

Maternal Depression and Anxiety Disorders within Two Years of Birth among African Immigrant Women in Alberta

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MATERNAL DEPRESSION AND ANXIETY DISORDERS WITHIN TWO YEARS OF
BIRTH AMONG AFRICAN IMMIGRANT WOMEN IN ALBERTA

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ABSTRACT

African immigrant women represent a rapidly growing group in Canada, yet they are underrepresented in maternal mental health research. Research that describes the rates, risk factors, help-seeking behaviours, and effects of depression and anxiety following childbirth among African mothers with young infants is limited. Of the 120 respondents, 27.5% self-reported symptoms of maternal depression, while 12.1% self-reported symptoms of maternal anxiety. Significant predictors of maternal depression included low social support, no access to a regular family doctor, unemployment, and being a non-recent immigrant. Significant predictors of maternal anxiety included low social support, lower levels of education, no access to a regular family doctor, and being a non-recent immigrant. African mothers had low perinatal mental health knowledge but high postpartum mental health knowledge, and were more likely to seek help first from a spouse or partner. Study results underscore the need for increased understanding of the determinants of African immigrant women's maternal mental health.

DECLARATION

I hereby declare that this dissertation represents my independent and original work and that I have used no other sources except as noted by citations. All data, tables, figures and text citations which have been reproduced from any other source have been explicitly acknowledged as such. This dissertation has not been accepted in substance for any other degree, nor is it currently being submitted in candidature or achievement of any other degree at any other university.

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“We may encounter defeats, but you must not be defeated. In fact, it may be necessary to encounter the defeats, so you can know who you are, what you can rise from, how you can still come out of it” – Maya Angelou

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LIST OF ABBREVIATIONS

AB	Alberta
AOR	Adjusted odds ratios
AMA	Advanced maternal age
AMHS	Alberta Maternal Health Survey
BDI	Beck Depression Inventory
CA	Canada
CES-D	Center for Epidemiologic Studies Depression Scale
CI	Confidence Interval
CIHI	Canadian Institute of Health Information
EPDS-3A	Edinburgh Postnatal Depression 3-item Anxiety Subscale
EPDS-10	Edinburgh Postnatal Depression 10-item Scale
GAD	Generalized Anxiety Disorder
GAD-7	Generalized Anxiety Disorder 7-item scale
HADS	Hospital Anxiety and Depression Scale
HAD-A	Hospital Anxiety and Depression Anxiety Subscale
OCD	Obsessive Compulsive Disorder
OR	Odds Ratio
PHF	Population Health Framework
PHQ-9	Patient Health Questionnaire 9-item Scale
SD	Standard Deviation
SDOH	Social Determinants of Health
SE	Standard Error
STAI	State-Trait Anxiety Inventory
WHO	World Health Organization

CHAPTER 1

Chapter 1: Introduction

Canada, is known for having one of the most diverse populations in the world, mainly driven by immigration. Specifically, immigrant women in Canada represent a significant and fast-growing group. According to the 2011 National Household Survey data, there are about 3.5 million immigrant women in Canada, representing 21 percent of the female population (Statistics Canada, 2015). Sixty-six percent of these immigrant women were from racialized (i.e., African) backgrounds, in comparison to 19.3% of the total female population in Canada that were from racialized backgrounds (Statistics Canada, 2015). In 2016, 13.4% of recent immigrants were born in Africa, constituting a four-fold upsurge from the 1971 Census data (3.2%) (Statistics Canada, 2017a). Africa thus ranked second, ahead of Europe, as a continent of origin for recent immigrants to Canada (Statistics Canada, 2017b). This means that African immigrants to Canada, although understudied in prior research, are now a timely group to include in current health research initiatives.

The number of women immigrating to Canada has grown since 1980, with a larger proportion of racialized women from developing countries. Additionally, between 2011 and 2016, the number of people who identified as racialized increased significantly across Canada (Statistics Canada, 2017). For the purposes of this dissertation, racialized immigrants are: Persons other than Aboriginal peoples, who are non-Caucasian in race or not-white in colour. This includes: African, Chinese, South Asian, Black, Arab/West Asian, South East Asian, Filipino, Latin American, Japanese, and Korean etc. In some academic and governmental resources (i.e. papers, book chapters), the concepts of ‘racialized immigrants’ and ‘visible minorities’ have been used interchangeably. Nevertheless, to avoid homogenizing the experiences of different ethnic groups,

and to acknowledge race as a social construct, this dissertation uses the term ‘racialized immigrants’.

There is a need to examine past history of colonization, immigration, and discrimination to understand how people come to their current situation (Morris and Bunjun, 2007). This is particularly important in Canada. Prior to examining the resettlement of racialized immigrant women in Canada, it is important to examine the broader historical and sociopolitical contexts of Canadian immigration, as it provides insights into how health inequities occur in these communities. Specifically, three reasons highlight the need to examine historical contexts that explain health inequities among racialized immigrants in Canada. The next two paragraphs have been reproduced with permission from Springer Nature [Nwoke, C. N., & Leung, B. (2021). Historical Antecedents and Challenges of Racialized Immigrant Women in Access to Healthcare Services in Canada: an Exploratory Review of the Literature. *Journal of Racial and Ethnic Health Disparities*, 8(6), 1447–1455. <https://doi.org/10.1007/s40615-020-00907-3>].

Firstly, changes to immigration policies, e.g. introduction of the point system, and changing immigration goals have created a need to attract and accept increasing numbers of immigrants from across the globe. Today, more racialized immigrants are coming to Canada from source countries (Statistics Canada, 2017). Secondly, the feminization of migration has led to what Kuroczycka and Vallianatos (2016) termed “birthing new lives abroad”. For instance, the average migrating immigrant woman of African origins is of childbearing age, and comes from a country where female identity centers on motherhood (Hochschild, 2000). Existing research thus links feminization of migration to socioeconomic changes in origin countries of migrants, changes in the labour markets of destination countries, changes in structural factors, and changing social attitudes, all of which can ultimately lead to health inequities (Kuroczycka & Vallianatos, 2016).

Thirdly, racialized immigrants in Canada are victims of structural and systemic racial discrimination, perpetuated by historically institutionalized systems of slavery and oppression, all of which contribute to health inequities. These historical contexts are discussed in detail in later chapters.

Nonetheless, there is no collective “standard” Canadian immigration experience (Creese, 2011). Gender, racialization, ethnicity, social class, age, class of immigration, sexuality, and language all affect settlement (Boyd & Yiu, 2009; Creese, 2011; Thobani, 2007). Compared to any other group, immigrant women from racialized (i.e., African) backgrounds, including recent immigrants, continue to experience the most significant challenges in accessing health care, ultimately leading to poorer health and maternal health outcomes than their non-immigrant counterparts (Statistics Canada, 2016). This mosaic of individuals in Canada from different cultures presents a unique and evolving challenge for healthcare provision, especially for racialized immigrant women. The current Canadian immigration policy is dictated primarily by economic preferences and skilled immigration priorities, thus, the number of highly educated, professional women is growing even though women continue to immigrate to Canada primarily as dependents, either in the family class category or as the spouse of a principal applicant (Rezazadeh & Hoover, 2018). The effects of this influx of racialized immigrant women into Canada is ultimately reflected in the provision of their healthcare, including after childbirth.

Maternal mood and anxiety disorders are the most common complications that occur after childbirth (Kingston, Tough, & Whitfield, 2012). For maternal depression specifically, most studies have been conducted in Western countries and have reported a prevalence rate between 10-15% (Letourneau, Denis et al., 2017). A growing body of research also suggest that immigrant women may have higher rates of depression in pregnancy and in the postpartum period when

compared to women born in Canada (Kingston, Tough, & Whitfield, 2012; Anderson, Hatch, Comacchio et al., 2017). Thus, the relationship between migration and maternal mood disorders following childbirth has significant public health implications.

Canada is an important destination country for international migrants, including those from the African continent; there is a growing presence of African immigrants in Canada (Giardinelli, Innocenti, Benni et al., 2012). The term “African immigrants” throughout this thesis is defined as individuals that emigrated from the African continent to Canada, and is based on self-identification and not citizenship. Between 2006 and 2011, over 145,700 people emigrated from countries in Africa to Canada; they currently comprise 13.6% of the Canadian immigrant population, relatively more than the 11.9% from Europe (Anderson et al., 2017; Giardinelli et al., 2012). In spite of the growing presence of African immigrants in Canada, maternal perinatal research focusing on African immigrants is sparse. Very little effort has been made to examine African women’s immigration and the risk of developing depression and/or anxiety disorders following childbirth. To date, there are no prevalence statistics for maternal depression and/or anxiety among African immigrant women in Canada within two years after childbirth. In addition, with the increasing number of African immigrants, no research in Canada has compared the determinants of maternal depression and/or anxiety disorders for African immigrant populations.

A traditional African proverb says “*It takes a whole village to raise a child*”. This implies that there are culture-specific expectations and traditions involved in birthing and raising a child. African traditions are collectivistic in nature, where the role of a mother in raising a child is seen as an addition to the role the family and community plays. The gap in this collectivistic nature might be hard to fill when African women immigrate to Canada, where they may end up feeling unable to adequately perform such birthing traditions. This, coupled with the loss of social

networks and decreased social class, could increase their vulnerability to depression and anxiety disorders after childbirth.

The term maternal depression and/or maternal anxiety encompasses a range of conditions that can affect women during and after pregnancy. Maternal depression, for example, is defined as a depressive disorder that emerges during the postpartum period, and sometimes during pregnancy (Banti et al., 2011). It typically occurs within the first three to six months after delivery with symptoms presenting up to one year following childbirth. Unlike depression, which is more commonly talked about, anxiety is commonly known as the “hidden disorder” because it is not widely discussed in research literature, and thus few mothers recognize it, and in most cases it goes undiagnosed (Giardinelli et al., 2012). Maternal anxiety is a disorder that occurs after childbirth, and can take on several forms, with the most common disorders being generalized anxiety disorder (GAD), obsessive compulsive disorder (OCD), and panic disorder (Khanlou et al., 2017). These highlighted disorders manifest differently across a spectrum; nonetheless, the core issue of anxiety remains the same. Empirical research that specifically describes the rates, associated risk factors, help-seeking behaviours, and effects of depression and anxiety following childbirth among African immigrant women in Canada is limited.

Some Canadian studies have also indicated that immigrant women from Africa (determined by region of origin) exhibited the highest rates of emergency caesarean sections, higher risk of preterm births, and higher infant mortality rates – all risk factors for maternal depression and anxiety disorders (Vigod et al., 2016; Khanlou et al, 2017). African immigrants are on the rise in Canada, are at higher risk of mental health issues in the postpartum period, and higher risk of birth complications, yet they remain an understudied group for maternal depression and anxiety. This study is timely and unique because no other studies have specifically examined maternal

depression and anxiety within two years of birth among African immigrant women in Alberta; this addresses the gap of immigrants being treated as a single group in research studies. With an increased influx of African immigrants into Alberta and/or Canada, maternal depression and anxiety occurrence in this population warrants consideration at the population health level. Additionally, as societies become more diverse like Canada, researchers and clinicians are continually challenged to enhance their understanding of mental health and illness. Highlighting the importance of more research will create a solid foundation for better treatment and coping strategies for the target population.

Overall, the findings will contribute to new knowledge on maternal depression and anxiety disorders among African immigrant women in Western countries. Finally, findings from the study will contribute to the understanding of factors that influence the occurrence of maternal depression and anxiety within two years of birth, among African immigrant women, thus highlighting their needs, cultural assumptions, and social and preferred support interventions for depression and anxiety. Ultimately, understanding the symptoms of maternal depression and anxiety in immigrant women of African descent is important for screening, diagnosis, and appropriate clinical care. The need to better understand and serve the African community in Alberta is becoming more evident; it is now more critical than ever for service providers and researchers to become aware of the magnitude and risk factors for maternal depression and anxiety as an integral component of overall health of African immigrant women.

Research Objectives

Recognizing that maternal depression and anxiety is an understudied area among African immigrant women in Canada, this study aims to address the following objectives:

1. Assess the proportion of African mothers with symptoms of maternal depression and anxiety within two years of birth, using the 10-item Edinburgh Postnatal Depression Scale (EPDS) and the Generalized Anxiety Disorder-7 Scale (GAD-7);
2. Explore associations between risk factors and maternal depression and anxiety among African immigrants;
3. Determine how African immigrant women understand the effects of depression and anxiety following childbirth and help-seeking behaviours for maternal depression and anxiety.

Research Questions

The primary research questions posed in this dissertation is: What is the prevalence of maternal depression and anxiety symptoms in the study sample, and is there any association to socio-demographic or socio-economic factors?

In pursuit of this primary research question, three additional sub-questions are explored:

1. Is there any association between lifestyle characteristics (perceived level of social support, health and behavior, acculturation factors) and maternal depression and/or maternal anxiety?
2. How do African immigrant mothers understand the underlying effects of maternal depression and maternal anxiety following childbirth?
3. What are the preferred or common help-seeking behaviors African immigrant women utilize for maternal depression and/or maternal anxiety within two years of birth?

Dissertation Organization

This dissertation is presented in a traditional thesis-based format. As is evident from chapter

one so far, this chapter has presented an introduction to the research project, and articulated the purpose, research objectives, research questions, and significance which serve as the foundation for the overall doctoral research study.

Chapter Two reviews the relevant literature and findings with respect to maternal depression and anxiety disorders among populations in Canada and in western countries, which serves as a background to inform the current study. The epidemiology of depression and anxiety among immigrant mothers is also examined, highlighting the gap in literature involving African immigrants.

Chapter Three begins with study objectives, research questions, and hypotheses of the research. Thereafter, it summarizes the theoretical frameworks for this doctoral study - *Determinants of Population Health Framework*. This chapter also explains the methodological procedures including population, sampling and ethical considerations of this study. The tool used to collect data has been described in detail.

Chapters Four and Five outlines the major findings from the descriptive and inferential analysis of the data, intended to address the research hypotheses. It discusses the results as it relates to the distribution of SDOH measures. Next, it examines key SDOH shaping African immigrant mothers' maternal mental health. Simple and binary logistic regression analyses were used for socioeconomic factors associated with maternal depression and anxiety. The results of the analyses are presented in an order which corresponds with the research objectives of this study.

Chapter Six discusses the study findings in the context of current literature and presents implications of examining African immigrant women's' maternal mental health, while Chapter Seven presents a summary of the overall findings from this dissertation research recommendations for future research in this area of study. Strengths and limitation of this current study are also

discussed. This research topic area adds to the body of knowledge related to African immigrant women and their maternal mental health, while also highlighting a number of areas which deserve future investigation and clarification in future research studies.

CHAPTER 2

Chapter 2: Study Background and Summary of the Literature

In this chapter, current literature considered relevant to the topic area will be presented. First, background data of Africans in Canada is presented. Specific issues from some African cultures regarding postpartum traditions is highlighted. The importance of social support and social class on maternal mental health are also presented. Then, general literature on maternal mood and anxiety disorders is presented, including specific literature on maternal depression and anxiety in relation to migration. Occurrence, symptoms, risk factors, and consequences of maternal depression and anxiety are also discussed in subsequent sections of this chapter.

Background of African Population in Canada

The African population in Canada has grown faster than the population as a whole, and in 2001, about 48% of Black immigrants who came to Canada in the 1990s were born in Africa (Milan & Kelly Tran, 2004; Statistics Canada, 2003). According to census statistics, between 1996 and 2001, the number of African immigrants rose by 32%, whereas the overall Canadian population only grew by 4% (Milan & Kelly Tran, 2004; Statistics Canada, 2003; Lindsay, 2001). By 2006, the census recorded 138,750 persons who identified themselves as African (Msiri, 2010). In 2016, 13.4% of recent immigrants were born in Africa, a four-fold increase from the 1971 Census (3.2%). Africa thus ranked second, ahead of Europe, as a source continent of recent immigrants to Canada. Nigeria, Algeria, Egypt, Morocco, and Cameroon were the top five countries of birth of recent African-born immigrants in 2016. Most Africans have also settled in Ontario, followed by Québec, British Columbia, and then Alberta (Lindsay, 2001). For all 10 provinces and three territories, there has been an increase in African immigration in recent years. The province of Alberta accounted for the second largest growth rate in Canada, at 11.6% (Misri,

2010). Alberta also has the fastest growing Black population in Canada, majority of whom are African immigrants (Msiri, 2010).

Additionally, 52% of recent immigrants to Canada are women (Anderson et al., 2015), highlighting the feminization of migration. Feminization of migration is a term used to describe the gradual increase in the proportion of females moving across international borders and the types of work (Kuroczycka & Vallianatos, 2016). The 2011 National Household Survey estimated 3,544,400 immigrant women and girls in Canada, representing 21.2% of the country's total female population; this marks the highest proportion of immigrants among Canada's female population in 100 years (Statistics Canada, 2011). This has also brought attention to gendered aspects of immigration, meaning the process of integration and acculturation of women in their “new country” differs from that of men (Chui & Maheux, 2011).

Women often cite family reunification, economic opportunities, and escaping gender-based or political violence as reasons for migration (Comas-Díaz & Greene, 2013). Accordingly, statistics show that fertility rates of immigrant women in Western Canada (including Alberta) are higher than other parts of Canada (Misri, 2010). These same statistics also show that an increasing proportion of immigrant African women are within childbearing age, making it timely for a study on their maternal mental health post-childbirth. With most immigrant women of childbearing age, they often face pressures and responsibilities in “creating” and “reproducing” families physically and socially. As a result, the feminization of migration presents a challenge in maternal mental health care provision in Canada.

Canada is a multicultural country comprised of people from a wide range of ethnic and cultural heritages. Views of the mental health and maternal mental health status of immigrants were based on the idea that as immigrants encountered hardships and obstacles while adapting to their new

environment, they were at increased risk of developing mental health problems when compared with their Canadian counterparts (Newbold & Danford, 2003). Also, migration to a new country is a potentially disruptive and stressful experience; it can produce profound distress even among the best prepared (Newbold & Danford, 2003; Anderson et al., 2015).

Difficulties in connecting with and adapting to the economic and social institutions of the host country may result in poor maternal mental health outcomes for immigrant women after childbirth (Falah-Hassani et al., 2015), including African immigrant women. Pregnancy is already challenging for many immigrant women because of the lack of social and family support (physical presence), decreased social class from their home country, and the inability to perform birthing traditions or practices that they once had when they were back in their home country. For some, they may now be further affected by depression and anxiety (Boerleider, Wiegers, Manniën et al., 2013).

Traditions and Culture

Childbirth Traditions

Most ethnic and religious groups in Africa have practices associated with childbirth. For example, within Islamic traditions in Somalia, women are mandated 40 days of rest following childbirth (Eberhard et al., 2010). Another example is seen among the Igbo ethnic group of Southeast Nigeria, where the grandmother comes for a period of “*omugwo*”. ‘*Omugwo*’ is an Igbo word that is used to describe the practice in which a nursing mother and her baby are taken care of by a close family member (Anugwom, 2007). It is the Igbo term for the traditional custom of postpartum care. In most cases it’s done by the mother or mother-in-law except in the case where they are not available then another close female family member steps in. *Omugwo* is a great support

system to help transition the young parents into their new life and deter postpartum depression and anxiety, and can be seen as a form of informal social support (Anugwom, 2007).

These practices are critical in making women feel valued in their new roles as mothers; without these practices, mothers are stripped of protective layers (i.e., adequate physical support, adequate social support) that may be related to an increased risk of maternal mood and anxiety disorders among immigrant populations (Eberhard et al., 2010; O'Mahony & Donnelly, 2010). When these women immigrate to Canada, such traditional practices are usually lost due to a lack of social and family support to care for both the new mother and the new baby while the mother embarks on this mandatory period of "rest" or respective ritual practice. Not making room for cultural and traditional practices in the period following childbirth can have overwhelming effects on the burden of maternal depression and anxiety disorders among African immigrants, due to the loss of the believed supportive effects of these practices.

The protectiveness of such postpartum practices against depression and anxiety has been questioned, and research findings are inconsistent (Eberhard et al., 2010). For example, some studies found that cultural values and practices may be protective in some circumstances (Bina, 2008), whereas in other instances they intensify depression and anxiety, suggesting that some postpartum practices do not provide significant psychological benefits for new mothers not living in their home country (Klainin & Arthur, 2009). This phenomenon thus needs to be better understood given the high levels of individuals of African origins migrating to Canada.

Cultural Perceptions

Culture is frequently defined as a system of meaning shared by a group of people with common historical, racial, ethnic, or social backgrounds (Chan, MacDonald, & Cohen, 2009). It is learned

and passed down from one generation to another. Individuals are viewed as cultural beings, bringing their own values, beliefs, and knowledge (Chan et al., 2009). Although certain cultural aspects are identified or associated with certain groups, these aspects hold varying meanings for individuals and are taken up selectively (Lynam, Browne, Kirkham, & Anderson, 2007). This means that cultural customs, traditions, and beliefs are not viewed in the same manner by members of a certain cultural group (Lynam et al., 2007). Some individuals may find a sense of belonging with cultural traditions and norms, while others may find them to be restrictive (Lynam et al., 2007). Therefore, when examining culture, cultural groups must not be deemed homogeneous, as this can lead to the risk of cultural stereotyping and labelling (Lynam et al., 2007). Culture is not static in nature but is experiential, dynamic, and constantly changing (Hankivsky, 2011). It is continuously being redefined within different contexts (Lynam et al., 2007), and hence, culture must be understood as a context itself, which evolves, interacts with, and is affected by, all aspects of the social environment (Chan et al., 2009).

It is well documented that culture influences how health is viewed, how symptoms of illness are experienced, and when and how help is sought (Hankivsky, 2011). Culture can profoundly influence every aspect of illness and adaptation, including: interpretations of illness and reactions to symptoms; explanation of illness; patterns of coping; and help-seeking behaviours (Helman, 2007; Hankivsky, 2011; Hankivsky & Christoffersen, 2008). A study of immigrant women from Africa in Nova Scotia used focus groups to explore the concept of health and found that health was defined as having physical, social, and emotional aspects, and none of the participants described health as being free of illness (Weerasinghe & Mitchell, 2007); this supports Lipson's (1992) notion that "health conceptions are culturally influenced" (p. 18).

Another study showed that across African communities, the act of seeking professional psychological help carries different meanings in different cultures (Ponterotto & Park-Taylor, 2007). For some, the process of seeking help may reveal one's inadequacy; others may feel uncomfortable seeking help to deal with depression and/or anxiety for fear of being labeled "insane" (O'Mahony & Donnelly, 2010). As a result, individuals, especially racialized immigrants may have different health knowledge, different healthcare experiences, and ultimately different interactions with the Canadian healthcare system (Edge & Newbold, 2013).

However, it is important to note that while many African immigrant women share similar cultural aspects due to their common ethnic and racial backgrounds, cultural factors may also hold a number of meanings for African immigrant women, some of which may resemble others. This highlights the need for a holistic understanding of maternal depression and anxiety following childbirth among African immigrant women. Ultimately, understanding African cultural perceptions helps shape the conversation between healthcare providers and African immigrant women in Canada, as it relates to maternal mental health during and after childbirth.

Social Support

Understanding social support, especially within the African context in relation to the period after childbirth, is vital to reducing the risk of maternal depression and anxiety. Social support as a determinant of health has been well documented, and it is widely recognized that adequate social support significantly decreases the risk of mental and physical difficulties (O'Mahony & Donnelly, 2010; Falah-Hassani et al., 2015). Furthermore, research studies have described the consequences new immigrants experience when they lose their previous social networks upon arriving in a new country (Molsa et al., 2010; Guerin et al., 2004). This loss of social networks can make the period

after childbirth challenging for some African immigrant mothers, thus increasing vulnerability to depression and anxiety.

A study by Wiklund et al. (2000) indicated that respondents connected symptoms of depression, anxiety, and sadness to the lack of social support. This study highlighted barriers (i.e. stigma, denial) that prevented immigrants from seeking help for mental health problems in the perinatal period. This is supported by another study from Australia that discovered the loss of social relationships from an African woman's home country was linked to feelings of loneliness, sadness, and depression (McMichael, 2004).

Women, including African women, who are isolated, displaced, depressed, and without traditional references of support are more vulnerable to depression and anxiety following childbirth (Falah-Hassani et al., 2015). In Somalia, for example, new mothers relied on *haawaleey*, an informal solidarity group of other women in one's community coming together for postpartum support (Molsa, Hjelde, & Tiilikainen, 2010). Such culturally appropriate social support groups are not readily available to Somali women in Western countries like Canada, leaving them to either form these groups on their own or rely on the Canadian system for social support.

African immigrant women often face unique interpersonal challenges as they physically leave behind support networks of close and extended family and friends, which previously sustained their everyday lives (Edge & Newbold, 2013). For women who have experienced trauma, the negative mental health consequences of migration are further amplified (Comas-Díaz & Greene, 2013). The loss of family and support networks may be expressed through stress, anxiety, and fear, which can ultimately affect their adjustment to the new society and maternal mental health outcomes. Ultimately, the incidence of maternal depression and anxiety disorders are greater when

the mother's social network (e.g., family and friends) and social support are minimal (O'Mahony & Donnelly, 2010).

Social Class

Increased maternal depression and anxiety symptoms after childbirth have also been linked to low social class, specifically low socio-economic status (O'Mahony & Donnelly, 2010). In immigrant women, in particular, Morrow et al. (2008) noted that the extent to which they become vulnerable to migration stressors is related to their socioeconomic status. For example, social determinants of health, such as housing, income, and social support networks have been found to be associated with the development of maternal depression in immigrants (Benoit, Westfall, Treloar, Phillips, & Jansson, 2007). The determinants can be further compromised in African immigrant women.

In terms of economics, African immigrant women face many challenges upon arriving to Canada. For example, as pointed out by Hill et al., (2012), many Somali immigrant women never had to work in their own countries, and hence, their employment opportunities in Canada are limited due to language barriers, lack of previous work experience, and possibly lack of education. As a result, these women are forced to work laborious jobs with low-pay, which can increase stress and reduce time for self-care (Hill et al., 2012). Additionally, income becomes a major stressor in the lives of African immigrant women. Low income and the loss of job autonomy can affect one's resources, and decrease one's social status (Canivet, Aronsson et al., 2017; Creese & Wiebe, 2012). As O'Mahony and Donnelly (2010) point out, when an immigrant woman has a "second class status in relation to the labour force, government benefits, and services, a common result is

isolation and dependency within the family” (p. 445), which can increase risk of mood and anxiety disorders.

Maternal Mood and Anxiety Disorders

The research literature focusing on the maternal mood and anxiety disorders among African immigrant women in Alberta and/or Canada is limited. Due to the lack of available literature on this topic, the scope of this review pertaining to the occurrence, symptoms, risk factors, and consequences of maternal mood and anxiety disorders (specifically depression and anxiety) is limited to information/reports pertaining to other immigrant groups in Canada and in the United States.

Maternal mental health following childbirth is an integral part of a woman’s health and well-being, as the postpartum period represents a high-risk time for the onset of new and recurrent mental disorders, including depression and anxiety (Anderson et al., 2017; Gavin et al., 2005; Giardinelli et al., 2012; Banti et al., 2011). Maternal mood and anxiety disorders after childbirth range in severity from baby blues to psychosis; depression and anxiety exist within this spectrum (Anderson et al., 2017; BC Reproductive Mental Health Program, 2014; Giardinelli et al., 2012).

Occurrence of Maternal Depression and Anxiety

The postpartum maternal mental health of immigrants as a whole appears to be particularly poor; specifically, the occurrence and associated risks of depression and anxiety appears to be twice as high in recent immigrant women when compared to their Canadian counterparts (Khanlou et al., 2017). Also, it is generally accepted that depression and anxiety occur more frequently in individuals who are emotionally and socially disadvantaged (Luke et al., 2009).

In addition, a review of available literature showed that prevalence rates of maternal depression do vary in studies conducted in different countries, on different populations using different methodologies. In Western countries, however, the prevalence of maternal depression has been found to range between 8% and 20.2% (Dennis et al., 2004; Lanes et al., 2011; Rich-Edwards et al., 2006; Glavin et al., 2009; Eberhard-Gran et al., 2002), with the lowest prevalence rate of 8% found in a US cohort (Lanes et al., 2011). One study done in the U.S found a prevalence of 17.4% in a rural setting; however, this study excluded non-English speakers and women with four children or more, and had an oversampling of women of low socioeconomic status (SES) and African American women (Dolbier et al., 2013).

Interestingly, the highest prevalence of postpartum maternal depression at 20.2% was seen in a longitudinal study from Canada, conducted among women who had recently given birth (Dennis & Hodnett, 2007). Selection bias was, however, introduced in this study, since only women who could speak or write in English were included (Dennis & Hodnett, 2007). This is a problem because the majority of non-native English speakers, who are particularly at higher risk for mood disorders, were excluded from the study, and most immigrants fall under this category. This is supported by another similar Canadian study that included French-speaking respondents, which found that recent immigrants had the highest prevalence of maternal depression (14.2%) compared to non-recent immigrants (9.4%), Canadian-born respondents (5.4%), and respondents that arrived in Canada as a child (10.3%) (Urquia et al., 2012).

In contrast to depression, maternal anxiety has largely been ignored by healthcare providers despite an estimated incidence as high as 28.9% in a U.S study (Toler et al., 2018). Though maternal anxiety following childbirth may or may not be accompanied by depression, it is often not assessed or addressed in women, including immigrant women (Biaggi et al., 2016). An anxiety

disorder can disrupt a woman's abilities to enjoy life and to self-care (Fairbrother et al., 2016). When an anxiety disorder is present in the period following childbirth, it can change how a woman experiences her pregnancy and how she interacts with and cares for her child (Bayrampour et al., 2015). With the social isolation immigrant women already face, poor interaction and care for her infant can be detrimental to child development. It is important to note that some degree of anxiety is common during pregnancy and postpartum, so healthcare professions and researchers should aim to differentiate between "normal" anxiety and generalized anxiety disorder (GAD).

Maternal depression is one of the most underdiagnosed obstetric complications among women in North America (Bayrampour et al., 2015). However, there is a scarcity of literature on rates of maternal anxiety following childbirth among immigrants in Canada and no study focused specifically on maternal anxiety disorders among African immigrants.

Symptoms and Risk Factors of Maternal Depression and Anxiety

General symptoms of maternal depression and anxiety can include low self-esteem, sleep disturbances, suicidal thoughts, confusion, anxiety, dysphoria, and emotional lability (Dennis et al., 2004; O'Hara & Swain, 1996; Robertson et al., 2004). Literature further highlights that the occurrence of these symptoms is greatest in the first 12 weeks postpartum, and the duration of these symptoms depends on the severity and treatment regime or intervention strategy (Dennis et al., 2004; Bayrampour et al., 2015). Furthermore, multiple risk factors have also been associated with maternal depression and anxiety following childbirth, with the most common risk factors highlighted below.

According to the World Health Organization (WHO), poor socioeconomic status, low social status, and unintended pregnancies are all factors associated with an increased occurrence of

maternal mental health “problems” (Cullen-Drill et al., 2008); unwanted pregnancies can also trigger, in the perinatal period, underlying mental health problems (Cullen-Drill et al., 2008). In addition, earlier history of depression or anxiety during pregnancy has been linked to an increased risk for developing depression and anxiety after childbirth, highlighted in several studies of non-immigrant populations (Cullen-Drill et al., 2008; Bayrampour et al., 2015; Sword et al., 2006; Kingston et al., 2015; Ahmed et al., 2008; Stein et al., 2014; Auger et al., 2008; Gagnon et al., 2013; Carrington, 2006; Hudon, 2015; Vigod et al., 2016). Also, a lack of social support networks, marital conflict, recent life events, disease, economic problems, and stress during pregnancy have been found to be risk factors for maternal depression and anxiety (Bayrampour et al., 2015; Bowen, 2015a; Kingston et al., 2015; Stein et al., 2014; Gagnon et al., 2013; Hudon, 2015; Vigod et al., 2016).

Importantly, cultural factors play a role in maternal depression. They may trigger the occurrence of postpartum depression, as well as contribute to the improvement of depressive symptoms (Bina, 2008; Mechakra-tahiri et al., 2007). Studies that looked at this association in the postpartum period have yielded opposite conclusions. One scoping review study concluded that cultures have different rituals and beliefs that may affect the severity of maternal depression; however, this is dependent on the specific childbirth ritual being performed (Bina, 2008). It is thus critical to be cognizant of the way in which symptoms of maternal depression and anxiety present among African immigrants whose expression of mental health conditions in the period following childbirth may also be influenced by their cultural beliefs.

Consequences of Maternal Depression and Anxiety

Maternal depression and anxiety in the period after childbirth, have been shown to have negative consequences. For immigrants, these consequences could be much greater due to other vulnerabilities they face associated with the stressful life event of migration to a new country (Edge, 2007). A review study showed that maternal depression has the potential to impact not only mothers but also their partners, babies, and support networks (i.e., other family members) (Bayrampour et al., 2015).

For mothers, the potential consequences of depression could include breastfeeding for shorter periods of time and using alcohol, cigarettes, or other substances that are harmful to the baby (Misri, 2010; Anderson et al., 2017). Some of these findings are supported by results from another study that showed these women are at an increased risk of future episodes of more severe mental health disorders outside the postpartum period, including risk of suicide - especially in untreated instances (Verbeek et al., 2011; Banti et al., 2011). Moreover, these women may have negative views of motherhood and themselves as mothers, see their baby's behaviour as "difficult," and may not recognize their baby's cues to respond appropriately (Bowen, 2015a, Sword et al., 2006).

Additionally, the literature shows that for babies, the potential consequences of maternal depression and anxiety include behaviour disturbances; for example, babies are quicker to cry, cry louder, cry for longer periods of time, and spend less time in the "quiet and alert" state when they learn the most about their environment (Falah-Hassani et al., 2015; Bowen, 2015b; Kingston et al., 2015). These babies may have developmental delays as they may walk and talk later than others (Falah-Hassani et al., 2015).

Lastly, for partners, the potential consequences of maternal depression and anxiety may include relationship disruption (i.e., increased risk of separation/divorce) and sympathetic

depression (the partners themselves also going into depression), resulting in the need to also treat the partners (Ahmed et al., 2008; Stein et al., 2014). Surprisingly, other studies showed that partners experiencing depression in the postpartum period experience many of the same negative consequences on their relationships and their baby, similar to that seen in instances of depression and anxiety in mothers (Urquia et al., 2012; Bayrampour et al., 2015). Nonetheless, in the case of immigrants, these aforementioned effects on mothers, babies, and partners have the potential to be further worsened.

Although this study does not focus on the treatment of maternal depression or anxiety, it is hoped that the findings of this study will help further inform preferred help-seeking behaviours and coping strategies for African immigrant women in Western countries like Canada during the postpartum period, thus addressing study objective number three *“Determine how African immigrant women understand the effects of depression and anxiety following childbirth and help-seeking behaviours for maternal depression and anxiety”*. Studies showed that most Africans tend to cope with depression and anxiety by using informal resources such as the church and their family (Edge, 2007; Kotecha, 2009). There is, however, a lack of literature to show whether these informal coping mechanisms utilized by Africans are effective in decreasing the burden or associated risk factors of maternal depression and anxiety.

Review of other literature highlighted the fact that most African women, when compared to White women in the United States, held stronger beliefs that “problems” should not be discussed outside the family, including with neighbours, friends, and health professionals (Bina, 2008; Kotecha, 2009; Matthews & Hughes, 2001; Hill et al., 2012). These “problems” could sometimes include maternal mental illnesses such as depression and anxiety. African women were more likely to seek help from ministers in a church setting; if a minister was contacted first, the likelihood of

seeking help from other sources (e.g. health professionals), could be decreased (Kotecha, 2009; Khanlou et al., 2017).

Seeking help from a church minister or family member is suitable for personal family issues, and in some cases health concerns as well. However, for maternal depression and anxiety, it could become unfitting in instances where adequate or appropriate referrals and support is not provided in a timely manner (Azale et al., 2016). Not seeking the right help at the right time could possibly move the individual further down the continuum scale of mood and anxiety disorders, worsening the condition to a more advanced stage of illness, which is the stage most immigrants have reached when they present to health professionals or the healthcare system in Canada (Khanlou et al., 2017). Maintaining the stereotypical image of the self-reliant, strong African woman also often hinders seeking appropriate help for depression and anxiety (Kotecha, 2009; Khanlou et al., 2017). There is a need for more research into the prevalence, risk factors, help-seeking behaviours and effects of maternal depression and anxiety within two years of birth, among African immigrants in Alberta.

Measuring Maternal Anxiety and Depression

The only way to be sure whether a woman has maternal depression and/or anxiety is by conducting a full assessment, often through a referral to a psychologist, psychiatrist, or physician. With approximately 385,000 births in Canada in 2018 (CIHI Snapshot, 2019), it is not practical to do this for every woman each year. This is where the concept of a screening test for the likelihood of maternal depression or anxiety becomes best practice.

Screening is defined as the presumptive identification of unrecognized disease in an apparently healthy, asymptomatic population by means of tests, examinations, or other procedures that can

be applied rapidly and easily to the target population (Dohoo, Martin, Styhn, 2012). In simpler terms, a screening test is done to detect potential perinatal mental health disorders or diseases in people who do not have any symptoms of disease. The goal is early detection and lifestyle changes or surveillance, to reduce the risk of disease, or to detect it early enough to treat it most effectively (Dohoo et al., 2012). Screening tests are not considered diagnostic, but are used to identify a subset of the population who should have additional testing to determine the presence or absence of disease (Dohoo et al., 2012). Therefore, screening for depression or anxiety involves asking certain questions to elicit symptoms of depression or anxiety using a standardized screening tool.

Current approaches measuring maternal mental health in both research and clinical contexts mainly involve the utilization of standardized screening tools (e.g. questionnaires). Each tool has advantages and disadvantages; hence clinicians and researchers are tasked to select the appropriate tool based on the specific disorder, timeline (prenatal vs. postnatal), cost, and importantly the population of interest. It is also important to note that these tools are only screening tools to measure possible symptomatology risk, and a diagnostic exam from a clinician is still required to infer a diagnosis of maternal mental health illness.

For maternal depression, common standardized tools include: the Edinburgh Postnatal Depression 10-item Scale (EPDS-10; Cox, Holden & Sagovsky, 1987), the Patient Health Questionnaire (PHQ-9; Spitzer, Kroenke & Williams, 1999), the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), and the Beck Depression Inventory (BDI) (Beck, Ward, Mendelson et al., 1961). Similarly, common standardized tools for perinatal anxiety include: the Edinburgh Postnatal Depression Anxiety Subscale (EPDS-3A; Cox et al., 1987; Meades & Ayers, 2011), the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch & Lushene, 1970), the

Generalized Anxiety Disorder 7-item Scale (GAD-7; Spitzer, Kroenke, Williams & Lowe, 2006), and the Hospital Anxiety and Depression Anxiety Subscale (HAD-A; Zigmond & Snaith, 1983).

These standardized scales vary in advantages and disadvantages for the purpose of measuring maternal depression and/or anxiety. Cost effectiveness, efficiency, comparability, and minimal clinician/researcher/reporting bias are noted as advantages. Consequently, burden of scale completion, language barrier, recall bias, and timing are some noted disadvantages. (Bjelland, Dahl, Haug et al., 2002). A concise summary of these aforementioned standardized measures is provided in *Appendix 1.1*.

CHAPTER 3

Chapter 3: Materials and Methods

This chapter describes the materials and methodological design of this primary thesis research. First, the objectives, research questions and hypothesis of the study are provided. Next, a brief description of the research design and the framework used to approach the research questions and interpretation of results is presented, followed by sections on sampling, inclusion/exclusion criteria, sample size selection, recruitment and data collection methods. Thereupon a thorough presentation of the study questionnaire follows, including a review of the EPDS-10 and GAD-7, ending with a brief presentation of the dependent and independent variables and the statistical analysis used. Ethical considerations are presented in the last section of this chapter.

Research Design

The methodology of study is largely based upon the nature of research questions and research traditions of the discipline in which the study is conducted. This study is epidemiological in that it examines the prevalence of maternal depression and anxiety among a sample of African immigrant women in Alberta. Thus, a cross-sectional survey design is used to assess the magnitude of maternal depression and anxiety within two years of childbirth, and the associated risk factors among a sample of African immigrants in Alberta.

The study utilized quantitative methods because data was collected in predefined categories for concise and statistically valid information which may later be used for comparisons whenever possible. For the purpose of data collection, individual based survey method was used, which included the characteristics of both descriptive and analytical surveys. This hybrid survey method was instrumental for the present study since the research objectives of this study were to measure both the prevalence (descriptive) and outcomes (analytical) of maternal mental health issues. As a

result of the survey design, there will be a lack of temporal sequence and it may not be possible to analyze behaviour over time nor determine cause and effect. Nonetheless, using a cross-sectional survey design was feasible within the scope of this research due to the time constraints of the doctoral program and limited resources available.

A non-probability sampling approach was used, where members were selected from the population in any form of non-random manner (Tyrer & Heyman, 2016). Specifically, this study utilized both convenience sampling and snowball sampling techniques. Convenience sampling is when easily accessible non-random selection of the population under enquiry (African immigrant women in Alberta) is chosen; a frequently used method is contacting people by email (Tyrer & Heyman, 2016). Likewise, a snowballing technique is a non-probability sampling approach where participants are encouraged to inform other African immigrant women that meet the eligibility criteria of the study (Tyrer & Heyman, 2016). Snowball sampling relies on existing study participants recruiting future participants from among their acquaintances; it is often used when it is anticipated that individuals may be reluctant to be identified (Tyrer & Heyman, 2016). This was communicated on the Recruitment Memo (*Appendix 1.2*): online participants were asked to forward the Recruitment Memo email, and/or the principal investigator's contact information with others, paper-based participants were informed on the Recruitment Memo that they can also share the principal investigator's contact information with others they feel will be interested in participating in the study.

Thus, bias could occur because a representative sample of the African immigrant women population in Alberta may not be identified. The attributes (e.g., demographics) of the African immigrant women who were contacted by email may differ to those not contacted by email. Also, the nature of the responses of African immigrant women who failed to reply to the survey will be

unknown, as they might differ from respondents if, for instance, they were busier, more stressed, or more anxious/depressed, and thus were less likely to participate in the study. As a result, the identified sample of African immigrant women is not representative and the findings cannot be safely generalised to all African immigrant women or immigrant women overall.

Nonetheless, observational studies (e.g., looking for relationships of theoretical constructs, such as depression and anxiety) are mostly conducted using opportunistic samples (Dohoo et al., 2014); therefore the proposed sampling approach is deemed sufficient for this study. Additionally, because this study utilizes a non-probability sampling approach and, as such, statistical inferences cannot be confidently made from the results (i.e., results cannot be generalized to a bigger population), the results of this survey study is not valueless. Although they cannot be reliably generalised to the total population of African immigrant women in Alberta and/or Canada, they could still be useful for piloting purposes, and exploring associations. It is expected that associations may be different among those in the study and those not in the study. This is discussed in Chapter 7. Ultimately, certain questions on the survey could also be refined and/or alternative questions included in follow-up study.

Determinants of Population Health Framework

Theoretical framework is used to describe a worldview that is informed by philosophical assumptions about ontology, epistemology, and axiology (Stewart & Klein, 2016). Different theoretical frameworks have been applied in research on immigrant women's mental health in general, and health of mothers specifically, and provide a theoretical lens through which to interpret study findings. The framework used to approach a particular research question has important implications for health care and health policy decisions (Stewart & Klein, 2016).

Pregnancy is affected by many factors, including perceptions and expectations (personal, societal, cultural), with some researchers arguing that the medical model is not solely sufficient and effective in tackling maternal depression and anxiety (Beck, 2002; Khanlou, Haque, Skinner, Mantini, & Kurtz, 2017). Although medicalizing maternal depression has called attention to the serious nature of the condition, aiding in the fight against the stigma of mental illness, it ignores structural determinants of mental health (specifically poverty, discrimination, and gender inequality) that African immigrant women may face (Beck, 2002; Khanlou et al., 2017). African immigrant mothers may encounter multiple stressors directly linked to lower socioeconomic positions and difficulties accessing culturally competent and affordable health care and social services (Goodkind et al., 2008). The medical approach to maternal depression and anxiety often neglects the connection between the social self and the physical body, thus discounting cultural variations in mental health (Beck, 2002); this is one of the key arguments why the medical perspective alone is insufficient in addressing African immigrant women's maternal mental health after childbirth.

Since this proposed study seeks to examine the impact of multiple determinants of immigrant health on the risk of maternal depression and/or anxiety in African women, a population health framework demonstrates promise as a theoretical perspective to inform this complex population-level analysis. While a population health perspective shares some similarities with other theoretical perspectives, its conceptualization of social factors specific to the migrant experience is a unique aspect as it illuminates the relationship between maternal mental health and broad social and economic factors not only for immigrant populations but for all members of the population. Considering immigration as a determinant of population health may offer a new and valuable way of examining the linkages between immigration and maternal mental health, and in revealing the

mechanisms responsible for maintaining or degrading immigrant maternal mental health of African women after childbirth.

The determinants of population health framework, created by Evans and Stoddart (1990) and adapted by Newbold (2009), has been used to guide research and examine links between experiences of depression and anxiety disorders among immigrant women. This perspective describes the interaction between determinants of health, for the purpose of understanding the health of a given population beyond the boundaries of the health care system (Evans & Stoddart, 1990). Common features include emphasis on the context and the capacity of biological, social, economic, cultural, and physical environments to modify the relationship between individual characteristics and health (Newbold, 2009). Additionally, it is crucial to acknowledge the complexity of these interactions, and aim for a shift of attention from treating sick people to addressing factors that can prevent the development of disease disparities (Evans & Stoddart, 2003).

Unlike a biomedical model that views health as the absence of disease, the determinants of population health framework include functional capacity and well-being as health outcomes of interest (Newbold, 2009). It also presents the behavioral and biologic responses of individuals as factors that influence health, but are themselves influenced by social, physical, and genetic factors that are beyond the control of the individual (Newbold, 2009). The model emphasizes general factors that affect many diseases or the health of large segments of the population, rather than specific factors accounting for small changes in health at the individual level. It takes a multidisciplinary approach, uniting biomedical sciences, public health, psychology, statistics and epidemiology, economics, sociology, education, and other disciplines (Newbold, 2009).

Social, environmental, economic, and genetic factors are seen as contributing to differences in health status and, therefore, as presenting opportunities to intervene. It is important to note, as Evans and Stoddart (1994) have done, that each component of the model represents complex sets of factors that can be examined in greater detail. Different risk exposures, vulnerability profiles, and different consequences occur depending on one's social and economic position (Evans & Stoddart, 1994). Social and economic position exerts its effects directly and indirectly via intermediate social factors; intermediate determinants, such as material circumstances, psychosocial, behaviors, and biological determinants may influence health and well-being in a more proximal manner (Newbold, 2009). Together, the determinants of health work synergistically as a system that perpetuates health disparities, to recognize that immigrant maternal mental health is influenced by a wide range of variables, as well as the interaction and interrelationships between variables.

The population health framework serves as the primary framework for the study. According to this framework, many broad determinants - including income and social status, employment and working conditions, health practices, social and physical environments, and culture - influence the health of Canadians; immigrant status is also considered a determinant of population health (Evans & Stoddart, 1990; Newbold, 2009). The determinants of population health framework predicts worse health for immigrants because of poor labour conditions (e.g. precarious employment), low income and education, experiences of discrimination, worse healthcare access, and poor social inclusion (Newbold, 2009). A review paper on *“Historical antecedents and challenges of racialized immigrant women (e.g. African women) in access to healthcare services in Canada”* highlights important precursors to understanding challenges racialized immigrant women face in accessing quality and timely healthcare (Nwoke & Leung, 2020).

A conceptual diagram of the determinants of maternal mental health disorders, specifically depression and anxiety, among migrant women is presented in *Appendix 1.3*. As proposed by Newbold (2009), these determinants of health can be grouped into broader categories of: (1) socio-demographic, (2) socio-economic, (3) social support effects and (4) health behaviour/utilization variables, for more meaningful application, and was used to demonstrate their association to maternal depression and anxiety risk among African immigrant women within two years of childbirth. Using a determinants of population health perspective for this research approach was crucial for grasping the complexities of maternal depression and anxiety among immigrant African women following childbirth, though the approach to this specific demographic has not yet been explored.

Sampling

Purposive homogenous sampling, a non-random sampling from a single segment of the population (Creswell & Plano Clark, 2011) was carried out by posting study flyers in public areas of congregation (community centres, African supermarkets, places of worship, African hair salons etc.) in major cities across Alberta (Calgary, Edmonton, Lethbridge). Snowball recruitment was then employed by asking initial participants to refer their friends and relatives. The aim of recruitment was to include all eligible African mothers. Theoretically, the acceptable sample size for a cross-sectional survey study is dependent on the sample size of the study population. Larger cross-sectional studies often require a large sample size as compared to smaller targeted studies, to establish sufficient statistical power and reduce sampling error (Oleckno, 2008). Nonetheless, Rothman et al. (2008) acknowledges the usefulness of smaller targeted cross-sectional studies in

epidemiological research; this suggests that a relatively small sample size in small cross-sectional studies is theoretically acceptable.

Inclusion Criteria

All African immigrant women over the age of 18 years with an infant two years of age or under in Alberta, was eligible to participate in this study. The term African was chosen to include both persons born in the continent of Africa, or any other countries with an African diaspora. Inclusion was not based on citizenship, but ethnicity, and relied on self-definitions by the women. Only women able to read/write in English were included in the study as the survey was not translated.

Exclusion Criteria

Eligible respondents were excluded from the study if they were under 18 years of age, not an African immigrant, or refused to give informed consent.

Sample Size Calculation

For the purpose of this study, sampling formula for known population ($n = N / (1 + N(e)^2)$) was used, and the sample size was calculated by computing the values in the formula. Although data on the number of African immigrant women in Alberta with infants two years of age or under is unknown, census data estimates that there are approximately 43,000 African immigrant women in Alberta (Statistics Canada, 2016). Therefore, to obtain a 9% margin of error at a 95% level of confidence requires a minimum sample size of 119 respondents.

In order to increase participation, potential subjects were encouraged to partake in the study using acceptable ethical means such as raffles draw entries for all partial or completed surveys. Data in all attempted or partially completed surveys was kept and statistical techniques were utilized to explore accounting for missing data.

Data Collection

Study Questionnaire

In order to meet the research objectives of this study, a 63-item self-administered questionnaire (*Appendix 1.4*) was developed to collect information from participants. Comprehensive review of literature was conducted to develop the tool for this study. During review, it emerged that the research questions of the present study corresponded closely to the questionnaire developed for the Alberta Maternal Mental Health (AMMH) Survey 2012. The Alberta Maternal Mental Health Survey was a computer-assisted telephone survey of Alberta adults conducted in 2012 by the Population Research Lab on behalf of PolicyWise for Children and Families (formerly the Alberta Centre for Child, Family and Community Research). The subject areas covered by the survey included the following: (a) adults' understanding of the effects of depression and anxiety in the prenatal and postpartum period, (b) adults' views on mental health screening and treatment in pregnant and post-partum women (c) help-seeking behaviours for prenatal and postpartum anxiety and depression. As the AMMH survey already has validated questions to address adults' understanding of the effects of depression and anxiety in the prenatal and postpartum period, and help-seeking behaviours for prenatal and postpartum anxiety and depression, these questions were utilized and revised to fit the African immigrant context.

Additionally, since the present study was to be conducted in African immigrant women, the AMMH questionnaire was modified according to cultural and contextual frame of African immigrants. In order to do this, draft questionnaire was shared with my supervisor, supervisory committee, a psychologist, and some members of the African community. Upon their feedback, the questionnaire was modified. Additionally, since AMMH's questionnaire is itself a compilation of different tools, attempts were made to edit this compilation to address the specific research questions of the present study. Before commencing data collection, pilot testing of the modified questionnaire was done to further refine the questions. The questionnaire was prepared in English language. Since medium of instruction in Canada was also English, it was anticipated that African immigrant women would be well conversant with English. The study questionnaire was divided into seven sections. A detail of each section is given as follows:

Dependent Variables

This section dealt with the dependent variables of the study, namely: maternal depression [measured using the validated EPDS-10 scale] and maternal anxiety [measured using the validated GAD-7 scale]. These scales are discussed in more detail as follows:

10-item Edinburg Postnatal Depression Scale: The 10-question Edinburgh Postnatal Depression Scale (EPDS) is a valuable and efficient way of identifying patients at risk for perinatal depression. The screening questions on the EPDS can indicate whether a parent has symptoms that are common in women with depression and anxiety during pregnancy and in the year following the birth of a child (Cox, 1987). A systematic review of the validity of the EPDS found that the EPDS

is able to detect episodes of major depression with a cut off score of 12/13 and combined depression (major and minor) with a cut off of 9/10 (Gibson et al., 2009).

The EPDS is easy to administer and has proven to be an effective screening tool. The EPDS takes five minutes to administer and is readable at third-grade level (Cox, 1987). Responses are scored on a four-point scale from zero to three according to the severity of the symptom; scores range from zero to 30 with higher scores indicative of higher risk for depression (Cox, 1987).

The EPDS has the following psychometric properties: sensitivity 86% (the ability of the tool to correctly identify respondents with depression symptoms), specificity 78% (the ability of the tool to correctly identify respondents without depression symptoms), positive predictive value 73% (the probability that respondents who test positive for symptoms of depression truly have depression), split-half reliability 0.88 (a measure of internal consistency), and alpha coefficient 0.87 (Cox, 1987).

The EPDS has been found to be more effective than many other depression screening tools. Harris, Huckle, Thomas, and Johns (1989) conducted a comparison study of the EPDS and the Beck Depression Inventory (BDI) to identify individuals who had major depression according to the Diagnostic and Statistical Manual of Mental Disorders III criteria (Harris et al., 1989). The results showed that the EPDS had a better performance measure than the BDI (Harris et al., 1989). On the whole, the EPDS can be quickly administered, is easy to comprehend, and has been vastly used and validated in multiple ethnic and socioeconomic settings (Cox & Holden, 2003).

Cultural Considerations of the EPDS-10 Scale: Maternal depression and anxiety affect mothers across the globe. While these conditions are common worldwide, they are experienced and expressed very differently. Research shows that a person's culture significantly affects how they

experience depression, the symptoms they show, and the kind of help they seek. In some languages (i.e., Khmer, Zulu, Igbo), there is no word for depression, and people instead experience ‘deep sadness’, ‘shock’, or ‘a heavy heart’. This means that screening for maternal depression and anxiety across different cultural groups can be challenging. Psychosocial screening tools need to be culturally adapted to establish cultural equivalence, and not just translated, in order to adequately screen for maternal depression and/or anxiety in a target cultural group.

Consequently, the EPDS has also been translated into several languages, used worldwide, and validated for the purpose of identifying women with depression (Cox, 1987); if language barriers exist in participants, the translated validated version of the EPDS is commonly utilized, as opposed to using translators. Studies assessing the diagnostic accuracy of the EPDS propose that although the EPDS has a high accuracy in identifying depression symptomology, cut-off points may need to be lowered to accurately identify depression in culturally diverse populations (Shrestha et al., 2016; Thombs et al., 2015; Chaudron et al., 2010). Lastly, the use of the EPDS tool was free of charge, with author acknowledgement (Cox, 1987).

Generalized Anxiety Disorder-7 Scale: The GAD-7 is a seven-item self-report questionnaire created to identify essential areas of anxiety (worry, restlessness, irritability, and fear) and its severity in the previous two weeks (Spitzer et al., 2006; Meades & Ayers 2011). It is a self-administered questionnaire used as a screening tool and severity measure for anxiety disorder (Spitzer et al., 2006). The GAD-7 scale has shown excellent properties to identify individuals with probable generalized anxiety disorder, is easy to administer, and does not overburden patients or clinicians. In addition, its brevity makes it suitable for use in epidemiological studies and for potential use in surveys with remote administration of health questionnaires, making it a suitable

choice for this study. Additionally, the reported internal consistency of the GAD-7 is excellent (Cronbach's α , 0.92), and its test/retest reliability is good, with an intraclass correlation coefficient ICC of 0.83 (Simpson et al., 2014).

The GAD-7 score is calculated by assigning scores of 0, 1, 2, or 3 to the response categories and adding together the scores for the seven questions; scores of 5, 10, and 15 are taken as the cut-off points for mild, moderate, and severe anxiety, respectively (Simpson et al., 2014). Using the threshold score of 10, the GAD-7 has a sensitivity of 89% and a specificity of 82% for GAD. It has also been shown to be moderately good at screening other common anxiety disorders, namely panic disorder (sensitivity 74%, specificity 81%), social anxiety disorder (sensitivity 72%, specificity 80%), and post-traumatic stress disorder (sensitivity 66%, specificity 81%; Kroenke et al., 2007).

Cultural Considerations of the GAD-7 Scale: The GAD-7 is a common measure of generalized anxiety disorder symptoms that has been used across many cultural groups. Current evidence shows that the prevalence of GAD varies across different cultural and ethnic groups, attributed to cross-cultural measurement error rather than to actual differences in rates of GAD, emphasizing the need for culturally sensitive GAD screening tools (Hofmann et al., 2014; Parkerson et al., 2015). Nonetheless, the effect of culture on the response patterns to the GAD-7 and factor structure have not been examined among African immigrant women in Canada, and could result in over- or underestimated GAD-7 scores. One study assessed the factor structure of the GAD-7 in White/Caucasian, Hispanic, and Black/African American undergraduates and tested for cultural-based biases (Parkerson et al., 2015). Results revealed that Black/African American participants with high GAD symptoms scored lower on the GAD-7 than other participants with similar GAD

symptoms (Parkerson et al., 2015). These results highlight the need for culturally sensitive GAD screening tools across culturally and ethnic diverse populations. In this study, the cut-off score of the GAD was lowered to 10 to indicate probable maternal anxiety.

Independent Variables

This section dealt with the demographic details of the respondents and were grouped into categories consistent with the determinants of population health framework informing the study. These include:

1. ***Sociodemographic variables*** consisted of the variables found to be significant predictors of maternal depression and anxiety in the literature. They included maternal age, age of most recent infant, residence, religion;
2. ***Socioeconomic variables*** included total household income, employment status, living arrangements, and highest level of education completed;
3. ***Social network variables*** included marital status, presence of family in the city, frequency of interaction with family in the city, frequency of interaction with family outside the city, friends in the city, frequency of interaction with friends in the city, frequency of interaction with friends outside the city, sense of belonging to community, and community or cultural group memberships;
4. ***Health status variables*** included regular medical doctor, availability of mental health services in community, instances of racism or discrimination, presence of specific chronic health conditions, understanding of the underlying effects of depression and anxiety, and common/preferred help-seeking behaviors;

5. ***Acculturation variables*** included years since immigration, age at time of immigration, and satisfaction with settlement process.

Feedback/comments

Some space was left at the end of questionnaire for any feedback or comments by the respondents.

Pre-testing

The questionnaire was pre-tested with five respondents who did not form part of the total sample size to ascertain content and face validity before administering it to the target population. An important goal of the pilot was to assess response latency – the amount of time it takes to complete individual sections and the full study questionnaire, response wording, logical flow and the overall impression of the survey. The last question on the questionnaire allowed respondents to include feedback/comments.

Based on their comments/feedback, minor issues were identified and resolved. Two of three respondents had difficulty in understanding few terms (e.g., definition of an immigrant). In order to rectify this issue, detailed definitions were provided for all terminologies used in the final study questionnaire. Nonetheless, pilot testing revealed that the rest of the questions on the survey were suitable for the study population (African immigrant mothers). Pilot testing on average, took 10 to 15 minutes to complete the questionnaire, and thus the response latency time was deemed appropriate.

Participant Recruitment

Study participants were not contacted directly, but rather through other organizations, and those interested in the study were then be asked to contact the researcher directly. A list of all contacted organizations is listed in *Appendix 1.5*. African women were contacted through their provincial cultural associations. Contact was made by e-mail, where a letter of introduction (*Appendix 1.6*) and recruitment memo (*Appendix 1.2*) was sent to the presidents or directors of the respective associations, to solicit study participants through membership lists. The presidents of these associations were then asked to forward the recruitment memo via email to their membership list.

Interested postpartum African women then contacted the researcher directly by phone or e-mail. Organizations and/or associations were also asked to post a request for participation in the study on their websites and newsletters, using the study poster (*Appendix 1.7*). Each recruitment partner organization was sent a thank you email for their assistance with the study at the end of the recruitment period. Additionally, study posters were posted across the key traffic areas at the University of Lethbridge campus, in African groceries store in Calgary and Edmonton, African hair stores and salons across Alberta, and in some African community WhatsApp women groups as added recruitment strategies.

Additionally, study information booths were to be set-up at summer community or cultural events in major cities in Alberta – Calgary, Edmonton, and Lethbridge, as it is assumed that most major immigrant community events occur more frequently in bigger cities like Calgary and Edmonton, and attracts a greater number of immigrants, including African immigrants. A study research assistant was to be hired on a need basis to assist only in setting up study information booth at African community events. Nonetheless, both the setting up of information booth at

summer events and hiring of a research assistant for data collection had to be postponed due to the cancelation of African community summer events as per restrictions from the COVID-19 pandemic.

Once a potential participant expressed interest in the study, eligibility was assessed. A 4-question pre-survey screening (inclusion criteria) was sent to the participant via the respective method they used to contact the researcher. For example, email for those that expressed interest via e-mail, or text message for those that expressed interest via text message, to determine inclusion or exclusion from the study.

The four questions are listed below:

- ☐ I am aged 18 years or older
- ☐ I reside in the province of Alberta
- ☐ I had a live birth and my infant is two years of age or younger at the moment
- ☐ I identify as African

Once a respondent answers “yes” to all four questions, they were deemed eligible to participate in the full study. Following this, there was a prompt to access the study questionnaire online through the Qualtrics platform, or request for a paper questionnaire. In both instances of questionnaire administration, before starting the data collection, informed consent was obtained. Online participants were allowed to give consent via the online consent form (*Appendix 1.8*), whereas paper-based participants were mailed a consent form along with their questionnaire package (*Appendix 1.9*). All terminology used in the study questionnaire (e.g., depression, anxiety, mental health) were meticulously defined.

Participants were asked to recommend the research to others they know that will meet eligibility for the study. This information was communicated to all participants in the Recruitment

Memo and on the Study Questionnaire. Participants were asked to share the principal investigator's email and telephone contact information. Online participants also have the option of forwarding the Recruitment Memo email to others they felt were interested in participating in the study.

Initially, six months (January – June 2020) was the expected timeline for the data collection, however, the timeline was not met due to difficulties in recruitment and other unforeseen circumstances, mainly restrictions surrounding the COVID-19 pandemic. The revised data collection timeline was adjusted to January 2020 – December 2020.

A flowchart of the recruitment process is outlined in Figure 1:

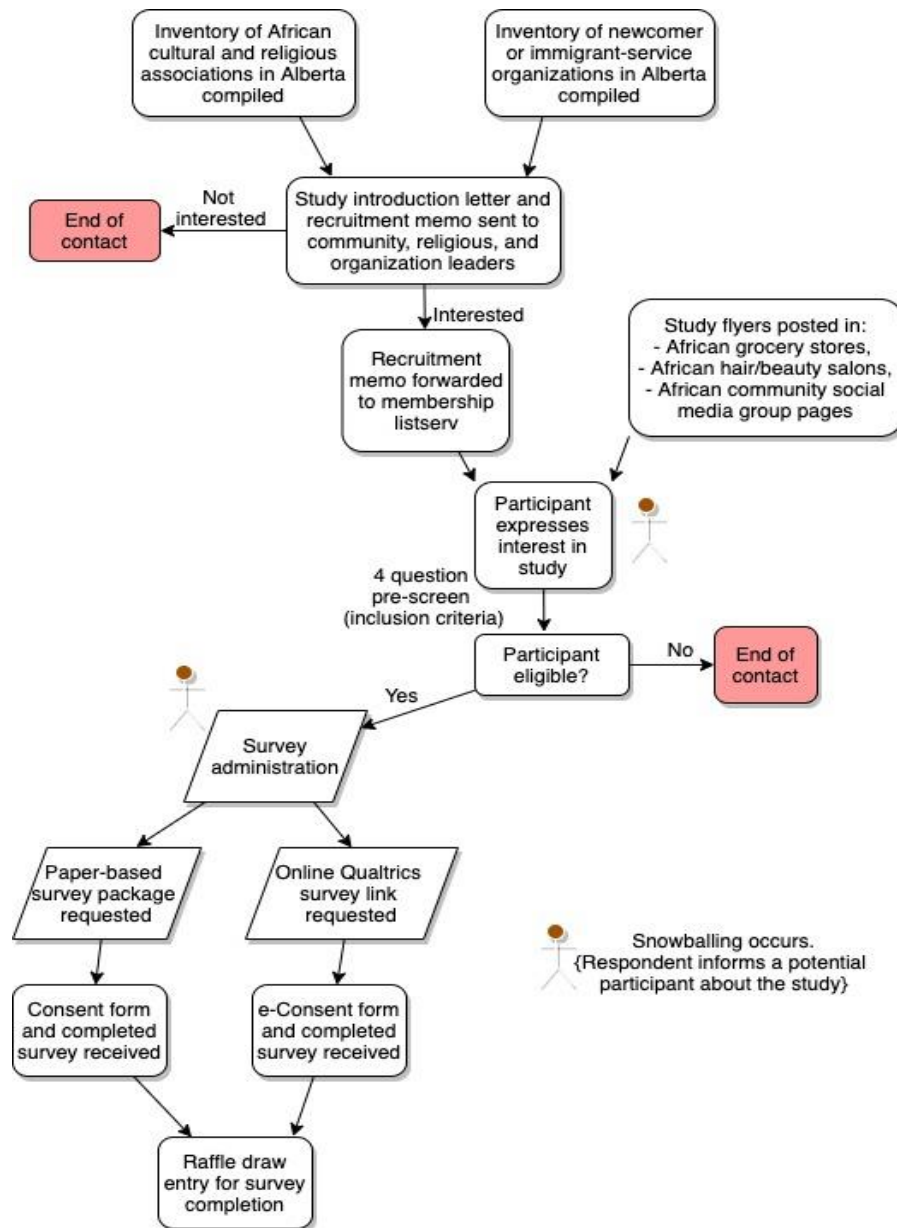


Figure 1: Flowchart of study recruitment and data collection procedure [reproduced with permission from Springer Nature].

A detailed description of the recruitment strategies used in this study is published in: Nwoke, C.N., Awosoga, O., Leung, B.M.Y. Recruitment Strategies Used in a Survey of African Immigrant Maternal Mental Health in Alberta, Canada. *Journal of Racial and Ethnic Health Disparities* (2021). <https://doi.org/10.1007/s40615-021-01078-5>

Survey Administration

Although online measurement tools have been shown to provide greater convenience and anonymity than traditional paper-based methods (Evans and Mathur, 2005), the tools used in this study were administered both online via Qualtrics, and in paper form via in-person administration or telephone administration, for those who are not computer literate and/or do not have access to a computer or email, or preferred this modality of data collection. Online surveys are becoming increasingly common (Andrews et al., 2003), and research comparing online vs. postal surveys is starting to confirm that electronic survey content results may be no different than postal survey content results, yet they provide strong advantages of speedy distribution and response cycles (Yun and Trumbo, 2000; Andrews et al., 2003).

Additionally, internet-based screening for depression and anxiety is becoming increasingly important. For example, a study validating the EPDS for internet administration found that at one-year follow-up, internal consistency and convergent validity of the internet-based EPDS determined by Cronbach's alpha was 0.87 (Spek et al., 2008). Hence, the psychometric properties of the internet-administered EPDS are comparable to those of the paper EPDS. Likewise, in a study that investigated whether the psychometric properties of the GAD-7 paper-pencil version were equivalent to the converted online version, the authors found that the self-rated online version of the GAD-7 was a reliable and valid measure to detect GAD, and thus can be used in clinical research to quickly screen for GAD on the internet (Donker et al., 2011).

Online administration

The study questionnaire was programmed in the Qualtrics survey platform. Before any data was collected, informed consent was obtained from prospective study participants through the

Qualtrics survey platform. All participants were advised at this stage that they have the right to withdraw from the study at any time without any consequences; this was explicitly noted in the Letter of Consent. Participants who met the study inclusion criteria and gave consent were then automatically able to access the study questionnaire via a link to Qualtrics. The prelude to the questions included the study rationale using lay terminology, a description of the survey structure and indicators of survey progress (using static statements), anticipated time commitment, and contact information of the researcher. The survey was made accessible to eligible participants until the end of the study recruitment period. The Qualtrics platform does allow for partially completed survey data to be saved, thus participants were able to save and continue the survey if any interruptions arose.

In a review of the literature by Dillman et al. (2009), typical response rates for online surveys range from 50–65%. Online surveys are easy to design and send out, and allow the researcher to keep track of who has responded, who has not, send out reminders, and act as a “push” technology to allow the researcher to directly communicate with prospective respondents. Administering the survey via the Qualtrics platform provided the ability to transfer survey responses directly into a database (Qualtrics, 2018), eliminating transcription errors and preventing survey alteration by the survey respondent. Nonetheless, because this online survey administration strategy assumed that participants all had internet access, a backup administration method using paper-based questionnaire was also utilized.

Paper-based administration

The option of having a paper-based version of the study questionnaire mailed to the participant’s residence was offered. Upon request, questionnaire packages were mailed to

individuals who made contact with the researcher and opted for a paper-based version of the study questionnaire. These packages included the recruitment memo outlining the purpose of the study, a paper-based version of the study consent form, a paper-based version of the study questionnaire, and a list of resources and support services from Alberta Health Services available to mothers in Alberta. Participants were provided with postage-paid return envelope and asked to return the questionnaire package at their earliest convenience. If the questionnaire package was not returned after three weeks, reminders were sent via the respective method the respondent expressed interest in the study.

It is hoped that by utilizing the primary method of survey administration for this study (i.e. Qualtrics), in addition to providing alternative administration options at community/cultural events, or having a paper-based version mailed out, the study was able to reach a suitable sample size of African immigrant mothers.

Data Management

Questionnaires were anonymous and no identifying information was collected from online participants. Participants were, however, advised in the consent form that their privacy cannot be guaranteed when electronic surveys are used. For paper-based participants, identifying information such as mailing addresses was stored in a password-protected Excel document, and was only used to send out study questionnaires packages; it was deleted once the package was mailed out and received. For the consent form of those completing the questionnaire via paper-based administration, the consent form only required a signature and a date, and did not include identifying information (*Appendix 1.9*).

Participants were also asked to provide their email addresses on a different Qualtrics link, if they choose to enter into the raffle draw for a chance to win one of five \$20 Walmart gift certificates. This ensured that their entry into the draw was not linked to their responses on the survey. Both online and paper-based participants were entered into the draw via a Qualtrics link; this link was provided at the end of the survey. For paper-based participants, this link was also provided at the end of the survey for them to access it separately from the study questionnaire. The study questionnaire did not require the participant to provide any identifying information. Identifying information was collected from participants separately, only for the purpose of the draw for the gift certificate, and was deleted once the raffle draw occurred and the winners have claimed their gift certificate; this was completed once the recruitment period ended.

The University of Lethbridge has a license to Qualtrics, hence study data was stored online on the Qualtrics platform. During the analysis phase, the raw dataset was extracted into an Excel file for analysis in Statistical Analysis System (SAS). To ensure security and integrity of the data, the Microsoft Excel extract was password protected and encrypted, and the password was only made available to the researcher and research supervisor upon request. Study data was deleted from the Qualtrics platform once a final and complete Excel database extract was done at the end of the data collection period. The proposed retention period for collected data is five years after the study end date, to allow for the possibility of additional publications.

Lastly, specific precautions was taken for the handling and storage of completed paper questionnaires and paper-based consent forms, which was stored in a locked file cabinet located at the Faculty of Health Sciences, and only the researcher had access to the cabinet keys.

Ethical Consideration

In many African communities and cultures, mental health problems are socially stigmatized. Since the present study examined the maternal mental health of African immigrant women, the foremost ethical consideration involved in this research was to ensure anonymity of the respondents. No identifying information such as name or contact details were acquired throughout the data collection process which could identify the respondent. Following the principle of informed consent, an information sheet detailing the nature and scope of the research was provided to respondents. It was also explicitly stated therein that respondents were at liberty to leave the questionnaire or specific questions uncompleted at any stage.

A self-reflective journal was kept for reference and to contextualize the analysis of the data. Researcher positionality was noted and reflected upon, as the researcher could be viewed as both an insider (Nigerian immigrant woman to Canada) and an outsider (no symptoms of depression and/or anxiety). As the researcher was of Nigerian background, it was integral that the researcher was aware of the assumptions and views that would be brought forward to this research from her cultural experiences. Sharing the same ethnic origin could have acted as a strength, as race/ethnicity concordance was a facilitator of participant recruitment; it is also plausible that participants could identify the researcher's name as one of African origins.

Cultural commonalities have been known to better position cultural insiders in developing rapport and closer relationships with communities than outsiders (Sutherland, Liamputtong, et al., 2017; Suwankhong & Liamputtong, 2015). This could have enabled African immigrant women to respond to sensitive issues (i.e., maternal mental health) in a timely and appropriate manner. Ultimately, it was crucial to accurately reflect and report the participants' experiences and to

refrain from incorporating personal views and biases that might have been present in the data analysis and interpretations of study findings.

An application along with the research proposal and questionnaire was submitted to the University of Lethbridge Human Participant Research Committee for ethics approval. After due consideration, HPRC approved the present research on December 11, 2019 (*Appendix 1.10*).

Statistical Analyses

The data was managed and prepared for data analysis by exporting the raw data from the Qualtrics platform into Excel, and imported into SAS. The primary dependent variable, maternal depression, was measured with the EPDS-10 scale which gives summed scores, and is an interval type of variable. Maternal anxiety, was measured with the GAD-7 scale which gives summed scores, and is also an interval type of variable. The independent variables (possible predictors of maternal depression and anxiety) were measured by a questionnaire that built on questions from other validated surveys. Other possible predictors of maternal depression and anxiety were categorical variables and included demographics, questions pertaining to knowledge of depression and anxiety, and preferred help-seeking behaviours. Furthermore, unique study IDs were automatically assigned by the Qualtrics platform to help with data navigation. Response modality was automatically computed in Qualtrics to see if there might be differences in partial and complete respondents.

At the onset, the data was reviewed for completeness, checked for inconsistencies, data cleaning, data coding, creating a codebook, and re-categorization of variables. Thereafter, the data were scanned for outliers. In terms of analysis, a few variables were recoded and descriptive statistics were computed including frequencies and percentages. Finally, analytical/inferential

statistics were obtained based on the hypotheses of the study. This section presents the details of descriptive and inferential analyses applied in this study.

Descriptive Analysis

This segment describes the analysis plan for understanding sociodemographic characteristics, socioeconomic characteristics, social network variables, health and behavior variables, acculturation variables and the prevalence of maternal depression and anxiety in the sample of African mothers in Alberta. Additionally, the descriptive characteristics of two study hypothesis are also described, namely: (1) how African immigrant mothers understand the underlying effects of maternal depression and maternal anxiety following childbirth; (2) preferred or common help-seeking behaviors African immigrant women utilize for maternal depression and/or maternal anxiety within two years following childbirth.

Sociodemographic and Socioeconomic Characteristics: The age of respondents was divided into two subgroups (≥ 30 years and <30 years). The age of the most recent infant of respondents was divided into two subgroups (0-12 months and 12+ months). The residence of respondents was divided into three subgroups- Calgary and area (Calgary and Airdrie), Edmonton and area (Edmonton), and Other (Grand Prairie, Lethbridge, Lloydminster, Barrhead, Brooks). Finally, the religion of the respondents was divided into two subgroups- Christian (Anglican, Presbyterian, Baptist, unlisted Christian, Catholic, Pentecostal) and Islam (Sunni, Shia). The total household income of respondents was divided into two subgroups ($\geq \$60,000$ and $<\$60,000$). Employment status of respondents was divided into three subgroups - employed, unemployed, and maternity leave. Home status of respondents was divided into two subgroups - own, rent. Finally, maternal

education was divided into two broad subgroups – bachelor's degree or less, and advanced degree; this was mainly to account for small cell counts in some categories.

Social Network Variables: Marital status of respondents was divided into two categories - married/common-law and not married. To capture the presence of family and friends in the city, two variables were used.

Respondents were asked if they have any family residing in the same city of their residence, and responses were categorized as a binary variable – yes or no. As a follow up to this question, respondents were asked the frequency of their interaction with their family in Canada; the responses were measured on a five-point scale ranging from 1=not at all, 2=daily, 3=weekly, 4=monthly, 5=yearly. These responses were recoded into 1=not at all, 2-3=daily-weekly, and 4-5=monthly-yearly. Respondents were asked the frequency of their interaction with their family outside Canada; the responses were measured on a five-point scale ranging from 1=not at all, 2=daily, 3=weekly, 4=monthly, 5=yearly. These responses were recoded into 1=not at all, 2-3=daily-weekly, and 4-5=monthly-yearly.

Respondents were asked if they have any friends residing in the same city of their residence, and responses were categorized as a binary variable – yes or no. As a follow up to this question, respondents were asked the frequency of their interaction with their friends in Canada; the responses were measured on a five-point scale ranging from 1=not at all, 2=daily, 3=weekly, 4=monthly, 5=yearly. These responses were recoded into 1=not at all, 2-3=daily-weekly, and 4-5=monthly-yearly. Respondents were then asked the frequency of their interaction with their friends outside Canada; the responses were measured on a five-point scale ranging from 1=not at

all, 2=daily, 3=weekly, 4=monthly, 5=yearly. These responses were recoded into 1=not at all, 2-3=daily-weekly, and 4-5=monthly-yearly.

Respondents' sense of belonging in local community was divided into two categories - strong and weak. Lastly, respondents were asked of membership in a community or cultural group, with responses divided into two categories – yes and no.

Health and Behavior Variables: The respondents were asked if they had a regular medical doctor, and their responses was divided into binary categories – yes and no. The respondents were asked about the availability of mental health services in their community, and their response was measured on a four-point scale ranging from 1=Excellent to 4=Poor. For analysis, these responses were recoded into 1=Excellent-Good and 2=Fair-Poor. The respondents were asked if they had experienced any instances of racism or discrimination in the past 12 months. The responses were divided into two categories - yes and no. Lastly, respondents were asked if they had any of the following chronic conditions – asthma, cancer, diabetes, heart disease, high blood pressure, and chronic obstructive pulmonary disease. The responses were recoded into two categories: yes – if respondent had at ≥ 1 chronic condition, and no – if respondent reported no chronic condition.

Acculturation Variables: The respondents were asked of the number of years since immigration. Responses were measured in four categories – 0-2 years, 3-5 years, 6-10 years, and 10+ years. These responses were recoded into two categories - 0-5 years and 5+ years. To account for small cell counts. The respondents were asked of their age at time of immigration to Canada. Responses were measured in five categories – <18 years, 18-24 years, 25-34 years, 35-44 years, and 45+ years. These responses were recoded into two categories - child (≤ 17 years) and adult (18+ years).

Lastly, the respondents were asked about their level of satisfaction with their settlement process post-immigration. Responses were measured on a five-point scale ranging from 1=extremely dissatisfied to 5=extremely satisfied. These responses were recoded into three categories - satisfied, neither satisfied nor dissatisfied, and dissatisfied.

Prevalence of Mental Health Outcomes in Study Sample: The depressive symptoms of the respondents were measured through the Edinburg Postnatal Depression Scale (EPDS-10). The EPDS is a 10-item scale measured on a four-point scale ranging from 0 to 3 according to the severity of the symptom. A cumulative score was obtained by summing the responses of all the 10 items by a respondent. The possible range for the cumulative score was 0 to 30 with higher scores indicative of higher risk for depression (Cox, 1987). The cut off score for this inventory was 13 which is also used in several previous studies with similar populations (Mokwena and Masike, 2020; Daoud et al., 2019). A cumulative score of ≥ 13 was considered indicative of maternal depression whereas a cumulative score of < 13 was indicative of no maternal depression (Daoud et al., 2019; Malqvist M et al. 2016).

The anxiety symptoms of the respondents were measured through the Generalized Anxiety Disorder-7 Scale (GAD-7). The GAD-7 is a seven-item scale measured on a four-point scale ranging from 0 to 3 according to the severity of the symptom. A cumulative score was obtained by summing the responses of all the 7 items by a respondent. The possible range for the cumulative score was 0 to 21 with higher scores indicative of higher risk for anxiety (Simpson et al., 2014). The cut off score for this inventory was 10 which is also used in several previous studies with similar populations (Evra and Mongrain, 2020; Grace, Tan, Cribbie et al., 2016). A cumulative

score of ≥ 10 was considered indicative of maternal anxiety whereas a cumulative score of < 10 was indicative of no maternal anxiety (Evra and Mongrain, 2020; Grace, Tan, Cribbie et al., 2016).

Perinatal Mental Health Knowledge: A research question of this study was to ascertain how African immigrant mothers understand the underlying effects of maternal depression and/or anxiety. For this analysis, frequency and percentages were computed for each variable in response to the dependent variables. For ease of interpretation, responses were grouped into four broad categories: (1) knowledge of prenatal mental health (high/low), (2) knowledge of postnatal mental health (high/low), (3) acceptability of pre- and postnatal mental health screening.

Preferred or Common Help-seeking Behaviors: A research question of this study was to ascertain common help-seeking behaviours African immigrant women utilize for maternal depression and/or anxiety, and reasons for not seeking help. Respondents were asked who their first choice of help would be if they experience symptoms of depression and/or anxiety following childbirth, and options included partner, friend/relative, healthcare professional, spiritual/religious leader, and no one. Respondents were then asked for reasons that prevent African mothers from seeking help for depression and/or anxiety (e.g. shame, guilt, lack of knowledge, self-management, normality, religion). Frequency and percentages were computed for each variable in response to the dependent variables. Groupings for some responses was recoded into broader categories to account for small counts ($n < 5$).

Inferential Analysis

This segment discusses the inferential statistics used for the analysis of research questions.

Association between demographic and lifestyle characteristics, and maternal mental health outcomes (depression/anxiety): A research question of this study was to ascertain demographic and lifestyle characteristics associated with maternal depression and anxiety. First, a bivariate analysis was performed with each independent and dependent variable separately to calculate proportions. Second, Cramer's V (an adjusted version of Chi² test) was computed to obtain the association between the two categorical variables, where the strength of association was interpreted through effect size. Significant variables were entered into a multivariate logistic regression model to examine if these variables retained their significance with each of the primary study outcome variables (maternal depression/maternal anxiety). Finally, significant variables from the multivariate logistic regression model were adjusted to account confounding variables. A flowchart of this process is shown in Figure 2.

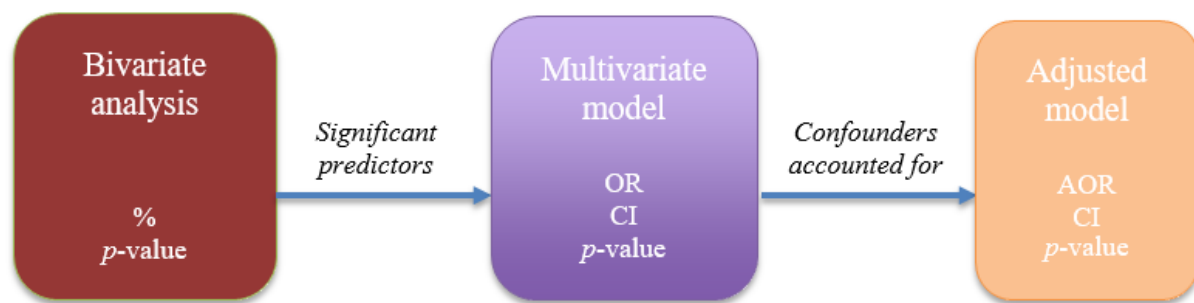


Figure 2: Flowchart of analyses to ascertain demographic/lifestyle factors associated with maternal depression and anxiety.

Association between demographic and lifestyle characteristics, and pre/postnatal mental health knowledge: To further ascertain respondents understanding of the impact of maternal depression and anxiety, this study explored factors associated with pre/postnatal mental health knowledge.

High level of prenatal mental health knowledge was defined by a response of strongly or somewhat agree to the item: women who have had anxiety or depression in the past (before they became pregnant) are more likely to experience anxiety or depression when they are pregnant. High postnatal knowledge was defined by a response of strongly or somewhat agree to at least one of three questions, including, “women who have postpartum depression find it more difficult to respond to their baby’s cues” and/or “women who have postpartum depression find it more difficult to respond to the needs of their partner and other children” and/or “partners of women who have postpartum depression are also at risk for depression, whereas those with low postnatal knowledge responded strongly disagree, somewhat disagree, or neither agree nor disagree to one or more of these questions. Unconditional logistic regression analyses was computed to ascertain significant predictors of high pre/postnatal mental health knowledge. Next, significant predictors were entered into a multivariable logistic regression model (OR), and later adjusted for confounding variables (AOR).

Factors associated with pre/postnatal mental health screening: Views of prenatal screening were considered to be acceptable if participants responded to the item “All women should be screened for depression and anxiety in pregnancy with a response of strongly agree or agree (versus strongly disagree, disagree, or neither agree nor disagree)”. A similar item related to postnatal screening assessed its acceptability. To ascertain predictors of high acceptability of pre/postnatal mental health screening, unconditional logistic regression analyses was computed. Next, significant predictors from the unconditional model were entered into a multivariable logistic regression model (OR), and later adjusted for confounding variables (AOR).

Factors associated with help-seeking from a healthcare provider/partner: To assess the first source of help and support, respondents were asked to identify who would be their first choice if they had depression or anxiety during pregnancy or after delivery (e.g., partner, friend, family doctor, obstetrician, midwife, public health nurse, parent, other relative). A multivariable analysis was performed to determine the independent factors associated with choosing a healthcare provider as the first source of help, choosing a partner as the first source of help, and support compared to support from other sources (e.g., friends, family).

In all instances of model building, sequential manual stepwise backward selection was used to develop the main effects model, retaining only variables where a p-value 20% change in regression coefficients of interest was observed. Biologically relevant interactions among risk factors were considered, retained, and reported in the final model if $p < 0.05$. Variable significance was checked by type 3 Wald test (Dohoo et al., 2012). Bonferroni correction was used for multiple test comparisons. For the final model, we tested the fit of the model with Hosmer and Lemeshow's goodness-of-fit test, and computed the variance inflation factor (VIF) to test for collinearity. All statistical analyses were performed using SAS Enterprise statistical software, version 7.1.

CHAPTER 4

Chapter 4: Distribution of SDOH Measures

This first section of the chapter outlines the major findings from the descriptive analysis of the data, which included 120 completely filled questionnaires with a completion rate of 88.2%. Completion rate is based on respondent's interaction with the study survey, computed by the number of completed questionnaires (n=120) over number of respondents who entered the survey (n=136). This section describes findings related to sociodemographic, socioeconomic, social network, health and behaviour, and acculturation variables. Next, the results pertaining to prevalence of maternal depression and anxiety in the study sample are reported. Finally, preferred/common help-seeking behaviours are described.

Sociodemographic and Socioeconomic Characteristics

This segment discusses the sociodemographic and socioeconomic characteristics of the respondents which includes the respondents' age, age of their most recent infant, residence, religion, total household income, employment status, home ownership, and maternal education.

Age of the respondents ranged from 24 to 40 years (Mean= 31.7; Standard Deviation (SD) = ± 3.2), with 46.5% of respondents between 31-35 years of age. From the proportion of African immigrant women with infants two years of age or younger in Alberta, majority had younger infants 0-12 months of age (55.6%), had a total household income of \$60,000 or more (56.0%), were employed (76.1%), rented their home (66.1%) and had an advanced degree (masters/professional degree) (58.5%). Of note, majority of African immigrant women in this study were highly educated with advanced degrees, yet about one-quarter of respondents were unemployed. Table 1 shows the distribution of respondents by sociodemographic and socioeconomic characteristics.

Table 1: Sociodemographic and socioeconomic characteristics of respondents.

Characteristics of participants (N=120)	Frequency	Percent
SOCIODEMOGRAPHIC		
Maternal age		
18-30 years	47	41.2%
31-35 years	53	46.5%
>=36 years	14	12.3%
Age of most recent infant		
0-12 months	65	55.6%
12+ months	52	44.4%
Residence		
Calgary and area	56	47.5%
Edmonton and area	16	13.5%
Other	46	39.0%
Religion		
Christian	109	93.2%
Islam	8	6.8%
SOCIOECONOMIC		
Total household income		
\$59,999 or less	51	44.0%

\$60,000 or more	65	56.0%
Employment		
Employed	51	43.6%
Maternity Leave	38	32.5%
Unemployed	28	23.9%
Home		
Own	40	33.9%
Rent	78	66.1%
Maternal education		
Certificate/diploma or less	7	5.9%
Bachelor's degree	42	35.6%
Advanced degree (>Bachelor's)	69	58.5%

Social Network Variables

Majority of the study respondents were married (92.7%), did not have family residing in the same city (55.7%), but had friends residing in the same city (85.2%). On frequency of interaction with family, majority of respondents interacted with family in Canada on a daily to weekly basis (57.3%) and also interacted with family outside of Canada on a daily to weekly basis (83.5%). On the frequency of interaction with friends, majority of respondents interacted with friends in Canada on a daily to weekly basis (73.7%), and also interacted with family outside of Canada on a daily to weekly basis (53.9%). Lastly, majority of respondents felt a weak sense of belonging in their local community (57.4%) and had no cultural or community group memberships (66.7%).

Health and Behaviour

The respondents were asked about a number of health and health behaviour characteristics. Majority of the respondents (86.4%) had access to a regular medical doctor, whereas only 13.6% had no access to a regular medical doctor. Furthermore, most respondents rated the availability of mental health services in their community as good to excellent (74.5%), had no instances of racism or discrimination in the past 12 months (90.9%), and had no chronic conditions (90.0%).

Acculturation Variables

For acculturation variables from the study questionnaire, 50.0% of the participants were recent immigrants and had been in Canada for only 0-2 years, were between 25-34 years old at time of immigration (57.8%), and were satisfied with their settlement process (74.3%). Figure 3 below shows the distribution of respondents by number of years since immigration.

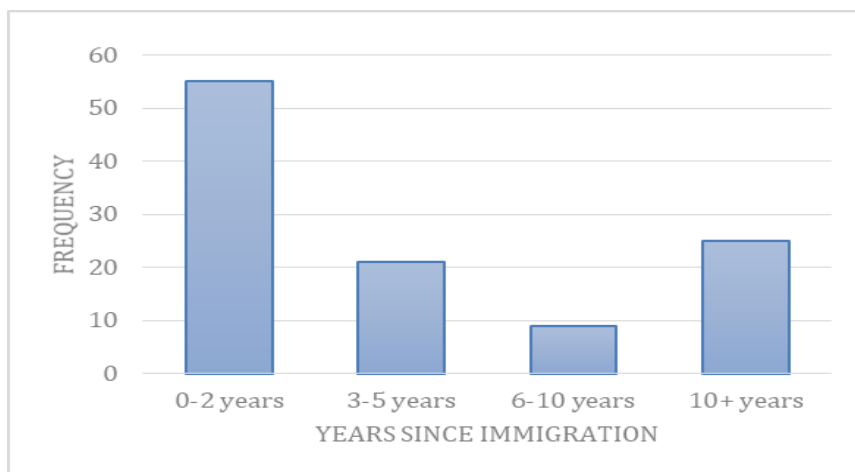


Figure 3: Years since immigration

Mental Health Outcomes

Maternal depression symptoms: The depressive symptoms of the respondents were measured by the Edinburg Postnatal Depression scale (EPDS-10). The data from the present study showed that the mean cumulative score was 9.9 (SD ± 5.5). As per the cut off score of 13, data showed that 27.5% (n=33) of the respondents were probably depressed as compared with 72.5% (n=87) who were not depressed (Table 2). Cross tabulations of EPDS-10 cumulative scores with respondent characteristics showed that respondents with younger infants 0-12 months were more likely to be classified as probably depressed (14.5%) than those with older infants 13-24 months (12.8%). Factors associated with maternal depression symptoms are discussed in subsequent sections of this thesis. A chi-square test was computed to determine the differences in proportion of respondents with symptoms of maternal depression by years since immigration; results showed that 16.4% of recent immigrants (0-5 years) had probable maternal depression symptoms in comparison to 10.0% of non-recent immigrants (6+ years) with probable maternal depression symptoms. However, this association was not statistically significant ($p=0.34$).

Maternal anxiety symptoms: The anxiety symptoms of the respondents were measured by the Generalized Anxiety Disorder scale (GAD-7). The data from the present study showed that the mean cumulative score was 4.8 (SD ± 4.2). As per the cut off score of 13, data showed that 12.1% (n=14) of the respondents were anxious as compared with 87.9% (n=102) who were not anxious (Table 2). Cross tabulations of GAD-7 cumulative scores with respondent characteristics showed that respondents with younger infants 0-12 months were more likely to be anxious (7.0%) than those with older infants 13-24 months (5.2%). Factors associated with maternal anxiety symptoms are discussed in subsequent sections. A chi-square test was computed to determine the differences

in proportion of maternal anxiety symptoms by years since immigration; results showed that 6.5% of recent immigrants (0-5 years) had probable maternal depression in comparison to 4.6% of non-recent immigrants (6+ years) with maternal depression; this association was not significant ($p=0.42$).

Table 2: Frequencies and percentages of maternal depression and maternal anxiety.

		Frequency	Percentage
Maternal Depression	Not depressed	87	72.5%
	Depressed	33	27.5%
	Total	120	
Maternal Anxiety	Not anxious	102	87.9%
	Anxious	14	12.1%
	Total	116	

Help-seeking Behaviors

One of the secondary objectives of this study was to determine preferred or common help-seeking behaviours African immigrant women utilize for maternal depression and/or anxiety within two years of childbirth.

Majority of all respondents noted that if depressed during pregnancy or after having a baby, their first choice of help would be their partner (41.7%), health professional (33.3%), friend/relative (23.2%) and no one (1.8%) (Figure 3). Similarly, when asked whom their first choice of help would be if anxious during pregnancy or after having a baby, majority of respondents indicated their partner (46.4%), health professional (27.3%), friend/relative (23.6%), clergy/spiritual leader (0.9%), and no one (1.8%) (Figure 4).

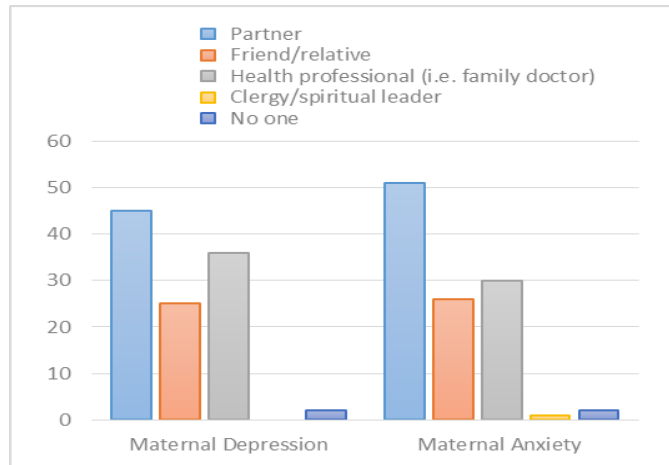


Figure 4: Common help-seeking behaviors of study respondents

Finally, when asked the main reason for not talking to a healthcare provider about feelings of depression or anxiety during pregnancy or after having a baby, respondents equally noted being ashamed/feeling guilty (24.8%) and having a lack of knowledge (24.8%), fear (22.9%), self-management/normality (22.9%), religion/spirituality (1.8%) and other reasons (2.8%) (Figure 5). Factors associated with help-seeking from a healthcare provider and factors associated with help-seeking from a partner are examined and discussed in subsequent sections.

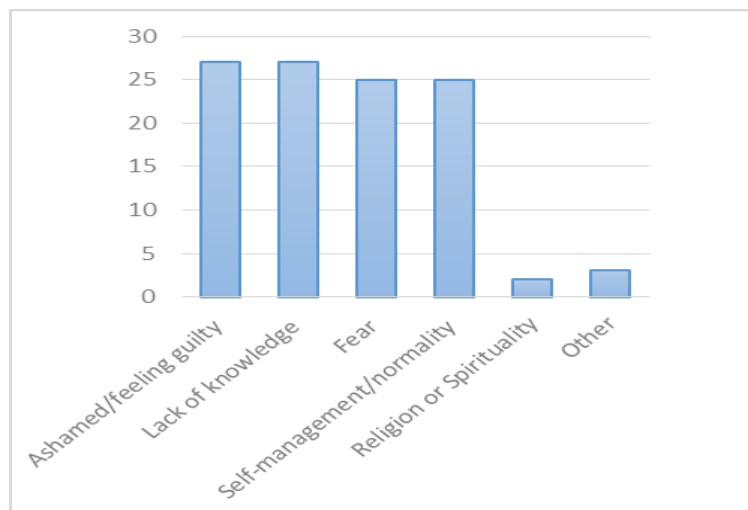


Figure 5: Participants' reasons for not seeking help

CHAPTER 5

Chapter 5: Key SDOH Shaping African Immigrant Mothers' Maternal Mental Health

This section presents the results of inferential statistics to address the research questions. Associations between the maternal depression group (maternal depression vs. no maternal depression), maternal anxiety group (maternal anxiety vs. no maternal anxiety) and sample characteristics were determined using bi-variate 2x2 analysis to compute proportions. Cramer's V test to obtain the association between variables, with the strength of association interpreted through effect size. Significant variables from the tests of association were used to choose variables for the multivariate logistic regression, performed to identify predictive variables significantly associated with self-report of symptoms of maternal depression and maternal anxiety.

Demographic and Lifestyle Characteristics Associated with Maternal Depression

Table 3 shows the results of the bivariate analysis with computed *p*-values from a Chi-square test of independence with Bonferroni adjustment for multiple comparison. A Chi-square test assumes that the level of measurement of all the variables is nominal or ordinal, groups are independent, and that the value of each cell should be five or more in at least 80% of the cells, and no cell should have an expected of less than one. All assumptions were met for this analysis. Additionally, as the Chi-square is a significance statistic, Cramer's V strength statistic was used to test the data when a significant Chi-square result was obtained.

Among those with probable maternal depression, a higher proportion were between 31-35 years of age (57%) than other age groups, and had infants 0-12 months of age (53%) than 12+ months of age (47%). The proportion of total household income of \$60,000 or more was higher among those with maternal depression than in those without (65% vs. 52%). Also, the proportion

of those on maternity leave was significantly higher among those with maternal depression than in those without (50% vs. 26%, $p=0.003$). Lastly, among those with maternal depression, a significantly higher proportion of respondents were single/separated/divorced than in those without (16% vs. 5%, $p=0.01$). Statistically significant differences were not observed between the two groups regarding most recent infant's age ($p=0.19$), total household income ($p=0.05$), and maternal education ($p=0.16$).

Table 3: Demographic characteristics of respondents with and without maternal depression.

	Maternal Mental Health Outcomes		p values [^]
Characteristics of participants ($N=120$)	Maternal Depression	No Maternal Depression	
Maternal age, %			0.03*
18 – 30 years	40.00	41.67	
31 – 35 years	56.67	42.86	
≥ 36 years	3.33	15.48	
Age of most recent infant, %			0.19
0-12 months	53.13	56.47	
12+ months	46.88	43.53	
Religion, %			0.04*
Christian	87.88	95.24	
Islam	12.12	4.76	
Total household income, %			0.05
\$59,999 or less	34.38	47.62	

\$60,000 or more	65.63	52.38	
Employment, %			0.003*
Employed	40.63	44.71	
Maternity Leave	50.00	25.88	
Unemployed	9.38	29.41	
Home, %			0.02*
Rent	72.73	63.53	
Own	27.27	36.47	
Maternal education, %			0.16
Certificate/diploma or less	6.06	5.88	
Bachelor's degree	33.33	36.47	
Advanced degree	60.61	57.65	
Marital Status, %			0.01*
Single/separated/divorced	16.13	4.76	
Married/common-law	83.87	95.24	
<i>CI= Confidence interval; *p < 0.05; ^p value with Bonferroni adjustment for multiple comparison.</i>			

As shown in Table 3, respondents with maternal depression had a higher absence of family in the city (68% vs. 51%), had a higher absence of friends in the city (32% vs. 8%), had a higher frequency of little to no interaction with family living in Canada (48% vs. 41%) and friends living in Canada (39% vs. 22%), had a higher frequency of little to no interaction with family living outside of Canada (23% vs. 14%) and friends living outside of Canada (55% vs. 43%).

Respondents with maternal depression also reported weaker sense of community belonging (84% vs. 48%), had higher non- participation in community groups (74% vs. 64%), had higher

dissatisfaction with their settlement process (7% vs. 9%), had higher fair/poor ratings on the availability of mental health services in their community (29% vs. 24%), had similar instances of racism in the past 12 months (10% vs. 8%), had higher instances of no access to a regular medical doctor (31% vs. 7%), but had lower occurrence of one or more chronic conditions (9% vs. 10%).

Lastly, individuals with maternal depression were more likely to be non-recent immigrants 5+ years than those without (38% vs. 28%). Statistically significant differences between both groups (maternal depression vs. no maternal depression) was observed for the following variables – presence of family in city ($p=0.03$), presence of friends in city ($p<0.001$), frequency of interaction with friends living in Canada ($p=0.02$), sense of belonging in local community ($p<0.001$), satisfaction with the settlement process ($p=0.01$), and access to a regular medical doctor ($p<0.001$) (Table 4).

Table 4: Lifestyle characteristics of respondents with and without maternal depression.

Characteristics of participants ($N=120$)	Maternal Depression	No Maternal Depression	p values
Presence of family in city, %			0.03*
No family in city	67.74	51.19	
Family in city	32.26	48.81	
Presence of friends in city, %			<0.001*
No friends in city	32.26	8.33	
Friends in city	67.74	91.67	
Frequency of interaction with family living in Canada, %			0.11

Not at all-Monthly-Yearly	48.39	40.51	
Daily-Weekly	51.61	59.49	
Frequency of interaction with friends living in Canada, %			0.02*
Not at all-Monthly-Yearly	38.71	21.69	
Daily-Weekly	61.29	78.31	
Frequency of interaction with family living outside Canada, %			0.07
Not at all-Monthly-Yearly	22.58	14.29	
Daily-Weekly	77.42	85.71	
Frequency of interaction with friends living outside Canada, %			0.06
Not at all-Monthly-Yearly	54.84	42.86	
Daily-Weekly	45.16	57.14	
Sense of belonging in local community, %			<0.001*
Weak	83.87	47.62	
Strong	16.13	52.38	
Group/organization participation, %			0.08
Not a member	74.19	63.86	
Member	25.81	36.14	
Years since immigration, %			0.09
0-5 years	62.07	71.60	
6+ years	37.93	28.40	

Age at immigration, %			0.24
<18 years (Child)	17.86	18.52	
18+ years (Adult)	82.14	81.48	
Satisfaction with settlement process, %			0.01*
Dissatisfied	7.14	8.64	
Neither satisfied nor dissatisfied	32.14	12.35	
Satisfied	60.71	79.01	
Regular medical doctor, %			<0.001*
No	31.03	7.41	
Yes	68.97	92.59	
Availability of mental health services, %			0.17
Fair/poor	28.57	24.32	
Excellent/good	71.43	75.68	
Racism/discrimination past 12 months, %			0.18
No	89.66	91.36	
Yes	10.34	8.64	
Chronic conditions, %			0.42
One or more	9.09	10.34	
None	90.91	89.66	
<i>CI= Confidence interval; *p < 0.05; ^p value with Bonferroni adjustment for multiple comparison.</i>			

Table 5 presented the adjusted odds ratios (OR) for respondents with maternal depression compared with those without maternal depression by sample characteristics and covariates. Adjusted ORs are used to control for confounding bias and measures the association between a

confounding variable and the outcome, and controls for that value. In Table 5, the model was adjusted for maternal age, religion, home ownership, marital status presence of family and friends in city, frequency of interaction with friends in Canada, and satisfaction with the settlement process.

As to covariates associated with probable maternal depression, respondents that were employed were 0.19 times less likely to report symptoms of maternal depression than those who were on unemployed; this association was significant ($p=0.01$). Also, respondents with a strong sense of belonging in local community were less likely to report symptoms of maternal depression than those with a weak sense of belonging in local community ($p=0.002$). Last, respondents with access to a regular medical doctor were less likely to report symptoms of maternal depression than in those with no access to a regular medical doctor ($p=0.03$).

The variables in the final model that were statistically significantly associated with probable maternal depression were employment status ($p=0.02$), sense of belonging in local community ($p=0.002$), and access to a regular medical doctor ($p=0.03$) (Table 5). In summary, being employed, having a strong sense of belonging in local community and having access to a regular medical doctor were protective factors for maternal depression among African immigrant women in Alberta.

Table 5: Final model of respondents' characteristics associated with maternal depression.

	Adjusted OR	95% CI	<i>p</i> values
Employment			0.02
Unemployed	Reference	Reference	
Maternity Leave	0.79	0.24-2.59	0.24
Employed	0.19	0.05-0.72	0.01

Sense of belonging in local community			0.002
Weak	Reference	Reference	
Strong	0.16	0.05-0.50	
Regular medical doctor			0.03
No	Reference	Reference	
Yes	0.25	0.07-0.86	
<i>CI= Confidence interval; p < 0.05; *model adjusted for maternal age, religion, home ownership, marital status presence of family and friends in city, frequency of interaction with friends in Canada, and satisfaction with the settlement process.</i>			

Demographic and Lifestyle Characteristics Associated with Maternal Anxiety.

Table 6 shows the results of the bivariate analysis with computed *p*-values from a Chi-square test of independence. Cramer's V strength statistic was used to test the data when a significant Chi-square result was obtained.

Among those with probable maternal anxiety, a higher proportion were between ages 18- 30 and 31-35 years of age (43%) than other age groups, and had infants 0-12 months of age (57%) than 12+ months of age (43%). The proportion of total household income of \$60,000 or more was higher among those with maternal anxiety than in those without (64% vs. 55%). Also, among those with maternal anxiety, a higher proportion were employed than in those without maternal anxiety (57% vs. 43%). Among those with maternal anxiety, a higher proportion of respondents were single/separated/divorced than in those without (15% vs. 7%). Last, among those with maternal anxiety, a significantly higher proportion had an advanced degree as their highest level of education than those without (64% vs. 59%; $p<0.001$). Statistically significant differences were not observed between the two groups with regard to maternal age ($p=0.15$), most recent infant's

age ($p=0.23$), religion ($p=0.06$), total household income ($p=0.13$), employment ($p=0.06$), home ownership ($p=0.19$), and marital status ($p=0.07$) (Table 6).

Table 6: Demographic characteristics of respondents with and without maternal anxiety.

	Maternal Mental Health Outcomes		p values [^]
Characteristics of participants ($N=120$)	Maternal Anxiety	No Maternal Anxiety	
Maternal age, %			0.15
18 - 30 years	42.86	40.82	
31 – 35 years	42.86	47.96	
≥ 36 years	14.29	11.22	
Age of most recent infant, %			0.23
0-12 months	57.14	55.45	
12+ months	42.86	44.55	
Religion, %			0.06
Christian	85.71	94.06	
Islam	14.29	5.94	
			0.13
Total household income, %			
\$59,999 or less	35.71	45.00	
\$60,000 or more	64.29	55.00	
Employment, %			0.06
Employed	57.14	42.57	
Maternity Leave	35.71	32.67	

Unemployed	7.14	24.75	
Home, %			0.19
Rent	71.43	64.71	
Own	28.57	35.29	
Maternal education, %			<0.001*
Certificate/diploma or less	21.43	2.94	
Bachelor's degree	14.29	38.24	
Advanced degree	64.29	58.82	
Marital Status, %			0.07
Single/separated/divorced	15.38	7.00	
Married/common-law	84.62	93.00	
<i>CI=Confidence interval; *p < 0.05; Chi-square test; ^p value with Bonferroni adjustment for multiple comparison.</i>			

Respondents with maternal anxiety had a higher absence of family in the city (69% vs. 54%), had a significantly higher absence of friends in the city (32% vs. 12%, $p=0.003$), had a higher frequency of little to no interaction with family living in Canada (46% vs. 42%), had a significantly higher frequency of little to no interaction with friends living in Canada (69% vs. 21%, $p<0.001$), had a higher frequency of little to no interaction with family living outside of Canada (31% vs. 15%) and friends living outside of Canada (54% vs. 45%) (Table 7).

Also, respondents with maternal anxiety also reported significantly weaker sense of community belonging (92% vs. 53%, $p=0.002$), had higher non-participation in community groups (85% vs. 65%), had higher fair/poor ratings on the availability of mental health services in their community (33% vs. 25%), had similar instances of racism in the past 12 months (8% vs. 9%), had higher instances of no access to a regular medical doctor (42% vs. 10%), but had lower

occurrence of one or more chronic conditions (7% vs. 10%) and had lower satisfaction with their settlement process (58% vs. 76%, $p=0.01$) (Table 7).

Table 7: Lifestyle characteristics of respondents with and without probable maternal anxiety.

Characteristics of participants ($N=120$)	Maternal Anxiety	No Maternal Anxiety	p values [^]
Presence of family in city, %			0.10
No family in city	69.23	54.00	
Family in city	30.77	46.00	
Presence of friends in city, %			0.003*
No friends in city	38.46	12.00	
Friends in city	61.54	88.00	
Frequency of interaction with family living in Canada, %			0.19
Not at all-Monthly-Yearly	46.15	42.11	
Daily-Weekly	53.85	57.89	
Frequency of interaction with friends living in Canada, %			<0.001*
Not at all-Monthly-Yearly	69.23	21.21	
Daily-Weekly	30.77	78.79	
Frequency of interaction with family living outside Canada, %			0.06
Not at all-Monthly-Yearly	30.77	15.00	
Daily-Weekly	69.23	85.00	

Frequency of interaction with friends living outside Canada, %			0.14
Not at all-Monthly-Yearly	53.85	45.00	
Daily-Weekly	46.15	55.00	
Sense of belonging in local community, %			0.002*
Weak	92.31	53.00	
Strong	7.69	47.00	
Group/organization participation, %			0.05
Not a member	84.62	64.65	
Member	15.38	35.35	
Years since immigration, %			0.11
0-5 years	58.33	69.79	
6+ years	41.67	30.21	
Age at immigration, %			0.12
<18 years (Child)	8.33	20.00	
18+ years (Adult)	91.67	80.00	
Satisfaction with settlement process, %			0.01*
Dissatisfied	0.00	9.47	
Neither satisfied nor dissatisfied	41.67	14.74	
Satisfied	58.33	75.79	
Regular medical doctor, %			<0.001*
No	41.67	10.42	

Yes	58.33	89.58	
Availability of mental health services, %			0.13
Fair/poor	33.33	25.00	
Excellent/good	66.67	75.00	
Racism/discrimination past 12 months, %			0.23
Yes	8.33	9.38	
No	91.67	90.63	
Chronic conditions, %			0.19
One or more	7.14	9.80	
None	92.86	90.20	
<i>CI= Confidence interval; *p < 0.05; Chi-square test; ^p value with Bonferroni adjustment for multiple comparison.</i>			

Table 8 presented the adjusted odds ratios (OR) for respondents with maternal anxiety compared with those without maternal anxiety by sample characteristics and covariates. Adjusted ORs were computed to account for confounding bias, thereby limiting the overestimation or underestimation of variable effects on maternal anxiety. In Table 8, the model was adjusted for maternal education, friends in the city, satisfaction with settlement process, and sense of belonging in local community.

As to covariates associated with maternal anxiety, respondents who interacted with friends living in Canada on a daily-weekly basis were less likely to report symptoms of maternal anxiety than those with infrequent interaction with friends living in Canada ($p=0.002$). Last, respondents with access to a regular medical doctor were less likely to report symptoms of maternal anxiety than those with no access to a regular medical doctor ($p=0.004$) (Table 8).

The variables in the final model that were significantly associated with probable maternal anxiety were frequency of interaction with friends living in Canada ($p=0.002$) and access to a regular medical doctor ($p=0.004$) (Table 8). This highlights that having a more frequent interaction with friends in Canada and having a regular medical doctor are protective factors for maternal anxiety among African immigrant women in Alberta with young infants.

Table 8: Final model of sample characteristics associated with probable maternal Anxiety.

	Adjusted OR	95% CI	<i>p</i> values
Frequency of interaction with friends living in Canada			0.002
Not at all-Monthly-Yearly	Reference	Reference	
Daily-Weekly	0.07	0.01-0.37	
Regular medical doctor			0.004
No	Reference	Reference	
Yes	0.08	0.01-0.43	
<i>CI= Confidence interval; $p < 0.05$; *model adjusted for maternal education, friends in the city, satisfaction with the settlement process, and sense of belonging in local community.</i>			

Determinants of Perinatal Mental Health Knowledge and Help-Seeking Behaviors

A secondary objective of this study was to assess women's understanding of the underlying effects of maternal depression or anxiety following childbirth, as well as preferred/common help-seeking behaviours. This was assessed by nine questions in the study questionnaire (see appendix 1.4), re-categorized to measure level of prenatal knowledge, level of postnatal knowledge, acceptability of prenatal mental health screening, acceptability of postnatal mental health screening, help-seeking from a healthcare provider, and help-seeking from a partner.

Overall, 51.5% of all respondents knew of someone that has had depression or anxiety after they have had a baby (Table 9). A similar proportion of respondents with depressive symptoms and anxiety symptoms knew someone that had depression or anxiety after they had a baby (Table 9). About half of respondents had high knowledge levels regarding prenatal mental health and over 94% had high levels of postnatal mental health knowledge (Table 9). Acceptability of prenatal mental health screening was high among 75.2% of respondents, while acceptability of postnatal mental health screening was high among 82.7% of respondents (Table 9).

Table 9: Summary of participant responses to the perinatal mental health items and underlying effects of maternal depression and anxiety (N=120).

Responses to perinatal mental health items	Frequency	Percent (%)
Personal experience with someone who experiences maternal depression or anxiety	n=103	
Yes	53	51.5
No	50	48.5
Knowledge of prenatal mental health	n=110	
High	57	51.2
Low	53	48.2
Knowledge of postnatal mental health	n=115	
High	109	94.8
Low	6	5.2
Acceptability of prenatal mental health screening	n=109	

High	82	75.2
Low	27	24.8
Acceptability of postnatal mental health screening	n=110	
High	91	82.7
Low	19	17.3

Factors associated with prenatal mental health knowledge: Overall, 51.8% of all respondents strongly agreed/somewhat agreed that women with histories of anxiety or depression were more likely to experience anxiety or depression in pregnancy, with 27.3% strongly/somewhat disagreeing, and 20.9% neither agreeing/disagreeing. A multivariable analysis was performed to determine independent factors associated with having high prenatal mental health knowledge (Table 10). Respondents who were Christian, held a bachelor's degree or less, who had a total household income of \$60,000 or more, and who were on maternity leave were more likely to have high prenatal mental health knowledge (Table 10). Respondents who were younger (≤ 30 years of age), had younger infants (0-12 months), were married/common-law, and who had a low acceptability of prenatal and postnatal screening were less likely to have high prenatal mental health knowledge (Table 10).

Factors associated with postnatal mental health knowledge: Seventy-two percent of all respondents strongly agreed/somewhat agreed that women with depression find it difficult to respond to their baby's cues, 75.4% strongly agreed/somewhat agreed that women with depression find it more difficult to respond to the needs of their partner or other children, and 70.4% strongly agreed/somewhat agreed that partners of women with depression or anxiety were more likely to

experience depression. A multivariable analysis was performed to determine independent factors associated with having high postnatal mental health knowledge (Table 10). Respondents who were younger (≤ 30 years of age), had younger infants (0-12 months), rented their home, were married/common-law, on maternity leave or employed were more likely to have high postnatal mental health knowledge (Table 10). Respondents with a total household income of \$60,000 or more, with a bachelor's degree or less, and who had a low acceptability of prenatal and postnatal screening were less likely to have high postnatal mental health knowledge (Table 10).

Table 10: Factors associated with prenatal and postnatal knowledge among African immigrant women in Alberta, Canada (UOR, AOR, 95% CI).

Independent Variables	High Prenatal Knowledge			High Postnatal Knowledge		
	n (%)	UOR (95% CI)	AOR (95% CI)	n (%)	UOR (95% CI)	AOR (95% CI)
Maternal age						
≤ 30 years	41 (38.7)	0.86 (0.40-1.90)		45 (40.5)	3.61 (0.41-31.96)	
≥ 31 years	65 (61.3)	1.00		66 (59.5)	1.00	
Age of most recent infant						
0-12 months	60 (55.6)	0.67 (0.31-1.44)		63 (55.8)	2.65 (0.47-15.11)	
12+ months	48 (44.4)	1.00		50 (44.3)	1.00	

Religion						
Christian	99 (92.5)	1.92 (0.44-8.48)		104 (92.9)	- ^a	
Islam	8 (7.5)	1.00		8 (7.1)		
Total household income						
\$60,000 or more	61 (57.0)	1.37 (0.64-2.96)		62 (55.4)	0.23 (0.03-2.06)	
\$59,999 or less	46 (43.0)	1.00		50 (44.6)	1.00	
Employment						
Employed	46 (42.2)	0.88 (0.34-2.30)	0.66 (0.23-1.92)	50 (43.9)	2.88 (0.45-8.38)	
Maternity Leave	36 (33.0)	3.25* (1.13-9.31)	3.22* (1.91-10.06)	36 (31.6)	4.2 (0.41-7.65)	
Unemployed	27 (24.8)	1.00		28 (24.6)	1.00	
Home						
Rent	74 (68.5)	0.99 (0.44-2.23)		77 (68.1)	2.24 (0.43-11.70)	
Own	34 (31.5)	1.00		36 (31.9)	1.00	
Maternal education						
Bachelor's degree or less	46 (41.8)	1.38 (0.65-2.96)		47 (40.9)	0.33 (0.06-1.86)	
Advanced	64	1.00		68	1.00	

degree	(58.2)			(59.1)		
Marital Status						
Married/ common-law	96 (91.4)	0.57 (0.13-2.40)		101 (91.8)	3.03 (0.30-30.44)	
Single/ separated/ divorced	9 (8.6)	1.00		9 (8.2)	1.00	
Prenatal Screening						
Not acceptable	27 (24.8)	0.10* (0.03-0.32)		27 (24.8)	0.30 (0.06-1.61)	
Acceptable	82 (75.2)	1.00		82 (75.2)	1.00	
Postnatal Screening						
Not acceptable	19 (17.3)	0.04* (0.004-0.27)	0.03* (0.003-0.23)	19 (17.3)	0.18* (0.03-0.98)	0.18 (0.03-0.98)
Acceptable	91 (82.7)	1.00		91 (82.7)	1.00	
<i>UOR-Unadjusted odds ratio; AOR-Adjusted odds ratio; CI-Confidence interval. Some variables do not total n due to missing responses. *Meets criteria for inclusion in multivariable models ($p < 0.10$). Variables in the multivariable model are adjusted for all other variables in the model. Multivariable models present only those variables significant at $p < 0.05$. ^a – zero odds in denominator, OR not computed.</i>						

Factors associated with acceptability of prenatal and postnatal mental health screening: About two-thirds of all respondents somewhat/strongly agreed that all women should be checked for depression and anxiety during pregnancy (75.2%), with a minimal proportion indicating that they

neither agreed nor disagreed (9.2%), and over 15% indicating that they strongly/somewhat disagreed (15.2%). Similarly, majority of respondents also somewhat/strongly agreed that all women should be checked for depression and anxiety after the baby is born (82.7%), with a minimal proportion indicating that they neither agreed nor disagreed (3.6%) and over 10% indicating that they strongly/somewhat disagreed (13.6%).

A multivariable analysis was performed to determine independent factors associated with acceptability of prenatal and postnatal screening (Table 11). Respondents with younger infants (0-12 months), who rented their homes, had a bachelor's degree or less, who were on maternity leave or employed were more likely to strongly agree/agree that all women should be screened pre- and postnatally. Younger respondents (≤ 30 years of age) and respondents with a total household income of \$60,000 or more likely to strongly agree/agree that all women should be screened prenatally, but less likely to strongly agree/agree that all women should be screened postnatally. Respondents who were Christian and married/common-law were less likely to strongly agree/agree that all women should be screened prenatally than non-Christian and unmarried respondents. Respondents who had low pre- and postnatal mental health knowledge were less likely to strongly agree/agree that all women should be screened pre- and postnatally (Table 11).

Table 11: Factors associated with African immigrant women's acceptability of prenatal and postnatal mental health screening in Alberta, Canada (UOR, AOR, 95% CI).

Independent Variables	Acceptability of Prenatal Screening			Acceptability of Postnatal Screening		
	n (%)	UOR (95% CI)	AOR (95% CI)	n (%)	UOR (95% CI)	AOR (95% CI)
Maternal age						

<=30 years	41 (39.1)	1.03 (0.42-2.57)		41 (38.7)	0.99 (0.35-2.80)	
>= 31 years	64 (60.9)	1.00		65 (61.3)	1.00	
Age of most recent infant						
0-12 months	59 (55.1)	1.80 (0.73-4.44)		60 (55.6)	1.13 (0.40-3.20)	
12+ months	48 (44.9)	1.00		48 (44.4)	1.00	
Religion						
Christian	98 (92.5)	0.44 (0.05-3.76)		99 (92.5)	— ^a	
Islam	8 (7.5)	1.00		8 (7.5)		
Total household income						
\$60,000 or more	60 (56.6)	1.03 (0.42-2.55)		61 (57.0)	0.91 (0.32-2.62)	
\$59,999 or less	46 (43.4)	1.00		46 (43.0)	1.00	
Employment						
Employed	46 (42.6)	1.07 (0.38-3.04)		46 (42.2)	1.95 (0.60-6.34)	
Maternity Leave	35 (32.4)	2.04 (0.61-6.80)		36 (33.0)	2.17 (0.61-7.79)	
Unemployed	27 (25.0)	1.00		27 (24.8)	1.00	

Home						
Rent	73 (68.2)	2.02 (0.80-5.08)		74 (68.5)	2.22 (0.77-6.39)	
Own	34 (31.8)	1.00		34 (31.5)	1.00	
Maternal education						
Bachelor's degree or less	46 (42.2)	1.33 (0.54-3.26)		46 (41.8)	1.29 (0.46-3.57)	
Advanced degree	63 (57.8)	1.00		64 (58.2)	1.00	
Marital Status						
Married/ common-law	95 (91.4)	0.44 (0.05-3.72)		96 (91.4)	_ ^a	
Single/ separated/ divorced	9 (8.6)	1.00		9 (8.6)		
Prenatal Knowledge						
Low	53 (48.6)	0.10* (0.03-0.32)	0.10 (0.03-0.32)	53 (48.2)	0.04* (0.01-0.27)	0.04 (0.01-0.30)
High	56 (51.4)	1.00		57 (51.8)	1.00	
Postnatal Knowledge						
Low	6	0.30		6	0.18*	

	(5.5)	(0.06-1.61)		(5.5)	(0.03-0.98)	
High	103 (94.5)	1.00		104 (94.5)	1.00	

*UOR-Unadjusted odds ratio; AOR-Adjusted odds ratio; CI-Confidence interval. Some variables do not total n due to missing responses. *Meets criteria for inclusion in multivariable models ($p < 0.10$). Variables in the multivariable model are adjusted for all other variables in the model. Multivariable models present only those variables significant at $p < 0.05$. ^a – zero odds in denominator.*

Factors associated with help-seeking from a healthcare provider or partner as first choice of help and support: Respondents most commonly identified the partner (41.7%) or the healthcare professional (33.3%) as the first choice of help and support if they suffered with depression during pregnancy or after childbirth. Respondents with a total household income of \$60,000 or more, and respondents with a bachelor's degree or less were more likely to indicate that they would choose a healthcare provider as their first choice for help (Table 12). Respondents who were younger (≤ 30 years of age), with younger infants (0-12 months), Christian, employed or on maternity leave, rented their home, and married/common-law were less likely to visit a healthcare provider as their initial source of help and support (Table 12).

Respondents who were younger (≤ 30 years of age), Christian, with a total household income of \$60,000 or more, held a bachelor's degree or less, and who were employed or on maternity leave were less likely to choose a partner as their initial source of help and support. Lastly, respondents with younger infants (0-12 months), who rent their homes, and are married/common-law were more likely to indicate that they would choose a partner as their first choice for help (Table 12).

Table 12: Factors associated with seeking a healthcare provider and partner as the first choice for help for maternal depression and anxiety in Alberta, Canada (UOR, AOR, 95% CI).

	Healthcare provider first choice for help	Partner first choice of help
<i>Independent Variables</i>	UOR (95% CI)	UOR (95% CI)
Maternal age		
<=30 years	0.88 (0.38-2.06)	0.89 (0.40-1.99)
>= 31 years	1.00	1.00
Age of most recent infant		
0-12 months	0.86 (0.38-1.94)	1.88 (0.85-4.15)
12+ months	1.00	1.00
Religion		
Christian	0.63 (0.13-2.97)	0.52 (0.11-2.45)
Islam	1.00	1.00
Total household income		
\$60,000 or more	1.38 (0.61-3.13)	0.66 (0.31-1.44)
\$59,999 or less	1.00	1.00
Employment		
Employed	0.73 (0.25-2.08)	0.99 (0.36-2.73)
Maternity Leave	0.81 (0.28-2.36)	0.50 (0.17-1.46)
Unemployed	1.00	1.00
Home		
Rent	0.83 (0.36-1.93)	1.19 (0.53-2.69)
Own	1.00	1.00

Maternal education		
Bachelor's degree or less	1.99 (0.88-4.50)	0.86 (0.40-1.87)
Advanced degree	1.00	1.00
Marital Status		
Married/common-law	0.60 (0.15-2.37)	1.47 (0.35-6.23)
Single/separated/divorced	1.00	1.00
<i>UOR-Unadjusted odds ratio; CI-Confidence interval. *Meets criteria for inclusion in multivariable models (p <0.10).</i>		

CHAPTER 6

Chapter 6: Discussion

In this chapter, a brief overview of the results is presented. The findings are then put in context by discussing previous research in this area, according to studies from the social determinants of health (SDOH) literature. The key SDOH of maternal depression and anxiety are grouped into three broader themes - distal factors (i.e. migration factors, socio-cultural factors, socio-economic factors, and health system factors), intermediate factors (i.e. interpersonal factors, social support factors, and psychological factors), and proximal factors (i.e. individual-level factors, healthcare factors) - each corresponding to the *Population Health (SDOH) Framework*. In this study however, these factors are not isolated and were overlapped across multiple study objectives. As a result, the succeeding sections of this chapter are grouped into the study objectives.

Proportion of Respondents with Maternal Depression and Anxiety Symptoms

This is the first quantitative study measuring depression and anxiety symptoms among a self-selected sample of African immigrant women in Alberta Canada. The proportion of respondents that met the cut-off for “probable depression” using the EPDS was 27.5%. Maternal depression symptoms were associated with individuals who were unemployed, had no access to a regular medical doctor, or who had a weak sense of belonging in local community. Study results also revealed that the proportion of respondents that met the cut-off for “probable anxiety” using the GAD-7 scale was 12.0%. Anxiety symptoms were associated with African mothers who had infrequent interactions with friends in Canada or no access to a regular medical doctor. As this study provides preliminary estimates on the burden of maternal depression and anxiety and the underlying factors among a sample of African immigrant women in Alberta, it highlights gaps for future applied research studies on maternal mental health for this demographic. These future

studies can possibly inform health care providers, policy-makers, and program planners when making decisions and planning evidence-based mental health care for African immigrants, an increasing demographic population in Alberta.

When compared to prior studies, the proportion of African immigrant women in the study sample with probable maternal depression (27.5%) are comparable to findings (22.5%) from a large scale original study conducted among Vietnamese and Indonesian immigrants in Taiwan (Huang and Mathers, 2008). However, this current study results showed a higher probable depression rate of 27.5% when compared to the 15.3% rate found by Small et al. (2003) in immigrants in Australia; the 14.2% and 9.4% rates found by Urquia et al. (2012) in recent and non-recent immigrants in Canada; the 13.2% and 11.5% rates found by Kingston et al. (2011) in recent and non-recent immigrants in Canada; and the 7.6% rate found by Bjerke et al. (2008) in Pakistani immigrants in Norway. Reasons for the inconsistency in findings across these studies vary and are described in detail in later sections, but some overarching reasons include: the studies were conducted with different methodologies, had different inclusion criteria, differences in recruitment, and recruited different groups of immigrant women. Immigrant women are a heterogeneous group, and as such their unique ethnic, cultural, and socioeconomic factors, family makeup and size, and quality or need of social networks can exert important and synergistic influences on the rates of maternal mental health outcomes (Khanlou et al., 2017). Although these studies were conducted on different immigrant groups, immigrant women do share similar experiences navigating mental health disorders.

Another reason for the inconsistency in findings across studies is that this study was open to African mothers up to two years after giving birth. A 2020 study that asked mothers of different ethnicities living in Upstate New York about symptoms of depression 4 months and 1, 2, and 3

years after birth found that depression symptoms can linger three years after childbirth (Putnick, Sundaram, Bell et al., 2020). In this study, one-quarter of mothers had depressive symptoms three years postpartum (Putnick et al., 2020), indicating that the 6-12 weeks' timeline (Bjerke et al., 2008), the 6-9 months' timelines (Small et al., 2003; Huang & Mathers, 2008), and the one year timeline (Kingston et al., 2011) utilized in the other studies may not be long enough to adequately gauge depressive symptoms or capture the various trajectories of depression after birth. Life stressors, such as low income, chronic maternal or child illness, unemployment, and inadequate housing, do not necessarily resolve after a certain period of time after birth, and as such more studies on maternal depression symptoms in immigrant mothers up to two years after childbirth may be beneficial and key to improving our understanding of African mothers' mental health which is crucial to her child's well-being and development.

Lastly, another reason for the inconsistency in rates is the consideration of factors that are unique to migrants, including the particulars of migration experience. For example, the category of migrant was used inconsistently across studies and entail different migration statuses such as refugees or landed immigrants, each with their own unique experiences, resources and barriers to services (Kirmayer et al., 2011; Browne et al., 2017). In this study, an African immigrant was defined through self-identification and no additional data on immigration category type (i.e. permanent resident, student, asylum seeker, and resettled refugees) was collected. Including the immigration category of African mothers in future studies is beneficial, as government-assisted refugees in Canada are recognized as Convention Refugees abroad and have assistance from the government during their initial resettlement period that includes both healthcare and family or community supports (IRCC, 2021), while other migrant categories in Canada have healthcare insurance but minimal family/community support. Further, undocumented African migrants (i.e.

asylum seekers) who may not have legal status, healthcare coverage or any other supports are likely to have experienced trauma and ill health and have to cope with greater variability in the precarious nature of their lives based on the circumstances of their arrival into Canada as well as the stress of mothering while waiting in Canada for their asylum claim to be settled. These differences in their settlement experiences in Canada can impact their risk of depression after childbirth and account for the lack of comparability in the varying rates of maternal depression across several studies. Nonetheless, the literature is fairly consistent in identifying significant risks to asylum seeking immigrant women and also for refugee and immigrant pregnant women.

In this study, 63.3% of respondents were recent immigrants, yet the proportion of respondents with symptoms of maternal depression was high at 27.5%. When stratified by years since immigration, a marked difference in the rates between recent immigrants with zero to five years of residency (16.4%) and long-term immigrants with 6+ years of residency (10.0%) was observed. These findings suggest that recent African immigrant mothers had poorer maternal mental health outcomes (i.e., a higher symptoms of maternal depression) when compared to non-recent immigrants, contradicting both the immigrant paradox phenomenon (i.e., where immigrants who have just moved to a host country have better health outcomes than the majority population despite socioeconomic disadvantage and barriers to health care use), and the acculturation paradox (i.e., where longer residency in a country is linked to poorer health outcomes than the majority population) (Urquia et al., 2012). If the immigrant and acculturation paradoxes hold true for maternal depression, we would expect to find even higher rates of depression and anxiety symptoms in non-recent immigrant African mothers in this study. The Immigrant Paradox's benefits do not appear to extend evenly and consistently to all races, ethnicities and subgroups. This finding is consistent with Urquia et al's (2012) study where immigrants of non-European

origin had higher prevalence of postpartum depression, irrespective of their length of residence in Canada, but immigrants from European-origin countries did not. This reveals that the healthy migrant hypothesis and the immigrant paradox have limited generalisability to racialized populations (i.e., African) for certain conditions such as maternal depression and anxiety. Maternal anxiety is associated with adverse outcomes in mothers and infants. Unfortunately, as anxiety often co-exists with depression, the studies focusing solely on maternal anxiety are not as robust as those in the field of depression. In this current study, the proportion of respondents with symptoms of probable maternal anxiety was 12%, and comparable to a rate of 18% from a study on perinatal anxiety among Mexican immigrant women in the United States (Padilla, Lara-Cinisomo et al., 2021); a rate of 18.4% from a study on postpartum anxiety among Chinese immigrant women in Canada (Dennis, Brown et al., 2018); and a rate of 12.4% from a study on anxiety disorders among African immigrants in the United States (Szaflarski, Cubbins et al., 2017). Like the varying rates of maternal depression symptoms seen across multiple studies, the varying rates between the included studies on maternal anxiety may further be attributed to diverse settings, recruitment strategies, inclusion and exclusion criteria, data-collection methods and scales, follow-up time periods, socioeconomic factors, and cultural influences.

The growing body of research on maternal anxiety shows that anxiety and depression are often comorbid conditions (Anderson et al., 2017; Bayrampour et al., 2015). Yet, the extent to which symptoms of maternal anxiety impact the likelihood of maternal depression is unclear. While anxiety might be included under the heading of ‘depression’, specific questions culturally related to anxiety are needed, as some mothers might predominately have anxiety, but few depressive symptoms (Austin et al. 2010). Respondents in this current study predominantly had maternal depression symptoms but few maternal anxiety symptoms. Although maternal depression tools

have been translated into many languages (Gibson et al. 2009), these studies have been conducted mostly in the mothers' countries of origin and are rarely studied in countries where mothers are immigrants. Noteworthy, in Canada, only two provinces of British Columbia and Saskatchewan have proposed guidelines to screen mothers for anxiety in pregnancy and after childbirth (BCRMHP, as compared to depression (Bayrampour et al., 2015; Giardinelli et al., 2010), there appears to be no national or universal consensus regarding screening, prevention, and treatment of perinatal anxiety disorders.

Mental health disorders are complex and multi-faceted, arising from a combination of contextual determinants including family and environmental context; social position; experiences of social support; experiences accessing healthcare; and exposure to acculturative stress. The process of immigration and acculturation are clearly multifactorial, and its individual determinants and effects should be examined in detail in future studies. The framework views the concept of "health" as physical and merely as the absence of illness, without acknowledging that the mental health of immigrants is multidimensional – involving country of origin, race, immigration experience, settlement experience, racism, gender, socioeconomic status. Many studies also do not consider the availability of supplementary health insurance and legal residency status (Crimmins, Kim, Alley, Karlamangla, & Seeman, 2007; Nalini-Junko, 2011). Repositories and databases may also not reflect the general underutilization of mental health services by immigrants, the undocumented, or those who face barriers in accessing services. As such, future epidemiological studies on the mental health of African immigrant women should consider that undocumented and uninsured groups, may be significantly underrepresented or not clearly distinguished. For future studies, it is also important to devise means and methods for collecting and reporting these data to ensure an accurate representation of all subgroups of African immigrant mothers.

Sociodemographic and Socioeconomic Characteristics

Age:

There is sufficient evidence to suggest that age is one of the most important factors affecting maternal mental health (CIHI, 2011; Joseph, Allen, Dodds et al., 2005; Bayrampour & Heaman, 2011; Carolan & Frankowska, 2011), yet the relationship between maternal depression/anxiety and advanced age in African immigrant women has not been adequately studied. In this study, the effect of age on maternal mental health outcomes showed lower rates of depression and anxiety among women who gave birth after 35 years of age than women who gave birth in younger age groups. This corroborates studies showing that higher and more stable socioeconomic status often characterizes women of advanced maternal age (AMA) (Bayrampour & Heaman, 2011; Stein & Susser, 2000) and could confer psychological benefits among women. This could be a possible reason why African immigrant women of AMA (35+ years of age) in the study sample had lower rates of maternal depression and anxiety. In other studies, being a woman of advanced maternal age was also a protective factor for depression even after controlling for mode of conception and known risk factors for maternal depression (McMahon, Boivin, Gibson, Fisher et al., 2011; McMahon, Boivin, Gibson, Hammarberg et al., 2015).

Employment:

The social determinants of immigrant maternal health include employment and income (Nwoke and Leung, 2020; Kaushik and Drolet, 2018). Most African immigrant women in the study sample were either employed or on maternity leave. This finding is consistent with other studies

conducted in Canada (Delara, 2016; Nwoke, Okpalauwaekwe et al., 2020), Singapore (Foo, Tam, Ho et al., 2018), United States (Miranda, Siddique et al., 2005), and Germany (Sieberer et al., 2011), where a sizable proportion of immigrant women were also employed. Moreover, although most of the African immigrant women were employed, studies show that immigrant women in general have lower employment rates than their Canadian counterparts and earn less than the average wage (Nwoke & Leung, 2020; Crossman, 2013; Banerjee & Lee, 2015; Nadeau, 2013; Nadeau & Seckin, 2010). This could be due to the structural circumstances they encounter, such as a lack of recognition of their foreign post-secondary degree, and underutilization of professional credentials (Nwoke and Leung, 2020). Despite having higher educational qualifications compared to native-born Canadians, immigrants are more likely to be underemployed. In one study, approximately 35% of immigrant professionals cited lack of recognition of foreign credentials or qualifications as a major impediment to professional success in Canada (Schellenberg and Maheux, 2007). This leads to underutilization of immigrant skills and has been termed ‘brain waste’ (McHugh and Morawski, 2017; Shinnaoui and Narchal, 2010).

In the current study, African immigrant women who were employed were less likely to report symptoms of maternal depression than those that were unemployed, corroborating that employment postpartum - specifically working outside of the home, was associated with lower depression symptomatology after controlling for confounders (Gjerdingen et al., 2014; Goyal et al., 2010; Lewis et al., 2017). In another study, being employed was a protective factor for depression during the first two years following childbirth (Mayberry et al., 2007).

Examining the difficulties African immigrant mothers face in labour market integration in Canada helps better understand another challenge in how they access mental healthcare services after childbirth. Since economic integration is a key element in gauging how successfully African

immigrants have integrated into Canada, their employability is central to many forms of inclusion. In this dissertation study, although most respondents had advanced educational degrees, 24% were unemployed. Although not comparable, this can be seen in disparity to the provincial 2020 unemployment rate of 11.6% among Albertans and may possibly highlight a key challenge recent African immigrant's face in the transfer of their international qualifications and credentials.

Racism:

This section on racism has been reproduced with permission from Springer Nature [Nwoke, C. N., & Leung, B. (2021). Historical Antecedents and Challenges of Racialized Immigrant Women in Access to Healthcare Services in Canada: an Exploratory Review of the Literature. *Journal of Racial and Ethnic Health Disparities*, 8(6), 1447–1455. <https://doi.org/10.1007/s40615-020-00907-3>].

Racism is a determinant of maternal depression and anxiety symptoms among African immigrant women in Alberta. Racism functions at several levels (i.e. individual, systemic, institutional, or societal), and reinforces exploitation and discrimination of immigrants, especially racialized immigrants (Kihika, 2013). Racialized immigrants face numerous instances of racism and discrimination (Comas-Díaz & Greene, 2013; Lee & Hadeed, 2009), as well as exclusion from economic integration and development (Creese, 2011). One study in Ontario identified that for racialized immigrants living in Hamilton, marginalization and oppression based on race and poverty remained two of the most prominent barriers (Klassen, 2012). As it relates to African immigrants, the enslavement of immigrants of African origin, racial segregation, and discrimination are also part of Canada's history (Creese, 2011). In Canada, the slavery of Blacks was actively practiced in many areas; for example, African immigrants were barred from schools,

churches, restaurants, hospitals, and public transportation (Creese, 2011). They were restricted to low-paying, menial, and exhausting labour intensive jobs, even when they had the qualifications (Creese, 2011). Ultimately, many African immigrants were mandated to live in segregated communities in Ontario, New Brunswick, and Nova Scotia (Creese, 2011).

Furthermore, Statistics Canada (2016) data findings show that racialized women faced an income gap of 47% with non-racialized men, and women immigrants earn 59% less than non-immigrant men. It is thus likely that racialized immigrant women in Canada experience the highest income gap (Statistics Canada, 2016). These stressors alone or in combination with linguistic capital, “accent discrimination”, and language barriers, can have negative effects on physical health, psychosocial well-being, and mental health during settlement, all of which can affect interactions with the health care system (Creese, 2011; Hankivsky, 2011).

According to Bourdieu (1977), linguistic capital is a form of cultural capital where individuals with prestigious upper class accents enjoy more credibility and legitimacy than a speaker of “lesser” eloquence. By linking accents to credibility, Creese demonstrates the prevalence of accent discrimination among Canadian employers. African accents were seen as “markers of individual incompetence regardless of the individual’s actual accomplishment’ (Creese, 2011, p. 50). Bourdieu (1977) argues that language is not solely a method of communication, but also a mechanism of power, which can ultimately impact an individual’s access and acceptability to various social networks, identities, and access to knowledge.

Consequently, racism and racial discrimination do impact the health and maternal mental health of African immigrant women. In other words, racism is itself a distinct social determinant of health (Krieger, 2003), as well as a root cause of other social determinants of health, such as poverty or inadequate housing. Racism generates stress, and stress itself has an evident impact on

health (Brondolo, ver Halen, Pencille, Beatty, & Contrada, 2009; Hyman, 2009; Veenstra, 2009). Individual and systemic racism present barriers to quality health services, more evident among racialized immigrants (Hankivsky, 2011). These barriers include the inappropriate use of interpreters, culturally-inappropriate treatment methods, and traditional health providers who impose their own values and perspective on racialized populations they know little about.

These barriers also deter racialized immigrants from utilizing health care services, or lead them to defer seeking help until they are in desperate need (Creese, 2011; Hankivsky, 2011). For instance, findings from a study of refugee mothers living in Hamilton concluded that perceived racial discrimination was a barrier to accessing health care for their young children (Wahoush, 2009). In this same study, mothers referred to being ignored by health care practitioners and prolonged wait times in emergency rooms as evidence of racism (Wahoush, 2009).

Although not examined in this study, other studies have noted that racialized immigrant women (e.g., African) are highly underemployed and concentrated in precarious work, which in turn affects their socioeconomic status, and ultimately how they access health and mental healthcare services such as not having paid time off work for sick days or to attend a medical appointment (Creese, 2011; Epp & Iacovetta, 2016). Based on available Census data, it is difficult to determine if African immigrant women are employed in the professions for which they are trained or are in jobs that are commensurate with their education levels and experience. It is likely that a high proportion of recent African immigrant women are either unemployed or work in “survival jobs” that do not reflect their education or related pay levels (Creese & Wiebe, 2012; Moyce, Lash et al., 2016; Mental Health Commission of Canada, 2019). Underemployment and poor-quality employment are particularly strong risk factors for maternal depression and anxiety, and thus

future studies might examine type of work done by African immigrant women in Canada and if they are working in the same field and level as they did pre-migration.

Education:

The study sample consisted of African immigrant women with differential education status. Most African women in the study were highly educated and held a bachelor's degree or higher. This finding is consistent with other studies that highlight that immigrant populations in general have higher levels of education and are more likely to have post-secondary degrees than people born in Canada (Mental Health Commission of Canada, 2019; Chui, 2011; Hou, Lu & Schimmele, 2019; Lu & Hou, 2019; Nwoke, Okpalauwaekwe et al., 2020). The higher level of educational attainment among immigrant women was partly because of Canada's immigration policy, which tends to emphasize educational and occupational qualifications in selecting immigrants.

Additionally, African immigrants in general are one of the most educated racialized immigrant groups with the majority holding a Bachelor's degree or higher, and migrating in the Economic or Skilled Immigrant Class (Commodore-Mensah, Himmelfarb et al., 2015; Venters & Gany, 2011). This is also evident in the inferential study results where African immigrant mothers with an advanced degree (master's or higher) were less likely to report symptoms of maternal anxiety. It is plausible that having an advanced degree translates to the African immigrant woman being able to critically source for information and resources in the community pertaining to maternal mental health on their own. Ultimately, better sociodemographic and socioeconomic outcomes do play a key role in maternal mental health of African immigrant women, and help integrate them better into Canadian society, leading to better maternal health outcomes after childbirth.

Social Network and Acculturation Characteristics

Social network and acculturation factors emerged as important social determinants of maternal mental health outcomes in African mothers in Alberta. Respondents with friends in the city were less likely to report symptoms of both maternal depression and maternal anxiety than those without friends in the city. According to Levitt et al. (2005) “the capacity of individuals to cope with transitional circumstances is facilitated by the presence of social support” (Levitt et al., 2005, p.160). Thus, frequent interaction with friends living in Canada may be indicative of higher levels of social support and social capital which may put African immigrant mothers in Alberta at a decreased risk for maternal depression and anxiety after childbirth.

Furthermore, sense of belonging was the strongest significant predictor of reporting symptoms of maternal depression and anxiety. This finding is similar to that of other studies conducted on immigrant populations, where having a strong sense of belonging in local community was a protective factor for self-reporting symptoms of depression and anxiety (Nwoke, Okpalauwaekwe, Bwala, 2020; Fung & Gudzer, 2018). This is also consistent with theorizing that social identity protects against maternal depression and maternal anxiety through several social and psychological mechanisms. For immigrant women, a sense of belonging to local community reflects whether they feel accepted, secure, and included in their adopted country (Schimmele and Wu, 2015; Wu, Hou and Schimmele, 2011). For African immigrant mothers specifically, newcomer initiatives that foster a strong sense of community among Africans are a promising strategy to consider, as the social ties that accompany a sense of belonging are a protective factor for maternal depression and anxiety. Future studies could explore sense of belonging in home country as a foundation to sense of belonging in Canada post-migration.

The acculturation measure of years since immigration was found to be an important factor associated with maternal mental health outcomes for study respondents. In this dissertation study, a higher proportion of recent African immigrant mothers had symptoms of maternal depression (6.5% vs. 4.6%) and maternal anxiety (16.4% vs. 10.0%) when compared to non-recent African immigrants. This finding corroborates similar studies on immigrant mental health, where years since immigration was highlighted as a protective factor for self-reporting symptoms of depression or anxiety (Nwoke, Okpalauwaekwe et al., 2020; Islam, 2015). African mothers who recently immigrated to Canada may have difficulties acculturating, and the ideals of being caught between two cultures (i.e. Canadian culture and that of their country of origin) could result in a struggle of them negotiating their identity in their new environment, possibly including motherhood.

Transnationalism – the linkages between immigrants and their countries of origin, is another factor in creating and maintaining strong social ties. African immigrants maintain strong ties to their homeland, despite relatively long period of residence in Canada. Transnational ties are mainly maintained through communication by telephone, repeat migration, cultural activities, cash remittances, and investments in one's country of origin (Binaisa, 2010; Owusu, 2003). In addition to individual linkages, many African immigrant women maintain collective ties to their homeland through a network of ethnic and township associations (Binaisa, 2010; Owusu, 2003). There are various African origin townships associations in Alberta – e.g., Nigerian Canadian Association of Calgary/Edmonton, Ghanaian-Canadian Association of Calgary, South Sudanese Community of Calgary/Edmonton, Eritrean Community Association of Edmonton etc. The types and functions of the associations reflect the needs of the immigrants in relation to the host country and their desire to maintain their home country ties and commitments. The associations also serve an important welfare function, as they seek to improve the social and economic well-being of their

members by assisting them to find employment, housing, and other social and economic opportunities. They also provide an avenue for social fellowship and informal networking, especially for African newcomers. In terms of their transnational significance, the associations also serve as a collective mechanism by which African immigrant groups seek to preserve and express their unique cultural identities.

Lastly, age at time of immigration was not significantly associated with any of the two maternal mental health outcomes (depression and anxiety) for African mothers in the study sample. Further investigation in the form of longitudinal studies that can follow African immigrant mothers upon arrival in Canada over time, would help elucidate the effect of age at time of immigration and years since immigration on maternal mental health outcomes.

Overall Health System and Healthcare Factors

African mothers in the study sample with no access to a regular medical doctor were five times more likely to have symptoms of maternal depression and six times more likely to have symptoms of maternal anxiety in comparison to those with access to a regular medical doctor. This corroborates findings from other immigrant studies where respondents with access to a family doctor were less likely to report poorer mental health outcomes (Nwoke, Okpalauwaekwe & Bwala, 2020; Visiliadis et al., 2009). Family doctors are viewed as a gateway to maternal mental health services and play a key role in the care and management of mental health (Mental Health Commission of Canada, 2012; Lesage et al., 2006). Thus, identifying the barriers (e.g., racism, discrimination, systemic barriers, and personal or community barriers) and facilitators (e.g., family and friends) to mental healthcare in Alberta is necessary to understand the access needs of African immigrant mothers and reduce disparities to access.

Unequal access to healthcare services is another challenge that racialized immigrant women face in healthcare provision in Canada. Health care access is fundamental to health. Racialized immigrants have lower reported rates of healthcare utilization in Canada (Chui, Amartey, Wang, & Kurdyak, 2018). For instance, in a study of ethnic differences in mental health utilization, Chiu et al. (2018) found Black populations in Ontario that reported poor or fair mental health were less likely to seek professional mental health help compared to Caucasian populations. Another prior study that examined ethnic differences in the rates of physician contacts and hospital admissions found that racialized immigrants were less likely to be admitted to hospital compared to their non-racialized counterparts (Quan, Fong, De Coster, Wang, Musto et al., 2006). Several studies suggest immigrants and racialized individuals are less likely to use preventive screening services (Quan et al., 2006) and mental health services (Gadalla, 2008). The inability to access health services, particularly those designed to maintain and promote health and prevent disease, increases health risks and is associated with negative health outcomes, particularly over time.

Moreover, in many instances, racialized immigrant women are unable to access health programs and services, such as mental health counselling, and screening, for a variety of reasons; these include physical inaccessibility, cultural factors, lack of cultural competency, geographic location, or the cost of non-insured health services (Chiu et al., 2018). The challenges these women face due to these barriers in accessing health care, can lead to emotional distress and feelings of isolation, which ultimately will affect overall health outcomes (Chiu et al., 2018). Cultural differences can prevent African immigrant women in Alberta from seeking appropriate care in a timely manner, thus undermining healthcare service utilization. Worsening health status for some African immigrant women in Alberta can result from health problems that are not addressed on time, either because they are not communicated to physicians, or due to language barriers in

explaining their symptoms to the healthcare providers. Likewise, services that do not address particular cultural needs (i.e., preference for female providers, same language, respect and knowledge of cultural traditions) become inaccessible (Kuroczycka & Vallianatos, 2016).

Access to family doctors is often a primary pathway to mental health and addiction services, and 80% of Canadians rely on them for mental healthcare (CMHA, 2018). Still, many Black (African and Caribbean) individuals in Canada have poor access to family doctors (Anderson, McKenzie & Kurdyak, 2017). Anderson et al. (2015) identified that only 35% of Black-Caribbean and 51% of Black-African participants had access to a family doctor in accessing care, compared to 62% of white participants. Furthermore, family doctors play a prominent role in mental healthcare, but they may be too resource-strapped to meet mental healthcare demands adequately (CMHA, 2018). Access to Black mental health professionals is also of particular importance (Office of the Provincial Advocate for Children & Youth, 2018). However, there remains a pronounced lack of available Black professionals in the mental healthcare sector (Shahsiah and Ying Yee, 2006).

Canadian Physician Statistics (2018) show that there are 89,911 doctors in Canada. Ironically, the Canadian Medical Association and other medical organizations in Canada do not track the race or ethnicity of physicians, hence the absence of comprehensive diversity data. Even without definitive numbers, there is a lack of Black representation in the medical field. For example, in Ontario, Black people comprise 2.3% of practising physicians, yet 4.5% of Ontarians are Black (Kralj, 2019). Thus, as no Alberta-specific data exist, it can be presumed that there are even less Black physicians and mental health professionals in Alberta. Between 2013 and 2017, the number of physicians per 100,000 population in Alberta increased by 11 per cent; in 2017, there were around 250 physicians per 100,000 population, up from about 230 in 2013 (CIHI, 2020).

Additionally, in Alberta, about 38 per cent of working doctors are women, which is slightly lower than the national average (CIHI, 2020). Ultimately, poor access to mental health professionals often leads to inadequate follow-up and poorer mental health outcomes (CMHA, 2018).

The Canadian Strategy for Mental Health proposes that primary healthcare services be expanded to integrate specialized mental healthcare services in order to address the gaps in the mental health system (Mental Health Commission, 2012). Family doctors in Alberta who serve predominantly African women or immigrant women as a whole seem appropriate for this role expansion, as study respondents identified their family doctor as their point of contact if they needed to seek mental healthcare after childbirth. Primary care for mental health is affordable, and investments can bring important benefits (World Health Organization, 2008). Certain skills and competencies are required to effectively assess, diagnose, treat, support and refer people with mental disorders. It is essential that primary care workers in Alberta are adequately prepared and supported in their mental health work. In Alberta, the main model of primary care are Primary Care Networks (PCN) with approximately 80% of family physicians operational under this model. PCNs were established in 2003 following the Primary Care Initiative (Rauscher, 2015) that reinforced the use of primary healthcare teams to improve access to and quality of care (Suter et al., 2014). By April 2017, there were 42 PCNs across the province (Alberta Health, 2017). PCNs have approximately 3,800 family physician members and over 1,400 full-time-equivalent non-physician healthcare providers to deliver primary care services to 3.6 million Albertans (Alberta Health, 2017). Nonetheless, not every family physician and/or mental health service provider in Alberta is a member of this initiative, highlighting a possible gap in service provision under this model.

Ultimately, to improve the mental health service provision for African mothers (including access), integrating mental health care in primary care in Alberta can also help reduce stigma and discrimination. Stigma and discrimination are reduced because people with mental disorders are treated in the same way as people with other conditions. They stand in the same queues, receive appointments in the same way, and see the same health workers. This is important for African immigrant mother's perception of their disorders, as well as for the perceptions of family members, friends, other members of the African community, and indeed the health workers who treat people with mental disorders.

Underlying Effects of Maternal Depression and Maternal Anxiety

Overall, this study found that respondents had high postnatal mental health knowledge levels but low prenatal mental health knowledge. The least understood topic was the influence of depression or anxiety during pregnancy on child development, where only 25% of participants responded with a somewhat/strongly agree that *“children who have mothers with depression or anxiety during pregnancy are likely to be slower in their development than children whose mothers do not have depression or anxiety in pregnancy”*, and over 46% reported that they were unsure or did not know. Findings from this study that showed African mothers were more knowledgeable about maternal mental health postnatal than prenatal are similar to both a Canadian study and an Australian study. In the Canadian study, 52% of respondents identified prenatal anxiety as ‘normal’ (Kingston, McDonald, Tough et al., 2014) while the Australian study indicated that 7.0% of participants acknowledged the health implications of maternal anxiety and depression before childbirth (Highet, Gemmil & Milgrom, 2011). The limited knowledge on the determinants of prenatal mental health is a risk factor for poor maternal mental health after childbirth, as it

contributes to the failure to recognize the role other societal and economic factors play in maternal depression and anxiety outcomes post-childbirth (Bunevicius et al., 2009; Milgrom et al., 2008; Giardinelli et al., 2012). This failure to recognize other non-biological factors can be a barrier to help-seeking, as it implies that prevention of maternal depression and anxiety is not possible. Strategies for improving help-seeking by African mothers in Alberta should focus on improving mental health literacy, reducing stigma, and considering the desire of immigrant African mothers for self-reliance. Help-seeking is discussed in more depth in a later section of this chapter.

The limited knowledge of prenatal mental health factors may also contribute to the high rates of maternal depression in African mothers in Alberta, as well as under-detection and under-treatment of other maternal mental health problems. Improving maternal mental health knowledge pre- and post-childbirth may have a substantial impact on the timely detection of maternal depression and anxiety, and possibly more timely help-seeking behaviours. Existing literature has indicated that early and targeted interventions to improve the mental health of pregnant women has long-term benefits for reducing the risk of maternal mental health problems following childbirth and poor child development (Milgrom et al., 2011; Kozinszky et al., 2012; El-Mohandes et al., 2011). Although the historical focus on immigrant maternal health studies has been on diagnosing and treating depression after pregnancy, the findings from this study highlight the need for a shift towards improving African mothers' (and immigrant mothers as a whole) understanding of the prevalence and risk factors for maternal depression and anxiety prior to childbirth (in the prenatal period).

The low level of prenatal mental health knowledge specific to the effects of maternal mental health outcomes on child development highlighted in this study, echoes findings from other studies indicating that knowledge of factors influencing child development is poor (Rikhy et al., 2010)

and dismisses the importance of early life influences on long-term child health and wellbeing (Davey, 2010; Kingston et al., 2014). Ultimately, this study highlights that among all participants, 51.5% knew someone who had depression or anxiety after they have had a baby; among respondents with maternal depression or anxiety symptoms, over 70% knew someone who had depression or anxiety after having a baby. Personal experience on the knowledge of maternal mental health plays a positive role (Leddy et al., 2011; Kingston et al., 2014). Thus, it is plausible that a consistent predictor of prenatal and postnatal knowledge is personally knowing another woman who has experienced maternal depression or anxiety.

Perinatal mental health screening, specifically postpartum depression screening, standardization was identified as a priority in the 2017 Government of Alberta's Valuing Mental Health Strategy (Healthy Children and Families, n.d.). Nonetheless, it is still not a required component of routine prenatal and postnatal care in Alberta. It is noteworthy, then, that this study's findings demonstrate high acceptability of routine perinatal mental health screening where 82% and 91% agreed that all women should be screened prenatally and postnatally, respectively. This is an important finding within the framework of Alberta's healthcare system. Although respondents highlight the value in prenatal and postnatal mental health screening, it is currently not mandated or actively promoted within current provincial or federal perinatal policies. Ultimately, findings from this study indicate that universal maternal mental health screening in the pre/postnatal period is acceptable among African mothers in Alberta.

Furthermore, perinatal mental health knowledge was a constant predictor of acceptability of pre- and postnatal mental health screening. Respondents who are knowledgeable about the impacts of maternal depression/anxiety were more likely to endorse universal screening, which highlights the dynamic interplay between perinatal mental health knowledge and perinatal mental health

screening acceptability. This finding is consistent with the known impact of health literacy on cancer screening (Oldach & Katz, 2013; Nguyen et al., 2021), screening for high BMI and type 2 diabetes (Ayre, Cvejic et al., 2020), and other forms of screening (Berkman, Sheridan et al., 2011). To improve the perinatal mental health knowledge of African mothers, family doctors and women health clinics across the province should make mental health screening in pregnancy a part of routine maternity care. This would require the reprioritisation of workloads, further mental health training, and a change in the attitudes and practices of healthcare providers. Currently in Alberta, women's maternity/obstetric clinics do not have resident psychiatrists or psychologists, as expecting mothers are referred elsewhere to seek services. Family doctors and women health clinics would need support from a wider multidisciplinary team, ideally with a psychiatrist to work together in a combined approach to develop and implement culturally appropriate guidelines to ensure African immigrant mothers receive the best possible care in a more holistic, culturally safe and comprehensive way.

Preferred/Common Help-Seeking Behaviours

Maternal mental health help-seeking behaviours in a “traditional” African society usually involves a family decision-making process, highly influenced by the community's concept of mental illness. Despite this, most participants outlined the following help-seeking choices (from first to last choice of help) if one is experiencing maternal depression or maternal anxiety: talk to their spouse/partner, talk to a healthcare professional, talk to a friend or other relative, talk to a clergy/spiritual leader, talk to no one. This observation differed from the literature of other immigrant groups, where talking to a healthcare professional for mental health was seen as a last resort in emergency situations rather than a preventative measure (Mental Health Commission,

2009; Chew-Graham et al., 2002; Nwoke, Okpalauwaekwe & Bwala, 2020). A possible reason for the observed conclusion could be because of the small sample size in this study, and differences in population demographics (African immigrants) when compared to other studies with immigrants grouped as a whole. Nonetheless, the foreignness of seeking an “outsider’s” help for personal issues and mistrust of outsiders to one’s immediate family are difficult attitudes to change and require immense trust. This explains why the preferred help-seeking behaviour for both maternal depression and anxiety in this study was the traditional norm of talking with one’s partner/spouse due to the lack of other familial support.

Closely related to preferred help-seeking behaviours among African immigrant women is the lack of targeted maternal mental health outreach. This lack of targeted mental health outreach has also been noted by South Asian and other immigrant and racialized communities in Canada (Ahmad et al., 2004; Li & Browne, 2000; Mental Health Commission, 2009). A solution offered in these studies is to educate immigrant communities about mental illness and mental health, so that the recommendation to seek timely mental healthcare slowly emerges from the community itself. Although participants’ knowledge of maternal mental health in this study was high, mental health education emerging directly from the African immigrant community can help mitigate the stigma surrounding seeking timely mental healthcare, especially pre- and post-childbirth.

Strengths

This study is the first quantitative study in Canada to investigate factors associated with maternal depression and anxiety among a sample of African immigrant mothers within two years after childbirth. Thus, it serves as a basis for future research on African mothers and their maternal mental health. Further studies are needed to determine if applicability can be inferred to all

immigrant African mothers in Alberta and other racialized immigrant mothers in Alberta and Canada within two years after childbirth. In addition to the proportion of respondents with symptoms of maternal depression and anxiety, this study provided the characteristics of associated variables, as well as estimates of prenatal and postnatal knowledge among the sample of immigrant African mothers in order to paint a detailed landscape of maternal mental health patterns for immigrant African mothers within two years after childbirth. Lastly, another strength of the study was the very small number of missing data, which required no imputation or weighting adjustments during the analysis stage.

Limitations

Self-selection of study respondents presents a limitation of this current study. Although the sample represents a variety of African immigrant women in Alberta from different socio-economic backgrounds, it is plausible that African mothers that responded to the study callout may be different from those that did not respond (i.e., self-selection bias). In most instances, self-selection will lead to biased data, as the respondents who choose to participate will not well represent the entire target population or exaggerate some findings from the study. As described earlier, the study used non-random sampling, and as a result, the total sample might not be representative or generalizable of all African mothers in Alberta within two years after childbirth. Additionally, with an over-representation of West African immigrant mothers in the study sample, selection bias may have been introduced and limited the generalizability of study findings to all African immigrant women in Alberta. As such, study findings could be more generalizable to West African immigrant mothers in Alberta.

Furthermore, it was not possible to extract demographic or any other data about the non-responders; this would have provided information about the representativeness of the sample and could have compensated for selection and non-response bias. Self-selection of study participants could also impact the prevalence of maternal depression and anxiety in this study sample, such that respondents more likely to experience depression or anxiety could have also been more likely to complete the study survey. This could have resulted in the inclusion of African immigrant women with severe or mild disease, leading to an overestimation of the true proportion of respondents with symptoms of depression and anxiety. To mitigate this, future studies should confirm previous and current depression and anxiety using a representative sample and ensuring a clinical diagnosis.

Moreover, there is considerable controversy about whether depression and anxiety manifest themselves differently across ethnicities. The validity of measurement tools is substantially dependent on context and all measures of depression or anxiety are flawed and prone to cultural influences. As these are important limitations to consider, their influences create varied effect on the measurement of the actual proportion of respondents with symptoms of maternal depression and anxiety. This highlights the need for more adequate research into identifying symptoms of maternal depression and anxiety in large sample sizes of African immigrant mothers in Alberta and Canada; through this, a validation of the EPDS-10 and GAD-7 tools could be done in this increasing demographic population in Canada. Maternal depression and anxiety were measured with the EPDS-10 and GAD-7 scales, neither of which has been validated in African immigrant populations in Canada. These screeners measured symptoms of depression or anxiety rather than the clinical diagnosis, and as a result could have overestimated the true burden of depression and anxiety in the sample of African immigrant mothers in Alberta within two years after childbirth.

Maternal depression and anxiety symptoms were self-reported and not based on clinical interviews by health professionals. Thus, the self-report nature of the survey data may be subject to social desirability and recall biases (Patten et al., 2012). Social desirability bias is the tendency to underreport socially undesirable attitudes and behaviors and to over report more desirable attributes (Patten et al., 2012), resulting in an overestimation or underestimation of the actual symptoms of maternal depression and anxiety among the sample of African immigrant mothers within two years after childbirth. Further research is however needed to determine the direction of this bias.

All statistics reported are estimates and caution needs to be taken in their application and interpretation. Statistical associations must be interpreted as exploratory. Moreover, the transferability and application of findings to other settings/cultural groups is especially an issue for the study due to the sample size and lack of representativeness of the sample. This study only provides a snapshot of maternal depression and anxiety among a self-selected sample of African mothers in Alberta in a specific time (year 2020). The variations in the proportion of respondents with symptoms of maternal depression and anxiety over time and their impact on mental health could be examined further with a longitudinal research study design. Lastly, although these analyses of cross-sectional population level data identified some associations, it is important to acknowledge that they cannot imply a cause-and-effect relationship between predictor variables (i.e. access to a regular medical doctor) and the outcomes of maternal depression and anxiety.

CHAPTER 7

Chapter 7: Conclusions and directions for future research

Conclusions

This research analyzed the relationship between maternal depression and anxiety symptoms and the key determinants shaping it, in a sample of African immigrant women in Alberta with infants two years of age or under. It has also explored perinatal mental health knowledge, grouped into prenatal and postpartum knowledge, and help-seeking behaviours African immigrant mothers' utilize for depression and anxiety.

Of the recruited African immigrant mothers, 27.5% self-reported symptoms of probable maternal depression and 12.0% self-reported symptoms of maternal anxiety. Social demographic and social support variables appeared to be associated with both maternal depression and maternal anxiety outcomes. There was evidence of mothers with a strong sense of belonging in local community and mothers with access to a regular medical doctor being less likely to report symptoms of maternal depression. Similarly, mothers with daily-weekly interaction with friends in the city and mothers with regular access to a medical doctor were less likely to report symptoms of maternal anxiety. In addition, African mothers had low perinatal mental health knowledge but high postpartum mental health knowledge, and were more likely to seek help first from a family member (i.e., partner) for mental health concerns.

Study results underscore the need for increased understanding of African mothers as they navigate the maternal mental healthcare system in Alberta and Canada following childbirth. It is hoped that the findings of the present study will serve as a basis for future larger studies, and ultimately help inform the implementation of culturally sensitive and competent health literacy programs for African immigrant women that take into account the strengths of cultural values, norms, beliefs, and perception of mental health. As two of the most significant predictors of

maternal depression and anxiety in these analyses, social support and postpartum mental health knowledge, represent ideal candidates for population-level interventions, they are promising options for immigrant-settling organizations and cultural association to consider to improving the maternal mental health outcomes of African mothers in Alberta.

In implementing maternal mental health awareness programs in African immigrant communities in Alberta, public health professionals could partner with African spiritual leaders and women leaders from the community in pre-and-post mental health awareness creation (i.e., forums on perinatal mental health during mother's day celebrations). A holistic approach to postpartum mental health care is crucial for African immigrant mothers; one that includes the use of social support groups, spirituality, self-help, non-medicinal treatments, or a combination of many. Ultimately, providing pre-immigration counselling to African mothers on the transitioning process to Canada, that includes content on "birthing" new lives abroad is of high value.

Implications for Future Research

This study has implications for both practice and future areas of research on African immigrant women with young infants. Findings from this study contribute to our knowledge of disparities in maternal mental health outcomes among African mothers with infants' aged two years or under. Study results show that, in Alberta, African mothers' maternal mental health and well-being is associated with a variety of factors including social support (i.e., having friends in the same city of residence), sense of belonging in local community, and having access to a regular medical doctor. Also, community-level barriers exist that prevent African mothers from seeking care. As noted in study results, stigma (i.e., shame and guilt) make the seeking of care by African immigrant

women especially difficult. Awareness campaigns and open discussions on the topic are needed to reduce this stigma.

Future research should focus on further investigations on maternal depression and anxiety among African mothers in Canada. Qualitative research on perception, mental health service utilization in the perinatal period, and childbirth traditions could add value to this quantitative study and reveal new knowledge that would provide the mental healthcare system in Alberta with tools to meet African mothers' needs in the postpartum period. Future research can investigate the differences in maternal mental health system delivery between origin and host countries, as this is needed to better understand the past experience and point of view of African immigrant women and the mental healthcare system barriers they face in Canada. Ultimately, there is an urgent need for future research that capitalizes on the strengths, resilience and cultural values of African immigrant mothers in Alberta and/or Canada.

Furthermore, there is limited literature on the prevalence of maternal depression and anxiety symptoms in African mothers in Canada. No articles were found specifically on the topic of maternal anxiety screening or assessment in this population. As a result, further validation of common depression and anxiety screening tools in diverse immigrant populations (i.e., African immigrants) is required and could be explored in a future study. Further studies need to be conducted to examine qualitative domains not examined in this study – for example: stigma, cultural adjustment issues, underemployment of African immigrants, and how these have cumulative impacts on their maternal mental health.

Immigration, Refugees, and Citizenship Canada's (IRCC) settlement programs play a major role in accelerating social and economic integration, which in turn impacts African immigrant women's overall health and maternal mental well-being. For example, this study found that having

friends in the same city of residence and having a strong sense of belonging in local community were associated with a decreased likelihood of experiencing maternal depression and anxiety. One of the central priorities of Canada's settlement program is to encourage participation of immigrants in all aspects of Canadian social life and is designed to meet immigrants' immediate needs by providing orientation and referral services and facilitating access to social, health, and recreational facilities.

In the case of Alberta specifically, there are multiple immigrant settlement organizations that play an integral role in the integration of all immigrants into Canadian society; these organizations provide services and programs to newcomers, as well as guidance on language translation, educational assessment, employment, housing, childcare etc. These organizations are however not limited to serving African immigrants alone. In an effort to combat the spread of COVID-19, settlement agencies in Alberta made modifications to their services, as most were now offered solely online with some exceptions in urgent circumstances. This modification could possibly have restricted access to some new immigrant mothers, especially those without stable access to internet connectivity. Ultimately, if African immigrant mothers do not receive adequate settlement services, their multiple social determinants of health could be impacted; for example, they would not receive the support they need in their job search, employability, and would possibly not know where to receive community social support from other African mothers etc. Therefore, settlement programs in Alberta that are culturally safe play a significant role in supporting African immigrant women's settlement, integration, and their maternal mental health.

Findings from this study have mental health policy and mental health system delivery implications. Noteworthy, system-level barriers (i.e., access) make it difficult to navigate the mental health system. Like other immigrant populations, African immigrants do not feel adept in

navigating specialized mental health services and require targeted outreach, awareness, and education programs to be better informed. The data showed that African mothers preferred to consult primary care providers for maternal mental health concerns. Thus, expanding the mental healthcare role of the family doctor, so they can act as a first line of defense for maternal depression and anxiety is one possible course of action for consideration. Further research is needed on how integrated care can be effectively promoted and what types of training family doctors will require to expand their mental healthcare role.

Ultimately, results from this study indicate that African mothers with both maternal depression and anxiety symptoms may have a distinct set of needs. Therefore, these findings highlight the need for IRCC's and Alberta Health Services' continued support of resettlement services directed to meet the needs of African immigrant women, especially their maternal mental health needs post-migration. There is a need for increased attention to the maternal mental health of African immigrant women in Alberta – one that encompasses more epidemiological research, more avenues to increase social support of newcomer African mothers, creation of better health and social policies to ease integration into Canada (e.g. more refined methods for the transfer of international qualifications, increase access to culturally-appropriate healthcare), and an increased visibility of African or Black mental health professionals in Alberta and/or Canada.

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APPENDIX

Appendix 1.1: Common approaches to measuring maternal depression and anxiety

Tools and Description	Measure	Number of Items and Format	Administration and Scoring Time	Psychometric Properties	Cost
<i>Common approaches to measuring depression</i>					
Edinburgh Postnatal Depression Scale EPDS-10	Depression & anxiety	10 items	Less than 5 minutes	Sensitivity: 59-100% Specificity: 49-100%	Freely accessible
Patient Health Questionnaire PHQ-9	Depression & anxiety	9 items	Less than 5 minutes	Sensitivity: 75% Specificity: 90%	Freely accessible
Center for Epidemiologic Studies – Depression Scale CES-D	Depression	20 items	5-10 mins	Sensitivity: 71% Specificity: 57%	Freely accessible
Beck Depression Inventory BDI-II	Depression	21 items	5-10 minutes	Sensitivity: 84% Specificity: 81%	Proprietary (\$115/kit)
<i>Common approaches to measuring anxiety</i>					
Edinburgh Postnatal Depression Scale	Anxiety	3 items	Less than 5 minutes	Sensitivity: 88%	Freely accessible

EPDS – 3A				Specificity: 49%	
Spielberger State Trait Anxiety Inventory STAI	Current “state” anxiety; pervasive “trait” anxiety	40 items; 20 per scale (state & trait)	10 minutes	Sensitivity: 80.95% Specificity: 79.75%	Proprietary (\$125USD /kit)
Hospital Anxiety and Depression Scale HADS-A	Generalized symptoms of anxiety and fear	7 items	Less than 5 minutes	Sensitivity: 92.9% Specificity: 90.2%	Proprietary . User fee required.
Generalized Anxiety Disorder Scale GAD-7	Anxiety	7 items	Less than 5 minutes	Sensitivity: 89% Specificity: 82%	Freely accessible

Appendix 1.2: Recruitment memo

Email Subject Line: Univ. of Lethbridge Study – Maternal Mood and Anxiety Disorders within 2 Years of Childbirth among African Immigrant Women in Alberta.

Dear Potential Participant,

My name is Chinenye Nwoke. I am a PhD candidate in the Faculty of Health Sciences at the University of Lethbridge. I am writing to invite your participation in a research project designed to explore maternal mood and anxiety disorders within two years of childbirth among African immigrant women in Alberta. This project involves the completion of a questionnaire, and is estimated to take approximately 15-20 minutes of your time.

Please keep in mind that you are under **NO** obligation to participate in this study. Participation is voluntary and confidential, and your identity will remain anonymous; no one at your cultural association or organization will be told whom has chosen to participate in this study. There are no anticipated risks to taking part in this survey and you can stop at any time. You will be entered into a draw to win one of five **\$20** Walmart gift certificates for your time (1 in 30 odds of winning). Winners will be notified via email.

If you have questions about the study or are interested in participating in this study, you may contact me at chinenye.nwoke@uleth.ca or 403-561-7125. You may also contact the Office of Research Ethics at the University of Lethbridge at 403-329-2747 or research.services@uleth.ca if you have questions about your rights as a participant. This research has been reviewed for ethical acceptability and approved by the University of Lethbridge Human Participant Research Committee.

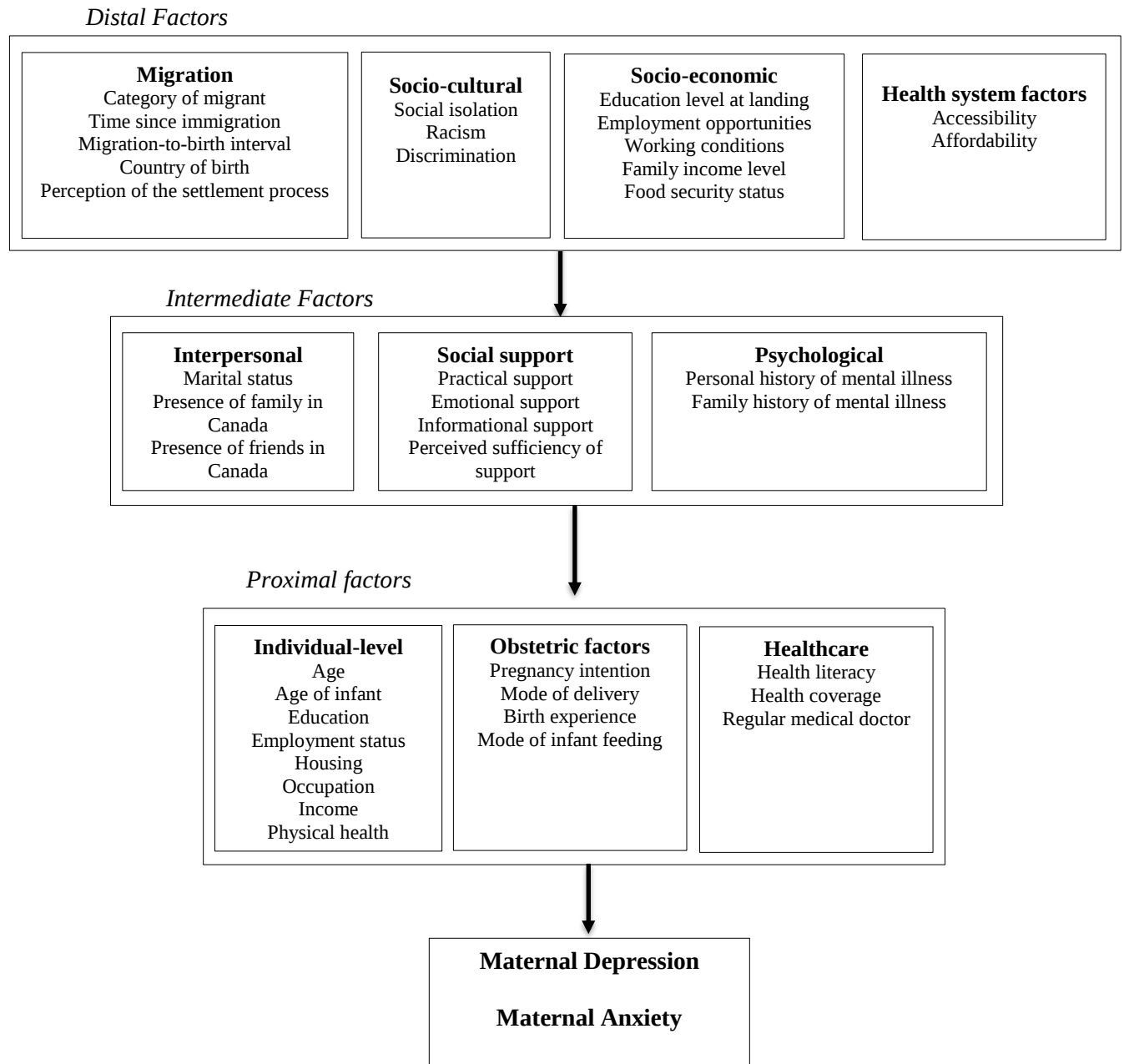
If you would like to participate in this study, please contact me at your earliest convenience. Survey administration can be determined at your convenience, with options online, or via a mailed questionnaire. If you have any questions or concerns, please feel free to contact me.

Please share this memo with other individuals you feel would be interested in participating in this study.

Thank you in advance for your participation.

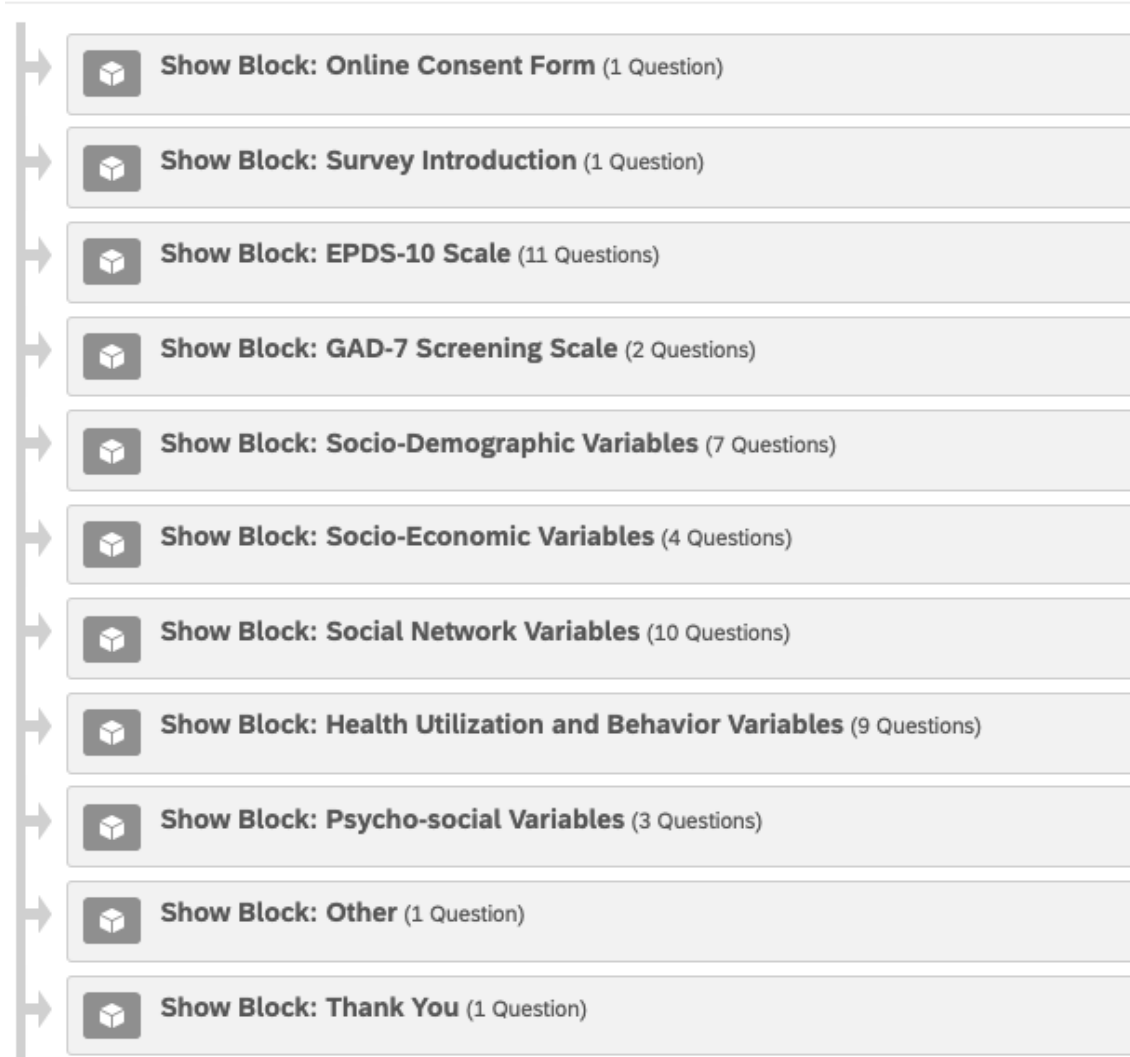
Chinenye Nwoke
PhD Candidate
Faculty of Health Sciences,
University of Lethbridge
403-561-7125
chinenye.nwoke@uleth.ca

Appendix 1.3: Determinants of maternal depression and anxiety



Appendix 1.4: Survey flow in Qualtrics and study questionnaire

Survey Flow Maternal Mood & Anxiety Disorders within 2 Years of Childbirth among African Women



EPDS-10 Scale

In the past 7 days:

1. I have been able to laugh and see the funny side of things
 - ☐ As much as I always could
 - ☐ Not quite so much now
 - ☐ Definitely not so much now
 - ☐ Not at all

2. I have looked forward with enjoyment to things
 - ☐ As much as I ever did
 - ☐ Rather less than I used to
 - ☐ Definitely less than I used to
 - ☐ Hardly at all

3. I have blamed myself unnecessarily when things went wrong
 - ☐ Yes, most of the time
 - ☐ Yes, some of the time
 - ☐ Not very often
 - ☐ No, never

4. I have been anxious or worried for no good reason
 - ☐ No, not at all
 - ☐ Hardly ever
 - ☐ Yes, sometimes
 - ☐ Yes, very often

5. I have felt scared or panicky for no very good reason
 - ☐ Yes, quite a lot
 - ☐ Yes, sometimes
 - ☐ No, not much

- No, not at all
6. Things have been getting on top of me
- Yes, most of the time I haven't been able to cope
 - Yes, sometimes I haven't been coping as well
 - No, most of the time I have coped quite well
 - No, I have been coping as well as ever
7. I have been so unhappy that I have had difficulty sleeping
- Yes, most of the time
 - Yes, sometimes
 - Not very often
 - No, not at all
8. I have felt sad or miserable
- Yes, most of the time
 - Yes, quite often
 - Not very often
 - No, not at all
9. I have been so unhappy that I have been crying
- Yes, most of the time
 - Yes, quite often
 - Only occasionally
 - No, never
10. The thought of harming myself has occurred to me
- Yes, quite often
 - Sometimes
 - Hardly ever
 - Never

GAD-7 Scale

Over the last 2 weeks, have you felt bothered by any of these things?

	Not at all	Several Days	More than half the days	Nearly Every day
Feeling nervous, anxious, or on edge?	☐	☐	☐	☐
Not being able to stop or control anything?	☐	☐	☐	☐
Worrying too much about different things?	☐	☐	☐	☐
Trouble relaxing?	☐	☐	☐	☐
Being so restless that it is hard to sit still?	☐	☐	☐	☐
Becoming easily annoyed or irritable?	☐	☐	☐	☐
Feeling afraid as if something awful might happen?	☐	☐	☐	☐

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

- ☐ Not difficult at all
- ☐ Somewhat difficult
- ☐ Very difficult
- ☐ Extremely difficult

Other Covariates

Q1 Are you an immigrant? (An immigrant is a person residing in Canada, but was born outside of Canada)

- ☐ Yes
- ☐ No

Q2 What is your current age?

Q3 What is the age group of your most recent infant?

- ☐ Less than 6 months
- ☐ 6-9 months
- ☐ 10-12 months
- ☐ 13-18 months
- ☐ 19-24 months
- ☐ 25+ months

Q4 Where in the province do you reside?

- ☐ Airdrie
- ☐ Calgary
- ☐ Edmonton
- ☐ Lethbridge
- ☐ Red Deer
- ☐ Other (specify):

Q5 What is your country of origin?

(Country of African origin)

Q6 What is your religion?

- ☐ No Religion
- ☐ Anglican
- ☐ Baptist
- ☐ Pentecostal
- ☐ Presbyterian
- ☐ Catholic (Roman, Ukrainian, Greek)
- ☐ Christian, unlisted
- ☐ Islam (Sunni, Shia)
- ☐ Latter Day Saints (Mormon)
- ☐ Other (specify):

Q7 Are you currently pregnant?

- ☐ Yes
- ☐ No

Q8 Do you (or your spouse/partner/parents) presently own or rent your residence?

- ☐ Own
- ☐ Rent

Q9 What is the best estimate of the total household income received by all household member, from all sources before taxes and deductions, in the past 12 months?

- ☐ < than \$5,000
- ☐ \$5,000 - \$10,000
- ☐ \$10,000 - \$15,000
- ☐ \$15,000 - \$20,000
- ☐ \$20,000 - \$30,000
- ☐ \$30,000 - \$40,000
- ☐ \$40,000 - \$50,000
- ☐ \$50,000 - \$60,000
- ☐ \$60,000 - \$70,000
- ☐ \$70,000 - \$80,000
- ☐ \$80,000 - \$90,000
- ☐ \$90,000 - \$100,000
- ☐ \$100,000 - \$150,000
- ☐ \$150,000 and over

Q10 What is your present employment status?

- ☐ Employed full-time
- ☐ Employed part-time
- ☐ Unemployed, looking for work
- ☐ Not in labor force, not looking for work
- ☐ Student employed part-time or full-time
- ☐ Student not employed
- ☐ Retired
- ☐ Homemaker
- ☐ Maternity leave
- ☐ On disability
- ☐ Other (specify):

Q11 What is your highest level of education?

- ☐ No schooling
- ☐ Elementary – incomplete
- ☐ Elementary – complete
- ☐ Junior high – incomplete

- ☐ Junior high – complete
- ☐ High school – incomplete
- ☐ High school – complete
- ☐ College – incomplete
- ☐ College – complete
- ☐ University – incomplete
- ☐ University – diploma
- ☐ University – bachelor's
- ☐ University – professional
- ☐ University – master's
- ☐ University – doctorate

Q12 What is your current marital status?

- ☐ Never Married (Single)
- ☐ Married
- ☐ Common-Law Relationship / Live-in
- ☐ Divorced
- ☐ Separated

☐ Widowed

Q13 How strongly do you agree to the statement that “Partners of women who have maternal depression or anxiety are also at risk for depression or anxiety?”

☐ Strongly agree

☐ Somewhat agree

☐ Neither agree nor disagree

☐ Somewhat disagree

☐ Strongly disagree

Q14 Do you have family in the same city you reside in?

☐ Yes

☐ No

Q15 What is the frequency of your interaction with family living in Canada?

☐ Daily

☐ Weekly

☐ Monthly

☐ Yearly

☐ Not at all

Q16 What is the frequency of your interaction with family living outside of Canada?

- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☐ Yearly
- ☐ Not at all

Q17 Do you have friends in the same city you reside in?

- ☐ Yes
- ☐ No

Q18 What is the frequency of your interaction with friends living in Canada?

- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☐ Yearly
- ☐ Not at all

Q19 What is the frequency of your interaction with friends living outside of Canada?

- ☐ Daily

- ☐ Weekly
- ☐ Monthly
- ☐ Yearly
- ☐ Not at all

Q20 How would you describe your sense of belonging to your local community? Would you say it is:

- ☐ Very strong
- ☐ Somewhat strong
- ☐ Somewhat weak
- ☐ Very weak

Q21 Do you belong to any cultural or community groups? (I.e. community associations)

- ☐ Yes, active member
- ☐ Yes, non-active member
- ☐ No or non-member

Q22 Overall, how would you rate the availability of mental health care services in your community?

- ☐ Excellent
- ☐ Good
- ☐ Fair
- ☐ Poor

Q23 Do you have a regular medical doctor?

- ☐ Yes
- ☐ No

Q24 In the past 12 months, have you experienced any instances of racism or discrimination when accessing health or mental health care services in your community?

- ☐ Yes
- ☐ No

Q25 Now I'd like to ask about certain long-term health conditions which you may have. We are interested in "long-term conditions" which are expected to last or have already lasted 6 months or more and that have been diagnosed by a health professional.

	Yes	No
Do you have asthma?	☐	☐
Do you have high blood pressure?	☐	☐
Do you have heart disease?	☐	☐
Do you have cancer?	☐	☐
Do you have diabetes?	☐	☐
Do you have chronic bronchitis or chronic obstructive pulmonary disease (COPD)?	☐	☐

Q26 Do you know of anyone who has had anxiety or depression after they have had a baby?

☐ Yes

☐ No

Q27 How well do you agree to the following statements:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Women who have had anxiety or depression in the past (before they became pregnant) are more likely to experience anxiety or depression when they are pregnant.	☐	☐	☐	☐	☐
Women who have postpartum depression find it more difficult to respond to their baby's cues (needs).	☐	☐	☐	☐	☐
Women who have postpartum depression find it more difficult to respond to the needs of their partner and other children.	☐	☐	☐	☐	☐
Children who have mothers with depression or anxiety during pregnancy are likely to be slower in their development than children whose mothers do not have depression or anxiety in pregnancy.	☐	☐	☐	☐	☐

Children who have mothers with postpartum depression or anxiety are more likely to have autism than children whose mothers do not have anxiety or depression.

☐☐☐☐☐

All women should be checked for depression and anxiety during pregnancy.

☐☐☐☐☐

All women should be checked for depression and anxiety after the baby is born.

☐☐☐☐☐

Q28 If depressed during pregnancy or after having a baby, who would be your FIRST choice to go to for help?

- ☐ Partner
- ☐ Friend
- ☐ Family doctor
- ☐ Obstetrician
- ☐ Midwife
- ☐ Public health nurse
- ☐ Mother/father
- ☐ Other relative

- ☐ Mental health therapist
- ☐ Psychologist
- ☐ Clergy/spiritual leader
- ☐ No one
- ☐ Other (Specify):

Q29 If anxious during pregnancy or after having a baby, who would be your FIRST choice to go to for help?

- ☐ Partner
- ☐ Friend
- ☐ Family doctor
- ☐ Obstetrician
- ☐ Midwife
- ☐ Public health nurse
- ☐ Mother/father
- ☐ Other relative
- ☐ Mental health therapist
- ☐ Psychologist
- ☐ Clergy/spiritual leader

- ☐ No one
- ☐ Other (Specify):

Q30 What is the main reason for African mothers not talking to a healthcare provider about feelings of depression/ anxiety during pregnancy or after having a baby?

- ☐ Want to manage it on their own
- ☐ Feel ashamed and cannot cope when other women seem to manage
- ☐ Don't know what is happening to them
- ☐ Fear of having their child taken away
- ☐ Fear of being seen as a failure as a mother
- ☐ Think it is normal to feel this way
- ☐ Feel guilty that they are not happy
- ☐ Don't want to go on medication
- ☐ Don't know who to talk to about it
- ☐ Gender of the doctor
- ☐ Fear of stigma from their community
- ☐ Religion or spirituality
- ☐ Don't Know

Q31 How many years has it been since you immigrated to Canada?

- ☐ 0-2 years
- ☐ 3-5 years
- ☐ 6-10 years
- ☐ 10+ years

Q32 What was your age group at the time of immigration to Canada?

- ☐ Under 18 years
- ☐ 18 - 24 years
- ☐ 25 - 34 years
- ☐ 35 - 44 years
- ☐ 45 - 54 years
- ☐ 55+ years

Q33 How satisfied were you with your settlement process into Canada post-immigration?

- ☐ Extremely satisfied
- ☐ Satisfied
- ☐ Neither satisfied nor dissatisfied
- ☐ Dissatisfied
- ☐ Extremely dissatisfied

Q34 Are there any other things you would like to add that has not been covered in this survey?
If yes, please specify in the space below:

Thank you for your time.

Appendix 1.5: List of contacted community organizations

Organization Name	Contact Information
Nigerian Canadian Association of Calgary (NCAC)	secretary@nca-calgary.com Tel: 587-966-1351
Immigrant Services Calgary (ISC)	nfo@immigrantservicescalgary.ca Tel: 403-265-1120
Alberta Network of Immigrant Women	info@aniw.org Tel: 403-262-8040
House of David Calgary	info@houseofdavid.org Tel: 403-606-7540
RCCG Freedom House Lethbridge	freedomhouse@rccglethbridge.org Tel: 403-929-0881
Ogaden Somali Community of Alberta Residents (OSCAR)	ogaden.alberta@gmail.com Tel: 780-705-0522
South Sudanese Community of Calgary	sudanesecommunity.alberta@gmail.com Tel: 587-896-7239
Eritrean Community Association of Edmonton & Calgary	contact@calgaryeritreans.org Tel: 403-234-7646
Young African Professionals Calgary	yap.calgary@gmail.com Tel: 403-402-0807
Ghanaian Canadian Association	anthonymanful@hotmail.com Tel: 403-383-2644
Lethbridge Family Services: Immigrant Services	Tel: 403-320-1589
SAAMIS Immigration Services Association Medicine Hat	info@saamisimmigration.ca Tel: 403-504-1188
Nigerian Canadian Association of Fort McMurray	info@ncafm.ca
Centre for Newcomers Grand Prairie	info@volunteergrandeprairie.com Tel: 780-538-2727
The Calgary Bridge Foundation for Youth	contactus@cbfy.ca Tel: 403-230-7745

Appendix 1.6: Letter of introduction

Chinenye Nwoke
PhD Candidate
Faculty of Health Sciences
University of Lethbridge
chinenye.nwoke@uleth.ca
403-561-7125

Dr. Geetha Ramesh
President
Alberta Network of Immigrant Women
Unit 107 - 1409 Edmonton Trail NE
Calgary, Alberta
T2E 3K8

Dear Dr. Ramesh,

I am a Ph.D. candidate in Population Studies in Health from the University of Lethbridge. I am completing my dissertation on maternal depression and anxiety disorders within two years of childbirth among African immigrant women in Alberta, and am contacting you in the hope that you can help in my quest to find participants for my study.

I am looking for African mothers who have given birth in the last two years to complete an online questionnaire. The option to also have a mailed paper-based questionnaire is also available. The time estimate for completion of the questionnaire is approximately 15-20 minutes, and participation is voluntary and confidential. Participants will be entered into a draw to win one of five **\$20** Walmart gift certificates (1 in 30 odds of winning).

The purpose of my dissertation is to assess the prevalence of maternal depression and anxiety in a sample of African mothers in Alberta, to examine the magnitude of associated risk factors, to determine understanding of the effects of depression and anxiety after childbirth, and to determine preferred help-seeking behaviours for maternal depression and anxiety.

I have attached a copy of the study Recruitment Memo for mothers, and would greatly appreciate it if you would distribute this memo in any forum you deem appropriate (e.g., newsletters, e-mail lists). Please also feel free to also share the Recruitment Memo with your partner organizations, as you deem fit.

Thank you so much and if you have any questions or concerns, please do not hesitate to contact me.

Sincerely,
Chinenye Nwoke

Appendix 1.7: Study recruitment poster

University of
Lethbridge



PARTICIPANTS NEEDED FOR RESEARCH ON MATERNAL DEPRESSION AND ANXIETY WITHIN 2 YEARS OF BIRTH

Are you 18 years of age or older? ✓

Are you of African origins? ✓

Do you reside in Alberta? ✓

Did you have a live birth AND your infant is now ≤ 2 years of age? ✓

If YES to all questions above, you are invited to take part in a survey study of *maternal depression and anxiety within 2 years of birth among African immigrant women in Alberta*.

Participation would involve a single session, lasting about 15-20 minutes.

Participation is voluntary and confidential.

In appreciation for your time, all participants will be entered into a draw for one of five **\$20** Walmart gift card (1 in 30 odds of winning).

For more information about this study, or to volunteer for this study, please contact:
Chinenye Nwoke | Phone: 403-561-7125 or Email: chinenye.nwoke@uleth.ca |

This study has been reviewed for ethical acceptability and approved by the University of Lethbridge Human Participant Research Committee.

Appendix 1.8: Online consent form (e-consent)

Study name:

Maternal Mood and Anxiety Disorders within 2 Years of Birth among African Immigrant Women in Alberta.

Researcher:

Chinenye Nwoke
PhD Candidate,
Faculty of Health Sciences
University of Lethbridge
chinenye.nwoke@uleth.ca
403-561-7125

Purpose of the research:

The purpose of this research is to determine how many African immigrant women experience symptoms of depression and anxiety within two years of childbirth. This study will also examine the risk factors, effects, and preferred support or help-seeking behaviors for maternal depression and anxiety.

What you will be asked to do in the research:

You are asked to complete a brief survey that would take 15-20 minutes to complete.

Risks and discomforts:

There is minimal anticipated risk of emotional discomfort. However, some of the questions you will be asked as part of this study may make you feel uncomfortable. You may refuse to answer any of these questions, take a break, or stop your participation in this study at any time. There is a link to postpartum support services and resources from Alberta Health Services available to you at the end of the questionnaire.

Benefits of the research and benefits to you:

There are no direct benefits to you from taking part in this study. Although you may not directly benefit from taking part in this study, your participation may help us learn more about the experiences of African immigrant women in Alberta with maternal depression and anxiety. The results of this study may also help inform perinatal interventions and programs for the African immigrant community in Alberta and/or Canada.

Voluntary participation:

Your participation in the research is completely voluntary and you may choose to stop participating at any time without penalty. You are free to decline to answer any particular question you do not wish to answer for any reason. In appreciation for your time, all participants will be entered into a draw for one of five **\$20** Walmart gift card (1 in 30 odds of winning). If you would like to be entered into the draw for the Walmart gift certificate, please provide your email address on the additional link provided at the end of the survey.

Withdrawal from the study:

You may stop participating in the study at any time, for any reason, if you so decide. Your decision to stop participating, or to refuse to answer particular questions, will not affect your relationship with the researcher, University of Lethbridge, or any other group associated with this project.

Also, should you choose to withdraw from the study partway during the survey, it will not be possible to have your responses withdrawn because there is no personal identifying information linked to your responses that would allow for its removal.

Confidentiality:

Your individual survey responses will be kept confidential. The data are stored on the password-protected Qualtrics platform. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study. Extracted and non-identifying raw data will be stored in a secure password-protected Excel database, and only the researcher will have access to it.

Use and Dissemination of the Data:

Study findings will be disseminated in aggregate form to African immigrant communities through community, cultural, and/or religious events in the form of discussions, presentations, and infographics. Hence, there will be no information that could identify your individual response from the data collected. Further dissemination will occur in peer-reviewed journals to the academic and research community, and a final thesis will be published in University of Lethbridge Thesis Portal – publically available through the University of Lethbridge library.

Retention of Collected Data:

The University of Lethbridge has a license to Qualtrics, hence study data will be stored online on the Qualtrics platform. During the analysis phase, the full dataset will be extracted into a password-protected encrypted Excel file. The password will only be made available to the principal investigator (Chinenye Nwoke) and my research supervisor (Brenda Leung, PhD). Study data will then be deleted from the Qualtrics platform once a final and complete Excel database extract has been done at the end of the data collection period, when the required study sample size has been reached. The proposed retention period for collected data will be five (5) years following the study end date to allow for the possibility of additional publications.

If you choose to participate in the raffle draw, your email addresses will be stored in a separate secure password-protected database and will only be used for the draw. It will be deleted once the raffle has been done and the winners have claimed their gift certificates; it is anticipated that this will be completed once the survey is closed.

Questions about the research?

For further information about the study or study results, please contact me at: 403-561-7125 or chinenye.nwoke@uleth.ca. If you have any concerns about this research that I have not addressed, please contact my research supervisor at: brenda.leung@uleth.ca or 403-329-2366.

Questions regarding your rights as a participant in this research may be addressed to the Office of Research Ethics, University of Lethbridge (Phone: 403-329-2747 or Email: research.services@uleth.ca). This research study has been reviewed for ethical acceptability and approved by the University of Lethbridge Human Participant Research Committee.

Legal Rights and Signatures:

I consent to participate in Maternal Mood and Anxiety Disorders within 2 Years of Birth among Immigrant African Women in Alberta conducted by Chinenye Nwoke.

Electronic Consent: I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. My selection below indicates my consent.

Please select your choice below. You may print a copy of this consent form for your records.

Clicking on the “Agree” button indicates that

- You have read the above information
- You voluntarily agree to participate
- You are 18 years of age or older

☐ Agree

☐ Disagree

Please print a copy of this page for your future reference.

START SURVEY <[start survey button](#)>

Appendix 1.9: Paper-based consent form

Study name:

Maternal Mood and Anxiety Disorders within 2 Years of Birth among African Immigrant Women in Alberta.

Researcher:

Chinenye Nwoke
PhD Candidate,
Faculty of Health Sciences
University of Lethbridge
chinenye.nwoke@uleth.ca
403-561-7125

Purpose of the research:

The purpose of this research is to determine how many African immigrant women experience symptoms of depression and anxiety within two years of childbirth. This study will also examine the risk factors, effects, and preferred support or help-seeking behaviors for maternal depression and anxiety.

What you will be asked to do in the research:

You are asked to complete a brief survey that would take 15-20 minutes to complete.

Risks and discomforts:

There is minimal anticipated risk of emotional discomfort. However, some of the questions you will be asked as part of this study may make you feel uncomfortable. You may refuse to answer any of these questions, take a break, or stop your participation in this study at any time. There is a link to postpartum support services and resources from Alberta Health Services available to you at the end of the questionnaire.

Benefits of the research and benefits to you:

There are no direct benefits to you from taking part in this study. Although you may not directly benefit from taking part in this study, your participation may help us learn more about the experiences of African immigrant women in Alberta with maternal depression and anxiety. The results of this study may also help inform perinatal interventions and programs for the African immigrant community in Alberta and/or Canada.

Voluntary participation:

Your participation in the research is completely voluntary and you may choose to stop participating at any time without penalty. You are free to decline to answer any particular question you do not wish to answer for any reason. In appreciation for your time, all participants will be entered into a draw for one of five **\$20** Walmart gift card (1 in 30 odds of winning). If you would like to be entered into the draw for the Walmart gift certificate, please provide your email address on Qualtrics link provided at the end of your questionnaire (**Note:** do not provide your email address on your completed paper questionnaire).

Withdrawal from the study:

You may stop participating in the study at any time, for any reason, if you so decide. Your decision to stop participating, or to refuse to answer particular questions, will not affect your relationship with the researcher, University of Lethbridge, or any other group associated with this project.

Should you choose to withdraw from this study, please discard the questionnaire package you received. If you choose to withdraw from the study after your responses have been sent back to the researcher, it will not be possible to have your responses withdrawn because there is no personal identifying information linked to your responses that would allow for its removal.

Confidentiality:

Your individual survey responses will be kept confidential. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study. Extracted and non-identifying raw data will be stored in a secure password-protected Excel database, and only the researcher will have access to it. Your signed consent form will also be stored in a locked file cabinet housed at the Faculty of Health Sciences.

Use and Dissemination of the Data:

Study findings will be disseminated in aggregate form to African immigrant communities through community, cultural, and/or religious events in the form of discussions, presentations, and infographics. Hence, there will be no information that could identify your individual response from the data collected. Further dissemination will occur in peer-reviewed journals to the academic and research community, and a final thesis will be published in University of Lethbridge Thesis Portal – publically available through the University of Lethbridge library.

Retention of Collected Data:

Collected data will be entered into a password-protected encrypted Excel database. The password will only be made available to the principal investigator (Chinenye Nwoke) and my research supervisor (Brenda Leung, PhD). Completed paper questionnaires and paper-based consent forms will be stored in a locked file cabinet located at the Faculty of Health Sciences, and only the principal researcher will have access to the cabinet keys. The proposed retention period for collected data will be five (5) years following the study end date to allow for the possibility of additional publications.

If you choose to participate in the raffle draw, your email addresses will be stored in a separate secure password-protected database and will only be used for the draw. It will be deleted once the raffle has been done and the winners have claimed their gift certificates; it is anticipated that this will be completed once the survey is closed.

Questions about the research?

For further information about the study or study results, please contact me at: 403-561-7125 or chinenye.nwoke@uleth.ca. If you have any concerns about this research that I have not addressed, please contact my research supervisor at: brenda.leung@uleth.ca or 403-329-2366.

Questions regarding your rights as a participant in this research may be addressed to the Office of Research Ethics, University of Lethbridge (Phone: 403-329-2747 or Email: research.services@uleth.ca). This research study has been reviewed for ethical acceptability and approved by the University of Lethbridge Human Participant Research Committee.

Legal Rights and Signatures:

I consent to participate in Maternal Mood and Anxiety Disorders within 2 Years of Birth among Immigrant African Women in Alberta conducted by Chinenye Nwoke.

Written Consent: I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

Participant's Signature

Date

Please return this signed form along with your completed study questionnaire.

Appendix 1.10: Ethics approval letter



Office of Research Ethics
4401 University Drive
Lethbridge, Alberta, Canada
T1K 3M4
Phone: (403) 329-2747
Email: research.services@uleth.ca
FWA 00018802 IORG 0006429

Wednesday, December 11, 2019

Principal Investigator: Chinenye Nwoke, Doctor Student
Co-Investigator: Brenda Leung, Faculty of Health Sciences
Study Title: Maternal Depression and Anxiety Disorders within 2 Years of Birth among African Immigrant Women in Alberta
Action: Approved
HPRC Protocol Number: 2019-116
Approval Date: December 11, 2019
Final Report Due: On or before January 15, 2021

Dear Chinenye,

Thank you for clarifying your human research ethics application with co-investigator Brenda Leung titled "Maternal Depression and Anxiety Disorders within 2 Years of Birth among African Immigrant Women in Alberta". It has been reviewed and approved on behalf of the University of Lethbridge Human Participant Research Committee (HPRC) for the approval period **December 11, 2019 to January 1, 2021**, and assigned Protocol #2019-116. The HPRC conducts its reviews in accord with University policy and the Tri- Council Policy Statement: Ethical Conduct for Research Involving Humans (2018).

Please be advised that any changes to the protocol or the informed consent must be submitted for review and approval by the HPRC before they are implemented. A final report will be required; please submit it to the Office of Research Ethics on or before **January 15, 2021**.

We wish you the best with your doctoral research.

Sincerely,

A handwritten signature in cursive script, appearing to read "Susan Entz".

Susan Entz, M.Sc., Ethics Officer
Office of Research Ethics
University of Lethbridge
4401 University Drive
Lethbridge, Alberta, Canada
T1K 3M4

Appendix 1.11: Definition of terms

African Immigrant	An immigrant of African descent or cultural/racial origin, originating from the continent of Africa. African cultural/racial origin in this study was done through self-identification.
Cross-Sectional Study Design	A type of observational study, where the researcher measures the outcome and the exposures in the study participants at the same time (Setia, 2016).
Effect Size	A standard measure calculated from statistical outputs, and is the magnitude, or size, of an effect (Sullivan & Feinn, 2012). Effect size indexes usually gauge the association between two variables, and can include correlation coefficient (r), Cohen's statistic (d), relative risk (RR), or odds ratios (OR).
Help-Seeking	The process of initiating an interaction with another individual to obtain support, information, advice, assistance, or treatment (Broadhurst, 2003).
Immigrant	"Persons residing in Canada who were born outside of Canada, excluding temporary foreign workers, Canadian citizens born outside Canada and those with student or working visas" (Statistics Canada, 2010).

Maternal Anxiety

A natural response to protect one's baby, and often that's expressed with hyper-alertness and hyper-vigilance (Biaggi et al., 2016). It is an anxiety disorder that can disrupt a woman's abilities to enjoy life and to self-care (Fairbrother et al., 2016).

Maternal Depression

A depressive disorder that may start during pregnancy or at any time following childbirth (Falah-Hassani et al., 2015; Vigod et al., 2016). Maternal depression is distinct from general depression in that it specifically relates to the baby and parenting (Vigod et al., 2016).

Point Prevalence

The proportion of a population who have specific characteristic (i.e. anxiety and/or depression) at a specified point in time (NIMH, 2017). It is the number of current cases, new and pre-existing, at a specified point in time, and is a way of assessing the overall burden of disease in the population (LaMorte, 2016).