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Comparison by Race/Ethnicity and Social Determinants of Health in Early Postpartum Maternal Morbidities

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This is to certify that the doctoral dissertation by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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Walden University
2024

Abstract

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MSN, Indiana University, Kokomo, 2016

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Dissertation Submitted in Partial Fulfillment

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Abstract

Maternal mortality continues to increase in the United States, despite medical advances. Patients with negative social determinants of health (SDOH) and racial/ethnic minorities are at increased risk for maternal morbidities although most mortality and morbidities found in maternal health could have been prevented. The purpose of this study, guided by the SDOH conceptual mode, was to examine the relationship between the five components of SDOH and early postpartum morbidities among minority racial and ethnic groups. Secondary data ($n = 1401$) were obtained from a state health department in the Midwest for women who delivered in the year 2022 from one county. After institutional review board approval was obtained, a multiple logistic regression analysis was performed with results showing no significant relationship between SDOH, race/ethnicity, and postpartum morbidities. The study was limited by the few cases of morbidities reported in the dataset ($n = 24$), which may be the result of the single county data sources. With current literature showing higher morbidities than seen in this study, further quantitative studies over an extended time period and with a broader region are warranted to confirm or refute this study finding. Increasing awareness of the impact of race/ethnicity and SDOH on postpartum morbidities and mitigating efforts to promote healthy maternal outcomes in minority populations will affect positive social change.

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Dedication

I would like to dedicate this dissertation first and foremost to God, whose unwavering guidance and grace has been my constant source of strength throughout this journey. Without my relationship with Him, I would never have come this far in life. I would also like to dedicate this dissertation to my husband, Michael, who has been my pillar of support, offering encouragement. To my children, Madesyn, Elizabeth, and Michael, your patience and sacrifices during this pursuit have not gone unnoticed, and I hope to inspire you to reach for your dreams. Finally, to my parents, Roger and Brenda. Thank you all for always believing in me and supporting me. Your unyielding love and belief in my abilities have been the foundation upon which I built my academic achievements. You both have always been my main supporters. Even in high school, Dad tried to get me to go to school for nursing. He would say, "CJ, nothing grosses you out!". I didn't listen to him until later in life, but I'm exceeding myself now. Thank you, Mom and Dad, for helping me with my career! I love you all more than words. This PhD dissertation affirms the love and faith of these cherished individuals in my life.

Acknowledgments

I extend my heartfelt gratitude to my dissertation committee chair, Dr. Long, for her invaluable guidance, unwavering support, and mentorship throughout my doctoral journey. Her expertise and commitment to my success have been instrumental in shaping the quality of my research. I would also like to express my sincere appreciation to my second committee member, Dr. Hussey, for her invaluable insights and constructive feedback, which significantly contributed to the refinement of my work. I am deeply thankful to both Dr. Long and Dr. Hussey for their dedication and belief in my research, which have been pivotal in helping me reach this milestone.

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Chapter 1: Introduction to the Study

The United States is considered one of the most industrialized countries in the world; however, the rates of maternal mortality and morbidities continue to increase every year (Centers for Disease Control and Prevention [CDC], 2021). In fact, despite the continued advancements of medical technology in recent decades, researchers have shown that approximately 700 pregnancy-related deaths occur annually in the United States, along with a significant increase in maternal morbidities (CDC, 2021). Maternal mortality represents roughly 10 times the number of maternal morbidities annually, and most of these incidents could have been prevented (Collier et al., 2019; Ejiogu, 2021; Howell, 2018; Mehra et al., 2021; Peterson et al., 2019; Wang et al., 2021). The March of Dimes 2022 Report Card has also given the United States a D+ rating in maternal mortality and morbidities and has shown a worsening amount of racial disparity within the United States (March of Dimes, 2022). Gemmill et al. (2022) identified in their study that the leading causes of death for women of reproductive age were pregnancy-related. Gemmill et al. also noted that pregnancy-related deaths had increased in the United States by 183% since 1999.

Maternal morbidity is defined as a short- or long-term health problem that has occurred as a result of being pregnant or giving birth (National Institutes of Health [NIH], 2021). Maternal morbidities have been steadily increasing since 2014, and the quality of health care during the perinatal or postpartum period has been shown to have significant racial, ethnic, and social disparities (CDC, 2022). These inequalities in health care have been linked to factors that include many Social Determinants of Health (SDOH), such as

socioeconomic status, age, education, risk factors, pre-disposing factors, and discrimination (Attanasio & Kozhimmani, 2015; Callaghan et al., 2012; Dagher & Linares, 2022; Howell, 2018; Mehra et al., 2020; Wang et al., 2021).The continued increasing number of maternal morbidities in the United States reveals how research needs to continue to be conducted to give further insights into the differences seen among all racial and ethnic groups, SDOH, and early postpartum morbidities. This research may provide insights that stakeholders can use to create quality initiatives and improve policies and procedures in clinical facilities. With these initiatives in place, stakeholders may be able to navigate the rise of maternal postpartum morbidities within the United States, specifically in non-metro areas.

Chapter 1 of the study serves as an introduction to the problem, providing background information and a problem statement that highlights the significance of maternal morbidities in relation to race, ethnicity, and SDOH. Chapter 1 will introduce the conceptual model used to guide the research and a definition of the key variables, as well as a discussion of the limitations and delimitations of the study.

Background

The CDC (2021) has defined maternal mortality as a maternal death that occurs from the beginning of pregnancy and up to 1 year after delivery for anyone who has given birth or had an abortion, spontaneous or nonspontaneous. Maternal mortality rates are observed throughout different stages of pre- and post-pregnancy, with most maternal deaths occurring among racial and ethnic minority groups. Data for 2011–2015 showed a

pregnancy-related mortality percentage of 42.8% for Black women, compared with 13.0% for non-Hispanic, White women (Petersen et al., 2019).

Not only is maternal mortality an issue, but another alarming concern is the increase in maternal morbidities and complications in the United States (American College of Obstetricians and Gynecologists, 2022; Ejiogu, 2021; Howell, 2018; Pera et al., 2021; Peterson et al., 2019; Wang et al., 2021). The CDC (2021) defined maternal morbidities as "unexpected outcomes that result in significant short- or long-term consequences to a woman's health" (para. 1). For every maternal death, approximately 100 women have a complication during their pregnancy, which affects approximately 60,000 women annually (Callaghan et al., 2012; Howell, 2018). Nearly half of women who give birth in the United States are from minority groups, and many of these women have negative maternal outcomes (Attanasio & Kozhimanni, 2015; Howell, 2018). Research has shown that most maternal morbidity and mortality occur during the postpartum period (CDC, 2019), with one study linking 36% of maternal morbidities occurring during the early postpartum period from delivery up to 7 days after birth (Tikkanen et al., 2020).

Researchers have also identified racial and ethnic disparities and social determinant disparities in many aspects of health care, especially emergency room care and mental health (Balter et al., 2021). However, research is still lacking when it pertains to maternal care, specifically maternal morbidities, in the United States, the absence of which may contribute to the continued annual increase of maternal morbidities (Attanasio & Kozhimmani, 2015; Howell, 2018; Mileski et al., 2021). There has been more recent

research on SDOH and maternal morbidities. However, not all components have been thoroughly researched. The main gaps in SDOH that could be further investigated include marital status, employment status, and income (Dagher & Linares, 2022). Researchers have also examined severe maternal morbidity and disparities within the United States; however, the data for many of these studies were collected in larger cities or parts of the United States, such as California and New York (Howland et al., 2019).

In the current study, I addressed this research gap by exploring the relationship between race/ethnicity, SDOH, and early postpartum morbidities in a less populous area within the United States. Addressing this relationship can give access to organizing quality initiatives throughout each stage of pregnancy, including prenatal care, delivery care, and postpartum care, to reduce maternal morbidities in the early postpartum period. Shedding light on the possible relationship between early postpartum morbidities among racial and ethnic groups and SDOH may help organizations develop training for medical providers to create better environments and intake questions for patients, which can essentially lead to better outcomes. My study also provided better insight for less populous cities in the United States, as lack of access to health care in more rural areas, such as the Midwest region of the United States neighborhoods, can be more multifactorial (Dagher & Linares, 2022; Howland et al., 2019). Examining race/ethnicity and SDOH as it pertains to early postpartum morbidities has been identified as an area of growth for future research (Dagher & Linares, 2022).

Problem Statement

The problem that prompted my research is the need to understand and explain the increased maternal morbidities in the United States by examining the relationship between racial and ethnic groups, SDOH, and early postpartum morbidities. Research has identified how minorities are at risk of morbidities. In fact, Black women are three to four times more likely to die and have significantly increased maternal morbidities than White women during and after childbirth (Callaghan et al., 2012; Howell, 2018). Studies also linked ethnic minority women with more morbidities than white women despite having similar socioeconomic status and/or pre-disposing risk factors (Collier & Molina, 2019; Howell et al., 2019; Peterson et al., 2019). However, there is also strong evidence that shows that patients with lower socioeconomic status and less education tend to have poorer outcomes than their counterparts (Andermann, 2016). Therefore, understanding the ongoing issue of maternal postpartum complications as it pertains to race/ethnicity and social determinants in maternal health care should be addressed to decrease and prevent maternal complications in the United States and to provide quality health care for all women. By understanding the influences of SDOH on maternal morbidities, stakeholders may be able to develop quality initiatives and better health care services. Stakeholders may also promote education for health care professionals and patients in early pregnancy and preconceptual counseling to prevent maternal complications.

Purpose

The purpose of this quantitative study was to examine the relationship between race/ethnicity, SDOH, and early postpartum morbidities. This research is significant

because other research shows that over half of pregnancy-related mortality and morbidities could have been prevented (Howell, 2018). Researchers have also stated how many of the components of SDOH should be further investigated given the lack of published research on maternal morbidities, including those in racial and ethnic minorities, those with SDOH risk factors, and maternal morbidities in rural areas (Dagher & Linares, 2022). In fact, researchers have shown that minorities are even more at risk in rural areas than in highly populous areas (Attanasio & Kozhimmani, 2015; Dagher & Linares, 2022; Vedam et al., 2017). Therefore, I chose to examine the relationship between race/ethnicity, SDOH, and early postpartum morbidities.

Research Question and Hypotheses

The following research question guided this study:

RQ: What is the relationship among race/ethnicity, SDOH, and early postpartum morbidities in women?

H_0: There was no statistically significant relationship between ethnicity, SDOH, and early postpartum morbidities in women in one county in the upper Midwest.

H_1: There was a statistically significant relationship between ethnicity, SDOH, and postpartum morbidities in women in one county in the upper Midwest.

Conceptual Framework

The concept that grounded this study was the SDOH concept. A conceptual framework for SDOH was reconstructed by the World Health Organization (WHO) in 2010 (Solar & Irwin, 2010). Marmot et al. (2008) described SDOH as "the circumstances in which people are born, grow up, live, work, and age and the systems in place to deal

with illness" (p. 1661). The SDOH concept was chosen for this study to help in gaining a deeper understanding of morbidities and postpartum outcomes during a woman's postpartum period and how the world around the patient can increase the patient's risk. Investigating the SDOH was extremely pertinent in this study, as research has indicated that the components of SDOH account for as much as 55% of health outcomes (WHO, 2021). There are many social elements that can contribute to the outcomes of the mother. The SDOH concept considered the five areas that included extrinsic and intrinsic factors, such as neighborhood environment, health and health care, education, social and community context, and economic stability. For this study, the SDOH concept and five elements were modified and broken down in more depth to include aspects for each that are found in the secondary dataset. These elements included transportation status, health care status, education status, social support, and employment status. Race/ethnicity were also an independent factor, as research has indicated that postpartum complications occur more often in minorities despite any negative SDOH (Attanasio, & Kozhimmani, 2015; Howland et al., 2019; Wang et al., 2021). Examining the framework helped navigate the main issue at hand and led to further, in-depth studies based on the five elements within the framework. The research gap identified many maternal factors of SDOH that needed further investigation, especially in the areas of employment status and marital status; therefore, this research is significant, including those specific components (Dagher & Linares, 2022). More information about the SDOH concept will be addressed in Chapter 2.

Nature of the Study

For this study, a quantitative cross-sectional, correlational design was used to examine the relationship between race/ethnicity groups, SDOH, and early postpartum maternal morbidities. A correlational design assesses the relationship between two or more variables (Creswell & Creswell, 2018). A multiple logistic regression analysis was the best methodology for this study because there is more than one independent variable and one dependent variable. In the research question, the dependent variable, postpartum morbidities, is a categorical, dichotomous variable. Secondary data from the mother's medical information examined specific components of maternal morbidities immediately after labor and delivery, which included maternal transfusion, third- or fourth-degree perineal laceration, ruptured uterus, and an unplanned hysterectomy, admission to an intensive care unit, and unplanned operating room procedure. However, for the results of this study, each category was listed as having no morbidities or one or more morbidities. The independent variables were categorical. The first independent variable was race/ethnicity, which had five levels (Non-Hispanic White, Hispanic, Black, Asian, and other). The other five variables were based on SDOH and include employment status (yes/no), education (never attended school, 1st-12th grade- no diploma, high school graduate, GED or equivalent, some college credit (but no degree), Associate degree: academic program, Associate degree: occupational, technical, or vocational, Bachelor's degree, Master's degree, Doctorate, Professional school degree, not asked, patient refused), transportation (yes/no), support system (partner, husband, friend, family, and other), and health coverage (self-pay, Medicaid, or private insurance). Secondary data

were planned to be analyzed and examined from a mid-size hospital in the Midwest with approximately 2,000 births annually to examine the relationship between the variables using IBM SPSS 27.0.

Definition of the Variables

For this study, the following definitions were used for the variables:

Early postpartum morbidity: A morbidity that occurs immediately after birth and for up to 12 hours after giving birth (CDC, 2021)

Health literacy: "an individual's ability to access, comprehend, and understand the basic health information necessary for them to make decisions regarding their health" (Sahin et al., 2021, p. 598).

Social determinants of health: Conditions in the environments where people are born, live, work, learn, play, worship, and age that can affect the functionality and quality of health (Office of Disease Prevention and Health Promotion, n.d.). For this study, the five components of SDOH found in the health care system's electronic medical record (EMR) were transportation, education level, employment, support person, and insurance.

Maternal mortality: The timing from the start of pregnancy and up to one year after delivery for a mother who has given birth or had an abortion, spontaneous or nonspontaneous, and has had a death coded as "pregnancy-related" (CDC, 2021).

Maternal morbidity: The timing from the start of pregnancy and up to one year after delivery for a mother who has given birth or had an abortion, spontaneous or nonspontaneous, and has had a "pregnancy-related" complication (CDC, 2021). To obtain the maternal morbidity variable associated with this study, I used the information

that is recorded in the patient's medical record for the birth certificate information. Early postpartum morbidities are based on the time immediately after labor and delivery/prior to discharge and consist of maternal transfusion, third- or fourth-degree perineal laceration, ruptured uterus, unplanned hysterectomy, admission to intensive care unit, or an unplanned operating room procedure.

Race/ethnicity: The CDC categorizes race as American Indian, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, and White; it also categorizes ethnicity as Hispanic or Non-Hispanic (CDC, 2021). Due to the rural population where the study was conducted and the health care system's EMR intake data, race/ethnicity were based on the categories White-Hispanic, White- Non-Hispanic, Black, Asian, and Other.

Advanced maternal age: A woman who is 35 years of age or greater at the time of the estimated delivery date (American College of Obstetricians and Gynecologists, 2022).

Assumptions

Assumptions are important aspects of a study that must be accepted as true for the study to occur (Simon, 2011). One assumption for the research is that all the data collected from the organization represented the population of all mothers giving birth in the area. I also assumed that all health care professionals have accurately captured all the data and that the mothers have accurately reported their responses during the admission process, throughout their stay, and before discharge at the hospital setting. Another assumption for this research is that the dataset provided the sample population needed for the research. This was done by confirming the number of participants needed using

G*Power statistical power calculation software to ensure that the results are valid and reliable.

Scope and Delimitations

The results of this study were limited to mothers who (a) had given birth within the last year from one specific organization and (b) were between the ages of 18 and 34 years. This population was chosen as this is childbearing age for most women, and I chose to exclude mothers who were under 18 years of age and those women who were over 34 due to the increased risks associated with being underage or of advanced maternal age. The exclusion criteria also included mothers with postpartum complications after discharge, as this is not classified within the definition of early postpartum morbidities.

The purpose of this secondary data analysis from an acute hospital family birthing center was to determine whether race/ethnicity and the risks of SDOH impact early postpartum morbidities in mothers immediately after birth. This study used the SDOH conceptual model and may not have included all risks associated with early postpartum morbidities.

Limitations

This study had several limitations. Data were only provided from a community level, and not the entire Midwest, which could possibly limit the generalizability of the findings on a larger level. The data also did not contain all the information that was needed for the study. Examples of missing information include in-depth information related to the SDOH elements of transportation, employment status, and education level.

Researchers using quantitative methodology look solely at the data provided as observational, which does not allow for an in-depth conversation with patients to obtain a full picture of these specific variables (Albers, 2017). One other limitation is that data for each SDOH concept category addressed only certain factors and did not address all subcategories within the concept. Therefore, I did not examine all specific aspects of the model but only a portion of it. A final limitation of this study is that mothers may be admitted for delivery with pre-existing conditions that may have impacted their risk for early postpartum morbidities, such as diabetes, hypertension, and pre-eclampsia, which could influence the results of the study.

Significance

Maternal nursing is an area of nursing that entails mainly healthy individuals who are in the hospital due to pregnancy and labor, and not a major health concern. Therefore, it is alarming that recent research continues to identify an increasing trend of maternal morbidities and mortality within the United States (Callaghan et al., 2012; Saluja & Bryant, 2021). Research to identify the causes of this trend was imperative to improve the quality of care for women within the Midwest region, and possibly even the nation, specifically for ethnic minorities and individuals with negative SDOH.

Potential Contributions of Practice

Understanding the relationship among variables of race/ethnicity, SDOH, and early postpartum morbidities can help address the needs of maternal patients from all aspects of social determinants. Research has shown that when quality improvement collaboratives are created in hospitals across all races and ethnicities, morbidity rates are

reduced (Main et al., 2020). My research can support maternal clinical practice within hospitals and health care clinics by providing data to address the relationships between the variables. It is vital to have research that supports these areas to implement strategic interventions and collaborative quality improvement with medical care providers during all cycles of a woman's pregnancy to promote healthier outcomes. Possible promotions to practice for clinicians include incorporating mandatory, nationwide SDOH screening into the EMR. Educating providers on the importance of proper screening of SDOH in maternal nursing can increase awareness and improve outcomes (Johnson & Howard, 2020).

Implications for Positive Social Change

Mixed research has identified increasing morbidity and mortality within the United States among all races/ethnicities. However, research has also revealed that minorities are at a much higher risk of injury (Attanasio & Kozhimanni, 2015; Howell, 2018; Johnson & Howard, 2020). The inferences from this study will expand knowledge on maternal morbidities among minorities and women with negative SDOH within the early postpartum period. Awareness among the community on SDOH disparities can bring about greater engagement from all stakeholders and can promote healthier outcomes (Collie-Akers, et al., 2021; Johnson & Howard, 2020).

Summary

Chapter 1 introduced the topic of maternal morbidities seen in the United States, demonstrating that maternal morbidity and mortality are high in the United States and continue to rise despite increasing technological advances. The nature of the study was

introduced, explaining the gaps seen in the research, as well as identifying the need for

the study and the plan to use a quantitative correlational study design with secondary

data. The assumptions, scope of practice, limitations, delimitations, and significance of

the study were also explained. Chapter 2 will further discuss the current research on the

topic.

Chapter 2: Literature Review

The rates of maternal morbidities and mortality in the United States are higher among women of racial/ethnic minority groups than among non-Hispanic White women, and many minorities are linked to adverse outcomes because of adverse SDOH (Attanasio & Kozhimanni, 2015; Chambers et al., 2020; Saluja & Bryant, 2021; Standish & Parker, 2022). Although some researchers have identified SDOH outcomes on lower socioeconomic status and lack of insurance, researchers have connected challenges with SDOH among individuals who are also commercially insured. The key barriers identified included lack of childcare, work and school obligations, and transportation (Pera et al., 2021). Researchers have shown a steady increase in maternal morbidities in the United States, with one study showing an increase in postpartum hospitalizations more than doubling within recent decades (Saluja & Bryant, 2021). Many researchers have shown adverse SDOH for harmful outcomes within the maternal setting (Saluja & Bryant, 2021; Slaughter-Acey et al., 2019; Vedam et al., 2017).

This quantitative study aimed to analyze the possible relationship between race/ethnicity, SDOH, and early maternal morbidities. The results of this quantitative study can be promoted toward stakeholders to develop strategies to improve the quality of care for mothers in all stages of pregnancy and preconceptual care. This, in turn, may decrease the number of maternal morbidities in the United States, specifically among minorities and those with adverse SDOH factors. SDOH health care providers who are knowledgeable about negative outcomes related to SDOH can allocate resources early to maternal patients and provide more internal and external resources.

In this literature review, I discuss several topics that are pertinent to women of childbearing age and within the scope of maternal care. To fully understand the increasing number of mothers with morbidities in the United States, I briefly describe the factors contributing to maternal morbidities. I also discuss the conceptual framework as it pertained to this study in further detail. I conclude by providing the key variables and concepts in detail, followed by a summary and transition to Chapter 3.

Literature Search Strategy

I obtained information for the literature review through electronic databases, journal websites, and organization websites with reputable, peer-reviewed journal articles. The databases and journal websites used were CINAHL & MEDLINE Combined Search, SocIndex, PsychInfo, and Academic Search Complete. I based the database search dates on articles from 2016 to the establishment of the current document. However, some articles for the theoretical framework were published before 2016. Keywords included: *prenatal* OR *postnatal* OR *maternal* OR *birth*, *Black* OR *African American*, *minorities,* or *race*, or *ethnicity, social determinants* OR *determinants* OR *socioeconomic factors* OR *SDOH* OR *demographic factors* AND *conceptual framework* OR *theory* OR *model* OR *concept.* The terms were used interchangeably to obtain articles relevant to this study.

Conceptual Framework

The conceptual framework used for this research study was a modified version of the SDOH model from the WHO. This framework was used to develop procedures to reduce health inequity and adverse outcomes in individuals with negative SDOH (Solar

& Irwin, 2010). I used this framework to determine the correlation between negative early postpartum outcomes that lead to morbidities, race/ethnicity, and negative outcomes of SDOH. The SDOH is comprised of five social elements: economic stability, neighborhood and physical environment, education, and health and health care (Solar & Irwin, 2010). Any of these factors can lead to poor outcomes among pregnant women (Filippi et al., 2018). For this study, I examined early postpartum outcomes and the relationship between race/ethnicity of the mother and SDOH.

Figure 1

SDOH Conceptual Model
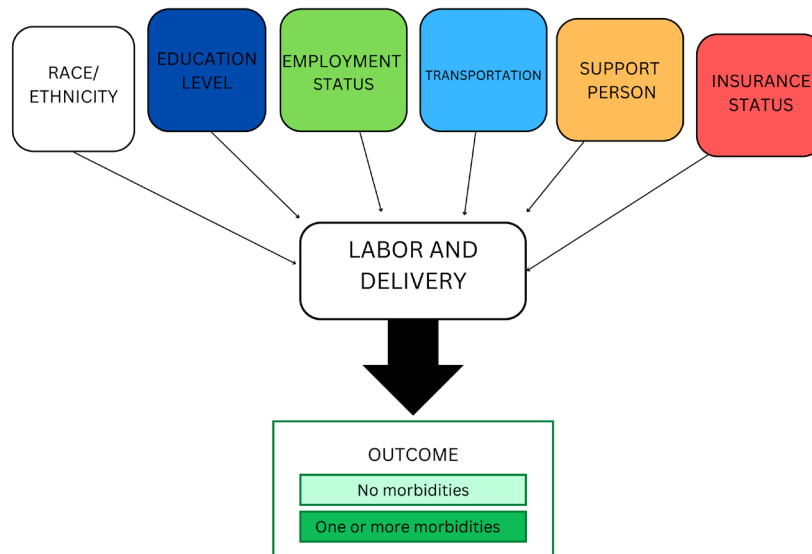
Note. Adapted from *Social Determinants of Health*, by Centers for Disease Control and Prevention, 2022, https://www.cdc.gov/publichealthgateway/sdoh/index.html). In the public domain.

Previous Articles with SDOH Conceptual Model Related to Maternal Outcomes

I conducted a search using *SDOH* and *maternal nursing* to find other studies that used the SDOH model. One article suggested the importance of screening for SDOH, stating how health care providers can use the screening tool to identify stressors for the individual patient and the community (Johnson & Howard, 2020). Johnson and Howard (2020) also suggested that understanding these stressors of SDOH resulted in better maternal outcomes. Two screening models have been implemented in the United States: Protocol for responding to and assessing patient's assets, risks, and experiences (PRAPARE) and the Rush Bridge model (Johnson & Howard, 2020). Health care providers have been able to use both models to screen for negative SDOH with patients (Johnson & Howard, 2020). The researchers also indicated that only 24% of hospital providers screen for SDOH of patients, despite the relationship between negative SDOH factors and adverse outcomes (Johnson & Howard, 2020).

Filippi et al. (2018) emphasized that research has indicated how disadvantaged women may have more serious pregnancy outcomes, even highlighting the socioeconomic determinants such as race/ethnicity. Giurgescu (2017) connected race/ethnicity and negative SDOH with poor maternal outcomes. Giurgescu suggested that minorities, particularly African American women, are more likely to live in poor quality neighborhoods (one concept of SDOH) and therefore are more likely to experience adverse maternal outcomes. Sahin et al. (2021) explained how a woman's health literacy can be influenced by socioeconomic reality. Arrington et al. (2021) conducted a study on negative maternal outcomes at a community hospital. Arrington et

al. engaged staff in a series of activities to raise awareness on racial/ethnic disparities within the hospital. Health care providers were able to understand more importance of SDOH and racial and ethnic disparities. Arrington et al. had hoped that outcomes from the project would eventually create a better maternal environment and better maternal outcomes.

Relevance of SDOH Conceptual Model to Current Study

There is a strong correlation between adverse SDOH factors, especially racial and ethnic disparities, and negative maternal outcomes (Dyess-Nugent et al., 2020). Due to recent publicity on disparities for mothers, Dyess-Nugent et al. (2020) included a definition of health disparity in their research from the Kaiser Family Foundation as "differences in health and health care between groups that are closely linked with social, economic, and/or environmental disadvantage" (p. 409). It is important to examine postpartum morbidities and outcomes by race/ethnicity to highlight the relationships that affect health. This framework states that there are gaps in health care provision for women (Filippi et al., 2018). In more depth, research has shown that despite awareness of disparities, there is a gap in the literature to address the specific problem related to race/ethnicity in multiple racial/ethnic groups and postpartum outcomes, specifically early postpartum outcomes (Office of Disease Prevention and Health Promotion, n.d.).

<div align="center">

Literature Review Related to Key Variables and Concepts

</div>

In the current study, I examined the differences in race/ethnicity in early postpartum morbidities. I also examined the outcomes for women in the early postpartum period based on SDOH.

SDOH

The WHO (2022) has identified SDOH as non-medical factors that influence health outcomes. These factors include where an individual is born, lives, goes to school, and is employed. A few examples of a SDOH are the level of education, understanding of health care needs, means of transportation, and access to any component of everyday living (including health care, food, clothing, shelter). Limited policies and models exist that are used to identify SDOH in the health care setting (Collie-Akers et al., 2021; Rangachari et al., 2022).

There is an interconnection between negative maternal outcomes and SDOH among individuals (Howell, 2017). Where a mother lives and works can have a huge impact on the outcome of pregnancy (Nelson et al., 2018). Although research has indicated that aspects of SDOH can contribute to negative outcomes for mothers, research on factors of SODH and maternal outcomes as well as intervention on SODH in the hospital setting is limited (Howell, 2017). For example, Yee et al. (2021) determined that one in five nulliparous, pregnant women had inadequate health literacy and were therefore associated with negative maternal and neonate outcomes. Yee et al. also determined that inadequate health literacy was also identified in individuals despite their level of education, with some participants identifying as having inadequate health literacy even with a college education. Because of health care literacy, it is important for the research to express the importance of health care providers to engage with patients in depth and ensure the patient verbally expresses understanding.

One study by Rangachari et al. (2022) provided evidence of SDOH and outcomes for disease processes. Rangachari et al. examined the relationship between SDOH and mortality due to cardiovascular disease and opioid use. The study examined data from a 10-year period based on SDOH. The criteria included factors such as race/ethnicity, education, income, health care, and housing. The study found a lack of information on SDOH factors and cardiovascular disease, accounting for most of the research focused on factors of race/ethnicity and employment status. Another limitation of Rangachari et al.'s study is that the SDOH database was recently released for public use in 2020, and much data were lacking and non-existent. However, the researchers performed a regression analysis between the relationship with the disease process and SDOH and determined that there were four major, negative predictors of SDOH, which included age, household income, ethnicity, and military status (veterans). Overall, the research study provided a gap in the practice of policy implications addressing the barriers of SDOH, specifically on the relationship between SDOH and disease processes; the study provided an opportunity for further research (Rangachari et al., 2021).

Researchers in California identified a study with structural barriers among women who were taking ongoing HIV antiviral treatment in California (Park et al., 2020). These challenges of why women were not receiving proper treatment included themes of SDOH on unemployment, lack of transportation, instability of housing, and lack of income (Park et al.).

Neighborhood (Transportation)

Neighborhood is also a broad scope in SDOH that can interfere with patient care and positive outcomes. Neighborhood subtexts in SDOH include parameters of housing security and transportation. Lack of transportation can lead to improper management of disease processes and delay in health care, mainly due to missing appointments, medication management, and delayed treatment for urgent health care problems. Transportation issues for patients in maternal care have broadened because of "maternity care deserts," which the March of Dimes (2015) identifies as a county with a lack of access to maternity health care services within a certain mile perimeter. Therefore, women have to travel a great distance for prenatal and postpartum appointments. Traveling distances for care can be a major financial barrier for women, especially if the family unit has only one vehicle and the partner is employed full-time.

Wolfe et al. (2020) created a regression analysis study based on 20 years of data from the National Health Interview Survey (1997-2017). The results from the study identified approximately 1.7% of patients in 2017 who delayed health care needs due to lack of transportation, with many even stating that they held proper health insurance. The study also identified that most individuals with transportation needs were Black (Wolfe et al., 2020). Pera et al. (2021) identified 4% of individuals in a study who reported transportation as a barrier to access to health care. The population in the study was a group of individuals who were mostly private-insured and had other SDOH factors, although they were identified as above the poverty level threshold (Pera et al., 2021).

A qualitative study by Ayers et al. (2018) identified providers' expressions of how a great number of patients would not call or show up for prenatal appointments. The providers also stated that patients would often explain that they did not have transportation to attend.

Health Care: Insurance

Several researchers have studied how limitations in health care access during pregnancy can lead to negative health outcomes (Adebayo et al., 2022; Lindly et al., 2020; Mazul et al., 2017). Lindly et al. (2020) found in a study that infants born to women with sufficient healthcare during pregnancy had a lower risk of prematurity. Women with government-assistend insurance may face challenges in finding providers who accept government insurance, thus limiting their choice for care and potentially causing delay in care (Mazul et al., 2017). Adebayo et al. (2022) highlighted a racial divide and undeserved status among Black women with Medicaid, who perceived a stigma and lower quality of care compared to White women. DiPietro Mager et al. (2021) conducted a cross-sectional study in Ohio, revealing that 11.3% of women of childbearing age lacked healthcare coverage, often leading to missed annual check-ups critical for identifying health risks. Annual check-ups are critical for women of child-bearing age to identify potential risk factors for the mother and infant (Centers for Medicare and Medicaid Services, 2022). On the contrary, despite many researchers identifying health coverage as major impact for maternal morbidities and mortality, Brown et al. (2020) identified no significance in complications for women based on Medicaid coverage or private insurance.

Employment Status

There is an abundance of research on the association between employment status and neonatal outcomes. However, research on maternal outcomes is limited (Groot et al., 2019). The research that can be found shows how employment status can have a huge effect on the mother and family unit due to financial stress, added stress from having to return to work too early, and exposure to environmental toxins (Kim et al., 2018; Mandal, 2018; Reynolds et al., 2020). The significance of employment status can vary greatly in research and can show improved outcomes based on many factors, including paid maternity leave for full-time employees (Mandal, 2018). Another aspect to consider with employment status is that women who are not financially stable have been linked to increased risk for certain conditions, including preeclampsia, gestational diabetes, and preterm labor (Kim et al., 2018). Therefore, this SDOH needs to be considered, especially in the early postpartum period when the mother is at greatest risk.

Reynolds et al. (2020) examined the relationship between maternal employment status reported at the mother's first prenatal visit and pregnancy outcomes in an observational study conducted at a large European maternity hospital. The study consisted of 62,395 participants, of whom 8% of women admitted to having been unemployed. Out of all participants, mothers who reported unemployment were more likely to have other socioeconomic factors that increased their risks for negative outcomes. These factors included higher odds of being single, separated, or divorced, having multiple children, and smoking or using illicit drugs (Reynolds et al., 2020). The

study also revealed that women who reported unemployment or were homemakers had more negative maternal outcomes (Reynolds et al., 2020).

Education Level

Focusing on the social determinants of education level is an important aspect of pregnancy and pregnancy outcomes. Studies are mixed on outcomes by education level, as some studies link mothers with higher education levels with better outcomes. However, other studies note that issues still arise with racial disparities despite higher education (New York City Department of Health and Mental Hygiene, 2016; Petersen et al., 2019). Rationally, studies may link education level with less outcomes based on the idea that mothers who are highly educated tend to be more health literate. However, other components of education need to be considered, as many women are now waiting until career stability to have children, and advanced maternal age is linked with poor maternal outcomes (Maloney et al., 2021). Other components of education level are based on the idea that mothers with better education tend to not experience the strain of financial instability, health insurance, and other aspects of health care that can cause stress to the mother, newborn, and family.

A study by Larranaga et al. (2018) verified the effects of educational level on negative pregnancy outcomes. A logistic regression analysis was performed on secondary data from mothers and the results determined that women without a college education had an increased risk of developing a negative pregnancy outcome (Larranaga et al., 2018). Groot et al., (2019) created a quantitative, prospective cohort study to determine the relationship between socioeconomic status and perinatal outcomes. The study

examined many aspects of socioeconomic status. However, one particular area was education level. The results from the study determined that women with lower education had a higher increase in miscarriage and other negative maternal outcomes (Groot et al., 2019).

Researchers from the New York City Department of Health and Mental Hygiene (2016), however, looked at data from severe maternal morbidities in New York City from 2008 to 2012 and found that Black women had a higher risk of severe maternal morbidity with a college degree than all other races/ethnicities with only a high school degree. This study has been identified as one of the few monumental studies that explores educational level as an SDOH factor. This rigorous study also explores a highly populated area, New York City (New York City Department of Health and Mental Hygiene, 2016). Therefore, comparing rural areas with respect to education level and race/ethnicity would be extremely beneficial for stakeholders and researchers alike.

Social Support Available

McNamara et al. (2018) defined social support as "receipt of resources, information, or emotional care through personal relationships" (p. 1). Researchers have identified a decrease in social support with more negative maternal outcomes, although limited research has been conducted (Keating-Lefler, 2004; Lamarca et al., 2013); however, the research is mixed. Therefore, identifying research for social support as a contributing SDOH leading to morbidities in early postpartum outcomes is pertinent to find within the literature.

Relationship of Race/Ethnicity to SDOH and Pregnancy Outcomes

Evidence has linked maternal morbidities with race/ethnicity in the United States (Miller et al., 2020). One study suggested that Asian women, even those with no alleviating risk factors and full-term pregnancy, are at greater risk of developing postpartum morbidities than White women (Parchem et al., 2020). Evidence also shows that Asian American and Pacific Islanders are also the fastest growing race within the United States, and even with a reported higher income, have experienced higher rates of maternal morbidity than White women (Siddiqui et al., 2018). Another article revealed that most adverse pregnancy outcomes is identified in minorities, specifically to American Indians, Asians, Black, Pacific Islanders, and Hispanics (Yee et al., 2022). Majority of maternal morbidities in the United States are linked to Black, Non-Hispanic women (Petersen et al., 2019; Sofer, 2018). Research has also identified more maternal morbidities and neonatal complications in women born in the United States than in foreign-born women (Adegoke et al., 2022).

Researchers have also shown that maternal racial and ethnic minorities, specifically Black women, are more likely to live in disadvantaged areas within the United States and in poverty (Attanasio & Kozhimmani, 2015; Callaghan et al., 2012; Howell, 2018; Mehra et al., 2020; Wang et al., 2021), and that they are more likely to experience racial discrimination (Attanasio & Kozhimmani, 2015). Researchers have also linked racial discrimination as a psychological stressor for mothers, and thus leads to negative maternal outcomes (Giurgescu, 2017).

Researchers have implied rationales for the increased morbidities in minorities, being a result of racism and inequity (Wang et al., 2021). Other possible factors found in the research are a result of economic inequity, such as less inadequate insurance and delivering in hospitals with worse outcomes (Howell, 2018). Furthermore, researchers have identified Black women as being at higher risk for certain complications due to underlying ethnic dispositions in rates of higher cardiac and metabolic disorders, such as hypertension and diabetes (Petersen et al., 2019).

Brown et al. (2020) conducted a quantitative, multivariate logistic model to specifically evaluate equity and maternal outcomes based on race/ethnicity. The researchers used data from 2016 and 2017 for a total of 1,501,606 deliveries. The data only included deliveries of viable births, and abortions were excluded. Out of the total deliveries, 19,120 cases were identified as severe maternal morbidity. The results from the study identified Black, Asian, and Hispanic women and women in the Northeast United States with an increased chance of severe maternal morbidity. The study also associated more severe maternal morbidity in hospitals that were considered "minority-serving" or safety net (Brown et al., 2020).

A retrospective cohort study by Hamilton et al. (2021) included data from military hospitals where more than 1,000 deliveries occurred annually to examine the rates of maternal morbidities. Hamilton et al. compared the morbidities between Black and White women and found that Black women had a higher likelihood of cesarean section and having to be admitted into the intensive care unit with maternal complications. However, there was no significant differences in race and postpartum hemorrhage.

Summary and Conclusion

A review of the literature demonstrated the prevalence of maternal morbidities in the United States. The literature also showed that maternal morbidities are not only increasing but also are showing significant disparities among those with adverse SDOH factors, including race/ethnicity. Despite various studies in recent years and goals set for the WHO, the number of maternal morbidities continues to increase (WHO, 2022). However, research on the components of SDOH within the United States for maternal early postpartum outcomes is still lacking. Studies on the prevalence of maternal early postpartum morbidities also remains limited within the United States, specifically in smaller cities (Phelan & Wetzel, 2018).

The goal of this study was to fill the gap in the literature by examining secondary data within a mid-sized hospital from patients who had recently delivered to determine if there is a relationship between race/ethnicity, SDOH, and early postpartum morbidities. In Chapter 2, I introduced the literature on maternal morbidities in the United States. Chapter 3 will identify the research design and rationale, methodology, data analysis plan, and threats to validity.

Chapter 3: Research Method

The purpose of this study was to clarify the relationship between race/ethnicity, SDOH, and early postpartum morbidities based on the gaps found in the literature. Chapter 3 examines the variables for the quantitative study. I will explain in detail the research design and rationale for this type of research design, study methodology, data collection, data analysis plan, possible threats to the validity within the research, and ethical procedures.

Research Design and Rationale

The sampling strategy used for this research was a non-experimental, quantitative design using secondary data from a large organization within the Midwest. Multiple logistic regression analysis was the most appropriate because it allowed for more than one independent variable and a categorical dependent variable; and because the data were already available for comparison and analysis (Reno et al., 2021). The purpose of this study was to determine reasons for maternal morbidities and to note whether there was an increase of postpartum morbidities among minorities and individuals with increased risks of SDOH.

Variables

The independent variables of interest in the study were both categorical and dichotomous. The independent variables were race/ethnicity, SDOH elements, transportation, employment status, education level, insurance status, and support person present at birth. The dependent outcome variable was a dichotomous, multiple variable based on whether the patient did not have an early postpartum morbidity or if they had

one or more postpartum morbidities. For the analysis of this study, I used a dummy code in place to show that there were no morbidities. A dummy variable was used because the variables took one of two values: zero or one. The variables were listed by no morbidities = 0 or one or more morbidities = 1.

Research Question and Research Design

A quantitative design for the study also helped to minimize any preconceptions and personal bias (Baldwin et al., 2022). A quantitative design with random selection for the sample was planned on being used to improve the study rigor and to reduce the potential for bias in sample selection and during data collection and analysis. Quantitative data on the variables of race/ethnicity, maternal morbidities, transportation, employment status, education level, insurance status, and support person present at birth were collected through secondary data from a hospital-based acute care setting within the last month from the start of the research. Determining the relationships among the variables helped to provide results to the research question: What is the relationship between race/ethnicity, SDOH, and early postpartum morbidities in women in a county in the upper Midwest? The null and alternative hypotheses were as follows:

- H_0: There was no statistically significant relationship between race/ethnicity, SDOH, and early postpartum morbidities in women in one county in the upper Midwest.

- H_1: There was a statistically significant relationship between race/ethnicity, SDOH, and postpartum morbidities in women in one county in the upper Midwest.

Methodology

Multiple logistic regression analysis was used to analyze the relationship between race/ethnicity, SDOH, and early postpartum morbidities. Multiple logistic regression was appropriate given that the study had more than one independent variable and the dependent variable was dichotomous (Gray et al., 2017). Multiple logistic regression showed a relationship between the independent variables and the likelihood of the dependent variable occurring, and a multiple logistic regression was able to test the predictors without any type of linear relationship (Gray et al., 2017).

Assumptions

Several statistical assumptions must be met to use multiple logistic regression. In a multiple logistic regression, there is one dependent variable and multiple independent variables. There are four assumptions associated with multiple logistic regression. It is assumed that the predictor variable has only two possible outcomes, no morbidities or one or more morbidities. This assumption is easily met in my study because the dependent variable is dichotomous (see Laerd Statistics, 2017). Another assumption is that all observations are not related to each other and are not repeated measurements (Laerd Statistics, 2017). The best way to determine this is to create a plot of residuals and determine if there are any patterns seen in the data. Another assumption in multiple logistic regression is that there are no outrageous outliers within the variables. If outliers are seen within the data, they can either be removed or replaced with a value such as the median or mean. A final assumption is a sufficiently large sample size. To confirm the necessary sample size for my study, I used G*Power to determine the sample size needed

in multiple logistic regression using a power of .80, an alpha of .05, and effect size of .15

with six predictor variables, and found that I would need 98 participants in my study. The

health system where I had planned on obtaining the secondary data had a large population

of women who delivered in their institution and provided more than enough data to

ensure that I could draw a random sample of 98 from their database.

Population

The target population was mothers who had given birth in a hospital-based acute

care setting at a family birthing center in the Midwest United States. The family birthing

center currently delivers approximately 2,000 babies each year. Inclusion criteria

included mothers who were between the ages of 18 and 34 years of age. I excluded

mothers who were under 18; I also excluded mothers over 34 years of age since this age

was considered advanced maternal age, which is an additional high risk for morbidities

with pregnancy and delivery (American College of Obstetricians and Gynecologists,

2022).

Sampling and Sampling Procedures

G*Power using multiple logistic regression (Faul et al., 2009) identified a sample

size of 98 with a power of 0.80, an effect size of 0.15, and an alpha of 0.05 with six

predictors. The sample was to be selected from December 2022 through the month the

data collection. This criterion was listed for the sample because the hospital had recently

put into practice mandatory charting within their EMR that looked specifically at

transportation needs, which is one of the SDOH included in my SDOH variable. Up until

December 2022, transportation needs were an optional selection for nurses within the

EMR. Therefore, the plan of including a random selection from secondary data starting from December of 2022 would have helped increase validity for the study.

Data Analysis Plan

For my study, I planned to use secondary data from a mid-size hospital in the Midwest. I contacted the unit manager who then provided a letter of permission to obtain the data for my study (see Appendix A). The secondary data were then obtained from the hospital's EMR system, Epic. These elements included race/ethnicity, employment status, available transportation, support person, level of education, and health insurance (see Appendix B).

The proposal for this dissertation was reviewed by the Walden University Institutional Review Board (IRB). After receiving university IRB approval, I obtained an Affiliation Agreement through the hospital IRB on March 28, 2023. In accordance with IRB, the letter is not included to mask the organization from the study results. A copy of the letter is on file with the Walden University IRB. Walden was made the IRB of Record and approval was received on April 27, 2023. Upon approval from the Walden University IRB, I requested data from the partner organization on May 17, 2023. I planned to retrieve the secondary data from the certified nurse specialist in the Family Birthing Center in a password-protected USB file with no patient identifiers and unique identifiers for analysis. I planned to be the only one with access to the data. The data would be stored in a secure, USB drive in a locked desk in my office.

IBM SPSS Statistics for Windows (Version 27.0) was used to analyze secondary data. After all data were entered in SPSS, I cleaned the data prior to beginning the

analysis. To clean the data, I removed any data that were incomplete and discarded the file. I analyzed the data based on the research question: What is the relationship between race/ethnicity, SDOH, and early postpartum morbidities in women in one county in the upper Midwest? I used a multiple logistic regression analysis, which required examining the assumptions for that test that have been mentioned earlier within this chapter. I determined whether there is or is not a relationship between race/ethnicity, SDOH, and early postpartum morbidities.

Threats to Validity

The research collected was non-experimental and consisted of secondary data. There were possible threats to the internal and external validity based on the original data collection from the hospital-based organization. Additional threats to validity will be explained in Chapter 4.

Internal Validity

Internal validity reflects how well a study is conducted and is considered the truth in the study (Patino et al., 2018). Selection is one threat to internal validity. One way to help with the internal validity is by using random sampling from the secondary data. The use of random sampling reduces potential bias, as there is no control over what has been collected from secondary data. Another threat to internal validity is the possible miss-handling of some data,as some components of the research was planning on being retrieved from the EMR and other data obtained from the paper documentation. It was extremely important to analyze all data to ensure there were no outliers or missing data for each variable.

External Validity

External validity relates to how well the findings in the study can be applied to the real world (Patino et al., 2018). Due to the nature of the secondary data being limited to one organization, the results of the study can only be generalizable to one specific area of the United States and to the population represented by the study sample.

Ethical Procedures

Permission to obtain the data were given by the director of Maternal Nursing and Pediatrics at the hospital. To protect all rights from the patients' data, permission was granted by both the hospital and Walden University IRBs (Walden IRB Approval No. 04-11-23-1006087). Permissions were not needed from the patients since the data are secondary data and any underlying medical record numbers were coded to allow for privacy. Data were only used for this study in strict confidence and were not disclosed to others. Data were also stored securely and privately on a personal password-protected USB drive that was locked in a cabinet in my office to which only I had access. Data will be destroyed after 5 years, following IRB guidelines for electronic data. The only other persons who saw these data were my dissertation chair and second committee member, and all information was examined through a Microsoft Teams call.

Summary

In Chapter 3, I outlined the variables and type of research that will be conducted, the components of methodology were also identified, including population, sampling procedures. I explained the data analysis plan in depth, as well as the validity of the

research and the ethical procedures. The results and details of the research will be

discussed in Chapter 4, including the revisions of the study.

Chapter 4: Results

In this study, I examined the relationship between race/ethnicity, SDOH, and early postpartum morbidities in maternal women in one county in the Midwest. The study originally involved analyzing secondary data from a hospital-based organization in the County. However, due to constraints outlined in Chapter 3, data were obtained from the State. The dataset from the State included women who had delivered in the specific county in the study and who met the inclusion criteria for the study. I conducted a quantitative logistic regression from secondary data obtained from the State Health Department and using IBM SPSS for the analyses.

The research question and hypotheses for the study were as follows:

- RQ: What is the relationship between race/ethnicity, SDOH, and early postpartum morbidities in women in one county in the upper Midwest.

- H_0: There was no statistically significant relationship that exists between race/ethnicity, SDOH, and early postpartum morbidities in women in one county in the Midwest.

- H_1: There was a statistically significant relationship that exists between race/ethnicity, SDOH, and postpartum morbidities in women in the Midwest.

This chapter includes specific data collection procedures, including the timeframe for data collection, discrepancies in data collection presented in Chapter 3, baseline descriptive and demographic characteristics, representation of the sample size, steps taken for data collection, cleaning of the data, and preparation for analyses. I also include the results of the data using the research question in this chapter.

Data Collection

While the data request was sent from the original source of the secondary data, I considered the advantage of broadening the sample size by including data from multiple hospital organizations within the county. The most recent data, which included all deliveries for the year 2022, could be obtained from the State Health Department. I therefore chose to withdraw from the original partner site agreement to increase the potential secondary data sample size from the State organization. I requested a new approval from the IRB through Walden for use of public secondary data from the State in July 2023. A formal request was then made to the State on July 6th for public secondary data. I received de-identified secondary data from an excel spreadsheet from the State in a secure email on September 27th, 2023. Just as discussed in Chapter 3, all data were for women based on the criteria who were the ages of 18 to 34 years of age. Total files received were 1,548. The data were from patients who delivered from January 2022 through December 2022.

Data Cleaning and Review of the Data

As part of the cleaning process, I exported all files into IBM SPSS. I analyzed the files based on each variable to determine which files needed to be removed. Several files were duplicates and thus manually removed from the dataset. Some files did not meet the criteria and were removed. Variables were grouped and dummy coded to meet the criteria outlined within the study. However, I found a few discrepancies in the data cleaning process from what was outlined in Chapter 3. Firstly, the data received from the State had race/ethnicity variables in several separate variables. To help with consistency in the data

and analysis, I created a dichotomous variable with 1 being "White Non-Hispanic" and 0

being "Other Race/ethnicity." I replaced "Support Person" with "Marital Status" and then

I dummy coded the variables as 1 = *yes* and 0 = *no*. I condensed "Education Status" from

a total of 13 levels to only 5 due to the number of samples that were either non-existent or

had a small number in these sections. The new categorical variables are listed as: less

than high school graduation, high school graduate/GED/some college credit, Associate

degree, Bachelor's degree, Master's degree or Doctorate degree. I coded insurance type

as self-pay, Medicaid or Hoosier Healthwise, and private insurance. Since the sample size

was small for Tricare, I removed Tricare from the total sample. The data received also

did not have the transportation variable as discussed in Chapter 3. Therefore, only five

total independent variables, marital status, employment status, education level, insurance

type, and race/ethnicity resulted (see variables table in Appendix C). After cleaning of

data and removing of any outliers, the remaining sample size included 1,401 files. I could

not conduct random sampling since the total number of early postpartum morbidities

were much lower than expected with a total of only 24 cases.

Results

Descriptive Data

Predictor and outcome variable frequencies and percentages are displayed in

Table 1. The predictor variables examined included race/ethnicity, employment status,

education level of the mother, marital status, and type of insurance. Dependent variables

included early postpartum morbidities.

The majority of the sample was White or Non-Hispanic. Most participants were employed. The most prevalent education level for mothers was high school or GED completion. A majority of the participants were married, and most participants had private insurance. Table 1 presents the frequencies of the demographic variables split by early postpartum morbidities.

Table 1

Frequency Table for Nominal Variables

	Early postpartum morbidities	
Variable	No complications	One or more complications
White or Non-Hispanic		
No	301 (21.86%)	5 (20.83%)
Yes	1076 (78.14%)	19 (79.17%)
Total	1377 (100.00%)	24 (100.00%)
Type of employment		
Homemaker, student, or unknown	501 (36.38%)	8 (33.33%)
Employed _____	876 (63.62%)	16 (66.67%)
Total	1377 (100.00%)	24 (100.00%)
Mother's education		
No high school diploma	132 (9.59%)	1 (4.17%)
High school diploma or GED completed	688 (49.96%)	10 (41.67%)
Associate's degree	132 (9.59%)	0 (0.00%)
Bachelor's degree	291 (21.13%)	9 (37.50%)
Graduate degree	134 (9.73%)	4 (16.67%)
Total	1377 (100.00%)	24 (100.00%)
Marital status		
No	542 (39.36%)	7 (29.17%)
Yes	835 (60.64%)	17 (70.83%)
Total	1377 (100.00%)	24 (100.00%)
Type of insurance		
Self-pay	31 (2.25%)	0 (0.00%)
Medicaid	533 (38.71%)	6 (25.00%)
Private insurance	788 (57.23%)	18 (75.00%)
Other	25 (1.82%)	0 (0.00%)
Total	1377 (100.00%)	24 (100.00%)

Assumptions

Prior to conducting the multiple logistic regression model, I examined the seven assumptions of the study to ensure they were met. I examined Assumptions 1 through 4 first before moving onto the other assumptions on IBM SPSS. Assumption 1 must have a dependent variable that is a dichotomous variable and not an ordinal scale (Laerd, 2017). This assumption was met as the dependent variable (early postpartum morbidities) is defined as either no postpartum morbidities or one or more postpartum morbidities. Assumption 2 is also met, which ensures that there are two or more independent variables, and the variables are measured on either a continuous or nominal scale (Laerd, 2017). This study had several independent variables that met this assumption: race/ethnicity, employment, education level, marital status, and insurance type. Assumption 3 is also met. The data must have independence of observations and all of the independent variables must be exhaustive and mutually exclusive (Leard, 2017). In other words, the variables must not be able to fit into more than one category. For example, a mother cannot have a high school degree and a bachelor's degree. Assumption 4 states the minimum of cases per independent variable. The minimum independent variable cases should be no less than 15, with some researchers asking for a minimum of 50 cases (Laerd, 2017). This assumption is met as well. The next three assumptions are based on how the data fit with the multiple regression model and include that (a) there is a linear relationship between the variables, (b) there should be multicollinearity, and (c) there should be no significant outliers (Laerd, 2017). To ensure that there was a linear relationship between the dependent variable and each of the

independent variables, I transformed the dependent variable into a log format and ran

linear correlations with the demographics using Pearson correlations. There does not

appear to be a significant relationship between the demographics and the log transformed

dependent variable (see Appendix D). Multicollinearity was the next assumption.

Multicollinearity occurs when there is a strong relationship between the variables (Laerd,

2017). I ran a variance inflation factor (VIF) values to test for multicollinearity (See

Table 2 below). This test shows all VIF values close to 1. Ideally, the VIF value should

be <3. Therefore, there was no correlation between the variables.

Table 2

Multicollinearity Test

	Coefficients [a]					Collinearity statistics	
	Unstandardized		Standardized				
Model	B	SE	Beta	t	Sig.	Tolerance	VIF
(Constant)	.003	.011		.246	.805		
Education level of mom	.005	.004	.050	1.547	.122	.696	1.437
Employment status	-.003	.008	-.010	-.347	.729	.874	1.144
White_NonHispanic	-.002	.009	-.005	-.180	.857	.935	1.070
Marital status	-.001	.008	-.003	-.082	.934	.736	1.358
Type of insurance	.005	.007	.023	.751	.453	.771	1.297

[a] Dependent variable = DV

The final assumption states that there should not be any significant outliers

(Laerd, 2017). To determine if there were any outliers, I ran a casewise list on IBM SPSS

to look at the standard residual. The standard residual should be ± 2 (Laerd, 2017). There

were two cases that were considered outliers. The standard residuals for two of the cases

were 3.005 and 3.165, after examining the outliers individually, I chose to keep each in

the analysis due to these cases being from the dependent variable. The sample size for the

dependent variables was so small that it would have been best to keep them in the data.

Research Question: What is the relationship between race/ethnicity, SDOH, and early postpartum morbidities in women in one county in the upper Midwest?

H_0: There was no statistically significant relationship that exists between race/ethnicity, SDOH, and early postpartum morbidities in women in one county in the Midwest.

H_1: There was a statistically significant relationship that exists between race/ethnicity, SDOH, and postpartum morbidities in women in the Midwest.

To address the research question, I conducted a multiple logistic regression model. The findings of the overall logistic regression model were not statistically significant, $\chi^2(10) = 11.79$, $p = .300$, indicating that collectively, ethnicity and the SDOH do not significantly predict early postpartum morbidities in women. Approximately 5.3% of the variance in early postpartum morbidities could be explained by the predictor variables. Upon further examination of the individual predictor variables, none of the factors were statistically significant predictors of early postpartum morbidities. Therefore, the null hypothesis for the research question was retained. Table 3 presents the findings of the logistic regression model.

Table 3

Results for Logistic Regression With Race/Ethnicity and Social Determinants of Health Predicting Early Postpartum Morbidities

Variable	*B*	*SE*	Wald	*p*	*OR*
Race/Ethnicity (reference: Non-White)					
White, Non-Hispanic	-0.10	0.53	0.04	.846	0.90
Employment status (reference: Homemaker, student, or unknown)					
Employed	-0.16	0.47	0.12	.731	0.85
Education level (reference: No high school diploma)					
High school diploma or GED completed	0.56	1.07	0.27	.601	1.75
Associate's degree	-16.40	3450.21	0.00	.996	0.00
Bachelor's degree	1.21	1.15	1.10	.295	3.35
Graduate degree	1.13	1.23	0.85	.355	3.11
Marital status (reference: Not married)					
Married	0.01	0.56	0.00	.987	1.01
Type of Insurance (reference: Self-Pay)					
Medicaid	16.75	6910.72	0.00	.998	1.8×10^7
Private insurance	17.17	6910.72	0.00	.998	2.8×10^7
Other	-0.10	10438.98	0.00	1.000	0.91

Note. Overall model fit: $\chi^2(10) = 11.79$, $p = .300$, Nagelkerke $R^2 = 0.053$.

Summary

Chapter 4 provided the results of this study, including a presentation of the processes used in collecting and analyzing the data to answer the research question. Descriptive data were presented, and results revealed that no significant findings were identified and the null hypothesis that ethnicity and SDOH do not significantly predict early postpartum morbidities in women. In Chapter 5, I discuss the interpretation of the findings in relation to the framework noted for this study. I also present limitations, recommendations for future research, and social change implications of my findings.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this study was to explore the relationship between race/ethnicity, SDOH (education level, marital status, employment status, and insurance type), and early postpartum morbidities. The research was a quantitative, correlational study using secondary data from a state in the Midwest for all live childbirth deliveries for women ages 18 to 34 years of age within a specific county. I used multiple logistic regression to provide further information about my sample.

Results from the analyses indicated that there was no significant difference in early postpartum morbidities by race/ethnicity, and SDOH. In this chapter, I will discuss the interpretation of the findings related to the conceptual model and literature, implications for the study, and recommendations.

Interpretation of the Findings

Interpretation of the Findings Related to the Conceptual Framework

The conceptual framework I utilized for this study was the SDOH model reconstructed by the WHO. The SDOH model is used to describe how individuals with negative social situations can have negative health outcomes (Marmot et al., 2008; Solar & Irwin, 2010; WHO, 2010). This study was on early postpartum morbidities, based on research showing that there is an interconnection between negative maternal outcomes and SDOH among individuals (Howell, 2017). Moreover, understanding the intersectionality of race/ethnicity within the framework of the SDOH conceptual model can provide valuable insights into addressing disparities in early postpartum patients. According to the model, when a patient is a racial and ethnic minority and has a negative

SDOH factor, such as less education, unemployment, not married, or on government assistance, the patient is more at risk for developing early postpartum morbidity. However, my findings did not identify the majority of early postpartum complications coming from any negative SDOH factors. In fact, 79.17% of early postpartum complications that occurred in the county were from educated, employed, white non-Hispanic mothers, who had private insurance (75%). This suggests that while SDOH can offer valuable insights into addressing disparities in early postpartum morbidities, they may not fully explain the occurrence of early postpartum morbidity.

Interpretation of Findings Related to Literature

The findings from the research study indicated that the individual predictor variables, including race/ethnicity, education level, employment status, marital status, and insurance type were not statistically significantly related to early postpartum morbidities in one county in the upper Midwest. My findings do not correspond with previous studies, which have consistently linked maternal morbidities with SDOH, race, and ethnicity in the United States (Attanasio & Kozhimmani, 2015; Callaghan et al., 2012; Dagher & Linares, 2022; Howell, 2018; Mehra et al., 2020; Wang et al., 2021).

Race/ethnicity

Parchem et al. (2020) showed that Asian women, even those with no alleviating factors and full-term pregnancy, are at greater risk of developing postpartum morbidities than White women. Additionally, minorities, despite having a reported higher income, have experienced higher rates of maternal morbidity than White women (Siddiqui et al., 2018). Furthermore, research has identified Black, Non-Hispanic women as being linked

to the majority of maternal morbidities in the United States (Petersen et al., 2019; Sofer, 2018). Additionally, economic inequity, such as inadequate insurance, has been identified as a possible factor contributing to the disparities in maternal morbidities (Howell, 2018). The findings from my study are inconsistent with the existing literature described above and, therefore, further studies on this topic are suggested.

Education Level

Although studies such as Petersen et al. (2019) highlighted the importance of education level as a SDOH in maternal outcomes, studies have also shown mixed outcomes based on education level, with some linking higher education levels of mothers with better pregnancy outcomes, while others have noted that racial disparities persist despite higher education (New York City Department of Health and Mental Hygiene, 2016). Additionally, research has suggested that mothers with higher education levels tend to be more health literate, which could be one possible rationale for better maternal outcomes (Maloney et al., 2021). I did not find any significant relationship between education level and early postpartum morbidities.

The study by New York City Department of Health and Mental Hygiene (2016), which found that Black women with a college degree had a higher risk of several maternal morbidities compared to all other races and ethnicities with only a high school degree. This highlights the complex interaction between race/ethnicity and education level in maternal health outcomes, which suggests that further research, particularly in different geographical areas within the United States, may be needed to better understand the relationship between education level and early postpartum morbidities.

Employment Status

The findings in my research study indicated that employment status was not found to be a statistically significant predictor of early postpartum morbidities. The research emphasized the significance of employment status on SDOH and health outcomes. Other research has shown employment status can have a substantial impact on the mother and family due to financial stress, early return to work, and exposure to environmental toxins (Groot et al., 2019; Kim et al., 2018; Mandal, 2018; Reynolds et al., 2020). Additionally, women who are not financially stable have been linked to increased risk for certain health conditions, such as preeclampsia, gestational diabetes, and preterm labor, stressing the importance of considering employment status as a SDOH (Kim et al., 2018). However, my results did not show a significant relationship between employment status and early postpartum morbidities. This discrepancy may suggest that the model did not capture the impact of employment status on early postpartum morbidities, despite the existence of research on the variable. Furthermore, the study by Reynolds et al. (2020) revealed that women who reported unemployment or were homemakers had more negative maternal outcomes, indicating the potential importance of employment status as a SDOH in maternal health outcomes.

Marital Status

The literature highlighted the importance of social support and marital status in maternal health outcomes. A decrease in social support was related to negative outcomes, suggesting that the lack of social support may contribute to adverse maternal outcomes

(Keating-Lefler, 2004; Lamarca et al., 2013; McNamara et al., 2018). My study did not support the relationship between marital status and early postpartum morbidities.

Insurance Type

Literature has consistently linked insurance type to barriers in accessing adequate care and negative health outcomes. Studies have shown that lack of insurance, or not having adequate private insurance, can lead to many barriers in receiving adequate care and can result in negative health outcomes (Adebayo et al., 2022; Lindly et al., 2020; Mazul et al., 2017). Additionally, women with government-assisted insurance may struggle to find a provider who accepts that type of insurance, leading to limited choices and delayed care during pregnancy (Mazul et al., 2017). Furthermore, racial disparities and stigma have been associated with government-assisted insurance, leading to perceived lower quality of care for Black women (Adebayo et al., 2022). Adequate health care coverage for women of childbearing age is important, as annual check-ups are critical for identifying potential risk factors for both the mother and infant (Centers for Medicare and Medicaid Services, 2022; DiPietro Mager et al., 2021). However, my findings did not show a significant relationship between insurance type and early postpartum morbidities.

Brown et al. (2020) found no significance in complications for mothers in early postpartum morbidities based on insurance type, which my study also confirmed. In contrast to my study findings, previous research by Howell and Zeitlin (2017) identified an increased risk for maternal morbidity associated with insurance type and coverage. This highlights the complexity of the relationship between insurance type and maternal

health outcomes and suggests that further research may be needed to better understand the association between insurance and early postpartum morbidities.

Limitations of the Study

The study had several limitations that may have impacted the overall results. The limitations in this study included sample size, reporting of secondary data, and use of research design method. The sample size in this study was large ($N = 1401$). This was after I had removed all outliers and duplicates. However, the number of cases for the dependent variable was very low, impacting the statistical power and generalizability of the study. Additionally, the reporting of secondary data were a limitation. Inconsistencies in data collection and underreporting of early postpartum morbidities may have occurred since assignments of patients are typically with different nurses from labor to postpartum. Therefore, nurses who were not available during the early postpartum period may have missed any specific events in the course of the patient's perinatal experience and missed reporting the complications on the State Health Department report. Finally, the use of a multiple logistic regression could be considered a limitation as it did not capture the impact of certain variables in the postpartum morbidities, despite evidence from existing literature that links these variables to negative maternal outcomes (Attanasio & Kozhimmani, 2015; Callaghan et al., 2012; Dagher & Linares, 2022; Howell, 2018; Mehra et al., 2020; Wang et al., 2021). Another aspect to report is that the data from the State did not offer the variable results for transportation, which was an element of SDOH listed in the literature review. Completing another study with this variable would be an important component due to the research that identifies transportation as a major factor in

SDOH and negative health outcomes (Ayers et al., 2018; Pera et al., 2020; Wolfe et al., 2020).

Recommendations

Based on the results of this study, several recommendations can be made for future research. These recommendations include increasing sample size, standardizing data reporting, considering alternative statistical approaches, incorporating multiple counties within the State, and exploring complex interplay between SDOH and early postpartum morbidities. Firstly, future studies should consider increasing the sample size to increase the n of the dependent variable and to improve the statistical power of the results. Also, efforts to standardize data collection and reporting procedures should be considered to enhance the accuracy and reliability of the findings. Next, future research should consider alternative statistical approaches or even additional variables to better understand the complex relationship between SDOH and early postpartum morbidities. Another suggestion is to break the study down into one variable within SDOH, instead of multiple variables. Conducting the study in multiple counties could also increase the sample size and, even more so, the diversity of the population which could help to mitigate the impact of limitations on the results. Finally, future research should be conducted to explore the complex interplay between SDOH and other contributing factors for early postpartum morbidities.

Implications

There are several implications of the study and its findings that may promote positive social change, through future research and through specific local or regional

policies. For practice, the research highlights the importance of addressing disparities in maternal morbidities among minorities and women negatively affected by SDOH. However, the results also underscore the need for future studies, as the results of this study contrast with what was found in the literature. The study findings may suggest that policy changes and institutional reforms are necessary to improve data collection for maternal health outcomes which includes providing strategies within policies to help with underreporting to the State. Possible underreporting of data from nurses may have influenced the full impact of the risk factors of race/ethnicity and SDOH on the dependent variable, postpartum morbidities. Overall, the study's implications for practice and patients revolve around the need for a more nuanced understanding of the factors contributing to maternal health disparities and possibly the need for further examination of other factors that weigh more heavily on the postpartum or even the antepartum period of maternal health. In addition, my study may raise awareness of the need for the development of targeted interventions to address risk factors that are known to contribute to postpartum morbidities.

Conclusion

I examined the association between race/ethnicity, SDOH, and early postpartum morbidities using secondary data from a specific county in the Midwest. My findings identified no statistical significance between SDOH and early postpartum morbidities. There were limitations in sample size, reporting of secondary data, and research design method, which may have influenced the results. Future implications would include the need for improved healthcare access and quality of care, proper SDOH screening to

increase awareness, and development of policies to ensure proper reporting of data.

Although my study did not yield statistically significant results, it is crucial to recognize

the strong interplay between race/ethnicity, SDOH, and early postpartum morbidities.

Every insight, no matter how small, contributes to a better collective understanding.

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Appendix A: Email Permission for Research

From:	███████████
To:	Garringer, Cynthia J; ██████████████████████
Subject:	RE: Research
Date:	Monday, November 7, 2022 6:24:22 PM

Cynthia,

I think your research will be valuable information to have related to SDoH and maternal morbidities. This project would need to go through our IRB process. Ivy, would you be able to help Cynthia navigate the process? I will send you a link to the process on FRANC.

"Knowing is not enough; we must apply. Willing is not enough; we must do. "
Johann Wolfgang von Goethe, German writer and scientist

From: Garringer, Cynthia J
Sent: Monday, November 07, 2022 12:23 PM
To: ▮▮▮▮▮▮▮▮▮▮▮▮
Subject: Research

Dear ▮▮▮▮▮▮▮ :

I wanted to email you about my current research. I know we had spoken in person but wanted to go into more detail of what I was going to be doing my topic on and to get official 'approval' from you in a reply email to proceed in my dissertation process. I also wanted to email about the IRB process at Franciscan, so I can be sure to get things rolling regarding my proposed research. My proposed research is a quantitative study titled, "Comparison by Race/ethnicity and SDOH in Early Postpartum Maternal Morbidities". I am planning on looking at all five components of social determinants of health to determine the correlation between these and early postpartum complications (prior to discharge). I will be looking at data from the admission process and complications to identify any relationship that exists for negative SDOH and for the relationship between race/ethnicity. The five areas I will be focusing on that are grouped in the categories will be marital status (to determine if they have a support person), level of education, employment status, health insurance coverage, and transportation. I will also look at race/ethnicity. I am really hoping to look at this research and to help identify needs regarding the continued increase of maternal morbidities in the United States. Thank you so much in advance for considering this research, and I truly look forward to hearing back from you and partnering with you.

Cynthia Garringer

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Appendix B: Variables Table

Variable	Type of Variable	Categories	# of Variables
Race/ethnicity	Categorical (Nominal)	White- Hispanic	1
Found in Epic		White- Non-Hispanic	2
		Asian	3
		Black	4
		Other	5
Employment	Dichotomous	Employed	1
Found oEpic		Unemployed	0
Education Level	Categorical	1st -12th grade, no diploma	1
Found in Epic under Social Determinants tab		High school graduate	2
		GED or equivalent	3
		Some college credit, but no degree	4
		Associate degree, academic program	5
		Associate degree, occupational, technical or vocational	6
		Bachelor's degree	7
		Master's degree	8
		Professional school degree	9
		Doctorate	10
		Never attended school	11
		Not Asked	12
		Pt. Refused	13
Support Person	Categorical	Husband	1
Found in Epic		Partner	2
		Family	3
		Friend	4
		Other _____	5

Maternal Morbidity- <mark style="background:red">DEPENDENT VARIABLE</mark>	Categorical	None	0
<mark>Found in</mark> Epic		1 or more morbidities	1
Insurance	Categorical	Self-Pay	1
<mark>Found in Epic</mark>		Medicaid/Hoosier Healthwise	2
		Private Insurance (listed)	3
Transportation *Found in Social Determinants tab in Epic*	Dichotomous	In the past 12 months, has lack of transportation kept you from medical appointments or from getting medication? Yes/No	0, 1
<mark>Found in Epic</mark> – However, not consistent until December (now required to fill out from the SDOH tab)			

Appendix C: New Variables Table

Variable	Type of Variable	Categories	# of Variables
Race/Ethnicity	Dichotomous	Other	0
		White, Non-Hispanic	1
Employment	Dichotomous	Unemployed, Student, Unknown	0
		Employed _____	1
Education Level	Categorical	No High School Degree	0
		High school graduate or GED completed	1
		Associate degree	2
		Bachelor's degree	3
		Master's degree or Doctorate	4
Married	Dichotomous	No	0
		Yes	1
Maternal Morbidity-	Dichotomous	None	0
<mark>**DEPENDENT VARIABLE**</mark>		1 or more COMPLICATIONS	1
Insurance	Categorical	Self-Pay	0
<mark>*Found in Epic or birth certificate worksheet*</mark>		Medicaid/Hoosier Healthwise	1
		Private Insurance (listed)	2
Transportation DO NOT HAVE THIS INFORMATION, NO LONGER USING THIS VARIABLE	Dichotomous	In the past 12 months, has lack of transportation kept you from medical appointments or from getting medication? Yes/No	0, 1

Appendix D: Correlation Output

Correlations

		Log_Dichotomous_Early_Postpartum_Morbidities
White_NonHispanic	Pearson Correlation	.003
	Sig. (2-tailed)	.904
	N	1401
Employment Status	Pearson Correlation	.008
	Sig. (2-tailed)	.758
	N	1401
HighschoolDiplomaOrGED	Pearson Correlation	-.022
	Sig. (2-tailed)	.421
	N	1401
AssociatesDegree	Pearson Correlation	-.043
	Sig. (2-tailed)	.111
	N	1401
BachelorsDegree	Pearson Correlation	.052
	Sig. (2-tailed)	.053
	N	1401
GraduateDegree	Pearson Correlation	.030
	Sig. (2-tailed)	.259
	N	1401
Marital Status	Pearson Correlation	.027
	Sig. (2-tailed)	.311
	N	1401
Medicaid_vs_SelfPay	Pearson Correlation	-.037
	Sig. (2-tailed)	.171
	N	1401
PrivateInsurance_vs_SelfPay	Pearson Correlation	.047
	Sig. (2-tailed)	.081
	N	1401
Other_vs_SelfPay	Pearson Correlation	-.018
	Sig. (2-tailed)	.506
	N	1401