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Association Between Sociodemographic Variables and Low Birthweight Among Disabled Black Mothers

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This is to certify that the doctoral dissertation by

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Walden University
2024

Abstract

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MRH, University of Gondar, 2010

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Low birthweight (LBW) affects around 30 million infants annually. Infants with LBW face a 20-fold risk of mortality compared to those weighing 2,500 grams or more at birth. In the United States, the prevalence of LBW is nearly double among Blacks compared to Whites. Despite 61 million U.S. adults with disabilities, including 35 million women, there remains a significant research gap concerning factors that contribute to LBW among Black mothers with a disability (BMWD). This retrospective study employed 2019 and 2020 Pregnancy Risk Assessment Monitoring System (PRAMS) datasets to investigate the association between LBW and sociodemographic factors among BMWD. Bivariate and multivariate logistic regression were conducted to determine statistical significance. The social-ecological model (SEM) served as the theoretical framework. Results of logistic regression analysis showed that family income ($p = .038$), marital status ($p = .008$), and maternal race ($p < .001$) significantly predicted LBW among BMWD. Unmarried BMWD had a 32% higher chance of having LBW infants compared to their married counterparts. Additionally, BMWD were 1.87 times more likely to have LBW infants than mixed-race mothers. While disability status was positively associated with LBW ($p = .165$), it did not independently predict LBW beyond the effects of sociodemographic variables. The PRAMS survey, available only in English and Spanish, generalizes solely to live births of singletons or multiples of fewer than four. The implications for social change include a possible reduction in LBW, which will, in turn, decrease the infant mortality rate and health expenditure.

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Chapter 1: Introduction to the Study

Low birthweight (LBW) is a global phenomenon. According to Tessema et al. (2021), approximately 30 million LBW babies—babies weighing less than 2,500 grams—are born annually and are approximately 20 times more likely to die than those weighing 2,500 grams or more. In the United States, 311,932 (8.52%) babies were born LBW (Osterman et al., 2023). Researchers have found racial disparities in LBW in the United States (Lumpkins & Saint Onge, 2017; Osterman et al., 2023; Ratnasiri et al., 2018), where the percentage of LBW among non-Hispanic Blacks is nearly double (14.66%) compared with non-Hispanic Whites (7.03%; Osterman et al., 2023). Other researchers have found that babies born to Black mothers are more affected (10.2% Vs. 6.9%) by LBW than White infants (Burris & Hacker, 2017; Goldfarb et al., 2018). The disparity constitutes a significant problem for families and burdens the healthcare industry as LBW babies, in general, have a higher risk of respiratory distress and trauma during childbirth, neonatal morbidity and mortality, malnutrition in the first year of life, susceptibility to infections, and development of chronic noncommunicable diseases (Vilanova et al., 2019; Zoleko-Manego et al., 2021). Bianchi and Restrepo (2022) indicated that LBW predictors perinatal death, morbidity, and chronic noncommunicable diseases in adulthood.

I focused on LBW among BMWD in the present study. Babies born from BMWD require more care and support than others (Lu et al., 2010; Malouf et al., 2017). Lu et al. (2010) indicated that Black infants have significantly worse birth outcomes than White infants. The CDC (2023b) reported that about 61 million adults (1 in 4, 27%) in the

United States live with some disability that interferes with their routines. According to the CDC (2023a), about 35 million women in the United States have disabilities. The CDC (2023b) estimated that about 11.1% of the disabled population has a mobility disability with serious difficulty walking or climbing stairs. The CDC also indicated that 10.9% of disabled people have a cognitive disability with serious difficulty concentrating, remembering, or making decisions. 6.4% have an independent living disability with difficulty doing errands alone, and 5.7% are deaf or have serious difficulty hearing. 4.9% of disabled people have a vision disability with blindness or serious difficulty seeing even when wearing glasses, and 3.0% have a self-care disability with difficulty dressing or bathing. The CDC (2023b) reported that 1 in 4 adults with disabilities aged 18 to 44, the reproductive age group, do not have a usual healthcare provider. Being Black and having a disability will make the situation worse. Although the problem is significant, to my knowledge, there is no published study about LBW among BMWD.

According to Hidalgo-Lopezosa et al. (2019) and Mohammed et al. (2019), sociodemographic factors are associated with LBW. Hidalgo-Lopezosa indicated that children born to mothers under 19 and greater than 35 years have a higher chance of being LBW than others. Mohammed et al. (2019) underscored maternal education is associated with LBW. Mothers who completed secondary or higher education were 63% less likely to have LBW infants than those with lower education levels. Hidalgo-Lopezosa et al. (2019) showed that children born to single mothers have a higher chance of being LBW than others. Curtis et al. (2022) showed maternal income is highly associated with LBW. Curtis highlighted higher income levels may reduce LBW rates

and lead to more equitable birth outcomes between Black and White mothers**.** The current study aims to identify sociodemographic variables associated with LBW among BMWD and may serve as a springboard for future researchers targeting LBW among BMWD.

Problem Statement

It is essential to understand how sociodemographic factors contribute to LBW among BMWD. For instance, the Board of Governors of the Federal Reserve System found that a typical White family has eight times the wealth of the typical Black family and five times the wealth of the typical Hispanic family (Bhutta et al., 2020). Martinson and Reichman (2016) observed an explicit association between low income and LBW in the study exploring socioeconomic inequalities in LBW. Furthermore, the United States Census Bureau (2015) revealed a significant income disparity between people with a disability and those without a disability. People with disabilities make 33% less median income than those without disabilities. Manyeh et al. (2016) showed that having an infant weighing ≥ 2.5 kg is highly associated with the mother's socioeconomic status.

Hidalgo-Lopezosa et al. (2019) indicated the association between maternal age and LBW. Hidalgo-Lopezosa showed that extreme maternal age has a significant influence on birth weight. Children born to younger mothers aged below 19 years and greater than 35 years have a higher chance of being LBW than others. Manyeh et al. (2016) showed that having an infant weighing ≥ 2.5 kg is highly associated with maternal age. According to their finding, mothers 20 years and older were more than two times more likely to have babies who weighed ≥ 2.5 kg compared to those aged <20 years.

Mohammed et al. (2019) underlined that mothers with educational attainment beyond secondary education are 63% less likely to have LBW infants than uneducated mothers. Hidalgo-Lopezosa et al. (2019) showed that LBW is significantly associated with maternal education. Mothers whose educational level is ≤ secondary studies are more likely to have an LBW child than others. Cantarutti et al. (2017) indicated that mothers with low-level education have odds of LBW compared to mothers with higher-level education. Silvestrin et al. (2020) also showed that mothers with low educational attainment are at higher risk of delivering LBW infants. However, most researchers focus either on the association between sociodemographic variables and LBW among Blacks or the association between sociodemographic factors and LBW among people with a disability. To date, no study has investigated the link between LBW, Black mothers, and disability with sociodemographic variables of income, education, age, and marital status.

Hannan et al. (2022) and Brown et al. (2022) found that women with a disability experience more adverse birth outcomes and neonatal complications, including LBW, than other community segments, yet they have been the focus of only limited research. Previous researchers have found that women of childbearing age with disabilities experience significant adverse birth outcomes like LBW compared with women without disabilities. Tarasoff et al. (2020) underscored that newborns of mothers with disabilities might be at elevated risk for adverse health outcomes.

There are also significant disparities in the prevalence of LBW by race and ethnicity, especially between Black and White women (Ratnasiri et al., 2018). Lumpkins and Saint Onge (2017) also highlighted the significant burden of LBW among Blacks

despite collaborative efforts to address it. Despite the clinical and public health efforts to curb the disparity, the problem persists among BMWD (Hannan et al., 2022).

Researchers have shown that women with a disability are more likely to have babies with LBW and that Black women tend to have babies with LBW. It is also known sociodemographic variables (age, education, income, marital status, and race) of mothers predict LBW. However, no published research examines how sociodemographic variables and disability status affect LBW among Black mothers. Having a disability beyond being Black is a double burden and needs significant attention from public health professionals and lawmakers. Government, public health advocates, and policymakers may use the current study's findings to understand the magnitude of LBW among BMWD.

Nature of the Study

In this retrospective cross-sectional study, I explored the association between sociodemographic factors and LBW among BMWD. I used the 2019 and 2020 PRAMS datasets as PRAMS data collection on disability began in 2019. PRAMS data for 2019 and 2020 are already collected, cleaned, stored, and made available by the CDC for researchers upon request. I used the SPSS complex sample for the analysis of my data.

Research Questions

Research Question 1 (RQ1): To what extent do sociodemographic variables (age, education, income, marital status, race) significantly predict LBW among BMWD?

Null Hypothesis ($H_0$1): Sociodemographic variables (age, education, income, marital status, race) do not significantly predict LBW.

Alternative Hypothesis (H_a1): Sociodemographic variables (age, education, income, marital status, race) significantly predict LBW.

Research Question 2 (RQ2): To what extent does disability predict LBW beyond the effects of sociodemographic variables (age, education, income, marital status, race)?

Null Hypothesis ($H_0 2$): Disability does not predict LBW beyond the effects of sociodemographic variables (age, education, income, marital status, race).

Alternative Hypothesis ($H_a 2$): Disability predicts LBW beyond the effects of sociodemographic variables (age, education, income, marital status, race).

Research Objectives

In this study, my objective was to understand the association between sociodemographic variables and LBW among BMWD. Understanding the sociodemographic variables associated with LBW among BMWD is critical to designing a prevention strategy for LBW. There was no previous research on LBW among BMWD, and the present study will serve as a baseline for future studies.

Purpose of the Study

I examined the role of a Black mother's disability status in predicting LBW above and beyond what is explained by sociodemographic variables. Using the 2019 and 2020 PRAMS dataset, I determined the prevalence of LBW, and sociodemographic factors associated with LBW among BMWD. The findings of this study show the experiences of BMWD having LBW babies and suggest possible recommendations to tackle the problem.

Theoretical Framework

I used the SEM as the foundation for this study. Bronfenbrenner (1977) developed the SEM as the ecology of human development model in the late 1970s and formalized it as a theory in the 1980s to recognize that individuals affect and are affected by a complex range of social influences and nested environmental interactions. Bronfenbrenner (1977) illustrated his theory with nesting circles that place the individual in the center, surrounded by various systems (Kilanowski, 2017). The microsystem closest to the individual contains the strongest influences and encompasses the interactions and relationships of the immediate surroundings. The second circle is the mesosystem, which looks beyond immediate interactions and includes those with whom the individual has direct contact, such as work, school, church, and neighborhood. The exosystem does not directly impact the individual but exerts both negative and positive interactive forces on the individual, such as community contexts and social networks. The macrosystem includes societal, religious, and cultural values and influences. Lastly, the chronosystem contains internal and external elements of time and historical content (Kilanowski, 2017).

I used the SEM to show the interaction between LBW and BMWD, the Black community, and the physical, social, and political environments. I used the SEM to underscore the importance of these interactions on the birth outcomes of BMWD. Awareness of the factors associated with LBW among BMWD helps to take appropriate actions. The logical connections between the framework presented and the nature of my study include the ways in which disability is associated with an individual's acceptance of the disability, community perceptions towards disability, physical barriers to care,

availability of social support, and policymakers' understanding. Understanding such factors plays a significant role in tackling LBW among BMWD.

The SEM has proven effective in a variety of studies. Karger et al. (2022) used the SEM to show the Australian government that poorer individual-level outcomes for Indigenous women are strongly associated with poorer socioeconomic determinants. The SEM showed the impact of interventions related to nutrition, physical activity, diabetes, men's health, and substance use on Indigenous Australians (Snijder et al., 2019).

Operational Definitions

Keywords and terms used in this proposed study are defined below.

Disability: In the present study, I considered a woman to have a disability when she fulfilled one of the six questions indicated in the PRAMS questionnaire: Do you have difficulty seeing, even when wearing glasses or contact lenses? Do you have difficulty hearing, even if using a hearing aid(s)? Do you have difficulty walking or climbing steps? Do you have difficulty remembering or concentrating? Do you have difficulty with self care, such as washing all over or dressing? Using your usual language, do you have difficulty communicating, for example, understanding or being understood?

Education: The highest educational attainment of the woman at the time of delivering her baby (Green & Hamilton, 2019).

LBW: Defined as a birthweight of 5.5 pounds (2,500 grams) or less (Cutland et al., 2017), regardless of gestational age (World Health Organization [WHO], 2019).

Assumptions

I assumed that the sample data drawn by the CDC from mothers across the country were representative of the nation. I also assumed that accurate data concerning maternal and infant characteristics were obtained from the CDC. Finally, I assumed that the study participants provided the required information honestly and without any influence from the data collectors and the research team.

Limitations and Challenges

This study was limited by the PRAMS data collected in 2019 and 2020 in all participating states that provided the requested information. I used PRAMS secondary data collected by the CDC from the participating states, including the District of Columbia and territories, for this study. PRAMS data was generalizable only to pregnancies resulting in a live birth of singletons or multiples of fewer than four and it might not represent all deliveries. The PRAMS survey is administered only in English and Spanish. Therefore, it might exclude mothers who speak neither survey language. The self-reported PRAMS survey information had a potential for misclassification errors and self-reporting biases. The PRAMS survey did not explore whether mothers were themselves born LBW at birth, which had an intergenerational effect (Hannan et al., 2022).

Scope and Delimitations

This study was limited to the 2019 and 2020 PRAMS datasets collected in 46 participating states, the District of Columbia, New York City, and territories, representing approximately 81% of all United States live births. I used the data to explore the

association between LBW and sociodemographic variables among BMWD. I did not collect primary data or contact study participants.

The CDC defined disability based on six questions included in the supplementary questionnaire in PRAMS (CDC, 2023c). The National Center on Birth Defects and Developmental Disabilities (2020) defined disability as any condition of the body or mind (impairment) that makes it more difficult for the person with the condition to do certain activities (activity limitation) and interact with the world around them (participation restrictions). This definition does not fit with the PRAMS data and makes its use challenging. Therefore, in my study, I defined a woman as having a disability if she fulfilled one of the six questions indicated in the PRAMS questionnaire.

Significance of the Study

In this study, I examined the associations between sociodemographic factors and LBW among BMWD. Some sociodemographic variables associated with LBW, like marital status and income, are modifiable. Therefore, modifying the sociodemographic factors significantly associated with LBW is critical. The positive social change implications for this study include that public health practitioners and healthcare providers got the knowledge to improve health and health outcomes for mothers and infants. Improving health and health outcomes might cause a decline in LBW and contribute to lower infant mortality. A reduction in LBW might decrease health expenditures in the United States. Policymakers may use the findings from this study to allocate resources that women need to have a healthy, normal birthweight baby.

Summary and Transition

Almost 20,000 infants died in the United States in 2020, and a birth defect was the leading cause of death, followed by preterm birth and LBW (CDC, 2023d). Although LBW is the second leading cause of infant mortality, it burdens the family and healthcare system (Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, 2022). A better understanding of LBW's risk factors and outcomes allows for better care for women during pregnancy and childbirth, including key technological interventions. Vilanova et al. (2019) highlighted the latest advances in perinatal and neonatal care, such as surfactant replacement therapy, mechanical ventilation, and neonatal intensive care centers, which have contributed to significantly lower infant mortality rates for newborns. Despite these technological advances, LBW still claims lives in the United States (Pollock et al., 2021).

Statistics show significant disparities in the prevalence of LBW by race and ethnicity, especially between Black and White mothers. Black mothers had a persistent 2.4-fold greater prevalence of having an LBW infant compared with White mothers (Ratnasiri et al., 2018). In 2018, LBW among Blacks was 11.7% and 5.3% among Whites. LBW among those with less than high school was 8.5%, and for those who completed high school was 7.8%. However, no study has investigated the association between LBW and sociodemographic variables among BMWD. Lawmakers and public health practitioners can use the information from this study to implement interventions that may positively impact the lives of BMWD in the United States. The implications for

social change include the possible reduction in LBW, which will, in turn, decrease the infant mortality rate and health expenditure.

Chapter 2: Literature Review

In the present study, I examined the prevalence of LBW among BMWD and examined the role of Black mother's disability status in predicting LBW above and beyond what is explained by social factors and demographics. I conducted this literature review to access published information concerning LBW and interventions for preventing LBW. I focused on research examining the association between LBW and sociodemographic factors among BMWD in the United States. I included the Forty-six states, the District of Columbia, New York City, the Northern Mariana Islands, and Puerto Rico in the present study.

I divided the literature review into three sections. The first section detailed the literature search strategy, the second focused on LBW and BMWD, and the third addressed the theoretical framework. I conclude the chapter with a summary of the literature review results, highlighting significant themes and the gap in the literature and briefly discussing how this study bridged the gap.

Literature Search Strategy

I used the following search strategies to gather information on LBW. First, I determined a clear, focused question and searched for articles that could answer my research question. Then, I decided which key concepts address the different elements of the research question and which elements should be used for the best results. Based on the information gathered, I chose an appropriate database and interface to start the search process in a text document. I revised appropriate index terms and synonyms in the thesaurus of the first database. Finally, I added variations in search terms. I used the

keywords *low birth weight, low birthweight, low-birth-weight, Blacks, black Americans, blacks, disability, disabilities, disabled, disabled people, people with disabilities, PRAMS,* and *the United States*. I searched the CINAHL & MEDLINE Combined, Embase, ProQuest Health and Medical Collection, PubMed, and BioMedCentral databases.

I also searched the Walden University library for dissertations and theses. I identified literature using articles from the bibliographies of previous studies and doctoral dissertations on LBW. The journals accessed included Advances in Nursing Science, Archives of Pediatrics, Clinical Nursing, Journal of Maternal-Fetal and Neonatal Medicine, Maternal and Child Health, Palliative and Supportive Care, Pediatrics, Pediatric Health Care, and Neonatal Nursing. Others were Lancet, Lancet (ScienceDirect), Lancet Global Health, International Journal of Population Research, African Journal on Reproductive Health, Maternal Research and Treatment, Reproductive Health, and BMC Pregnancy and Childbirth. Also accessed were BMC Health Policy, BMS Pediatric, Lancet Health Policy, Asian Journal of Pregnancy and Childbirth, Asian Journal of Nursing Education and Research, BMC Pregnancy and Childbirth, and Journal of Health and Social Behavior.

The literature review included credible governmental and nongovernmental organizations' websites like the CDC, WHO, and United Nations International Children's Emergency Fund (UNICEF) to obtain further details about recommendations and best practices. I selected only papers published in peer-reviewed journals or information from reputable sources for inclusion in the literature review. However, I also included relevant

older articles because the literature search yielded relatively few papers published on this study's topic within the last five years.

LBW and BMWD

Low birthweight is the second leading cause of infant mortality and a critical public health problem worldwide (Vilanova et al., 2019). Erasun et al. (2021) found that LBW rates are increasing in both developed and developing countries. Despite extensive research and modern practices to reduce LBW, its prevalence remains high (Ratnasiri et al., 2018). According to Tessema et al. (2021), LBW in sub-Saharan countries reaches as high as 15%. The UNICEF (2019) data showed that LBW also remains high in the United States (8%) and the United Kingdom (7%). According to Burris and Hacker (2017), LBW among Blacks and Whites was 12.8% and 7.0%, respectively, but no current data exists.

Goldfarb et al. (2018) assessed county-level progress on trends in Black and White LBW rates as an indicator of progress toward more equal birth outcomes for Black infants. County-level LBW data indicated a significant county-level variation in progress toward racial equality in adverse birth outcomes such as LBW.

Identifying the variables associated with LBW among BMWD is crucial. Agorinya et al. (2018), Mahumud et al. (2017), and Taywade et al. (2017) found that education and socioeconomic factors such as income are essential determinants of pregnancy and birthweight outcomes (Agorinya et al., 2018); Mahumud et al., 2017; Taywade et al., 2017). Ratnasiri et al. (2018) showed that maternal age was a significant risk factor for LBW regardless of maternal race, ethnicity, or education level. Goisis et al.

(2017) found that maternal age was not significantly associated with LBW. Burris and Hacker (2017) found that lower levels of education are associated with increased risks of adverse birth outcomes and infant mortality.

Understanding different factors associated with LBW is crucial. Burris and Hacker (2017) and Martinson and Reichman (2016) found that income is significantly associated with LBW. Mothers with higher incomes had improved birth outcomes compared with lower-income mothers. Improvement in income revealed an almost linear increase in birthweight. In race-stratified analyses, Burris and Hacker (2017) found that for Black and White women, birth outcomes were worse among poor women than women with a better income. Black women had higher percentages of individuals below the poverty line, had lower income from earnings, and received more assistance from the federal government. In addition, Clay et al. (2021) found significant differences between Black and Non-Hispanic White women's marital status, and, along with Agorinya et al. (2018) and Bird et al. (2000), found that unmarried women are more prone to LBW than married women. Clay et al. (2021) indicated that marital status is a protective factor leading to better health and pregnancy outcomes. Green and Hamilton (2019) found that maternal education is also positively associated with lower rates of LBW.

Research has shown that mothers with disabilities are more likely to have babies with LBW, and Black mothers tend to have babies with LBW. It is also known that sociodemographic variables predict LBW. However, no researcher examined how sociodemographic variables and disability status affect birthweight in babies born to

Black mothers. Therefore, understanding the sociodemographic characteristics of BMWD is critical to tackling the problem.

Theoretical Foundation

The theory grounding this study is the SEM. Bronfenbrenner (1977) developed the SEM in the late 1970s and formalized it as a theory in the 1980s to recognize that individuals affect and are affected by a complex range of social influences and nested environmental interactions. The initial theory by Bronfenbrenner (1977) was illustrated with nesting circles that place the individual in the center, surrounded by various systems (Kilanowski, 2017).

The microsystem closest to the individual contains the strongest influences and encompasses the interactions and relationships of the immediate surroundings. The second circle is the mesosystem, which extends beyond immediate interactions and includes those with whom the individual has direct contact, such as work, school, church, and neighborhood. The exosystem does not directly impact the individual but exerts both negative and positive interactive forces on the individual, such as community contexts and social networks. The macrosystem includes societal, religious, and cultural values and influences. Lastly, the chronosystem contains internal and external elements of time and historical content (Kilanowski, 2017).

The model acknowledges that factors are not limited to a particular order; they can cross between different levels. The model also indicates individuals are impacted differently based on cumulative and intersectional experiences (University of Minnesota School of Public Health, 2015). According to Karger et al. (2022), SEM is a multilevel

public health approach to prevention that considers broad social and political factors, not just individual ones. The model consists of five levels, each intersecting with the next, beginning with the individual level, then interpersonal, organizational, community, and policy levels. Interventions applied at all model levels impact the levels nested within (Karger et al., 2022). Ecological models have been used in health promotion to understand and identify targets for general and specific health behavior interventions (McLeroy et al., 1988; Sallis et al., 2008; Stokols, 1996).

Wallerstein et al. (2003) stated that SEM is the interaction between the individual, the group/community, and the physical, social, and political environments. The SEM underscores the importance of various interactions on the birth outcomes of BMWD. The logical connections between the framework presented and the nature of my study include how disability is associated with an individual's acceptance of the problem, community perceptions towards disability, physical barriers to care, availability of social support, and policymakers' understanding, all of which play a significant role in tackling LBW among BMWD.

In my SEM, I diverged from traditional ecological approaches, which described the development of individuals within nested environmental subsystems, to instead considered the development of health-related policies and environments within nested contexts. I drew five concentric but connected circles to distinguish embedded systems and forces that mutually influence each other. I used the SEM to see if the sociodemographic variables are associated with LBW among BMWD. SEM is a

framework for understanding how individuals and their social environments mutually affect each other across the lifespan (Wendel et al., 2015).

The SEM includes individual and interpersonal factors and highlights the importance of interventions directed at changing those factors that support and maintain unhealthy behaviors. I emphasized on individual characteristics of age, education, marital status, income, and family size. Using the SEM's interpersonal dimension, I investigated how an individual's relationships influence their health. For instance, women who have been divorced often are at an increased risk for negative birth outcomes (Barr & Marugg, 2019).

Figure 1

SEM with Independent Variables

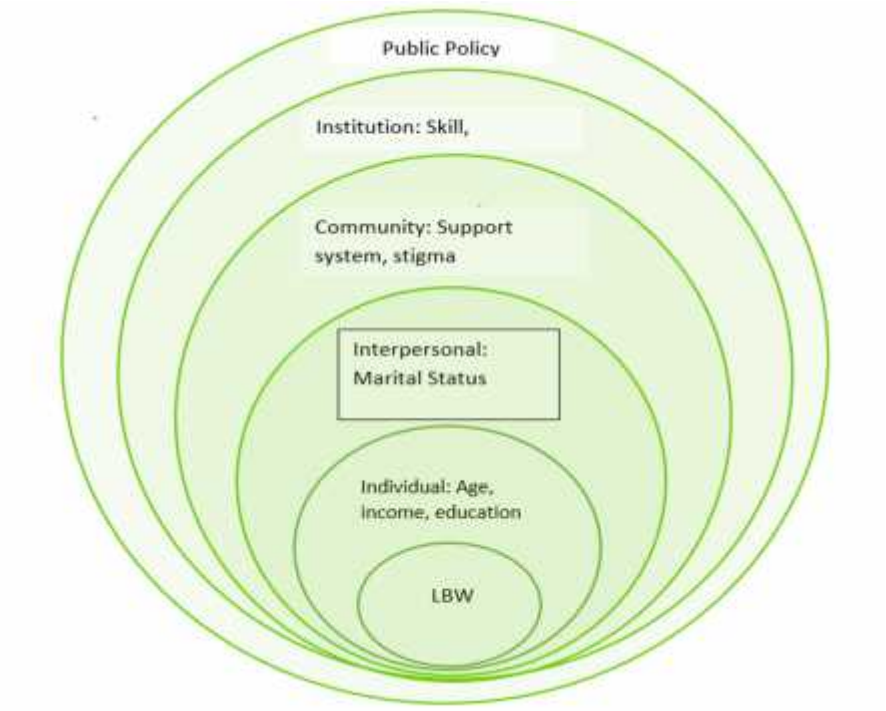


Figure 1 depicts the relationship between demographic factors, social factors, and LBW. It shows two levels of influence: demographic and social. The two levels are appropriate targets for public health interventions to address LBW. LBW was categorized as the dependent or outcome variable, and the independent variables involved demographic factors (such as the woman's age, education, race, marital status, and disability) and social factors (income and support system in the form of the Women, Infants, and Children program). The CDC collected all the variables in 2019 and 2020 in all states, the District of Columbia, and territories.

Summary

Demographic and social factors were associated with LBW (Agorinya et al., 2018; Gupta et al., 2019). Despite technological advances, LBW is a critical risk factor for infant morbidity and mortality in the United States. Although LBW affects everyone, it disproportionately affects Blacks (Catov et al., 2016) and people with disabilities (Tarasoff et al., 2020). The prevalence of LBW infants born to Black mothers is nearly twice that of White mothers (Echevarria & Lorch, 2022) and 88% greater than in Hispanic mothers. Burris and Hacker (2017) showed Black mothers are twice as likely to deliver LBW neonates than White mothers. It is also found women with a disability experience more adverse birth outcomes and neonatal complications than other community segments (Gleason et al., 2021).

My literature review reveals a significant lack of research on mothers with disabilities, even while they are at increased risk of LBW (Hannan et al., 2022). Tarasoff et al. (2020) found that newborns of mothers with disabilities might be at elevated risk for

adverse health outcomes compared with those of mothers without these disabilities, with particularly strong evidence of elevated risk for LBW. Most pertinent to this study was a lack of data on the prevalence of LBW among BMWD and a lack of data showing the association between sociodemographic factors and LBW among BMWD. I attempted to fill this literature gap with the current study. In the next chapter, I provided a detailed description of the research methodology and research design.

Chapter 3: Research Method

In this retrospective cross-sectional study, I examined the role of a Black mother's disability status in predicting LBW above and beyond what sociodemographic variables explain. The dependent or criterion variable was LBW, and the independent variables or predictors were the mother's race, age, education, income, disability status, and marital status. My current study might improve the pregnancy outcomes of BMWD as improved pregnancy outcomes are key to reducing medical expenditure and the well-being of the nation's future generation. Neonates with LBW have more than 20 times the risk of dying than neonates with normal birthweight (Cutland et al., 2017).

Research Design and Rationale

I used Hierarchical analysis for the current study. National epidemiological studies have used hierarchical analyses to elucidate the risk factors associated with maternal and infant health diseases. These analyses incorporate differentiated hierarchical levels of determination for a given outcome. I conducted a retrospective analysis using PRAMS's 2019 and 2020 secondary archival data. I used descriptive and inferential statistical analysis to explore the relationships between a mother's race, age, education, income, marital status, and LBW among BMWD.

Methodology

The target population was BMWD, and the study population was non-Hispanic BMWD who gave live birth in 2019 and 2020 in the United States. One in four non-Hispanic Blacks in the United States has a disability (CDC, 2020). As I used secondary data, there was no sampling, sampling procedure, recruitment, and data collection. I

contacted the CDC and requested archived data following their guidelines. This study was based on secondary/archival data, and no specific instrument used. The dependent variable was LBW. The independent or predictor variables, representing the risk factors for LBW, based on the SEM (Alio et al., 2010) were the mother's ethnicity, age, education, income, and marital status and infant's birth weight.

Data Analysis Plan

I used secondary data from the CDC for the present study. After receiving IRB approval, I contacted the CDC and requested the required data. The CDC provided the data as a SAS data file. The statistical analysis conducted using SPSS version 28.0. Descriptive statistics used to summarize the infant's birth weight and the woman's age, education, income, and marital status. Logistic regression utilized to determine if the woman's age, education, income, and marital status have statistically significant ($p < .05$) effects on LBW. Binary logistic regression used to determine if the woman's sociodemographic variables are statistically significant ($p < .05$) predictors of LBW. A stepwise procedure based on the Wald test statisticused to eliminate predictors with regression coefficients that were not significantly different from zero at $p < .05$. Variables that were not significant predictors of LBW ($p > .05$) excluded from the models.

Threats to Validity

According to Ahluwalia et al. (2013), the validity and reliability of the PRAMS data were high, and Ahluwalia et al. (2013) recommended the use of PRAMS data for epidemiological surveillance, research, and planning. Validity in research shows the test's ability to measure what is intended to be measured. High validity indicates results

corresponding to real properties, characteristics, and variations in the physical or social world. High reliability is one indicator that the measurement is valid. To my knowledge, there will not be any threat to validity in the present study.

Protection of Participants' Rights

After IRB approval was granted to collect data, I requested secondary/archival data from the CDC. There was no physical contact with the study participants. When requesting the data, I filed an agreement that specifies the conditions for gaining access, the data elements, the explicit purpose of use, and the expiration requiring the destruction of the data files. I signed and dated the agreement and returned it to the CDC via email. The CDC removed all study participants' identifiers from the dataset before data was handed over to me to protect the study participants' confidentiality and anonymity.

The findings of this study might be shared with community leaders, healthcare providers, lawmakers, and public health practitioners. Data that remain with me will be kept on a personal computer that only I can access for three years. Data sharing may be accomplished by publishing the results in an academic journal.

Summary

In this study, I explored the association between the dependent variable, LBW, and the independent variables: the woman's age, education, income, and marital status. I used the SEM as the theoretical framework to specify which key sociodemographic variables influence LBW among BMWD.

Chapter 4: Results

Using a retrospective cross-sectional study, I aimed to examine the role of maternal disability on LBW among Black women. I will further investigate determinants of sociodemographic variables on LBW. I detailed the descriptive statistics and binary logistic regression analysis results in this chapter. Future researchers may use the findings of the study. I provided basic information about the sociodemographic factors associated with LBW among BMWD in the United States. The study participants were from 46 states, the District of Columbia, and territories, representing approximately 81% of all United States live births in 2019 and 2020 PRAMS datasets. I used the following research questions to guide the analysis.

RQ1: To what extent do sociodemographic variables (age, education, income, marital status, race) significantly predict LBW among BMWD?

$H_0$1: Sociodemographic variables (age, education, income, marital status, race) do not significantly predict LBW.

H_a1: Sociodemographic variables (age, education, income, marital status, race) significantly predict LBW.

RQ2: To what extent does disability predict LBW beyond the effects of sociodemographic variables (age, education, income, marital status, race)?

$H_0$2: Disability does not predict LBW beyond the effects of sociodemographic variables (age, education, income, marital status, race).

H_a2: Disability predicts LBW beyond the effects of sociodemographic variables (age, education, income, marital status, race).

Data Collection of the Secondary Dataset

I used secondary data collected by the CDC for the present study. The United States started collecting disability data in 2019 along with the PRAMS. The current study used 2019 and 2020 PRAMS datasets as PRAMS data for 2019 and 2020 are already collected, cleaned, stored, and made available by the CDC for researchers upon request. After fulfilling all the requirements, I got permission to use the data and received the dataset.

Descriptive Statistics of the General Population

The dataset contains a nationally representative sample of 86,131 mothers who gave live birth in 2019 and 2020. As depicted in Table 1, most of the study participants in the general population were Whites (57%), followed by Blacks (19%). Although Blacks constitute 19% of the race category, when specifically asked whether they are Blacks or not, 17,949 (21%) disclosed being Black, creating a 2% gap. In the current study, those 17,949 (21%) who disclosed themselves as being Black were taken as the total number of Black population in the study. The prevalence of LBW among the general population was 21%, and 41% of the study participants reported having any form of disability. Any form of disability was defined as having at least one of the six forms of disability.

Table 1

Sociodemographic Characteristics of Study Participants

Variables	Categories	Frequency	Percent
Age (years)	<= 17	963	1
	18 - 19	2656	3

Variables	Categories	Frequency	Percent
	20 - 24	15178	18
	25 - 29	24391	28
	30 - 34	25862	30
	35 - 39	13818	16
	>= 40	3263	4
Family Income	$0 - $16,000	14006	18
	$16,001 - $20,000	5551	7
	$20,001 - $24,000	4136	5
	$24,001 - $28,000	3088	4
	$28,001 - $32,000	3828	5
	$32,000 - $40,000	4669	6
	$40,001 - $48,000	3521	5
	$48,001 - $57,000	3807	5
	$57,000 - $60,000	2385	3
	$60,001 - $73,000	4209	5
	$73,001 - $85,000	4098	5
	$85,001 or more	24906	32
Maternal Education	0 - 8 years	2412	3
	9 - 11 years	7349	9
	12 years	20817	24
	13 - 15 years	24346	29

Variables	Categories	Frequency	Percent
Marital status	>= 16 years	30546	36
	Other	35501	41
	Married	50581	59
Maternal Race	Oth. Asian	4240	5
	White	47650	57
	Black	16088	19
	Am. Indian	3291	4
	Chinese	1033	1
	Filipino	843	1
	Oth. Nonwhite	4496	5
	Mixed Race	5325	6
	Others (Japanese, Hawaiian, & Ak. Native)	913	1
Maternal Race - Black	No	66588	79
	Yes	17949	21
LBW	No	68265	79
	Yes	17791	21
Any form of disability	No	22943	59
	Yes	16207	41
Have seeing disability	No	31696	81
	Yes	7494	19

Variables	Categories	Frequency	Percent
Have hearing disability	No	37302	95
	Yes	1913	5
Have walking disability	No	36871	94
	Yes	2358	6
Have remembering disability	No	28194	72
	Yes	11027	28
Have selfcare disability	No	38207	97
	Yes	1035	3
Have communicating disability	No	37005	94
	Yes	2214	6

Sociodemographic Characteristics of Blacks

Of 17,949 Black mothers, 3,374 had any form of disability. According to 31% of mothers, family earnings were $16,000 or below, while 12% reported earnings of $85,001 or more. Four-thousand seven-hundred eighty-two (27%) of mothers gave birth to LBW babies, as depicted in Table 2 below.

Table 2

Sociodemographic Characteristics of Blacks

Variables	Categories	Frequency	Percent
Age (years)	<= 17	300	2

Variables	Categories	Frequency	Percent
	18 - 19	781	4
	20 - 24	4042	22
	25 - 29	5204	29
	30 - 34	4478	25
	35 - 39	2454	14
	>= 40	689	4
Family Income	$0 - $16,000	4852	31
	$16,001 - $20,000	1673	11
	$20,001 - $24,000	1228	8
	$24,001 - $28,000	886	6
	$28,001 - $32,000	1036	7
	$32,000 - $40,000	1185	8
	$40,001 - $48,000	742	5
	$48,001 - $57,000	669	4
	$57,000 - $60,000	364	2
	$60,001 - $73,000	550	3
	$73,001 - $85,000	434	3
	$85,001 or more	1897	12
Maternal Education	0 - 8 years	236	1
	9 - 11 years	1846	11
	12 years	6178	35

Variables	Categories	Frequency	Percent
	13 - 15 years	6117	34
	>= 16 years	3427	19
Marital status	Other	12117	68
	Married	5820	32
LBW	No	13154	73
	Yes	4782	27
Any form of disability	No	4808	59
	Yes	3374	41

Descriptive Statistics of BMWD

Of 3,374 Black mothers with any form of disability, 920 (27%) were aged 25-29. Most mothers (37%) claim the family earning $16,000 or below, and 236 (8%) earn $85,001 or more. Regarding maternal education, 1,245 (37%) attended 13-15 years of education, as indicated in Figure 2. Nine hundred seventy-four (28.9%) of mothers gave LBW babies, as depicted in Table 3.

Table 3

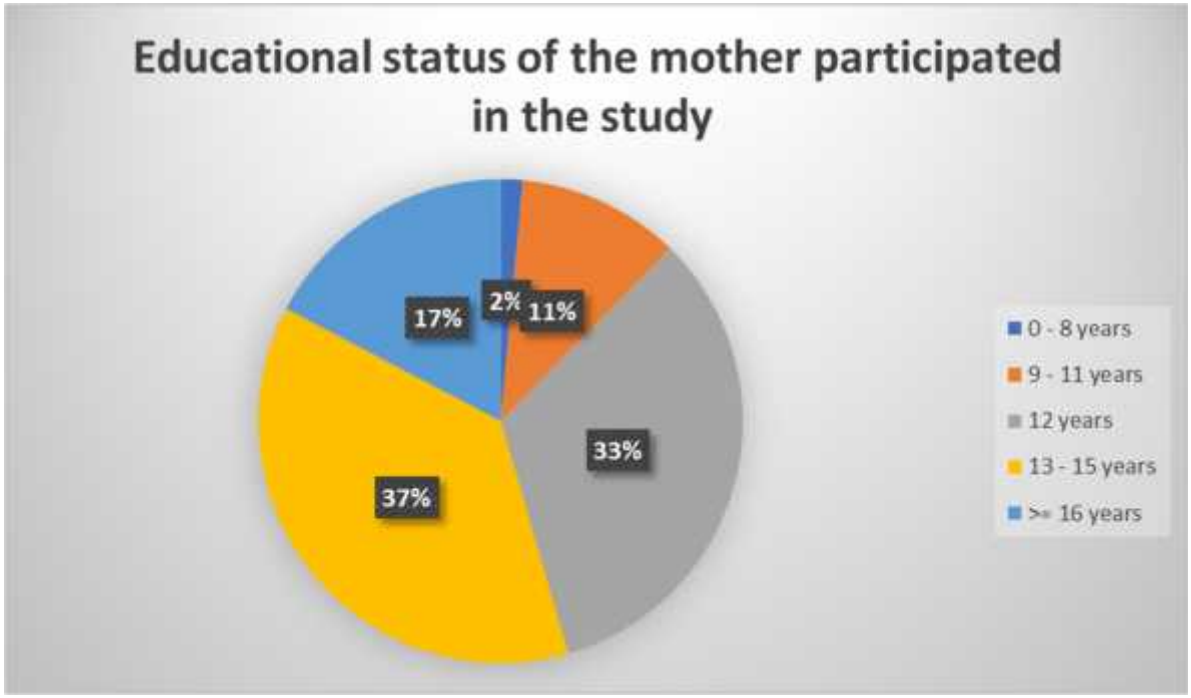
Sociodemographic Characteristics of BMWD

Variables	Categories	Frequency	Percent
Age (years)	<= 17	61	2
	18 - 19	168	5
	20 - 24	812	24
	25 - 29	920	27
	30 - 34	816	24
	35 - 39	468	14
	>= 40	127	4
Family Income	$0 - $16,000	1156	37
	$16,001 - $20,000	352	12
	$20,001 - $24,000	244	8
	$24,001 - $28,000	178	6
	$28,001 - $32,000	191	6
	$32,000 - $40,000	233	8
	$40,001 - $48,000	130	4
	$48,001 - $57,000	127	4
	$57,000 - $60,000	68	2
	$60,001 - $73,000	98	3
	$73,001 - $85,000	74	2
	$85,001 or more	236	8

Variables	Categories	Frequency	Percent
Maternal Education	0 - 8 years	49	2
	9 - 11 years	364	11
	12 years	1109	33
	13 - 15 years	1245	37
	>= 16 years	579	17
Marital status	Other	2393	71
	Married	980	29
Maternal race	Black	3046	90
	Mixed	327	10
LBW	No	2398	71.1
	Yes	974	28.9

Figure 2

School Years BMWD Completed

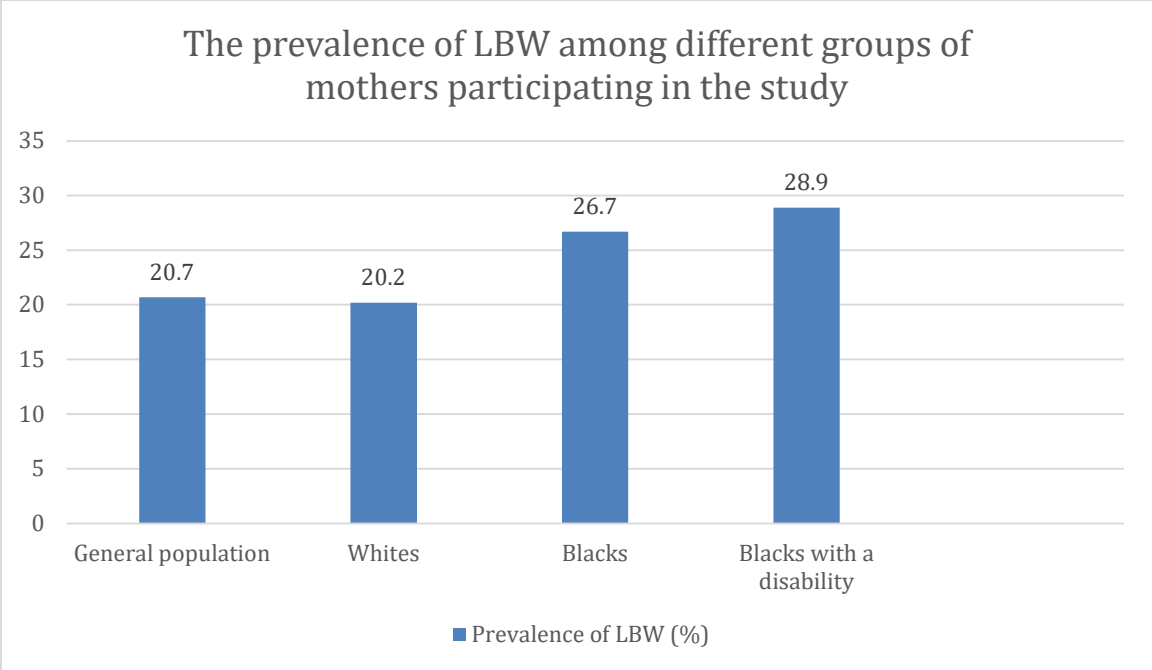


The Prevalence of LBW

The prevalence rate of LBW among Black mothers who participated in the study was 26.7%, while the prevalence rate among the general population and whites was 20.7% and 20.2%, respectively. The data indicated that Black mothers have a 29% higher chance of having LBW babies compared with the general population and a 32.2% higher chance of having LBW babies compared with whites. The prevalence rate of LBW among BMWD was 28.9%, which was an 8.2% higher chance of having LBW babies compared with Black mothers without a disability and a 39.6% higher chance of having LBW babies compared to the general population, as shown in Figure 3.

Figure 3

Comparing the Prevalence Rate of LBW



Effects of Sociodemographic Variables on LBW

A bivariate and multivariate logistic regression model was used to understand the association between sociodemographic variables (age, education, income, marital status, and maternal race) and LBW among BMWD. A mother who graduated from high school earns 40% more income than someone without one (State of Minnesota, 2023). Graduating from high school also increases the chances of employment by 33% (State of Minnesota, 2023) and adds 33% more to lifetime earnings (Carnevale et al., 2009). Despite the above advantages of completing a high school, the univariate analysis demonstrated that mothers who reported their education 9-11 years were associated with increased odds of LBW compared to mothers who completed 16 years or more of education (1.643[1.235 - 2.186], p <.001). According to Silvestrin et al. (2020), the

mother's educational status is critical in their babies' birth weight inequality. Therefore, mothers who completed 16 years or more of education have a lower chance of having LBW babies than those who completed 9-11 years of schooling.

Bivariate analysis was considered as a filtering stage for all the predictors in the present study. Therefore, the predictors with significant results were considered proposed predictors for LBW to answer the research questions explicitly. In the bivariate analysis, factors with a $p < .25$ were selected as candidate variables for the multivariate analysis. All sociodemographic variables incorporated in bivariate logistic regression were also selected as candidate variables for the multivariate logistic regression model. Maternal income, marital status, and maternal race showed significant association with LBW (Table 4).

Table 4

Bivariate Logistic Regression Analysis Predicting LBW

Variables	Categories	*LBW*		Crude odds ratio	
		Yes	No	COR (95%CI)	*p value*
Maternal Age (yrs)	20 – 24	246	566	1	
	<= 17	24	37	1.492(.874 - 2.548)	.142*
	18 – 19	58	110	1.213(.854 - 1.724)	.281
	25 – 29	244	676	.830(.674 - 1.024)	.082*
	30 – 34	217	599	.834(.672 - 1.034)	.098*
	35 – 39	144	324	1.023(.799 - 1.309)	.859
	>= 40	41	86	1.097(.735 - 1.638)	.651

Variables	Categories	*LBW*		Crude odds ratio	
		Yes	No	COR (95%CI)	*p value*
Maternal Education	0 - 8 years	11	38	.866(.432 - 1.739)	.687
	9 - 11 years	129	235	1.643(1.235 - 2.186)	<.001*
	12 years	324	784	1.237(.985 - 1.554)	.068*
	13 - 15 years	357	888	1.203(.961 - 1.506)	.106*
	>= 16 years	145	434	1	
Marital status	Married	229	750	1	
	Other	745	1648	1.481(1.247 - 1.757)	<.001*
Family Income	$0 - $16,000	352	804	1.671(1.191 - 2.344)	.003*
	$16,001 - $20,000	97	255	1.452(.981 - 2.148)	.062*
	$20,001 - $24,000	77	167	1.760(1.163 - 2.663)	.008*
	$24,001 - $28,000	53	125	1.618(1.032 - 2.537)	.036*
	$28,001 - $32,000	54	137	1.504(.964 - 2.348)	.072*
	$32,000 - $40,000	73	160	1.741(1.145 - 2.647)	.009*
	$40,001 - $48,000	26	104	.954(.560 - 1.625)	.863
	$48,001 - $57,000	28	99	1.079(.639 - 1.823)	.775
	$57,000 - $60,000	22	46	1.825(1.004 - 3.318)	.048*
	$60,001 - $73,000	26	71	1.398(.808 - 2.419)	.232*
	$73,001 - $85,000	19	55	1.318(.717 - 2.424)	.374
	$85,001 or more	49	187	1	
	Black	906	2140	1.613(1.221, 2.130)	<.001*

Variables	Categories	*LBW*		Crude odds ratio	
		Yes	No	COR (95%CI)	*p value*
Maternal race	Mixed race	68	259	1	

Note. * Indicates candidate variables selected for multivariate analysis (p < .25)

The candidate variables were entered into a multivariate logistic regression analysis to understand the extent of sociodemographic variables significantly predict LBW among BMWD. Model fitness was checked using Hosmer and Lemeshow test, and the *p* value was .934. The value .934 indicated that the dataset best fits the model.

Predictors of LBW

Logistic regression is the appropriate statistical test used to determine the predictors of LBW. Four assumptions were tested to accept the results of all the multivariate logistic regression models for the predictors. In assumption one, the dependent variable must be binary. LBW is binary; the response is either yes or no. Therefore, this assumption was met and accepted. In assumption two, the observations must be independent. Since a cross-sectional study was conducted, the observations were independent. Therefore, this assumption was met and accepted. In assumption three, the sample size should be sufficiently large. A small sample within a large number of predictors reduces power. The sample size should be at least ten times the independent variables. The current study has less than 13 independent variables. Therefore, there should be at least 130 samples. The current dataset has thousands of samples, and it met the assumption. In assumption four, there is no multicollinearity among explanatory

variables. I checked for high inter-correlations between predictors using Spearman Correlations, which should be less than .70. In the Collinearity diagnostics, the Tolerance value should be > 0.1, and the variance inflation factor (VIF) should be < 10. My test indicated a Tolerance level > 0.1 and VIF < 10, indicating my assumption is met. The scatterplot also showed the assumption is met.

Based on the multivariate logistic regression, family income, marital status, and maternal race were identified as significant predictors of LBW among BMWD. Unmarried disabled mothers had about 32% more odds of having LBW babies than married mothers (AOR=1.320, 95% CI [1.074, 1.621]). The odds of having family income of $32,000 - $40,000 increases LBW babies by 1.62 times as compared to having family income of more than 85,001 dollars (AOR=1.620, 95% CI [1.025, 2.550]). Black mothers who have a disability were 1.87 times more likely to have LBW babies as compared to mixed-race mothers (AOR=1.872, 95% CI [1.370, 2.550]) (Table 5).

Table 5

Bivariate and Multivariate Logistic Regression Predicting LBW among BMWD

Variables	Categories	*LBW*		Crude odds ratio		Adjusted odds ratio	
		Yes	No	COR (95%CI)	*p value*	AOR (95%CI)	*p value*
Maternal age (yrs)	20 – 24	246	566	1		1	
	<= 17	24	37	1.492(.874 - 2.548)	.142*	.855(.411 - 1.778)	0.675
	18 – 19	58	110	1.213(.854 - 1.724)	0.281	1.077(.729 - 1.591)	0.711
	25 – 29	244	676	.830(.674 - 1.024)	.082*	.839(.670 - 1.053)	0.129
	30 – 34	217	599	.834(.672 - 1.034)	.098*	.892(.702 - 1.133)	0.348
	35 – 39	144	324	1.023(.799 - 1.309)	0.859	1.135(.860 - 1.499)	0.37
	>= 40	41	86	1.097(.735 - 1.638)	0.651	1.343(.873 - 2.065)	0.18
Maternal Education	0 - 8 years	11	38	.866(.432 - 1.739)	0.687	.687(.314 - 1.507)	0.349
	9 - 11 years	129	235	1.643(1.235 - 2.186)	<.001 *	1.273(.887 - 1.828)	0.19

Variables	Categories	*LBW*		Crude odds ratio		Adjusted odds ratio	
		Yes	No	COR (95%CI)	*p value*	AOR (95%CI)	*p value*
	12 years	324	784	1.237(.985 - 1.554)	.068*	.972(.728 - 1.299)	0.85
	13 - 15 years	357	888	1.203(.961 - 1.506)	.106*	1.033(.791 - 1.350)	0.81
	>= 16 years	145	434	1		1	
Marital status	Married	229	751	1		1	
	Other	745	1648	1.481(1.247 - 1.757)	<.001*	1.320(1.074 - 1.621)	.008*
Family income	$0 - $16,000	352	804	1.671(1.191 - 2.344)	.003*	1.357(.899 - 2.049)	0.147
	$16,001 - $20,000	97	255	1.452(.981 - 2.148)	.062*	1.234(.784 - 1.940)	0.363
	$20,001 - $24,000	77	167	1.760(1.163 - 2.663)	.008*	1.527(.960 - 2.429)	0.074
	$24,001 - $28,000	53	125	1.618(1.032 - 2.537)	.036*	1.428(.874 - 2.332)	0.155
	$28,001 - $32,000	54	137	1.504(.964 - 2.348)	.072*	1.347(.829 - 2.190)	0.23

Variables	Categories	*LBW*		Crude odds ratio		Adjusted odds ratio	
		Yes	No	COR (95%CI)	*p value*	AOR (95%CI)	*p value*
	$32,000 - $40,000	73	160	1.741(1.145 - 2.647)	.009*	1.619(1.026 - 2.555)	.038*
	$40,001 - $48,000	26	104	.954(.560 - 1.625)	0.863	.891(.510 - 1.554)	0.683
	$48,001 - $57,000	28	99	1.079(.639 - 1.823)	0.775	1.023(.596 - 1.757)	0.935
	$57,000 - $60,000	22	46	1.825(1.004 - 3.318)	.048*	1.726(.926 - 3.215)	0.086
	$60,001 - $73,000	26	71	1.398(.808 - 2.419)	.232*	1.335(.763 - 2.337)	0.312
	$73,001 - $85,000	19	55	1.318(.717 - 2.424)	0.374	1.234(.665 - 2.292)	0.505
	$85,001 or more	49	187	1		1	
Maternal race	Black	906	2140	1.613(1.221, 2.130)	<.001*	1.873(1.376 - 2.549)	<.001*
	Mixed race	68	259	1		1	

Note. * indicates significance ($p < .05$).

Predictors of Disability among the General Population

Logistic regression was an appropriate statistical test used to determine the predictors of disability. In the bivariate analysis, factors with a $p < .25$ were selected as candidate variables for the multivariate analysis. The binary logistic regression in Table 6 indicated that maternal age, education, income, heart disease, diabetes, anxiety, depression, and residence were significant predictors of disability.

Table 6

Bivariate Logistic Regression Analysis of the Predictors of Disability

Variables	Categories	*Disability*		Crude odds ratio	
		Yes	No	COR (95%CI)	*p value*
Maternal age (yrs)	20 – 24	3283	3450	1	
	<= 17	231	221	1.098(.908 - 1.329)	.334
	18 – 19	595	593	1.054(.932 - 1.193)	.400
	25 – 29	4740	6431	.775(.729 - .823)	<.001*
	30 – 34	4452	7533	.621(.585 - .660)	<.001*
	35 – 39	2323	3905	.625(.583 - .671)	<.001*
	>= 40	581	806	.758(.674 - .851)	<.001*
Maternal Education	>= 16 years	4547	9937	1	
	0 - 8 years	423	710	1.302(1.149 - 1.476)	<.001*
	9 - 11 years	1635	1704	2.097(1.943 - 2.263)	<.001*
	12 years	4299	4750	1.978(1.874 - 2.088)	<.001*
	13 - 15 years	5188	5700	1.989(1.889 - 2.094)	<.001*
Family income	$85,001 or more	3019	7272	1	
	$0 - $16,000	3732	3365	2.671(2.508 - 2.845)	<.001*
	$16,001 - $20,000	1258	1393	2.175(1.994 - 2.374)	<.001*
	$20,001 - $24,000	963	1019	2.276(2.064 - 2.510)	<.001*
	$24,001 - $28,000	681	749	2.190(1.958 - 2.450)	<.001*
	$28,001 - $32,000	851	948	2.162(1.953 - 2.394)	<.001*

Variables	Categories	*Disability*		Crude odds ratio	
		Yes	No	COR (95%CI)	*p value*
	$32,000 - $40,000	1030	1241	1.999(1.822 - 2.194)	<.001*
	$40,001 - $48,000	719	1012	1.711(1.541 - 1.900)	<.001*
	$48,001 - $57,000	776	1075	1.739(1.571 - 1.925)	<.001*
	$57,000 - $60,000	478	684	1.683(1.487 - 1.906)	<.001*
	$60,001 - $73,000	841	1277	1.586(1.440 - 1.748)	<.001*
	$73,001 - $85,000	803	1197	1.616(1.464 - 1.784)	<.001*
Heart	No	3069	4007	1	
Problem	Yes	122	90	1.770(1.342 - 2.333)	<.001*
Diabetes	No	15493	22118	1	
	Yes	528	648	1.163(1.035 - 1.307)	.011*
Depression	No	11589	20660	1	
	Yes	4469	2121	3.756(3.550 - 3.974)	.000*
Anxiety	No	3225	5879	1	
	Yes	2254	1384	2.969(2.742 - 3.215)	<.001*
Residence	Urban	5320	7731	1	
	Rural	3630	4779	1.104(1.044 - 1.167)	<.001*

In the multivariate analysis shown in Table 7, disability was associated with LBW after adjusting for maternal race, diabetes, and residence. The cumulative incidence of LBW among the general population was 20.7%. The cumulative incidence of LBW

among Black mothers was 26.7% compared to 28.9% in BMWD. While considering all other variables constant, mothers with any disability were 1.112 (COR = 1.112 (1.057 - 1.170)) more likely to have a child with LBW. After adjusting for potential confounders, disability (AOR = 1.136 (1.055 - 1.223)) remained significantly associated with LBW.

Table 7

Multivariate Logistic Regression Predicting LBW Beyond the Effects of Socio-Demographic Variables

Variables	Categories	*LBW*		Crude odds ratio		Adjusted odds ratio	
		Yes	No	COR (95%CI)	*p value*	AOR (95%CI)	*p value*
Any form of Disability	No	4234	18698	1		1	
	Yes	3258	12936	1.112(1.057 - 1.170)	<.001	1.136(1.055 - 1.223)	<.001*

Note. Adjusted for maternal race, diabetes, and residence.

Predictors of Disability Among Blacks

Logistic regression was an appropriate statistical test to determine the predictors of disability. In the bivariate analysis, factors with a *p value* < .25 were selected as candidate variables for the multivariate analysis. The binary logistic regression in Table 8 indicated that maternal age, education, income, heart disease, diabetes, anxiety, and depression are significant predictors of disability as is in the general population. Residence was not statistically significant in the bivariate analysis but considered for the multivariate analysis as its *p* value was < 0.25.

Table 8

Bivariate Logistic Regression of Predictors of Disability among Blacks

Variables	Categories	Disability		Crude odds ratio	
		Yes	No	COR (95%CI)	*p* value
Maternal age (yrs)	20 – 24	812	1022	1	
	<= 17	61	81	.948(.671 - 1.338)	.761
	18 – 19	168	200	1.057(.844 - 1.324)	.628
	25 – 29	920	1433	.808(.714 - .915)	.001*
	30 – 34	816	1192	.862(.758 - .979)	.023*
	35 – 39	469	676	.873(.752 - 1.014)	.076*
	>= 40	127	204	.784(.616 - .996)	.046*
Maternal Education	>= 16 years	579	1013	1	
	0 - 8 years	49	55	1.559(1.047 - 2.321)	.029*
	9 - 11 years	364	502	1.269(1.071 - 1.503)	.006*
	12 years	1109	1653	1.174(1.033 - 1.333)	.014*
	13 - 15 years	1245	1560	1.396(1.231 - 1.584)	<.001*
Family income	$85,001 or more	236	462	1	
	$0 - $16,000	1156	1357	1.668(1.399 - 1.987)	<.001*
	$16,001 - $20,000	352	471	1.463(1.187 - 1.803)	<.001*
	$20,001 - $24,000	244	333	1.434(1.142 - 1.801)	.002*
	$24,001 - $28,000	178	243	1.434(1.118 - 1.839)	.005*
	$28,001 - $32,000	191	266	1.406(1.102 - 1.793)	.006*

Variables	Categories	Disability		Crude odds ratio	
		Yes	No	COR (95%CI)	*p* value
	$32,000 - $40,000	233	316	1.443(1.146 - 1.818)	.002*
	$40,001 - $48,000	130	236	1.078(.827 - 1.406)	.577
	$48,001 - $57,000	127	190	1.309(.995 - 1.721)	.054*
	$57,000 - $60,000	68	96	1.387(.979 - 1.964)	.066*
	$60,001 - $73,000	98	159	1.207(.897 - 1.623)	.215*
	$73,001 - $85,000	74	115	1.260(.904 - 1.755)	.172*
Heart Problem	No	1110	1481	1	
	Yes	43	24	2.391(1.442 - 3.963)	<.001*
Diabetes	No	3195	4624	1	
	Yes	133	140	1.375(1.080 - 1.751)	.010*
Depression	No	2393	4385	1	
	Yes	944	381	4.540(3.991 - 5.165)	<.001*
Anxiety	No	1015	1684	1	
	Yes	470	271	2.877(2.431 - 3.406)	<.001*
Residence	Urban	975	1506	1	
	Rural	359	499	1.111(.949 - 1.301)	.190*

Table 9

Multivariate Logistic Regression Predicting LBW Beyond the Effects of Socio-Demographic Variables among Blacks

Variables	Categories	*LBW*		Crude odds ratio		Adjusted odds ratio	
		Yes	No	COR (95%CI)	*p value*	AOR (95%CI)	*p value*
Any form of Disability	No	1335	3471	1		1	
	Yes	974	2399	1.056(.957 - 1.164)	.277	1.072(.972 - 1.184)	.165

Note. Adjusted for maternal race and diabetes

Further running a subgroup analysis by selecting only Blacks, disability was found to be positively associated with LBW but didn't reach a significant level. After adjusting for potential confounders, maternal race (black vs. mixed) and diabetes (yes vs. no), disability remained positively associated with LBW (AOR = 1.072, 95% CI [0.972, 1.184]).

Summary

The binary logistic regression results on RQ1 regarding to what extent sociodemographic variables (age, education, income, marital status, race) significantly predict LBW among BMWD showed a significant association between the dependent variable, LBW, and the independent variables, marital status, family income, and maternal race. Marital status, family income, and maternal race were significantly associated with LBW among BMWD ($p < 0.05$) and failed to reject the null hypotheses.

On the other hand, the analysis indicated no statistically significant association between LBW and sociodemographic variables age and education among BMWD.

The logistic regression results on RQ2 regarding to what extent does disability status predict LBW beyond the effects of sociodemographic variables indicated that the disability status of the mother did not significantly influence LBW among Black mothers beyond the effects of sociodemographic variables (p =.165) and accepted the null hypothesis (Disability status does not predict LBW beyond the effects of sociodemographic variables although it was positively associated). The prevalence rate of LBW was higher among BMWD than the general population and Blacks with no disability. In the next chapter, I will focus on the interpretation of the findings, application to professional practice, implications for social change, and study limitations.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this retrospective cross-sectional study was to examine the role of Black mother's disability status in predicting LBW above and beyond what sociodemographic variables explain. Various studies indicated a higher prevalence of LBW among people with disabilities (Tarasoff et al., 2020). Women with disabilities have a 29% higher risk of LBW babies (Horner-Johnson et al., 2022). Studies also show a higher prevalence of LBW among Blacks (Dombrowski et al., 2021; Goldfarb et al., 2018; Ratnasiri et al., 2018). The current study underlined the critical effects of having any form of disability and being Black in having a higher prevalence of LBW. The present study failed to reject the null hypotheses in RQ1 (Sociodemographic variables do not significantly predict LBW) and accept the null hypothesis in RQ2 (Disability does not predict LBW beyond the effects of sociodemographic variables). Based on the results and findings, evidence provided about the prevalence of LBW and sociodemographic factors associated with LBW among BMWD in the United States.

Interpretation of Findings

The results of the RQ1 showed a statistically significant effect and failed to reject the null hypotheses. The RQ2 did not show a statistically significant association and accepted the null hypothesis. The literature review results in Chapter 2 revealed that the sociodemographic factors of marital status, race, and family income were associated with LBW among Blacks. Similarly, I found that sociodemographic characteristics of marital status, family income, and race were associated with LBW among BMWD.

I found a statistically significant association ($p = .038$) between family income and LBW among BMWD. Black mothers with higher family incomes had improved birth outcomes compared with lower-income Black mothers. The current finding is consistent with Burris and Hacker's (2017), Martinson and Reichman's (2016), and Savitsky et al. (2022) result that family income is significantly associated with LBW.

In the present study, I found a statistically significant difference in LBW among BMWD compared to mixed-race BMWD ($p <.001$). Burris and Hacker (2017), Echevarria and Lorch (2022), Lumpkins and Saint Onge (2017), Ratnasiri et al. (2018) also found a significant association between maternal race and LBW.

Clay et al. (2021) found significant differences between Black and Non-Hispanic White mother's marital status and, along with Agorinya et al. (2018) and Bird et al. (2000), found that unmarried women are more prone to give LBW babies than married women. Hannan et al. (2022) and Brown et al. (2022) found that women with a disability experience more adverse birth outcomes and neonatal complications, including LBW. In the present study, I found that the sociodemographic factor of marital status was significantly associated ($p =.008$) with LBW among BMWD.

Although Hidalgo-Lopezosa et al. (2019) and Manyeh et al. (2016) indicated a significant association between maternal age and LBW, I did not find a significant association between maternal age and LBW among BMWD. Green and Hamilton (2019), Hidalgo-Lopezosa et al. (2019), Mohammed et al. (2019), Cantarutti et al. (2017), and Silvestrin et al. (2020) found that the educational status of the mother was significantly

associated with LBW, but I did not find a significant association between maternal education and LBW among BMWD.

Limitations of the Study

I used the dataset from a reliable source with a rigorous statistical analysis to test the hypothesis. The scientific community and researchers used PRAMS dataset to identify high-risk groups of women and infants for health problems, monitor changes in health status, and measure progress toward goals in improving the health of mothers and infants. Despite those benefits, PRAMS data are generalizable only to pregnancies resulting in a live birth of singletons or multiples of fewer than four. According to Hassan et al. (2021), neonates born in multiple pregnancies are more likely to have LBW when compared to their singleton counterparts.

The other limitation is that the PRAMS survey is currently administered only in English and Spanish. Therefore, it might present a hurdle in collecting data from mothers who speak neither survey language. Because PRAMS is based on self-reported information, there is the potential for misclassification errors. Bias might also occur if some groups of mothers recall experiences more or less accurately than others. For instance, disability status was determined solely based on the mother's report and might be subject to limitations related to self-reporting biases.

Finally, the present study did not explore whether mothers were themselves born LBW at birth. According to Hannan et al. (2022), a mother's own LBW status at birth might have an intergenerational risk for adverse birth outcomes for her baby.

Recommendations

In the present study, some sociodemographic variables significantly predict LBW among BMWD. Although the current study's findings did not indicate a statistically significant association between disability status and LBW beyond the effects of sociodemographic variables, I recommend a prospective cohort study to establish causation.

Mothers with disabilities require more assistance and accommodation than their counterparts. When mothers with disabilities become pregnant, the need for support increases (Heideveld-Gerritsen et al., 2021). Women with disabilities require additional support during the perinatal care periods (Byrnes & Hickey, 2016). As 71% of BMWD who participated in the study were unmarried, providing premarital counseling is essential. Therefore, considering premarital counseling for women with disabilities will help couples to get married and get better support during the perinatal periods (Rajabi & Abbasi, 2020), as support in the immediate environment results in less need for external institutional help (Gevorgianienė et al., 2023).

Family income is significantly associated with having a LBW baby (Martinson & Reichman, 2016). According to the United States Census Bureau (2015), people with disabilities make 33% less median income than those without disabilities. Therefore, it is critical to increase their income by creating a conducive working environment and equal employment opportunities for BMWD (Gevorgianienė et al., 2023; United States Department of Labor, 2023). Bringing more people with a disability into the workforce might benefit the economy by increasing productivity and reducing spending on

disability-related government benefits (Aichner, 2021). Most workplace accommodations for people with a disability are also simple and inexpensive (United States Department of Labor, 2023).

Implications for Professional Practice and Social Change

In the present study Blacks have the highest LBW babies compared with Whites. People with disabilities also have higher LBW babies than those without disabilities. I found that the prevalence of LBW is higher among Blacks with disabilities. Although people with disabilities want their own families like their counterparts, community members' stigma and discrimination against their reproductive needs limit them (Hussein & Ferguson, 2019). As a Black community member and having a close family living with a disability, I have witnessed the challenges they face. I tried to explore the factors associated with LBW among BMWD, but no published data existed. I was shocked by the lack of data and motivated to conduct research to contribute to my community and employ baseline data for future studies.

The positive social change implications for this study include the presentation of evidence and knowledge that public health practitioners and healthcare providers can use to improve health and health outcomes for BMWD and their infants. The availability of evidence and knowledge about the factors associated with LBW among BMWD can contribute to a decline in LBW and eventually lower infant mortality. A reduction in LBW might also decrease the nation's health expenditures. Policymakers

might use the findings from this study to mobilize resources to improve annual incomes of BMWD and provide premarital counseling services.

Conclusions

The current study indicated that sociodemographic variables (age, education, income, marital status, race) significantly predicted LBW among BMWD and showed a significant association ($p < 0.05$) between the dependent variable, LBW, and the independent variables, marital status, family income, and maternal race. On the other hand, the analysis indicated no statistically significant association between LBW and sociodemographic variables age and education among BMWD.

The logistic regression results on the extent disability status predict LBW beyond the effects of sociodemographic variables indicated that the disability status of the mother did not significantly influence LBW among Black mothers beyond the effects of sociodemographic variables (p=.165) and accepted the null hypothesis (disability status does not predict LBW beyond the effects of sociodemographic variables although it was positively associated). The prevalence rate of LBW was higher among BMWD than the general population and Blacks with no disability.

My study found that babies born from BMWD are at elevated risk for LBW. To my knowledge, there were no studies on LBW and associated factors among BMWD. I investigated the prevalence rate and sociodemographic factors associated with LBW among BMWD.

A social change will happen if the lawmakers work on interventions that focus on increasing the income of BMWD. The interventions by healthcare professionals and

lawmakers should target increasing the income of mothers with a disability. In future studies, researchers should consider exploring the maternal and healthcare factors associated with LBW among BMWD.

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