the depression subgroup were considerably more concise than the other two subgroups. This may be related to psychomotor changes or fatigue present in MDD⁴². Although we observed anger (stemming from government regulations and disregard for pandemic guidelines) in the anxiety and depression & anxiety subgroups, respondents in the anxiety subgroup more often contributed their anger to others and what they observed on social media and the news. This “outward” blame observed in the anxiety subgroup may be related to the irritability present in GAD⁴². In addition to the two unique themes in the depression & anxiety group, we observed that participants in this subgroup were the only ones who mentioned suicide. They also spoke more often about therapy and medications. This may be indicative of the increased burden of experiencing symptoms of both anxiety and depression simultaneously.

4.5.1 Limitations

Our study had limitations. Notably, we were unable to probe participants and seek clarification on sentiments expressed because we used written comments in lieu of interviews. By writing about their distress, participants may have limited what they would otherwise verbally express. However, we feel that if we had ignored the rich

written comments that participants labored to express, it would be a disservice to the knowledge they helped us create and a misuse of participants' time and efforts.

4.6 Conclusions

In this qualitative study we explained why women and gender nonconforming parents experienced high levels of depression and anxiety symptoms following the start of the pandemic. They had to adapt to greater family responsibilities created during the pandemic while feeling a loss of control and uncertainty over the future. Mothers and gender nonconforming parents were impacted in unique ways because of gender norms and social roles. We need to acknowledge the additional stressors for these individuals in order to devise more appropriate ways to identify who is at risk and to intervene with supports – social, child care, and health care.

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Table 4-1: Participant Demographic Characteristics

	Depression (n = 9)	Anxiety (n = 33)	Depression & Anxiety (n = 105)	Total (n=147)
Demographic data				
Age (yr), mean (SD)	43.8 (14.9)	40.1 (7.5)	38.6 (8.2)	39.2 (8.5)
Gender, n (%)	9 (100.0%)	32 (97.0%)	101 (96.2%)	142 (96.6%)
Women	0 (0.0%)	0 (0.0%)	3 (2.9%)	3 (2.1%)
Nonbinary	0 (0.0%)	1 (3.0%)	0 (0.0%)	1 (0.7%)
Agender	0 (0.0%)	0 (0.0%)	1 (1.0%)	1 (0.7%)
Other*	0 (0.0%)	0 (0.0%)	1 (1.0%)	1 (0.7%)
Marital Status, n (%)				
Single	1 (11.1%)	1 (3.8%)	9 (6.8%)	11 (5.7%)
Married	6 (66.7%)	29 (87.9%)	73 (69.5%)	108 (73.5%)
Common-law	0 (0.0%)	1 (3.8%)	3 (12.4%)	14 (9.5%)
Divorced	1 (11.1%)	2 (6.1%)	7 (6.7%)	10 (6.8%)
Widowed	0 (0.0%)	0 (0.0%)	1 (1.1%)	1 (0.7%)
Other	1 (11.1%)	0 (0.0%)	2 (1.9%)	3 (2.0%)
Country (n)**				
Canada	2 (22.2%)	17 (51.5%)	48 (45.7%)	67 (45.6%)
United States	4 (44.4%)	14 (42.4%)	53 (50.5%)	71 (48.3%)
Australia	1 (11.1%)	0 (0.0%)	0 (0.0%)	1 (0.7%)
Asia	1 (11.1%)	1 (11.1%)	0 (0.0%)	2 (1.4%)
Europe	1 (11.1%)	0 (0.0%)	3 (2.8%)	4 (2.7%)
Africa	0 (0.0%)	0 (0.0%)	1 (1.0%)	1 (0.7%)
Americas	0 (0.0%)	1 (3.0%)	0 (0.0%)	1 (0.7%)
Race/Ethnicity***				
White	8 (88.9%)	26 (81.2%)	87 (82.9%)	121 (82.9%)
Indigenous	0 (0.0%)	1 (3.1%)	3 (2.9%)	4 (2.7%)
West Asian	1 (11.1%)	1 (3.1%)	1 (1.0%)	3 (2.1%)
East Asian	0 (0.0%)	1 (3.1%)	0 (0.0%)	1 (0.7%)
South Asian	0 (0.0%)	0 (0.0%)	4 (3.8%)	4 (2.7%)
Southeast Asian	0 (0.0%)	1 (3.1%)	1 (1.0%)	2 (1.4%)
Arab	0 (0.0%)	0 (0.0%)	1 (1.0%)	1 (0.7%)
Mixed/Others	0 (0.0%)	2 (6.1%)	8 (7.6%)	10 (6.8%)
Number of Dependents, mean (SD)	1.56 (0.73)	1.94 (0.61)	1.8 (1.15)	1.82 (1.0)
1 n (%)	5 (55.6%)	7 (21.2%)	52 (49.5%)	64 (43.5%)
2	3 (33.3%)	21 (63.6%)	36 (34.3%)	60 (40.8%)
3	1 (11.1%)	5 (15.2%)	10 (9.5%)	16 (10.9%)
≥4	0 (0%)	0 (0%)	7 (6.8%)	7 (4.8%)
PreGAD	-	1.3 (0.96)	1.7 (1.1)	1.6 (1.1)
PostGAD	-	3.8 (0.99)	5.0 (1.0)	4.7 (1.1)
Diff GAD	-	2.5 (0.93)	3.2 (1.3)	3.1 (1.2)
PrePHQ	5 (4.5)	-	5.7 (3.9)	5.6 (3.9)
Post PHQ	13.8 (3.2)	-	16.1 (4.4)	15.9 (4.4)
Diff PHQ	8.9 (3.4)	-	10.3 (4.6)	10.2 (4.6)

*Gender: Other (as reported by participant) = Nonbinary femme

**Country (reported): Europe (Ireland, Romania, Sweden, United Kingdom), Asia (Iran, Israel), Africa (South Africa), Americas (Antigua and Barbuda).

Table 4-2: Themes and Representative Quotations from Participants

Themes	Representative Quotations
Theme 1: Loss of control leading to a sense of helplessness	<ul style="list-style-type: none"> • “My marriage is failing.” (Participant 163; 56-year-old woman with one child) • “The world as we knew it is over. All we can do is keep going through the motions until the new world arrives whatever that's going to be.” (Participant 255; 39-year-old woman with two children) • “It feels like the carpet is pulled out from under me ...” (Participant 902; 50-year-old woman with three children)
Theme 2: Lack of social support leading to loneliness	<ul style="list-style-type: none"> • “Social isolation is brutal. My husband is less likely to have complications and so is more comfortable socializing whereas I am too afraid. It’s hard.” (Participant 190; 47-year-old woman with two children) • “I am mainly feeling completely alone and always "on duty" with increased demands on my time and increased feelings of anxiety and isolation and feeling of failure towards my ability to do my best for my toddler and preschooler. I have significantly reduced time to spend with other adults including my husband as work and childcare and maintaining household time has dramatically increased.” (Participant 755; 36-year-old woman with two children) • “The Pandemic took away all the activities we enjoyed as a family. Our son is an athlete and we enjoyed going to his practises and games. Not seeing friends and family for over three months was depressing. My new grandson was not getting to know me. Loneliness took over and probably a slight depression and feeling of not having any control. My husband continued to work our teenage son had to widen his bubble early on so I was feeling that I couldn’t have a bubble as the two people I lived with created my extended bubble ... They were no support to me and my feelings. That enhanced my feeling of being in this alone.” (Participant 928; 67-year-old woman with one child)
Theme 3: Changes in responsibilities leading to feeling overwhelmed	<ul style="list-style-type: none"> • “The pandemic has put my commercial cleaning business into overdrive. We are so busy I don't have time to even answer the phone anymore. I was short staffed before the pandemic so my staff and I have been working nearly everyday since March 11th ... My 3 kids were home from school while my business was pushed into overdrive. Juggling a high-school senior 8th grader and a kindergarten was not easy ... They were taken out of school where they were thriving to be stuck at home with a stressed out overworked mom.” (Participant 308; 35-year-old woman with three children) • “This sucks! The job of protecting my family from COVID has fallen almost completely on me. Sanitizing the house making sure hands are washed reminding everyone to wear masks and step away from someone getting too close sanitizing phones etc. It’s an immensely stressful job and I wish I could have a break from it.” (Participant 734; 46-year-old woman with one child) • “Honestly it's been a bit of a wild ride. I've got a spouse who's suddenly working from home and a child who needs to be educated at home. My spouse is on meeting a LOT (and we don't have an office space with a closed door so there's a noise factor both with us making noise and him being fairly loud) ... All of a sudden I'm cooking a LOT more - lunches as well as dinner ... I miss my alone time - puttering around the house rather than blitzing through it putting on loud music or bad tv when I'm cleaning - can't do that anymore because of my spouse working

	<p>even with his headphones and I can't wear headphones because someone's got to keep an ear open for kid and issues and it's not the guy on the meetings ... I know we're lucky - that my husband has a great job and financially we'll be fine and that if I have to homeschool my kid well I am a teacher it'll be fine ... I'm tired of being 'on call' all the time. I know my husband can't carry the household load while he's working ... but I just want some damn downtime when I'm not responsible for cooking cleaning monitoring the kid's screen time getting sh!t done! I'm very productive - but I kind of wish I wasn't." (Participant 760; 43-year-old woman with one child)</p>
<p>Theme 4: Fears of infection leading to vigilance and worry</p>	<ul style="list-style-type: none"> • “Single mom, 2 kids, literally taking care of dying covid [patients], [with] an autoimmune disease. Had to leave my job and start at a new hospital, because conditions were so unsafe with regards to patient safety. I'm a little stressed and very tired. Pretty sure I'm using unhealthy coping strategies and I'm gonna end up with PTSD. It's a horrible way to die.” (Participant 208; 41-year-old woman with two children) • “I am suspicious of everyone in the sense that I assume no one is taking the proper precautions to protect themselves, let alone everyone else. I don't know what will need to happen for me to emotionally heal from this after the dust settles.” (Participant 211; 40-year-old woman with one child) • “I don't like being unable to visit my adult children or my elderly parents, who live in other states. Despite my health issues, I expected to live another 20 years. Now I truly fear that if I contract the virus, I will not survive.” (Participant 305; 50-year-old non-binary individual with one child)
<p>Theme 5: Reaction to regulations and others' disregard for guidelines leading to anger</p>	<ul style="list-style-type: none"> • “The lockdown worsened my mental health and now this mask stuff without sufficient evidence to show that it effectively reduces transmission! It's insanely frustrating to watch our government slowly chipping away at our rights and turning up the heat on everybody ... Now the men in my life are slowly collapsing under the weight of the decisions the government has made during this pandemic.” (Participant 101; 25-year-old woman with two children) • “I'm disturbed at the amount of people who think Covid has just disappeared and are trying to go back to "normal". I feel myself wanting to believe it's gone. It's like we're all playing pretend and I can't understand it. It's scary and frustrating. I feel a complete lack of protection from my government by not enforcing mask laws and downplaying the severity.” (Participant 235; 35-year-old woman with one child) • “The unwillingness and rudeness of ppl refusing to wear a mask also takes its toll and makes even small tasks like groceries concerning and difficult. The polarization in the U.S. is crushing and it feels as though we are just waiting for the bottom to fall out. [I'm] on social media less and less. [It's] just so toxic.” (Participant 244; 48-year-old woman with one child)
<p>Theme 6: Distress leading to substance use and problems with sleep</p>	<ul style="list-style-type: none"> • “My psychiatrist prescribed me this week's Melatonin to help me sleep better. I literally developed a delayed sleep disorder during the pandemic and when South Africa went into lockdown in March. I was only able to go to sleep at 5 or 7 am.” (Participant 223; 36-year-old woman with one child) • “Constant fear and anxiety, chest pains, can't sleep, trouble eating, irritated at all times, having to hide my feelings from my husband so he doesn't get mad at me for being scared. Heavy drinking in secret so I can control the anxiety. Haven't left the house since Feb. Some days I think if I kill myself at least I won't spread it to my family.” (Participant 224; 34-year-old woman with one child) • “During the day I'm able to do chores and keep myself from focusing on anxiety and depression. At night, this becomes difficult to do. I have trouble falling asleep, or sometimes I fall asleep easily but then wake up in a panic.” (Participant 246; 37-year-old woman with one child)
<p>Theme 7: Having children with</p>	<ul style="list-style-type: none"> • “Distance learning was very stressful for me, as my son has different capabilities. I have less hours at work, because I have to stay home with the kids ... I pride myself on being a caring, attentive mother, but my tank is depleted. I'm having a hard time being a good mom.” (Participant 153; 32-year-old woman with two children)

special needs leading to additional distress	<ul style="list-style-type: none">• “The schools never closed here in Sweden. I stayed home for three weeks due to symptoms, but never had a definitive test ... My daughter has type 1 diabetes. Making the decision to let her go back to school was hard. Going back to work at school after being away was hard. Being in a country where almost no one is wearing masks and where life seems so “normal” is hard.” (Participant 322; 43-year-old woman with three children)• “I have disabilities (I'm an upperbody monoplegic and both legs are weak) and I have a [5-year-old] son who has a severe form of Epilepsy called Lennox Gastaut Syndrome, Global Developmental Delays, Cognitive issues, severe ADHD, and Autism. It's been extremely difficult. My son was getting 4 types of therapy through school plus a 1:1 aide. I'm trying my best, but I'm not a trained therapist. He has lost progress and I'm afraid that if schools don't [re-open,] he'll lose even more. These therapies aren't offered here outside of school. I'm nervous for him ...” (Participant 718; 31-year-old woman with one child)
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Figure 4-1: Subcategories, Categories, Themes, and Concepts (by Subgroup)

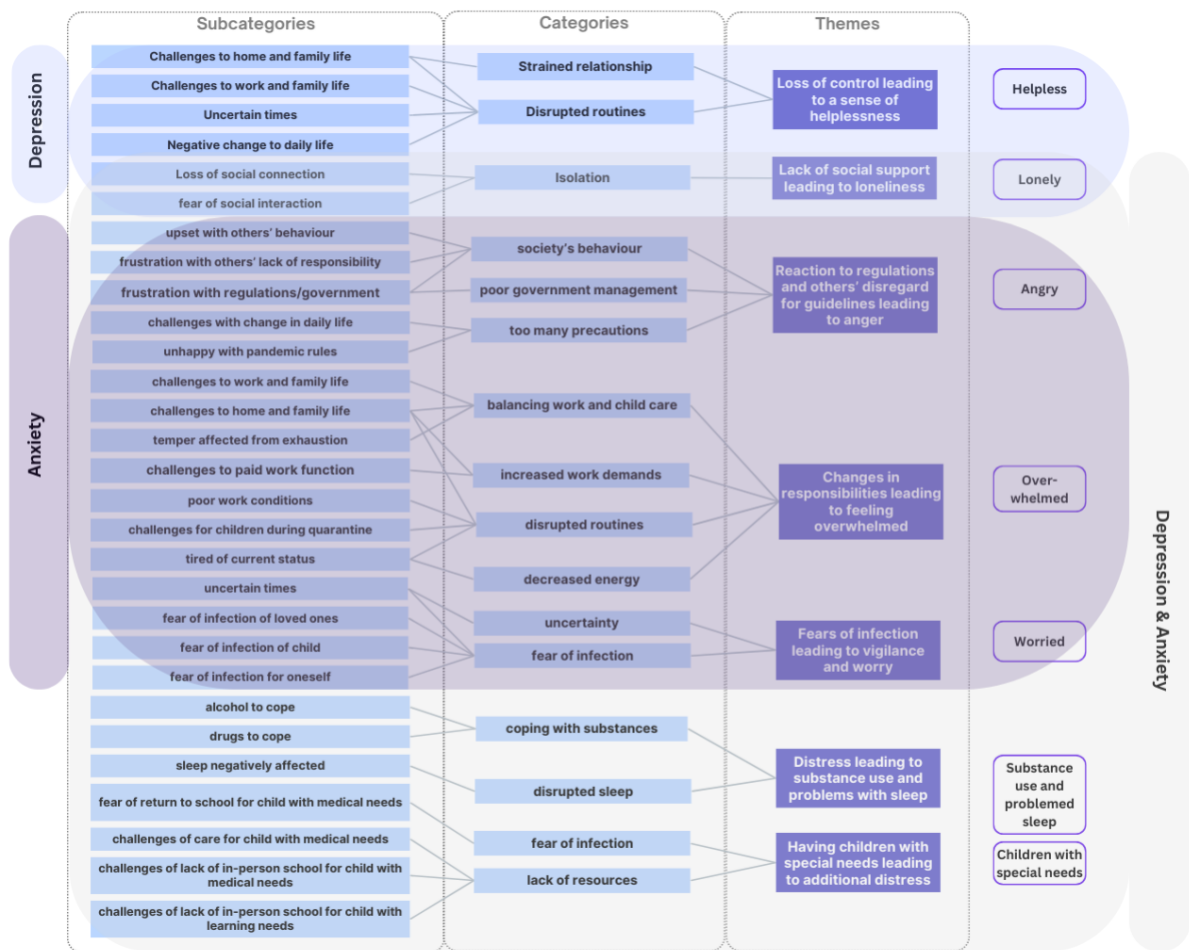


Figure 4-2: Codes, Subcategories, Categories, and Themes (by Subgroup)

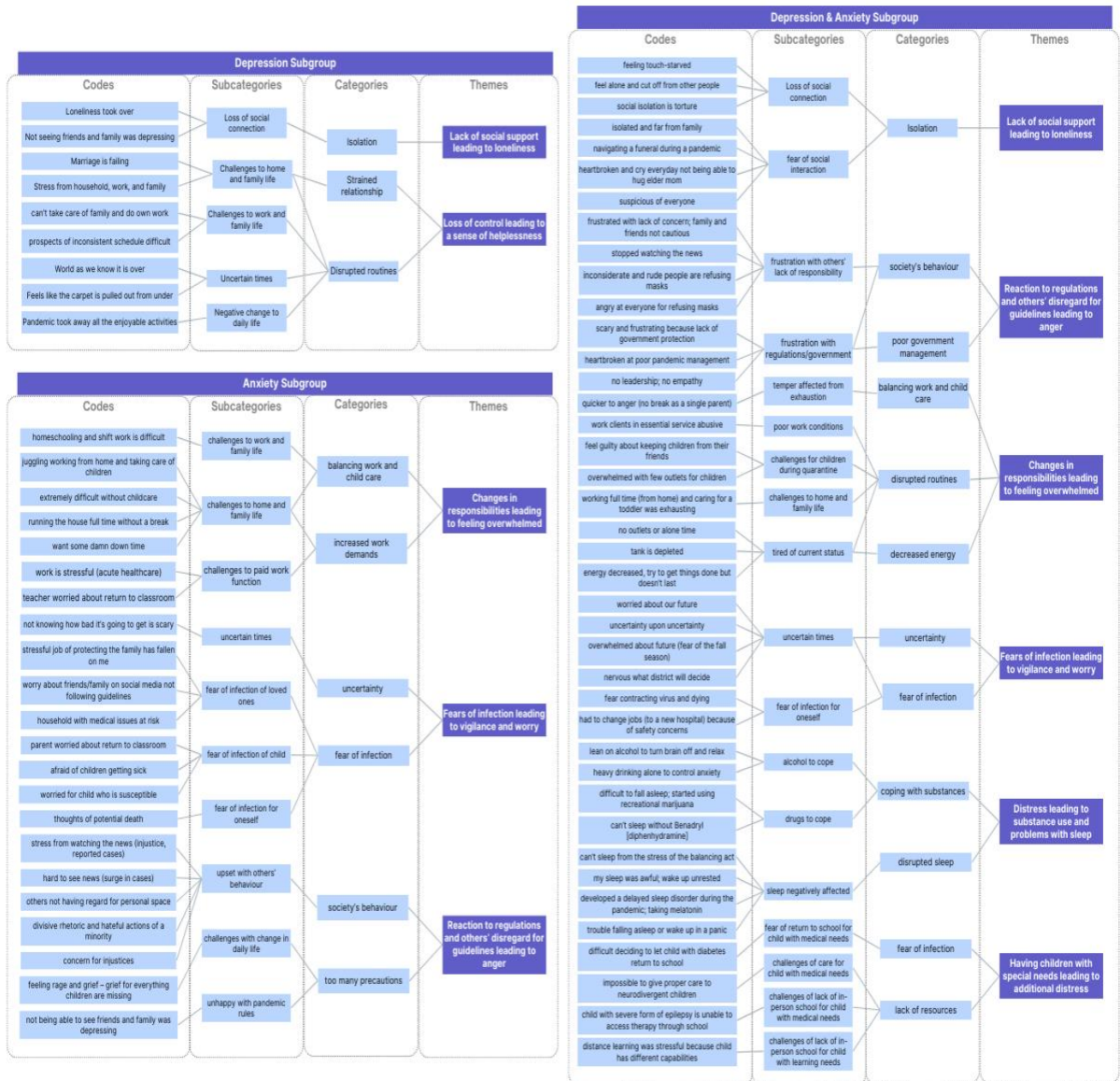
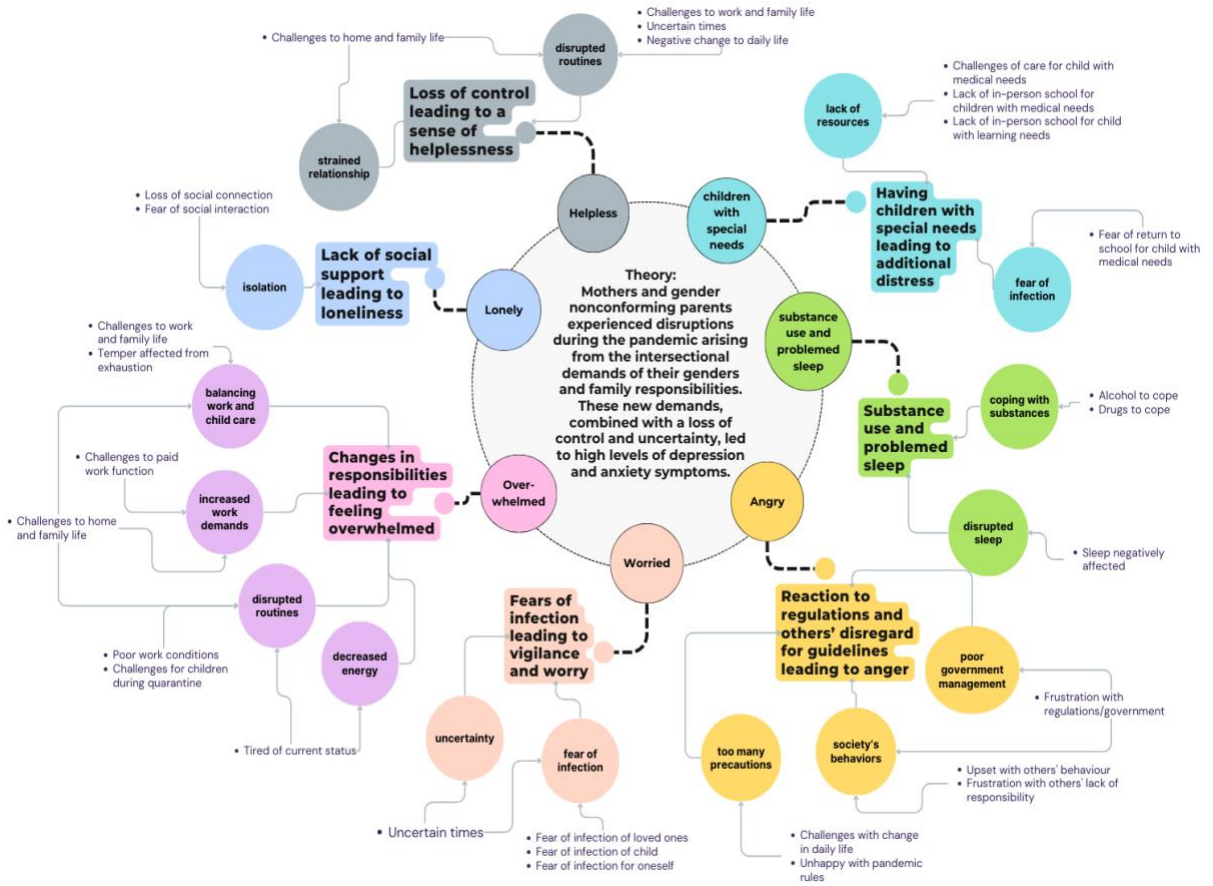


Figure 4-3: Theoretical Visualization



Chapter 5

5 Grand Discussion

Our overall purpose was to examine the role of sex and gender in mental health during the pandemic. We accomplished this by answering three specific research questions, as discussed in Chapters 2, 3, and 4, respectively. **Q1.** How did the levels of depressive and anxiety symptoms change during the pandemic by sex and gender? **Q2.** What individual and intersectional factors were related to experiencing the greatest levels of depressive and anxiety symptoms following the start of the pandemic? **Q3.** Why did some individuals experience more negative mental health outcomes?

In this mixed methods sequential explanatory study, we recruited 1847 participants from 43 countries examining mental health during the pandemic. Our results revealed that, following the start of the pandemic, the levels of depressive and anxiety symptoms increased 74.2% and 57.1%, respectively. We used the Patient Health Questionnaire-9 (PHQ-9) and Generalized Anxiety Disorder-2 (GAD-2) scales to measure the levels of depressive and anxiety symptoms, respectively, pre-pandemic and after the start of the pandemic. Our findings revealed that women and gender nonconforming participants had greater increases in symptoms of depression and anxiety than men following the pandemic. Additionally, our analysis revealed that these increases were significantly greater than those experienced by men. Through our stepwise multiple regression models of post-pandemic PHQ-9 and GAD-2 scores, we found that the variables of significance were pre-pandemic scores in the same scale, the interaction between gender (non-men) and increasing age, and the interaction between gender (non-men) and taking care of child(ren).

Several other studies have examined the effects of age on depression and anxiety during the pandemic¹⁻⁵; however, the results have been inconsistent. In our study, the mean age of respondents was skewed towards younger participants (30.4 and 30.3 years in the PHQ-9 and GAD-2 subset of participants, respectively). Considering the unreliability of age (as a single or conjunct variable), we focused our qualitative analysis on the conjunct

variable of gender and having child(ren). Using a critical feminist theory approach, we analyzed lived experiences of mothers and gender nonconforming parents to reveal themes and arrive at an explanatory theory about why these individuals were experiencing the highest levels of depression and anxiety following the start of the pandemic. We identified seven themes, as presented in Chapter 4, that informed the explanatory theory. Mothers and gender nonconforming parents experienced unique disruptions during the pandemic arising from the intersectional demands of their genders and family responsibilities. These new demands, combined with a loss of control and uncertainty, led to higher levels of depression and anxiety symptoms.

5.1 Limitations

There are limitations in our study that must be discussed. First, the survey was conducted in a cross-sectional design and relied on participants' recollections of past events. That is, we asked participants to rate their pre-pandemic and post-pandemic PHQ-9 and GAD-2 symptoms at one time point. We did this by asking participants (between June and August 2020) to recall an average two-week period prior to March 11, 2020 and an average two-week period following March 11, 2020. This potentially created recall bias where participants may have provided erroneous information based on their ability to recall the past⁶.

A second limitation in our study is the manner in which we had to analyze sex and gender diversity. While we gathered data from individuals with various sex (male, female, other) and gender (man, woman, non-binary, agender, other) identifications, our analysis was not powered to analyze the sex and gender nonconforming individuals separately. Although we attempted to gather a diversity of sex and gender respondents through our recruitment strategy, we had to combine the non-man and non-woman genders into one "other genders" category in order to conduct the analysis. Future studies on the influence of sex and gender need to target more diverse participants so that each of these categories

can appropriately represent the diversity with which respondents identify. Additionally, future studies should better capture cis- and trans-gender respondents.

Another limitation in our study is the type of qualitative data we gathered. We asked respondents to express how they were feeling through writing. In doing so, we were unable to probe participants through interview questions and seek clarification on sentiments expressed. It may have also limited the amount of information that participants would have otherwise verbally expressed. However, we decided to use this data for our qualitative analysis because had we ignored the rich written comments that participants expressed, it would be a disservice to participants' time and the knowledge that could be gathered from these responses. Additionally, using written comments from anonymously submitted responses may have decreased potential social desirability bias⁷ inherent in interviews.

5.2 Implications

This study and thesis have implications for health care practice, policy, and research. Health care practitioners, especially those who work in psychiatry or primary care, need to be aware of the gender-specific mental health needs of patients. Women and gender-diverse individuals bear different burdens because of their gender identify and its associated social responsibilities, such as household work and child care. They can be more vulnerable to stressors that disrupt daily life, such as a pandemic, especially those affecting daily routines and the care of children. As a result, women and gender nonconforming individuals may experience higher levels of depressive and anxiety disorders. Physicians and health care providers need to employ early diagnosis and interventions in order to mitigate the negative impacts on these vulnerable populations.

Policy makers need to address the social determinants of health in order to improve and support mental health for women and gender nonconforming individuals. According to the World Health Organization⁸, individuals are born, grow, and live in conditions known as the social determinants of health. In Canada, the Public Health Agency of Canada has

identified several social determinants of health. These include education, income and social status, working conditions, social support networks, social environments, physical environments, personal health practices and coping skills, healthy child development, gender, and culture⁹. These social determinants intersect with gender to affect health. Therefore, policy makers need to address the social determinants of mental health as well structural barriers for women and gender nonconforming individuals in accessing appropriate mental health care.

The findings from this thesis also have implications on future research directions. We have demonstrated the mental health struggles for women and gender nonconforming communities and identified parenthood as a factor associated with gender that further threatens mental health. However, we need more research examining the mental health needs of mothers and gender nonconforming parents and identifying ways to improve outcomes for these individuals. Current research on mothers tends to focus on two aspects of motherhood: the postpartum period and the mother-child relationship. In doing so, researchers are ignoring the bulk of women's lives and experiences. Additionally, researchers need to expand the exploration of gender and parenthood to include those parents who identify as gender nonconforming.

5.3 Knowledge Dissemination

When we began this research, little was known about the mental health effects of the pandemic. As such, we shared our findings widely through publications and conference presentations, in the news media, and on websites and social media. Specific information on the publications and conference proceeding can be found at the end of the thesis (in the curriculum vitae). To date, we have published seven manuscripts and are in the process of submitting an additional five manuscripts.

I was asked by CTV News Ottawa to discuss the study and its key findings with the public in September 2020. Additionally, I shared about the study in a segment on CTV News London in August 2023. These segments were on the evening news as well as

published on the CTV News websites. We also created a set of infographics to communicate our findings in an accessible format that we have shared widely online. The infographics from a number of our published studies are found in Appendix E. These infographics increase knowledge of women's mental health issues and provide a QR code connecting to mental health services in Ontario. Stemming from the success of this knowledge translation, I have begun an online campaign for women's mental health promotion through Instagram (handle: womensmentalhealthpromotion). I hope that through these efforts, women and gender nonconforming individuals know that they are not alone and can seek mental health resources in the community.

5.4 Personal Implications and Endeavours

As a mixed methods researcher and a critical feminist theorist, I believe I am part of the research process. As such, I would like to share the personal implications of this research for me. First, in addition to learning from the practical findings of this study, I have come to learn that as a woman and as a mother, I am not alone in experiencing exceptional stressors during the pandemic. Finding a community with similar experiences has been a powerful tool of empowerment for me.

During the disruptions of the pandemic, I was not able to recruit patients in the hospital for my original PhD thesis. Nonetheless, through this study, I was able to mentor three other PhD students in the use of my data for their thesis (one student) and comprehensive examinations (two students). Additionally, when patient recruitment was reinstated at St. Joseph's Health Care London, I mentored three graduate students (two MSc and one PhD) in conducting my original thesis study.

5.5 Conclusions

The COVID-19 pandemic created unprecedented challenges in mental health. Our research demonstrated that depression and anxiety symptoms increased across the population with women and gender nonconforming individuals being more greatly impacted. Examining personal and conjunct variables, we found that the intersection of age and gender and gender and having a child(ren) accounted for increased scores on depression and anxiety scales. Looking to explain this finding, our qualitative analysis revealed that mothers and gender nonconforming parents were impacted in unique ways because of gender norms and social roles. We need to identify and address the additional stressors that threaten the mental health of women and gender nonconforming individuals through policy, social support, and health care.

5.6 References

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Appendices

Appendix A: Study Survey

Mental Health amid COVID-19

Start of Block: Consent

Q1

Letter of Information and Consent

Study Title: Mental Health amid COVID-19 (Survey)

Investigators

Dr. Joy MacDermid, PT PhD (Principal Investigator)
Department of Physical Therapy, Western University

Ms. Hoda Seens, PhD candidate (Co-investigator)
Health and Rehabilitation Sciences, Western University
Email:

Study Purpose

The COVID-19 pandemic has affected our lives in many ways. The purpose of this study is to understand how the pandemic has affected some aspects of our mental health. We would like to explore if and how the pandemic has affected you in terms of family responsibilities, anxiety, depression, and the use of substance (such as caffeine and tobacco).

Procedures

This study is a questionnaire. Please read through this study information. If you have any questions, do not hesitate to contact Hoda for clarification.

It will take approximately 20 - 30 minutes to complete the questionnaire.

Who can Participate

If you are aged 18 years or older and can read and understand English, you may choose to participate.

We are looking for approximately 1800 individuals to respond to the survey.

Participating in the Study

Participating in this study is voluntary. You may refuse to participate, refuse to answer any questions, or stop answering the survey.

You do not waive any legal rights by agreeing to participate in this study.

Withdrawing from the Study

You may decide to stop answering the survey at any time. If you decide to withdraw from the study, the information that was collected up to that point can still be used to answer the research question. The survey data is completely anonymous so individual answers cannot be identified and removed. If you decide to withdraw, you will not be asked to provide any more information.

Benefits

There are no direct benefits to you. But your study participation will have societal benefits by helping improve knowledge about mental health during pandemics and the resources we may need to cope.

Risks

Thinking about the COVID-19 pandemic and its effects may be upsetting. If during the course of the questionnaire you are upset, you may stop taking the questionnaire. Please consult with your health care provider or public health unit if you feel that you need help in coping.

Compensation

There is no monetary reimbursement for participation in this study. But, as a token of our gratitude, you will have an opportunity to submit your email address for a chance to win one of three Amazon gift cards (50 CAD or 35 USD).

Confidentiality

Your individual results will be held in strict confidence.

No person, other than the study team, will have access to the data.

Representatives of Western University Health Sciences Research Ethics Board may require access to study records to monitor the conduct of the research.

By Western University policy, we will retain study-related data (on a secure Western network) for 7 years, at which time it will be permanently destroyed.

All email addresses collected for the gift draw, through the separate link, will only be used for the purpose of the draw. We will delete these email addresses once gift cards have been distributed. The link to provide your email address for the draw is completely separate from this questionnaire and cannot be connected to you or your responses.

Questions about your Rights

If you have any questions about your rights as a research participant, you may contact The Office of Human Research Ethics at

Questions about the Study

If you have any questions about the study, contact Hoda Seens (co-investigator) at

Consent

If you would like to voluntarily participate, please indicate that you are providing consent:

- Yes, I consent to participate (1)
- No, I do not consent (2)

Skip To: End of Survey If PLEASE READ THE STUDY INFORMATION BELOW AND PROVIDE YOUR CONSENT TO PARTICIPATE: Study Title = No, I do not consent

- **End of Block: Consent**

Start of Block: Location_job

Q2 Where do you live?

Country (1)

Province/State (2)

▼ Country (1) ... Zimbabwe ~ Midlands Province (3583)



Q3 Which city do you live in?

Q4 Which statement best describes your current employment status?

- Paid employee (8)
- Self-employed (9)
- Laid off (11)

- Stay-at-home parent/caretaker (12)
 - Student (13)
 - Retired (14)
 - Unable to work due to a disability (15)
 - Other (please specify) (16)
-

Display This Question:

If Which statement best describes your current employment status? = Paid employee

Or Which statement best describes your current employment status? = Self-employed

Q5 What is your job title?

Display This Question:

If Which statement best describes your current employment status? = Laid off

Q6 What was your job?

Display This Question:

If Which statement best describes your current employment status? = Student

Q7 What do you study?

Q8 Prior to the pandemic, did you have a paid job?

- Yes, full time (more than 20 hours/week) (1)
- Yes, part time (20 or fewer hours/week) (2)
- No (3)

Other (please specify) (4)

Q9 Since the pandemic started, do you have a paid job?

Yes, full time (more than 20 hours/week) (1)

Yes, part time (20 or fewer hours/week) (2)

No (3)

Other (please specify) (4)

Display This Question:

If Since the pandemic started, do you have a paid job? = Yes, full time (more than 20 hours/week)

Or Since the pandemic started, do you have a paid job? = Yes, part time (20 or fewer hours/week)

Q10 As a result of the pandemic, do you have to work from home?

With a similar workload (1)

With a greater workload (2)

With a lighter workload (3)

I still go into my work place (4)

I lost my job (5)

I have always worked from home (6)

- **End of Block: Location_job**

Start of Block: Household

Q11 What is your marital status?

Single (1)

- Common-law (2)
 - Married (3)
 - Divorced (4)
 - Widowed (5)
 - Other (please specify) (6)
-

Display This Question:

If What is your marital status? = Common-law

Or What is your marital status? = Married

Q12 What is the gender of your partner?

- Man (1)
 - Woman (2)
 - Non-binary (4)
 - Agender (6)
 - Other (specify if you wish) (3)
-

Q13 How many people in total currently live in your home, including yourself?

▼ Select an answer (2) ... > 12 (15)

Q14 Has the number of people living in your home changed as a result of the pandemic?

- Yes (1)
- No (2)

Display This Question:

If Has the number of people living in your home changed as a result of the pandemic? = Yes

Q15 Please pick all the ways in which the number of people in your household has changed as a result of the pandemic.

- Increased - elder(s) moved in (1)
- Increased - adult child(ren) moved in (2)
- Decreased - family member(s) with high exposure risk to COVID-19 moved out (3)
- Other - please specify (4)
-

Q16 How many children (who are dependent on you) currently live in your home?

▼ Select an answer (1) ... > 10 (13)

- **End of Block: Household**

Start of Block: Age_gender

Q17 What is your age?

▼ 18 (2) ... 105 (89)

Q18 What is your sex?

- Male (1)
- Female (2)
- Other (specify if you wish) (3)
-

Q19 With which gender do you identify?

- Man (1)
- Woman (2)

- Non-binary (4)
- Agender (5)
- Other (specify if you wish) (3)
-

Q20 With which ethnic origin (or visibility) do you identify?

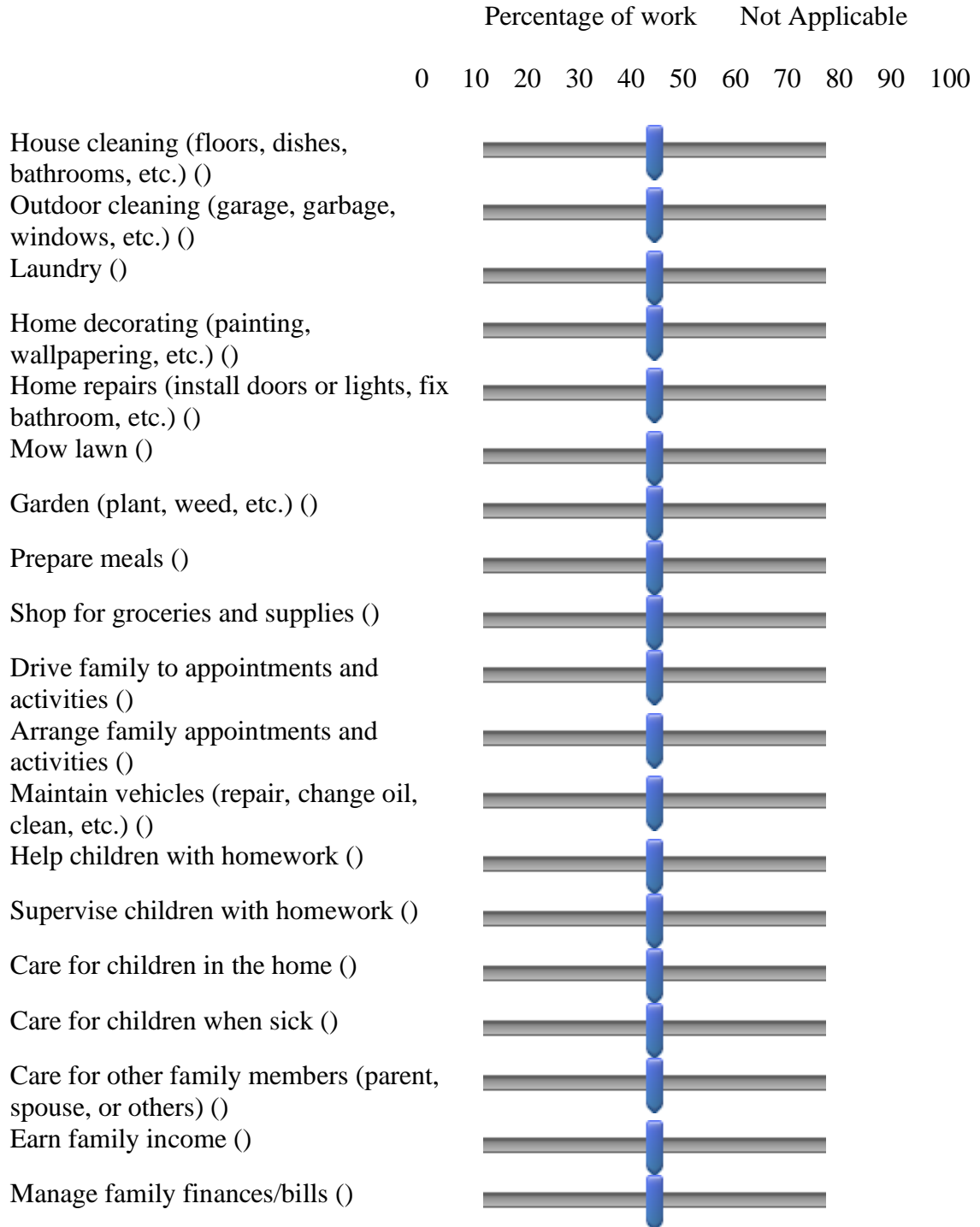
Please mark all that apply.

- North American Aboriginal (1)
- Black (8)
- White (5)
- Arab (16)
- Latin, Central, and South American (9)
- South Asian (E.g. East Indian, Pakistani) (10)
- West Asian (E.g. Iranian, Afghan) (11)
- Southeast Asian (E.g. Vietnamese, Cambodian) (12)
- East Asian (E.g. Chinese, Japanese, Korean) (13)
- Pacific Islands (E.g. Fijian, Hawaiian) (14)
- Other (please specify) (15)
-

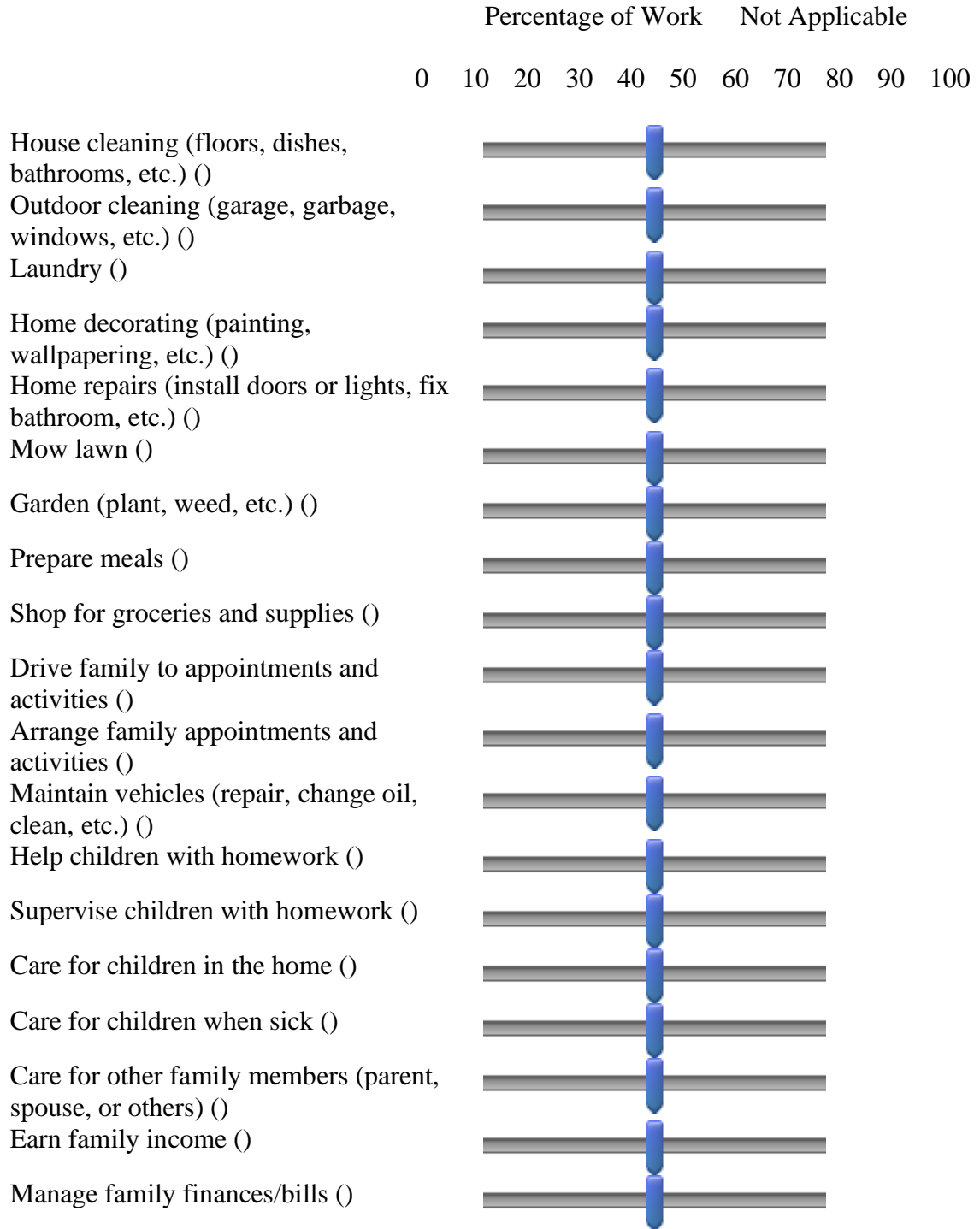
- **End of Block: Age_gender**

Start of Block: Family_responsibility

Q21 Think about the work you did to take care of your home and family BEFORE the COVID-19 pandemic (before March 11, 2020). Please do not count the work done by anyone else (family, friends, spouses, paid staff, etc.). Slide the scale to represent the percent of the work you did. If the question does not apply to you (example: you do not have children), then choose "not applicable."



Q22 Similar to the previous question, think about the work you did to take care of your home and family AFTER the COVID-19 pandemic began (after March 11, 2020).



- **End of Block: Family_responsibility**

Start of Block: Substance_use

Q23

In the following four questions, we would like to know how the COVID-19 pandemic has affected your daily use of substances (caffeine, tobacco, alcohol, and recreational drugs). Please be assured that your responses are completely confidential. For each question, select your average use BEFORE and AFTER the start of the pandemic (using March 11, 2020 as the pandemic date).

How many caffeinated beverages do you drink per day? Please count cups/cans/bottles of coffee, pop/soda, energy drinks, etc.

Before the pandemic (1)	▼ 0 (1) ... > 10 (14)
Since the pandemic (2)	▼ 0 (1) ... > 10 (14)

Q24 How many packs of cigarettes do you smoke per day?

Before the pandemic (1)	▼ 0 (6) ... > 2 (5)
Since the pandemic (4)	▼ 0 (6) ... > 2 (5)

Q25 How many glasses of alcohol (wine, beer, hard liquor) do you drink per day?

Before the pandemic (1)	▼ 0 (3) ... > 8 (12)
Since the pandemic (4)	▼ 0 (3) ... > 8 (12)

Q26 Do you use any recreational drugs?

Before the pandemic (7)	▼ None (1) ... Multiple drugs (7)
Since the pandemic (8)	▼ None (1) ... Multiple drugs (7)

- **End of Block: Substance_use**

Start of Block: Anxiety

failure or
have let
yourself or
your family
down (5)

Trouble
concentrating
on things,
such as
reading the
newspaper or
watching
television (6)

Moving or
speaking so
slowly that
other people
could have
noticed? Or
the opposite -
being so
fidgety or
restless that
you have
been moving
around a lot
more than
usual (7)

Thoughts
that you
would be
better off
dead or of
hurting
yourself in
some way (9)

Display This Question:

If Please indicate how often you were bothered by the following problems for an average two-week per... : Before the pandemic = Several days

And Please indicate how often you were bothered by the following problems for an average two-week per... : Before the pandemic = Several days

Or Please indicate how often you were bothered by the following problems for an average two-week per... : Before the pandemic = More than half the days

Or Please indicate how often you were bothered by the following problems for an average two-week per... : Before the pandemic = Nearly every day

Or Please indicate how often you were bothered by the following problems for an average two-week per... : Since the pandemic = Several days

Or Please indicate how often you were bothered by the following problems for an average two-week per... : Since the pandemic = More than half the days

Or Please indicate how often you were bothered by the following problems for an average two-week per... : Since the pandemic = Nearly every day

Q29 If you checked off ANY problems from the previous question, how difficult have these problems made it for you to do your work, take care of things at home, or get along with others?

Before the pandemic (1)

▼ Impossible (9) ... Not at all (6)

Since the pandemic (4)

▼ Impossible (9) ... Not at all (6)

- **End of Block: Depression**

Start of Block: Covid

Q30 Do you personally know someone who has tested positive for COVID-19?

Yes (1)

No (2)

I'm not sure (3)

Display This Question:

If Do you personally know someone who has tested positive for COVID-19? = Yes

JS

Q31 How do you know this person(s) with COVID-19?

Myself (11)

My partner (2)

My child(ren) (3)

My parent(s) (4)

Other family member(s) (please specify) (5)

Friend(s) (6)

Acquaintance(s) (7)

Coworker(s) (8)

Classmate(s) (9)

Other (please specify) (10)

Display This Question:

If If How do you know this person(s) with COVID-19?

q://QID125610082/SelectedChoicesCount Is Greater Than 1

And How do you know this person(s) with COVID-19? = Myself

Or How do you know this person(s) with COVID-19? != Myself

And And How do you know this person(s) with COVID-19?

q://QID125610082/SelectedChoicesCount Is Greater Than 0

Carry Forward Selected Choices - Entered Text from "How do you know this person(s) with COVID-19?"



Q32 Was this person(s) living in a long-term care facility?

	Selection		
	Yes (1)	No (2)	I don't know (3)
Myself (x11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My partner (x2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child(ren) (x3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My parent(s) (x4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other family member(s) (please specify) (x5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Friend(s) (x6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Acquaintance(s) (x7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Coworker(s) (x8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Classmate(s) (x9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify) (x10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Page Break

Display This Question:

If If How do you know this person(s) with COVID-19?

q://QID125610082/SelectedChoicesCount Is Greater Than 1

And How do you know this person(s) with COVID-19? = Myself

Or Or How do you know this person(s) with COVID-19?

q://QID125610082/SelectedChoicesCount Is Greater Than 0

And How do you know this person(s) with COVID-19? != Myself

Carry Forward Selected Choices - Entered Text from "How do you know this person(s) with COVID-19?"



Q33 Did this person(s) lose his or her life as a result of COVID-19?

	Selection		
	Yes (1)	No (2)	I don't know (3)
Myself (x11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My partner (x2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child(ren) (x3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My parent(s) (x4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other family member(s) (please specify) (x5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Friend(s) (x6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Acquaintance(s) (x7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Coworker(s) (x8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Classmate(s) (x9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify) (x10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- **End of Block: Covid**

Start of Block: Comorbidity

Q34 The following is a list of common health problems. Please indicate if you currently have any of the listed problems. If you have a medical condition not on the list, please list it under "other."

- Heart disease (1)
- High blood pressure (2)
- Lung disease (3)
- Diabetes (4)
- Ulcer or stomach disease (5)
- Kidney disease (6)
- Cancer (7)
- Depression (8)
- Osteoarthritis, degenerative arthritis (9)
- Back pain (10)
- Rheumatoid arthritis (11)
- Other (12) _____

Display This Question:

If If The following is a list of common health problems. Please indicate if you currently have any of t... q://QID26/SelectedChoicesCount Is Greater Than 0

Carry Forward Selected Choices - Entered Text from "The following is a list of common health problems. Please indicate if you currently have any of the listed problems. If you have a medical condition not on the list, please list it under "other.""



Q35 Do you receive treatment for it?

	Selection	
	Yes (1)	No (2)
Heart disease (x1)	<input type="radio"/>	<input type="radio"/>
High blood pressure (x2)	<input type="radio"/>	<input type="radio"/>
Lung disease (x3)	<input type="radio"/>	<input type="radio"/>
Diabetes (x4)	<input type="radio"/>	<input type="radio"/>
Ulcer or stomach disease (x5)	<input type="radio"/>	<input type="radio"/>
Kidney disease (x6)	<input type="radio"/>	<input type="radio"/>
Cancer (x7)	<input type="radio"/>	<input type="radio"/>
Depression (x8)	<input type="radio"/>	<input type="radio"/>
Osteoarthritis, degenerative arthritis (x9)	<input type="radio"/>	<input type="radio"/>
Back pain (x10)	<input type="radio"/>	<input type="radio"/>
Rheumatoid arthritis (x11)	<input type="radio"/>	<input type="radio"/>
Other (x12)	<input type="radio"/>	<input type="radio"/>

Display This Question:

If If The following is a list of common health problems. Please indicate if you currently have any of t... q://QID26/SelectedChoicesCount Is Greater Than 0

Carry Forward All Choices - Displayed & Hidden from "Do you receive treatment for it?"



Q36 Does it limit your activities?

	Selection	
	Yes (1)	No (2)
Heart disease (xx1)	<input type="radio"/>	<input type="radio"/>
High blood pressure (xx2)	<input type="radio"/>	<input type="radio"/>
Lung disease (xx3)	<input type="radio"/>	<input type="radio"/>
Diabetes (xx4)	<input type="radio"/>	<input type="radio"/>
Ulcer or stomach disease (xx5)	<input type="radio"/>	<input type="radio"/>
Kidney disease (xx6)	<input type="radio"/>	<input type="radio"/>
Cancer (xx7)	<input type="radio"/>	<input type="radio"/>
Depression (xx8)	<input type="radio"/>	<input type="radio"/>
Osteoarthritis, degenerative arthritis (xx9)	<input type="radio"/>	<input type="radio"/>
Back pain (xx10)	<input type="radio"/>	<input type="radio"/>
Rheumatoid arthritis (xx11)	<input type="radio"/>	<input type="radio"/>
Other (xx12)	<input type="radio"/>	<input type="radio"/>

- **End of Block: Comorbidity**

Start of Block: Additional_comments

Q37

Additional comments.

We would like to know how the pandemic has affected your life. Please tell us how you are feeling, how you are coping, or anything else you would like to share.

If you have a partner, please let us know how he or she may be helping you cope during

the pandemic.

- **End of Block: Additional_comments**

Start of Block: Email_request

Q38

To further understand mental health during the pandemic, we would like to interview some of the participants who completed this questionnaire. If you are willing to be contacted to schedule an interview, please provide your email address. Only some participants will be contacted.

The interviews are over the phone, take approximately 30 minutes, and we will give you a gift card for your participation (20 CAD or 15 USD).

Please note that providing your email address here will record it with the rest of your responses to this survey (making the survey not anonymous). We will only access your email address if we plan to directly ask you to participate in an interview and will not use it for any other purpose.

- Yes, I am willing to be contacted. Email address: (1)

- No, I do not want to be contacted (2)

Appendix B: Research Ethics Approval



Date: 25 June 2020

To: Dr. Joy MacDermid

Project ID: 115790

Study Title: The role of sex and gender in the experience of mental health during the COVID-19 pandemic: Unpaid work roles, anxiety, depression, and substance use among individuals with and without medical diagnoses

Application Type: HSREB Initial Application

Review Type: Delegated

Full Board Reporting Date: 07July2020

Date Approval Issued: 25/Jun/2020 19:49

REB Approval Expiry Date: 25/Jun/2021

Dear Dr. Joy MacDermid

The Western University Health Science Research Ethics Board (HSREB) has reviewed and approved the above mentioned study as described in the WREM application form, as of the HSREB Initial Approval Date noted above. This research study is to be conducted by the investigator noted above. All other required institutional approvals must also be obtained prior to the conduct of the study.

Documents Approved:

Document Name	Document Type	Document Date	Document Version
Sex and Gender in COVID Proposal. CLEAN	Protocol	18/Jun/2020	2
Mental_Health_amid_COVID-19	Online Survey	18/Jun/2020	2
Gift_Card_Draw	Online Survey	18/Jun/2020	1
Interview Guide - COVID Mental Health. CLEAN	Interview Guide	18/Jun/2020	2
Advertising - FB, IG, kijiji, craigslist. CLEAN	Recruitment Materials	18/Jun/2020	2
Advertising - listserv. CLEAN	Recruitment Materials	18/Jun/2020	2
Advertising - Twitter. CLEAN	Recruitment Materials	18/Jun/2020	2
Advertising - WUSM. CLEAN	Recruitment Materials	18/Jun/2020	2
Advertising- Columbus Plaza. CLEAN	Recruitment Materials	18/Jun/2020	2
Advertising- Western's Mass Email Recruitment. CLEAN	Recruitment Materials	18/Jun/2020	2
LOI - Survey COVID Mental Health. CLEAN	Written Consent/Assent	18/Jun/2020	2
LOI - Interview COVID Mental Health. CLEAN	Written Consent/Assent	18/Jun/2020	2
Email Script - COVID Mental Health. CLEAN	Recruitment	18/Jun/2020	2
Email Script (Alternative) - COVID Mental Health. CLEAN	Recruitment	18/Jun/2020	2

No deviations from, or changes to, the protocol or WREM application should be initiated without prior written approval of an appropriate amendment from Western HSREB, except when necessary to eliminate immediate hazard(s) to study participants or when the change(s) involves only administrative or logistical aspects of the trial.

REB members involved in the research project do not participate in the review, discussion or decision.

The Western University HSREB operates in compliance with, and is constituted in accordance with, the requirements of the TriCouncil Policy Statement: Ethical

Page 1 of 2

Conduct for Research Involving Humans (TCPS 2); the International Conference on Harmonisation Good Clinical Practice Consolidated Guideline (ICH GCP); Part C, Division 5 of the Food and Drug Regulations; Part 4 of the Natural Health Products Regulations; Part 3 of the Medical Devices Regulations and the provisions of the Ontario Personal Health Information Protection Act (PHIPA 2004) and its applicable regulations. The HSREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000940.

Please do not hesitate to contact us if you have any questions.

Sincerely,

Nicola Geoghegan-Morphet, Ethics Officer on behalf of Dr. Joseph Gilbert, HSREB Chair

Note: This correspondence includes an electronic signature (validation and approval via an online system that is compliant with all regulations).

Appendix C: Open Access Policy – Sage

us.sagepub.com/en-us/nam/journal-author-archiving-policies-and-re-use

Sage Disciplines Products Resources About

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Appendix D: Open Access Policy – Nature

Editorial and publishing polic × +

nature.com/srep/journal-policies/editorial-policies#license-agreement ☆ | ⌵

Pre-registration and replication

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Embargo policy and press releases

Communication with the media

Material submitted to *Scientific Reports* should not be discussed with the media, except in the case of accepted contributions, which can be discussed with the media once an embargo date has been set.

Papers that are deemed especially newsworthy may be press released, to a registered list,

Appendix E: Infographics

Anxiety and Depression During the Covid-19 Pandemic and the Role of Sex and Gender

Study authors:

Hoda Seen; Shirin Modarresi; James Fraser; Joy C MacDermid;
David M Walton; Ruby Grewal

The results of a study with nearly 2000 participants showed:
Following the pandemic



Anxiety symptoms >>> Increased by 74%

Depressive symptoms >>> Increased by 57%



**While people of different sexes and genders had
more symptoms of anxiety and depression
following the pandemic . . .**

**Women and nonbinary people
experienced higher levels of
anxiety and depression than men.**



For a list of mental health services in ontario, please visit:
www.ontario.ca/page/find-mental-health-support



MOTHERS' MENTAL HEALTH NEGATIVELY IMPACTED DURING THE PANDEMIC

Study Authors: Hoda Seens; Ze (Steve) Lu; James Fraser; Joy C MacDermid; David M Walton; Ruby Grewal

How are various aspects of a person's identity related to anxiety and depression following the pandemic?

Demographic and life circumstances can affect the distress people felt during the pandemic.

Women and gender nonconforming people experienced more anxiety and depression during the pandemic than men.

Women and gender nonconforming parents experienced more anxiety and depression during the pandemic than other people.

Mothers and gender nonconforming parents may need additional supports for mental health services following the pandemic.



FOR A LIST OF MENTAL HEALTH SERVICES IN ONTARIO, PLEASE VISIT:

WWW.ONTARIO.CA/PAGE/FIND-MENTAL-HEALTH-SUPPORT



Mental Health

DURING THE COVID-19 PANDEMIC IN PEOPLE WITH MEDICAL CONDITIONS

Study Authors:

Shirin Modarresi; Hoda Seens; Uzair Hussain; James Fraser; Jacob Boudreau; Joy C. MacDermid



Compared to people with no medical conditions ...

Those who had **a combination of** physical and psychiatric conditions experienced the highest symptoms of anxiety (+12%) and depression (+9%).



Receiving treatment for a medical condition ...

Did not impact the levels of anxiety and depression during the pandemic. This means that the severity of the condition does not exacerbate these negative outcomes OR higher severity may be counterbalanced by effective treatment.



Activity-limiting aspect of a medical condition ...

Did not have an impact on anxiety and depression during the pandemic.



There was an association between the number of medical conditions and mental health ...

In that, those with a higher number of medical conditions experienced more symptoms of anxiety and depression.

This study highlights that ...

With a focus on medical emergencies, people with chronic diseases may have been neglected during the pandemic.

This lack of care may be partially responsible for the increase in anxiety and depression among people with chronic illnesses.



FOR A LIST OF MENTAL HEALTH SERVICES IN ONTARIO, PLEASE VISIT:
WWW.ONTARIO.CA/PAGE/FIND-MENTAL-HEALTH-SUPPORT



Changes in Home and Family Responsibilities among Single Mothers during the COVID-19 Pandemic

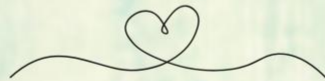
Study authors:
Lisbeth A Pino Gavidia; Hoda Seens; James Fraser; Marudan Sivagurunathan;
Joy C MacDermid; Laura Brunton; Samantha Doralp

The pandemic presented new challenges in completing home and family responsibilities.



Single mothers had special challenges in the home during the pandemic as they may be sole income earners and have less supports.

Family responsibilities increased during the pandemic, particularly in gendered roles such as meal preparation, cleaning, and caring for children in the home.



Mothers had more family responsibilities following the pandemic.



Each additional person living in the home decreased family responsibilities for single mothers indicating the importance of support systems.



For a list of mental health services in Ontario, please visit:
WWW.ONTARIO.CA/PAGE/FIND-MENTAL-HEALTH-SUPPORT



UNPAID WORK ROLES AMONG HOUSEHOLDS DURING THE PANDEMIC

Study authors:

Rochelle Furtado; Hoda Seens; Christina Ziebart; James Fraser; Joy C MacDermid

Households completed more unpaid work roles during the pandemic



01 GENDER-BASED LABOUR

Division of labour remained gendered during the pandemic with women completing more traditionally feminine roles (such as childcare and meal preparations)



02 MEN'S CHILDCARE ROLES

Men completed more childcare roles during the pandemic as compared to before the pandemic



03 WOMEN IN RELATIONSHIPS

Women who were in relationships and living with more household members (such as dependent children) did more unpaid work than others during the pandemic



NOT ALONE
MENTAL HEALTH PROMOTION

For a list of mental health services in Ontario, please visit:
www.ontario.ca/page/find-mental-health-support



Western
HealthSciences



Home and Family Work Roles Following the Pandemic

Study authors:

Armaghan Dabbagh; Hoda Seens; James Fraser; Joy C MacDermid



Greater family roles and responsibilities following the pandemic were related to

• • •



1

Greater pre-pandemic home and family roles and responsibilities



2

Having had full-time or part-time employment pre-pandemic



Even though some people began working from home or lost their jobs, this did not impact family responsibilities.



For a list of mental health services in Ontario, please visit:
www.ontario.ca/page/find-mental-health-support



Curriculum Vitae - Hoda Seens

EDUCATION

PhD - Health and Rehabilitation Sciences (Health Promotion)	2024
Western University, London, Ontario	
Dissertation: <i>Women's Mental Health during the COVID-19 Pandemic: A Mixed-Methods Sequential Explanatory Analysis of the Role of Sex, Gender, and Parenthood in the Experiences of Depression and Anxiety</i>	
MD student (Doctor of Medicine)	June 2023
Windsor University School of Medicine, St. Kitts & Chicago, Illinois	
MSc - Health and Rehabilitation Sciences (Health Promotion)	February 2013
Western University, London, Ontario	
Dissertation: <i>Sexual Trafficking in the Canadian Context: Exploring the Political Landscape, Examining Discourse, and Identifying Health Issues among Women with Lived Experience</i>	
Psychology Minor	April 2006
Western University, London, Ontario	
BHSc (Honours Bachelor of Health Sciences)	October 2004
Western University, London, Ontario	
HBA (Honours Business Administration)	June 2004
Richard Ivey School of Business, London, Ontario	
French Exchange Programme	August 1999
Université de Montréal, Montréal, Québec	

ACADEMIC AWARDS

Ontario Women's Health Scholars Award (\$35,000)	2023-2024
Ontario Graduate Scholarship (\$15,000)	2020-2022
Ontario Graduate Scholarship (\$15,000)	2017-2019
Faculty of Health and Rehabilitation Sciences Scholarship (\$20,000)	2016-2018
Women's Caucus Essay Award	2012
Ontario Graduate Scholarship (\$15,000)	2010-2011
Faculty of Health and Rehabilitation Sciences Scholarship (\$10,000)	2009
Bruce Dodds Scholarship (\$5,000)	2003
International Teamsters Scholarship (\$6,000)	1999-2003
Scholarship of Excellence (\$2,000)	1999

TEACHING EXPERIENCE

WESTERN UNIVERSITY, Teaching Assistant. London, Ontario; 2024 & present

- Graduate Diploma in Applied Health Sciences course in *Program Evaluation*

WESTERN UNIVERSITY, Teaching Assistant. London, Ontario; 2023

- Masters in Applied Health Sciences course in *Equity and Health Systems*

WESTERN UNIVERSITY, Teaching Assistant. London, Ontario; 2020

- Fourth-year Health Studies course in *Foundations of Mental Health*

WESTERN UNIVERSITY, Teaching Assistant. London, Ontario; 2020

- Second-year Health Studies course in *Social Determinants of Mental Health*

WESTERN UNIVERSITY, Teaching Assistant. London, Ontario; 2017

- Second-year Health Studies course in *Health and Aging*

WESTERN UNIVERSITY, Teaching Assistant. London, Ontario; 2011 & 2012

- First-year Management and Organizational Studies course in *Marketing and Human Resource Management*

WESTERN UNIVERSITY, Teaching Assistant. London, Ontario; 2010

- Second-year Health Studies course in *Biomedical Ethics*

WORK EXPERIENCE

RICHARD IVEY SCHOOL OF BUSINESS, Health Sector MBA. London, Ontario; 2008-2009

- Planned and executed recruitment strategy for Health Sector MBA Program
- Coordinated Health Sector Advisory Council meetings and activities
- Facilitated communication between external Board and internal Program Director, Admissions Office, faculty, and students
- Communicated via email, phone, and in-person with all MBA applicants
- Attended fairs and other recruitment activities to promote the MBA Program and the Health Sector MBA
- Evaluated applications, interviewed applicants, and made admissions decisions

MILLENNIUM RESEARCH GROUP, Analyst. Toronto, Ontario; 2004-2007

- Valued cardiovascular medical device markets and forecasted growth
- Contacted leading competitors, physicians, and lab managers to answer questions about market trends and quantitative estimates
- Led two market tracking projects by managing client relationships and research teams for accurate and timely delivery of medical device usage
- Led a consulting project for a Fortune 500 company wanting to expand in the Japanese market

PUBLICATIONS

Philip, S., MacDermid, J., Rushton, A., Parikh, P., & **Seens, H.** (2024). Patients' and therapists' perspective of integrating home and family work roles into rehabilitation following distal radius fracture. *Disability and Rehabilitation*, 1–11. <https://doi.org/10.1080/09638288.2024.2305297>

Dabbagh, A., **Seens, H.**, Fraser, J., & MacDermid, J. C. (2023). Construct validity and internal consistency of the Home and Family Work Roles Questionnaires: a cross-sectional study with exploratory factor analysis. *BMC Women's Health*, 23(1), 56. <https://doi.org/10.1186/s12905-023-02199-1>

Modarresi S., **Seens, H.**, Hussain, U., Fraser, J., Boudreau, J., & MacDermid J. C. (2022). What are the mental health changes associated with the COVID-19 pandemic in people with medical conditions? An international survey. *BMJ Open* 12(9). <https://doi.org/10.1136/bmjopen-2022-060995>

Seens, H., Lu, Z., Fraser, J., MacDermid, J. C., Walton, D. M., & Grewal, R. (2022). An intersectional approach to identifying factors associated with anxiety and depression following the COVID-19 pandemic. *Scientific Reports* 12(1). <https://doi.org/10.1038/s41598-022-15695-5>

Pino Gavidia, L. A., **Seens, H.**, Fraser, J., Sivagurunathan, M., MacDermid, J. C., Brunton, L., & Doralp, S. (2022). COVID-19 attributed Changes of Home and Family Responsibilities among Single Mothers. *Journal of Family Issues*. <https://doi.org/10.1177/0192513X221105247>

Furtado, R., **Seens, H.**, Ziebart, C., Fraser, J., & MacDermid, J. C. (2022). Understanding the unpaid work roles amongst households, during COVID-19. *Aging and Health Research*, 2(2), 100071. <https://doi.org/10.1016/j.ahr.2022.100071>

Dabbagh, A., **Seens, H.**, Fraser, J., & MacDermid, J. C. (2022). What Are Work-Related Predictors of Post-COVID-19 Home and Family Work Roles? A Cross-Sectional Survey. *Journal of occupational and environmental medicine*, 64(1), 19–25. <https://doi.org/10.1097/JOM.0000000000002406>

Seens, H., Modarresi, S., Fraser, J., MacDermid, J. C., Walton, D. M., & Grewal, R. (2021). The role of sex and gender in the changing levels of anxiety and depression during the COVID-19 pandemic: A cross-sectional study. *Women's Health*. <https://doi.org/10.1177/17455065211062964>

Modarresi, S., Janssen, S., **Seens, H.**, & Modarresi, G. (2021). Building Effective Therapeutic Relationships in Pelvic Floor Rehab: A Commentary. *RehabINK*.

Seens, H., Modarresi, S., MacDermid, J. C., Walton, D. M., & Grewal, R. (2021). Prevalence of bone fractures among children and adolescents with attention-deficit/hyperactivity disorder: a systematic review and meta-analysis. *BMC pediatrics*, 21(1), 1-10.

Seens, H., & Hirsch, A. (2020). From Kid to K-9: A Case of Benzodiazepine Withdrawal-Induced Zoopsic Intermetamorphosis (2649). *Neurology*, 94(15).

Seens, H., Modarresi, S., Macdermid, J. C., Grewal, R., & Walton, D. M. (2019). 6.64 Children and adolescents with ADHD: A meta-analysis of the prevalence of bone fractures. *Journal of the American Academy of Child & Adolescent Psychiatry*, 58(10).

Khurram, J., **Seens, H.**, Rudraraju, R., Kaur, V., Siddiquei, A., & Hirsch A. (2019). T149. Gabapentin Glycolimia: A Treatment for Cancer Cachexia? *Biological Psychiatry*, 85(10), S186-S187.

Hussain, M., **Seens, H.**, Moghaddam, E., & Hirsch, A. (2019). F122. Koro Syndrome Displaced Rostrally: Nasal Retraction Syndrome. *Biological Psychiatry*, 85(10), S260-S261.

Seens, H., & Hirsch, A. (2018). T214. Two Sisters Too Many: A Case of Benzodiazepine Withdrawal-Induced Reduplicative Paramnesia. *Biological Psychiatry*, 83(9), S211.

Malakouti-Nejad, H. (2012). Sexual Trafficking in the Canadian Context: Exploring the Political Landscape, Examining Discourse, and Identifying Health Issues among Women with Lived Experience. *Electronic Thesis and Dissertation Repository*. 960.
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Malakouti-Nejad, H. (2010). Tobacco use and women's health: an opportunity in international health promotion and a case study of tobacco policy in Canada. *Essay Contest 2000 - 2015*. 4.
<https://ir.lib.uwo.ca/essay-contest-previous/4>

Japanese Markets for Electrophysiology Mapping and Ablation (2007).
Published by Millennium Research Group, Decision Resources

US Markets for Electrophysiology Mapping and Ablation (2006).
Published by Millennium Research Group, Decision Resources

Japanese Markets for Electrophysiology Mapping and Ablation (2005).
Published by Millennium Research Group

European Markets for Electrophysiology Mapping and Ablation (2005).
Published by Millennium Research Group

US Markets for Electrophysiology Mapping and Ablation (2004).
Published by Millennium Research Group

PRESENTATIONS/KNOWLEDGE TRANSLATION

CTV News London - Television News Interview, London, Ontario; August, 2023
Western Researchers Win Women's Health Award.

Western University News - Text Interview, Ottawa, Ontario; September, 2020
Western researchers among 2023 Ontario Women's Health Scholars Award winners

Joint Mental Health Research & Innovation Day - Oral Presentation (Virtual), London, Ontario; October, 2021
The Role of Sex and Gender in the Changing Levels of Anxiety and Depression during the COVID-19 Pandemic: A Cross-sectional Study.

Medscape Medical News - Text Interview, New York, New York; November, 2020
Three's a Crowd: What Caused Two Sisters Too Many?

CTV News Ottawa - Television News Interview, Ottawa, Ontario; September, 2020
Mental Health during the COVID-19 pandemic.

American Academy of Neurology - Poster Presentation (Virtual), Toronto, Ontario; April, 2020
From Kid to K-9: A Case of Benzodiazepine Withdrawal-Induced Zoopsic Intermetamorphosis.

American Academy of Child and Adolescent Psychiatry - Poster Presentation, Chicago, Illinois; October, 2019
Children And Adolescents With ADHD: A Meta-Analysis of The Prevalence of Bone Fractures.

Canadian Psychiatric Association - Poster Presentation, Quebec, Quebec; September, 2019
From Kid to K-9: A Case of Benzodiazepine Withdrawal-Induced Intermetamorphosis.

Society of Biological Psychiatry - Poster Presentation, Chicago, Illinois; May, 2019
Gabapentin Glycolimia: A Treatment for Cancer Cachexia?

Society of Biological Psychiatry - Poster Presentation, Chicago, Illinois; May, 2019
Koro Syndrome Displaced Rostrally: Nasal Retraction Syndrome.

Society of Biological Psychiatry - Poster Presentation, New York, New York; May, 2018
Two Sisters Too Many: A Case of Benzodiazepine Withdrawal-Induced Reduplicative Paramnesia.

LEADERSHIP and COMMUNITY INVOLVEMENT

Ottawa-Carleton District School Board , Ottawa, Ontario Special Education Advisory Committee appointee	2022-present
Yale Women's Mental Health Conference , New Haven, Connecticut Conference organizing committee	2023
Health and Rehabilitation Sciences (Western University) , London, Ontario Judge for research presentations	2021

PEER REVIEWER

<i>BMC Public Health</i>	2024
<i>INQUIRY</i>	2022
<i>Scientific Reports</i>	2022
<i>Nordic Journal of Psychiatry</i>	2021
<i>Journal of Hand Therapy</i>	2020

AFFILIATIONS/MEMBERSHIP

American Academy of Child and Adolescent Psychiatry	2019-present
American Academy of Neurology	2019-present
American Psychiatric Association	2019-present
Canadian Psychiatric Association	2019-present
Canadian Public Health Association	2019-present
Society of Biological Psychiatry	2018-present