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The Relationship Between Preterm Birth Rates, Sociodemographic Factors, and Prenatal Care

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This is to certify that the doctoral study by

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Walden University
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Abstract

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Natasha Ann Grant

MBA, Western Governors University, 2017

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Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Reducing preterm births is a local, national, and global public health priority. Preterm birth rates continue to rise with evident racial and ethnic differences. The purpose of the quantitative study was to analyze the Mississippi Pregnancy Risk Assessment Monitoring System (PRAMS) Phase 8 data to investigate the association between preterm births, timing of prenatal care, insurance types, and marital status among 5,666 women who gave birth in Mississippi between 2016 - 2020 using logistic regression. The social-ecological model was used to explain the impact of preterm births at the individual, interpersonal, and policy levels. Marital status was shown to be statistically significant among preterm birth rates (OR – 1.528, $p < .001$) indicating unmarried women were more likely to have a preterm birth. Medicaid was also statistically significant (OR = 1.417, $p < .001$) indicating that for a Medicaid patient, the odds of a preterm birth increased by almost 1.5 times. Additionally, timing of prenatal care was not statistically significant in the study (OR = .998, $p = .979$). A potential public health practice implication could focus on at risk women with Medicaid. Group therapy, behavioral modification, and nutritional components may lead to improved health outcomes supporting incremental reductions in preterm births associated with Medicaid recipients. Positive social change may be accomplished through the emphasis on the impact of a healthy support system. Resources, both financially and holistically, can help lead in the reduction of the significant impacts preterm births have on communities and can serve as a vessel for other targeted approaches.

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Dedication

To my wonderful husband Milton. Thank you for believing in me even when I did not believe in myself. To my crazy siblings, Natalie, and Nate, and my sister-in-love LaDawn, thank you for the nonstop laughs to keep me sane. To my loving family, my aunts, uncles, nieces, nephews, and cousins. You all mean the world to me and thank you for your continued support. To my amazing friends. Thank you for always motivating me and pushing me. To my mother, Brenda. I am grateful for all the lessons you have taught me, and I humbly thank you for believing in me in this lifetime and the next. I hope you are looking down on me from heaven proud of the woman I have become.

Acknowledgments

First, I would like to thank my family and friends for their continued love and support throughout the entire process. I would like to thank my Chair, Dr. Stacy-Ann Christian and committee members Dr. Pelagia Melea and Dr. Heba Tawfik for your guidance and insight throughout this process. To Walden University for providing quality education and preparing me for this journey. To my Walden University cohorts, especially my classmate and sorority sister, Dr. Dainelle Clark, thank you for the late-night talks and encouragement throughout this process.

To the many families who have been impacted by preterm births. I am hopeful that this study can continue to bring awareness to understanding how preterm births not only affect families, but the impact is felt among multiple levels. Additionally, it is my sincere hope that this study can lead to targeted interventions.

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Section 1: Foundation of the Study and Literature Review

Introduction to the Study

Preterm births have been a matter of public health interest locally, nationally, and internationally. Initiatives to improve female reproductive health have been a significant priority for medical and public health professionals since the early 1980s (Hawks et al., 2018). Yet, preterm birth rates in the United States are significantly higher than in other highly developed countries (March of Dimes, 2015). The American Public Health Association (2006) indicated in a brief that preterm births and associated short- and long-term health outcomes had been shown to disproportionately affect specific populations. Social determinants of health such as race/ethnicity and marital status, as well as socioeconomic status factors such as income and related insurance types, require a thorough examination to fully understand the relationship these variables have on impacting preterm births. Subsequently, public health professionals have emphasized improvements in the efficacy of prenatal care, including access to affordable health insurance before, during, and after pregnancy (Meltzer & Markus, 2020). Additionally, improved social support during pregnancy, such as support from the infant's father, was linked to enhanced prenatal outcomes (Surkan et al., 2020).

Problem Statement

Premature births are not a new phenomenon impacting communities. In fact, preterm births have been known to intersect various aspects of public health. The intersection within the public health realm crosses epidemiological (clinical), policy and politics, socioeconomic, and behavioral pathways. Preterm births are classified as births

occurring at less than 37 weeks of gestation, while early preterm births occur in cases less than 32 weeks of gestation (Barfield, 2018). According to the Mississippi State Health Department, in 2016, almost 14% of all births were deemed preterm, resulting in the state having one of the highest rates of not only preterm births but infant related deaths (MSDH.gov, 2017). Barfield (2018) estimated that less than 1.7% of all preterm births are early preterm births; however, more than half (52%) of those births account for significant and often severe medical complications and infant deaths. The Centers for Disease Control and Prevention (CDC, 2019) reported that premature births are the leading cause of infant mortality. It is estimated that 17% of infant deaths were attributed to preterm births between 2014 and 2017 (CDC, 2019). Moreover, preterm births are responsible for high medical costs compared to full-term births add to the community's economic burden (Markus et al., 2017).

The impact of preterm births appears to be significantly linked to race within communities. In fact, Black American women are significantly impacted compared to non-Hispanic White American women (March of Dimes, 2019), and the CDC estimated that in 2017, the preterm birth rate for non-Hispanic Black American women was about 14% compared to 9% among non-Hispanic White American women (CDC, 2019). Recent evidence suggests an associated link between weight gained during pregnancy and early preterm births, with non-Hispanic Black women experiencing higher population attributable risk (PAR) percentages than non-Hispanic White women (Leonard et al., 2017). A more definitive understanding of the potential associated risk factors will help address the racial gap.

The adequacy of prenatal care utilization and insurance coverage has been suggested as potential contributors to preterm births (Osterman & Martin, 2018); however, there is a gap in identifying the behaviors contributing to lack of utilization and interrelationships among individuals and health care providers. Additionally, there are gaps in understanding the impacts potential ethical considerations may have in managing preterm births with determining the viability of a fetus, which potentially contributes to the behaviors impacting care utilization. The aim of reducing risk to mother and infant is a goal of medical-induced preterm births. Yet, Delnord et al. (2015) reported significant variations within the clinical practice, scope, and policies related to inductions. Additionally, VanderWeele et al. (2012) reported that the significant increase in preterm birth rates can be linked to the significant increase in medical practices such as induction rates, which rose by almost 95% from 3.4% to 6.6% between 1989 and 2004.

Purpose of the Study

Social determinants such as prenatal care timing, marital status, and insurance types were explored to examine how they impact preterm births in Mississippi and across races. In this quantitative study, I analyzed secondary data to investigate the relationship between prenatal care timing and sociodemographic factors such as insurance types on preterm birth rates among various races in Mississippi. The study's independent variables are insurance type (commercial or private and Medicaid), the timing of initial prenatal care, and marital status. In contrast, the study's dependent variable is preterm birth, and race/ethnicity was examined as a covariate variable. This study can help identify future

strategies to address gaps, such as standardization of screening and ways to reduce disparities within the state.

Research Questions

RQ1: What is the association between preterm births and insurance type (Medicaid versus private/commercial insurance) among various races in Mississippi?

$H_0$1: There is no statically significant association between preterm births and insurance type (Medicaid versus private/commercial insurance) among various races in Mississippi.

H_a1: There is a statistically significant association between preterm births and insurance type (Medicaid versus private/commercial insurance) among various races.

RQ2: What is the association of preterm births and timing of prenatal care (trimester of initial prenatal care) among various races in Mississippi?

$H_0$2: There is no statistically significant association between preterm births and prenatal care timing among various races in Mississippi.

H_a2: There is a statistically significant association between preterm births and prenatal care timing among various races in Mississippi.

RQ3: What is the association between preterm births and marital status among races in Mississippi?

$H_0$3: There is no statistically significant association between preterm births and marital status among various races in Mississippi.

H_a3: There is a statistically significant association between preterm births and marital status among various Mississippi races.

Theoretical Framework

The public health issue of preterm births clearly illustrates that this issue affects not only parents or children; instead, it shows that preterm births can and often do intersect many levels within communities. Different theories can be used to identify trends; therefore, in this doctoral study, I applied a social theoretical framework for understanding preterm births and potential associations, specifically, for understanding the levels of influence from various sources and how they can be used to prevent preterm births and promote overall health and wellness.

The socioecological model (SEM) is a theoretical framework developed by Urie Bronfenbrenner in the 1970s and later formalized as a theory in the 1980s focusing on prevention (Kilanowski, 2017). Bronfenbrenner (1977) proposed that human development's ecology was related to the relationship of one's environment consisting of nested circles at each point. The nested circles included the microsystem, identifying the relationship between an individual and their immediate environments, such as home, and the mesosystem, identifying the relationships between an individual and the environment at a specific point in life, such as school. The exosystem relates to formal and informal specific social structures such as neighborhoods and local, state, and federal government. The macrosystem examines the all-encompassing patterns of culture or subculture that determine the "blueprint" for the structures and activities occurring (Bronfenbrenner, 1977). Later adaptations of the SEM led to the development of specific levels that display interactive and reinforcing characteristics (Stokols, 1996). The most current transformation of the SEM comprises five constructs or groups of influences: individual,

interpersonal, organizational, community, and public policy. According to the CDC (n.d.), the influences and relationships between the different levels are quite complex and can help in identifying and understanding the range of risk factors among the various groups, how to prevent risks between these levels, and lead to sustaining prevention efforts over time than any single intervention.

Figure 1

The Social-Ecological Model

Note. Adapted from *The Social Ecological Model: A Framework for Prevention*, by Centers for Disease Control and Prevention, (http://www.cdc.gov/violenceprevention/overview/social-ecologicalmodel.html). In the public domain.

The SEM's utilization within this doctoral study focused on the intersecting relationships among the individual, interpersonal, and public policy levels. Specifically,

at the individual level, I examined race/ethnicity; at the interpersonal level, I explored the role of relationships, such as marital status and timing of prenatal care and its influence; and at the public policy level, I examined the relationship between insurance demographics. Moreover, as Glanz and Bishop (2010) suggested, the framework for reproductive health is not specific to personal attributes but rather the interaction of these attributes within the built environment and the social structures that could modify the relationship with preterm birth outcomes.

Table 1

Socioecological Model Levels Applied to Associated Research Variables

Socioecological model levels	Description	Research variables	Research question(s) number
Individual	Focusing on individual risk factors such as race/ethnicity and socioeconomic status	Ethnicity, race, the timing of prenatal care, insurance type, preterm birth outcomes	RQ1, RQ2, & RQ3
Interpersonal	Focusing on relationships between family and friends	Ethnicity, race, trimester of prenatal care, insurance type, preterm birth outcomes	RQ1, RQ2, & RQ3
Public policy	Focusing on policies impacting communities	Ethnicity, race, trimester of prenatal care, insurance type, preterm birth outcomes	RQ1, RQ2, & RQ3

Another theoretical framework examined in addition to the SEM is the health belief model (HBM). The HBM comprises six constructs to predict health behavior: risk

susceptibility, risk severity, perceived benefits, perceived barriers, self-efficacy, and cues to action (Rosenstock, 1974). The theory uses demographic variables such as age, race/ethnicity, and socioeconomic status to help identify those factors associated with perceived susceptibility and perceived severity, as well as psychological variables such as peer influence and perceived control over the behavior to help identify those factors associated with perceived benefits and perceived barriers all leading to self-efficacy and cue to action (Rosenstock et al., 1988). Within this doctoral study, I examined the construct of perceived susceptibility and the potential relationship between socioeconomic statuses such as insurance type and timing of prenatal care and insurance type among various races in Mississippi with associated birth outcomes. The HBM can serve as a basis for health-related behaviors that identify the desire to prevent preterm births and the belief that specific actions can potentially lead to a reduction in preterm births. Moreover, the HBM can assist in explaining factors influencing perceived susceptibility, such as the social, programming, and lifestyle barriers (exposure variables) (Stout, 1997) that women face, potentially strengthening the associated relationship with preterm births (outcome variable). Furthermore, the model can serve as a foundation for future interventions among potentially high-risk groups.

Nature of the Study

The doctoral study approach was quantitative. The quantitative approach allowed the secondary data to be analyzed to determine whether there are any significant relationships between the selected variables to help answer the proposed research questions. The secondary dataset analyzed was Pregnancy Risk Assessment Monitoring

System (PRAMS) data from the Mississippi State Department of Health. PRAMS data contain events such as birth, infant death, marital status, insurance, location of birth, and other confidential information related to any delivery within Mississippi. The requested data for the study included gestation weeks, race, ethnicity, insurance payors, and marital status. The study design was cross-sectional and was performed using secondary data collected at a time. The study included the independent/exposure variables (insurance types, the timing of prenatal care, and marital status), the dependent/outcome variable (preterm births), and the covariate variable examined, race/ethnicity.

Literature Search Strategy

I accessed multiple search engines, databases, and libraries to identify previously completed studies and additional research to aid in doctoral research. These libraries, search engines, and databases included Google Scholar, Google, ldh.la.gov, CDC.gov, and academicguides.waldenu.edu/library. The search included search terms such as *preterm birth(s), premature birth(s), insurance, Medicaid, race/ethnicity, marital status, parental involvement,* and *prenatal care* and combined search terms such as *Mississippi – preterm birth(s), Mississippi – premature birth(s), insurance type – insurance payor and preterm birth(s), the timing of prenatal care – insurance, and prenatal support – Mississippi – preterm birth(s)* from peer-reviewed journals such as the Journal of Global Health, Current Opinion in Obstetrics & Gynecology, JAMA, Annals of Epidemiology, Journal of Psychosomatic Obstetrics & Gynecology, American Journal of Health Promotion, Journal of Community Health Nursing, Pediatric Research, American Journal of Obstetrics and Gynecology, Health Education Quarterly, and Health Education

Monographs, as well as data from the CDC, Mississippi Department of Health, and the March of Dimes. The search strategy for peer-reviewed articles and data date range will include 2015–current.

Literature Review Related to Key Variables or Concepts

Paternal Involvement and Preterm Births

The study by Surkan et al. (2019) sought to examine the relationship between paternal involvement and support and preterm birth outcomes. A subsequent study by Mahrer et al. (2021) sought to identify latent factors from preconception stress such as relationship stress from partner involvement. The results of the study by Mahrer et al. suggest that more perceived stress prior to conception was associated with shorter gestation. Independent variables within the study consisted of questions surrounding father involvement during the pregnancy and social support from fathers, including variables of married with support, unmarried with support, married without support, and unmarried without support, as well as birth outcomes and covariates such as age, race, education, and marital status (Surkan et al., 2019). Chi-square analysis was performed to determine the relationship between the independent and dependent variables (Surkan et al., 2019). Surkan et al. (2019) found that more women with no paternal involvement (33.0%) reported preterm birth compared to those with some paternal participation (26.9%). The study also found higher odds of preterm births to be associated unmarried women compared to married women. Higher preterm birth rates were also related to unmarried women with or without outside support, suggesting that the perception of

paternal involvement could be potentially used as a predictor of preterm births (Surkan et al., 2019).

Race and Preterm Births

Leonard et al. (2017) sought to examine the relationship between weight gain during pregnancy, and its association with preterm births among non-Hispanic White American women and Black American women sought to explore the relationship between weight gain during pregnancy and if it is associated with preterm births among non-Hispanic Black and non-Hispanic White women. The researchers performed a retrospective cohort study between 2011 and 2015, and measurements included categorizing early preterm births and late preterm births, body mass index, race, and gestational weight. The study indicated that lower gestational weight significantly reduced preterm births in non-Hispanic Black women. Additionally, the authors did not include any information on the theoretical framework for the basis of the study; however, the research question was well-framed. The study adds to the current body of knowledge, as previous studies were performed on a much smaller scale. In contrast, the authors analyzed all births in the United States from 2011 to 2015, creating a considerable sample size. Although the sample size was significant, the authors limited the study to non-Hispanic Black and non-Hispanic White women; therefore, the results may not apply to other races/ethnicities.

The current study does not significantly differ from previous research methodologically; instead, other similar studies were found to have conflicting results and were performed over a decade ago. The analysis can potentially contribute to the

doctoral research because it can be expanded to help analyze the impacts of weight gain during pregnancy as a potential social determinant of health, racial disparities within other ethnicities, and preterm births.

Insurance Type, Race, Prenatal Care, and Preterm Births

Researchers have hypothesized that the type of insurance an individual has can lead to negative or positive health outcomes (Hawks et al., 2018). The study by Hawks et al. (2018) sought to examine the relationships between insurance status, race/ethnicity, and health before pregnancy using the New York City PRAMS. The PRAMS database is a retrospective surveillance tool that contains surveyed responses and birth data linked to prenatal (i.e., before and during pregnancy) and post-partum (i.e., after pregnancy; Hawks et al., 2018; PRAMS Methodology, 2015). Hawks et al. (2018) analyzed PRAMS data between 2009 and 2011 (n = 3929) and developed the Preconception Health Score (PHS) to quantify the survey responses by assigning points for services, behavior modification, the timing of prenatal care, and whether the pregnancy was planned as a method of determining the relationship based on insurance status. Key independent variables included insurance before pregnancy (uninsured, public insurance [Medicaid], and private/commercial insurance) and race/ethnicity, whereas covariates of the study included socioeconomic statuses such as age, marital status, and education level (Hawks et al., 2018). The researchers performed chi-square analysis for insurance status and logistic regression for insurance and PHS, then PHS, along with the covariates to examine the relationship among the reference groups (uninsured and non-Hispanic White race; Hawks et al., 2018). The study showed that insurance was statistically significant

among the variables examined, suggesting that participants with commercial/private insurance were shown to have higher PHS scores, higher levels of education, higher rates of marriage, and lower rates of unintended pregnancies among the non-Hispanic White race (Hawks et al., 2018). Moreover, the study suggests that while race/ethnicity with insurance status is statistically significant with regard to PHS scores, there are inconsistencies when comparing the same insurance status and type among different races, potentially indicating that insurance status may require an additional examination to be considered as a predictor of a higher PHS score (Hawks et al., 2018). Although PHS was developed as a means of quantifying prenatal experiences, PHS is based on survey responses identified in PRAMS, which could potentially be linked to unintentional biases (Hawks et al., 2018). Moreover, the PHS scores are not linked to birth outcomes such as preterm births, low birth weight, or infant mortality (Hawks et al., 2018).

The study by Hawks et al. (2018) differed from the studies by Meltzer and Markus (2019) and Markus et al. (2017), both of which sought to examine whether there was a significant association between insurance coverage and preterm births. Markus et al. (2017) sought to investigate if there was a significant association between Medicaid coverage and the risk of preterm births compared with private insurance coverage and preterm birth risk. The study was performed as a retrospective cohort study using 2010–2013 reimbursement data and birth statistics with Medicaid serving as the exposure variable and preterm births as the outcome variable (Markus et al., 2017). The study found that among reimbursement data, private insurance covered more births overall compared to Medicaid, yet Medicaid coverage covered more preterm births compared to

private insurance (Markus et al., 2017). Additionally, the study found that women with Medicaid coverage were more likely to have additional risk factors, including age, tobacco use, single marital status and the study also seems to suggest a link to an individual's race could also be a potential risk factor (Markus et al., 2017). The study presented by Meltzer and Markus also examined payment sources in relation to birth outcomes. The key independent variable was the source of payment, and preterm births were the dependent variable. The study used secondary data from the National Vital Statistics System from the CDC between 2011 and 2016 in this cross-sectional study (Meltzer & Markus, 2019). Several types of statistical analyses were performed, including chi-square to determine relationships between the independent variable and gestational age, and multivariable logistic regression analyses to perform an estimation of preterm birth outcome and payment source (Meltzer & Markus, 2019). Similar to the study by Hawks et al. (2018), the studies by Meltzer and Markus and Markus et al. showed that insurance status and payment source does appear to be significant in covering and paying for services before, and during pregnancy. However, Meltzer and Markus showed that, after pregnancy, public insurance (Medicaid) covered more preterm births, although private insurance covered most deliveries. Moreover, the preterm birth rate by payment source was highest among Medicaid; however, the likelihood of preterm birth by payment source was shown to decrease with Marketplace subsidies, maternity benefits, and coverage mandates (Melter & Markus, 2019).

In a similar study, Palmer (2019) sought to examine the relationship between prenatal care and birth outcomes by race. Palmer examined the relationship between

subsidized insurance, such as the expansion of healthcare through the Affordable Care Act and impacts on birth outcomes. To examine the potential relationship between subsidized insurance and birth outcomes by race, Palmer developed measures for Medicaid eligibility and non-Medicaid eligibility (NMSI) while birth outcomes were obtained from Vital Statistics. The study found that Medicaid expansion significantly increased the share of prenatal care visits among non-Hispanic whites and non-Hispanic blacks (Palmer, 2019).

The studies presented have research questions that were well framed and contributed to the existing body of knowledge. Additionally, the studies presented illustrate the need for additional research to understand the relationship between insurance type and preterm birth outcomes. Specifically, although the results showed that Medicaid covered more preterm births, further analysis is needed to explore the potential impact of Medicaid types as a risk factor, how Medicaid expansion has impacted prenatal care timing, and the relationship between other insurance types.

Theoretical Framework and Preterm Births

Rozen et al. (2018) sought to examine the personal growth of mothers of preterm infants. The authors performed a prospective study to examine the components of the five dimensions of self, which include spiritual, emotional, mental, physical, and social. The study found that mothers with moderate-high perceived stress were associated with spiritual change. The medical and perceived risk level of infants appears to be associated with perceived maternal emotional support needed and overall personal growth (Rozen et al., 2018). The study presented research grounded in social theory as it examined self-

efficacy and perceived risks. Although other studies examined postpartum depression, Rozen et al. demonstrated a different approach as they focused on behaviors and attitudes among mothers of preterm infants. The research methods conducted were appropriate for the study; however, the sample size, although sufficient, could have been larger. Additional study limitations included limitation data on other factors that could potentially contribute to personal growth or lack thereof. Rozen et al.'s study can add to future research as self-efficacy, and perceived risks can be analyzed for potential impact on future births. Additionally, while the study focused on Israeli women, behaviors and attitudes among other ethnicities can be explored as potential contributors to prenatal care timing and potential associated preterm births.

Secondary Data Types and Sources of Information

Secondary datasets and sources of information were used to complete the doctoral study. The doctoral study followed the HBM in identifying the potential associations between selected variables. Data for the study were provided by the Mississippi State Department of Health. PRAMS data from 2016–2020 were analyzed, and the variables of interest included premature birth rates, insurance type, race, marital status, and timing of the first prenatal visit.

Definitions

Ethnicity: Of a specific ethnic group (Merriam-Webster, n.d.). In the scope of this doctoral study, I used the term *race/ethnicity* and include the following groups: non-Hispanic white, white, non-Hispanic black, African American, Hispanic, and other.

Insurance type – commercial/private: Health insurance not marketed by government-run agencies and most commonly employer-sponsored related plans (Healthinsurance.org, n.d.).

Insurance type - Medicaid: Public health insurance that provides coverage to individuals, including eligible low-income adults, children, pregnant women, elderly adults, and people with disabilities (Medicaid.gov, n.d.).

Marital status: Classification of married or unmarried and may include commonly used terms such as married, divorced, single (never married), widowed, and cohabitation/common law marriage (Merriam-Webster, n.d.).

Preterm births: Classified as births occurring less than 37 weeks gestation while early preterm births occur in cases less than 32-week gestation (Barfield, 2018). Both early preterm births and late preterm births were combined and analyzed as outcome variables within this study.

Prenatal care/prenatal care coordination: Services and treatment received while pregnant (Shiel, 2018). *Timing of prenatal care/prenatal care coordination*: References the trimester of the initial services/treatment received (Shiel, 2018.)

Race: Referencing those groups of individuals with shared or common cultural, geographical, linguistic, or religious origin or background (Merriam-Webster, n.d.).

Assumptions

The study assumed that risk factors contributing to preterm births significantly impact women differently based on race, and therefore a potential challenge is a saturated body of knowledge. One such assumption is that all interventions presented will work for

anyone potentially at high risk of preterm births. The positivist paradigm presumes that those individuals responsible for implementing interventions begins with the definable problem: rather empirical identification seems to suggest that the problem and solution are of a one size fits all mold. Specifically, I assumed that preterm birth risk factors are the same among all women; therefore, techniques to reduce risk factors should work for all. The dataset provided quantifiable information on any associations; however, the datasets do not explain the behaviors or context, potentially creating a limitation in the study.

Scope and Delimitations

This study's scope included examining the relationships between race/ethnicity, marital status, the timing of prenatal care/care coordination, and insurance type with preterm births among women in Mississippi. Understanding how these variables are interrelated and the relationships' potential strength could help understand overall health outcomes and appropriate development of interventions and health policies to reduce and eliminate risks, particularly among high-risk groups. The study is delimited to women who gave birth in Mississippi regardless of residential status. The theory most related to the area of study not investigated includes the developmental origin theory. This theory has been presented in various studies and suggests that prenatal intrauterine stress and postnatal prematurity may create an allostatic load cycle that begins before birth and continues to adulthood (Sullivan et al., 2008). Moreover, the theory suggests that this cycle could potentially lead to various diseases and conditions including those that may trigger preterm births among those women (Sullivan et al., 2008).

Significance, Summary, and Conclusion

The potential contributions of this study include that it can aid with advancing knowledge in the discipline of maternal and infant health outcomes. Specifically, the potential to address sociodemographic and socioecological factors such as marital status and income factors related to types of insurance may lead to targeted screening approaches and potentially targeted interventions. Von Haeften et al. (2001) found that targeted interventions can be linked from correlational analysis as a research design. The researchers suggested that correlational analysis can be used to investigate whether elicited beliefs show that the theoretical factors that are assumed are directly linked to direct psychosocial determinants of intention and those determinants can be used to help predict intention narrowing targeted approaches. Moreover, findings from this study may lead to advances in practice and policy that seeks to develop new or enhanced models of care, as well as the creation of significant integrated service delivery models that addresses the overall range of health needs before, during, and after pregnancies as current models tend to provide limited scope for current policies (de Jongh et al., 2016).

The potential advancements in the current knowledge base as well as advances in practice and policy can also lead to positive social change. The history of social change suggests that positive change can more easily occur if it is presented, and social behaviors are viewed as allocations of time and resources (Barth, 1967). Positive social change within the scope of this doctoral study can be linked to understanding mechanisms that influence the targeted population but also ways that public health professionals can use

this knowledge and engage the targeted population, policy makers, and healthcare professionals, thereby improving overall health outcomes.

Preterm birth as a general concept is well known as public health professionals and health care workers have identified many short- and long-term impacts to infants and communities as a result. The CDC (2019) has also suggested that some areas tend to experience higher rates of preterm births compared to others. Within the context of this study, I examined potential correlations between race/ethnicity, marital status, types of insurance, and timing of prenatal care along with the potential influence on preterm birth outcomes in Mississippi. Although the general concept of preterm births is well known, what is not well known is how the variations among these variables influence clinical practice, scope, and policies. Additionally, other gaps include the impacts on behaviors that could lead to limited utilization of services and the influence of those behaviors to create barriers among and between socioecological levels including the targeted population, families, health care professionals, and policy makers. This study sought to examine the SEM and HBM to aid in filling the gap of what is not well investigated and could potentially advance knowledge in the field of preterm births beyond the general concepts. Moreover, potential relationships between the variables were examined through a correlational research design.

Section 2: Research Design and Data Collection

Introduction

In this study, I examined the association between race/ethnicity as a covariate variable, marital status, insurance types, and prenatal care timing in association with preterm birth outcomes in Mississippi using a quantitative correlation approach. The research variables included preterm births as the outcome variable, race/ethnicity as a control variable, and marital status, insurance types, and timing of prenatal care as the independent variables. The outcomes from this research study may lead to a more comprehensive understanding of variables influencing birth outcomes and targeted interventional approaches that can be supported throughout communities within Mississippi and potentially extended throughout other areas.

In this section of the doctoral study, I discuss the research design and rationale, exploring the variables and research questions and how the method can potentially contribute to advancing knowledge. Additionally, in the Methodology section, I describe the target population, sampling structure and procedures, sample size, and data collection associated with the chosen secondary dataset. External and internal threats to validity are also examined, and ethical systems are evaluated.

Research Design and Rationale

In this quantitative doctoral study, I examined the relationship between several variables and their potential influence on preterm birth outcomes in Mississippi as the dependent variable. The independent variables included in the study are prenatal care timing, marital status, and insurance types. Determining whether there is an association

between the independent and dependent variables within a specified population of the study is the basis of correlation (Leedy & Ormrod, 2010), and this research design was the premise of the doctoral study to answer the associated research questions.

With any study, there is the potential for influences such as time or resources that could delay the study's progress or implementation of interventions related to the study. Potential time constraints with correlation research design within this doctoral study were directly related to the required time needed to obtain permission to use the dataset for analysis which was initially requested through the Louisiana Office of Vital Health Statistics however subsequently requested and received from the Mississippi State Department of Health. This constraint was also viewed as a resource constraint due to limited public access availability and potential financial constraint. Within the confines of this study, monitored public data was used to prevent these potential challenges.

Correlational research design within the scope of this doctoral study was consistent as this type of research can potentially advance future research.

Methodology

Population

PRAMS data from 2016–2020 was used within this study to obtain the target population. The original dataset proposed for use did not arrive and required multilevel approval from the State of Louisiana. The use of the Mississippi State Department of Health PRAMS data was analyzed as an alternative, given that the demographics, such as race, are comparable for Louisiana and Mississippi for the period 2014–2018, with White averaging 61% of the population for both states, Blacks averaging approximately 35% of

the population, percentage of persons in poverty at about 19% for both states, and college degree averages for both states at about 23% making the use of the dataset appropriate (IndexMundi, n.d.). The specific sample size was on exact birth record counts per particular year. The population size was based on each year which included 2016–2020.

Sampling and Sampling Procedures

The data in the secondary dataset contained statistics from the Mississippi State Department of Health PRAMS database. Each year selected for the study was provided as a separate dataset for analysis containing specific variables related to the doctoral research. No power analysis was performed to estimate the sample size for the study. The information contained in the dataset provided statistics based on the collection of data, including but not limited to birth and death events at the state and local level, as well as information obtained through state and local registration platforms such as demographics including but not limited to marital status (Rothwell et al., 2014). The Mississippi State Department of Health then provides information to the CDC, resulting in a record of live births and deaths collected based on specific years and includes events occurring in the 57 U.S. vital registration areas (50 states, New York City, District of Columbia, and five U.S. territories; Rothwell et al., 2014).

Recruitment, Participation, and Data Collection

Access to the years of analysis was available for specific analytical use. The data used within this study was scrubbed to remove detailed, individually identifiable information before being provided for use. Additionally, no recruitment or participation is required by individuals as the data is provided directly from local, state, or territory

vital statistics and registries. I obtained access to the years of analysis by submitting a request to the Mississippi State Department of Health. The proposal included a data request form and a data sharing agreement form. No fee was associated with requesting the data for use. Additionally, the data request was limited to specific variables in question to reduce potentially identifiable information about the population being analyzed.

Instrumentation and Operationalization of Constructs

Instrumentation

Within the study context, the Mississippi State Department of Health PRAMS database was used for analysis as it provided the appropriate variables being studied. The PRAMS database analyzed included 2016–2020 data. This dataset was suitable for the study because vital statistics have been used to track and trend perinatal and obstetrics research within the United States since the 1900s (Schoendorf & Branum, 2006). According to the CDC National Center for Health Statistics (n.d.), birth data files, and other vital statistics data, are published as special reports. Four to six special reports are published each year covering final data from the previous year. Instrumentation surrounding vital statistics data is comparable state to state as the federal government recommends standards. They serve as guides for use by state registration offices, ensuring that the information collected meets not only the legal needs of individuals but also provides statistical data in a standardized form comparable from one reporting area to another (Hetzel, 1997).

Vital statistics records such as birth certificates have been examined for reliability and validity in previous studies. Northam and Knapp (2006) assessed the reliability and validity of birth certificates. They found that while birth certificates serve as a critical data source for birth and identifying causes of increasing U.S. infant mortality, birth certificates as the only key data source offered variations across items. Additionally, Northman and Knapps (2006) noted that using birth certificates to understand the relationship between external factors such as alcohol or tobacco use, delivery events, or obstetric procedures used in delivery was unreliable and invalid. Parks et al. (2011) also examined birth certificates' validity and reliability of weight, height, and body mass index. The authors used Pearson's correlation to estimate reliability, sensitivity, and specificity to measure validity among women enrolled in Florida prenatal Women, Infants, and Children (WIC) Program. Conversely, Parks et al. (2011) found that although variations exist, the variations were minimal and had a limited impact on the reliability and validity of population-based surveillance and research.

Operationalization

From an operational aspect of the study, dependent and independent variables were examined to explore potential associations. The dependent or outcome variable of the study is preterm birth, and the independent variables are race/ethnicity, insurance type, marital status, and timing of prenatal care. The variables were analyzed quantitatively.

Dependent Variable. Preterm birth within the dataset was coded by gestation weeks. Specifically, preterm births refer to any birth occurring before 37 weeks and the

associated years of analysis include the descriptor GEST_WK_NAPHSIS. GEST_WK_NAPHSIS was defined within the dataset as a grouped obstetric estimate of gestation (completed weeks). The group responses included 1 = <= 27 Weeks, 2 = 28–33 Weeks, 3 = 34–36 Weeks, and 4 = Full Term. Further grouping of the values was recoded to <= 27 weeks, 28–33 weeks, and 34–36 weeks = 1 (Preterm), and 4 = Full Term was recoded to = 2.

Independent Variables. The independent variables include marital status, the timing of prenatal care, and insurance type among various races.

Marital Status. Marital status is measured in the dataset by self-reporting from state registry information. The variable code MARRIED determines the mother's marital status at birth and includes the response types 1 = Married or 2 = Other.

Timing of Prenatal Care. The timing of prenatal care is measured in the dataset to determine whether prenatal care was received within the first trimester, after, or not at all. The variable code PNC_1TRM was used and indicated by 1= Yes (Prenatal care first obtained during the first trimester), 2 = No (Prenatal care received first received after the first trimester), and 3 = No prenatal care received during pregnancy. The variable code PNC_1TRM was used and was indicated by 1= Yes (Prenatal care first obtained during the first trimester), 2 = No (Prenatal care received first received after the first trimester), and 3 = No prenatal care received during pregnancy.

Insurance Type. The type of insurance was measured in the dataset from state-reported information. The variable codes used were divided into PP8_WORK_RAW

(insurance paid by job - commercial), where 1 = No and 2 = Yes, and PP_MEDIC_RAW (insurance paid by Medicaid), where 1 = No and 2 = Yes.

Covariate. Race will be examined in the study as a potential covariate.

Race. Maternal race was measured in the dataset by self-reporting from the population analyzed. The variable for race is MAT _RACE and was analyzed using the values 1 = Asian, 2 = White, 3 = Black, 4 = Other Race, 5 = Mixed Race.

Data Analysis Plan

Data analysis was performed using IBM SPSS software (Version 28). The data analysis plan included an initial review of each dataset year. The plan included merging each year of Phase 8 to allow for a concise analysis. Additionally, associated values were entered into SPSS variable view to allow for analysis, including running initial descriptive analysis such as the frequency of obtaining demographic information about the population being analyzed, creating sample tables, and performing necessary analysis to answer the research questions.

Data cleaning and screening procedures have been widely used to emphasize standardization, documentation, and reporting of data handling and quality (Van den Broeck et al., 2005). Within the context of this study, the data were screened for any inconsistencies, as databases can contain information entered multiple times or not at all. Additionally, identifying missing data errors can help reduce the lack of data. While missing cases were identified, they accounted for less than 3% of the analyzed population.

Research Questions

RQ1: What is the association between preterm births and insurance type (Medicaid versus private/commercial insurance) among various races in Mississippi?

$H_0$1: There is no statically significant association between preterm births and insurance type (Medicaid versus private/commercial insurance) among various races in Mississippi.

H_a1: There is a statistically significant association between preterm births and insurance type (Medicaid versus private/commercial insurance) among various races.

RQ2: What is the association between preterm births and prenatal care timing (trimester of initial prenatal care) among various races in Mississippi?

$H_0$2: There is no statistically significant association between preterm births and prenatal care timing among various races in Mississippi.

H_a2: There is a statistically significant association between preterm births and prenatal care timing among various races in Mississippi.

RQ3: What is the association between preterm births and marital status among races in Mississippi?

$H_0$3: There is no statistically significant association between preterm births and marital status among various races in Mississippi.

H_a3: There is a statistically significant association between preterm births and marital status among various Mississippi races.

Statistical Analysis Plan

Descriptive statistical analysis was performed to understand the frequency of each variable occurring. Inferential statistical analysis and binary logistic regression were used to examine the relationship between variables, as stated in the research questions. Moreover, binary logistic regression was appropriate for this study as it considers more than one factor of independent variables (marital status, race, timing of prenatal care, and insurance) can influence the variability of the dependent variable (preterm births; see Olivieri, 2008).

Table 2 is the data analysis matrix linking the research question to the data source and the analysis type.

Table 2

Data Analysis Matrix for Relationship Between Preterm Birth Rates, Sociodemographic Factors, and Timing of Prenatal Care Study

Study objective or research questions	Concept	Data source	Level of measurement	Analysis procedures
I: What is the association between preterm births and insurance type (Medicaid versus private/commercial insurance) among various races in Mississippi?	Association between preterm births and insurance types	PRAMS	Nominal. Both IV and insurance types among races, as stated in RQ1	Frequencies, means, percent description Chi-square, P value Binary logistic regression
II. What is the association between preterm births and prenatal care timing (trimester of initial prenatal care) among various races in Mississippi?	Association between preterm births and timing of prenatal care	PRAMS	Nominal. Both IV and timing of prenatal care among races, as stated in RQ2	Frequencies, means, percent description Chi-square, P value Binary logistic regression
III. What is the association between preterm births and marital status among races in Mississippi?	Association between preterm births and marital status	PRAMS	Nominal. Both IV and marital status among races, as stated in RQ3	Frequencies, means, percent description Chi-Square, P value Binary logistic regression

Threats to Validity

Potential threats to validity included threats to internal and external validity. Internal or external validity has been viewed as the most important and has become more controversial (Yu & Ohlund, 2010). One major external threat to validity is sampling bias. Minimizing sampling bias can occur through random sampling. Additionally, internal threats to validity can be caused by unanticipated events that could potentially influence the study (Coryn & Hobson, 2011). Again, random sampling can be used to address any potential internal validity threats. Internal or external validity has been viewed as the most important and has become more controversial (Yu & Ohlund, 2010). One major external threat to validity is sampling bias. To limit sampling bias from occurring, random sampling should be used. Additionally, internal threats to validity can be caused by unanticipated events that could potentially influence the study (Coryn & Hobson, 2011). Again, random sampling can be used to address any potential internal validity threats.

Ethical Procedures

The secondary dataset required an application for use and data sharing agreement to obtain access. Specific requests made to the state included de-identified data to reduce any potential risks for violations of privacy. Although the dataset was redacted, it was received as an encrypted file and password protected to prevent unauthorized access. Additionally, upon successful verification that the data is completed, the file will be destroyed using one or more methods, including shredding, crushing, or incineration, overwriting at a high level rendering the data unrecoverable. PRAMS data requires

analysis for specific research purposes only, and research must be used to improve medical, or public health for the state (CDC, n.d.) require scrutiny to be used for specific research purposes only, and research must be used to improve medical or public health for the state (CDC, n.d.).

Summary

Section 2 consisted of the methodology for the study. A quantitative approach was taken to examine the association between preterm births and marital status, insurance type, the timing of prenatal care, and race as a covariate variable. The data analysis plan included steps to ensure data cleaning and screening and the data analysis matrix outlining statistical analysis for each research question. Statistical analysis was performed using SPSS software 28, while special attention was given to ensuring both internal and external threats to validity are limited and addressed. Additionally, ethical consideration for gaining access to the dataset and participant confidentiality was identified.

In the next section of the study, I examine the results and findings of the study.

Section 3: Presentation of the Results and Findings

Introduction

The study examined the association between race/ethnicity as a covariate variable, marital status, insurance types, and prenatal care timing associated with preterm birth outcomes in Mississippi using Phase 8 (2016–2020) PRAMS data. The association between the selected variables, specific research questions, and associated hypotheses was analyzed.

RQ1: What is the association between preterm births and insurance type (Medicaid versus private/commercial insurance) among various races in Mississippi?

$H_0$1: There is no statically significant association between preterm births and insurance type (Medicaid versus private/commercial insurance) among various races in Mississippi.

H_a1: There is a statistically significant association between preterm births and insurance type (Medicaid versus private/commercial insurance) among various races in Mississippi.

RQ2: What is the association between preterm births and prenatal care timing (trimester of initial prenatal care) among various races in Mississippi?

$H_0$2: There is no statistically significant association between preterm births and prenatal care timing among various races in Mississippi.

H_a2: There is a statistically significant association between preterm births and prenatal care timing among various races in Mississippi.

RQ3: What is the association between preterm births and marital status among races in Mississippi?

$H_0$3: There is no statistically significant association between preterm births and marital status among various races in Mississippi.

H_a3: There is a statistically significant association between preterm births and marital status among various Mississippi races.

Accessing the Data Set for Secondary Analysis

The Mississippi Department of Health Phase 8 PRAMS data were used for this study. The PRAMS consists of maternal experiences antenatal, prenatal, and postnatal, and Phase 8 consists of years 2016–2020. Data for the study were initially to be based on Louisiana Health Department Vital Statistics; however, I changed the focus of the study to Mississippi Department of Health PRAMS data due to accessibility issues. As a result of the change in the dataset, it was essential to identify a dataset and state comparable to Louisiana to perform the intended analysis. Phase 8 of PRAMS was sent as individual datasets, which were merged to obtain the population of the study analyzed.

Demographics

The population analyzed consisted of n = 5666 cases. Baseline descriptive and demographic analysis (see Table 3) shows the frequency distribution of the independent variables, marital status, prenatal care during the first trimester, insurance demographics, and the covariate maternal race. The distribution for both Marital Status and Insurance – Medicaid is skewed left, whereas variables Maternal Race, Prenatal Care 1st TRM, Insurance – Job, and Insurance – None/Self-Pay are skewed right. The analysis of

Maternal Race appeared to identify potential outliers; however, the descriptive analysis showed that the range was within the associated values based on the PRAMS Codebook.

Table 3

Frequency of Selected PRAMS Phase 8 Variables

Statistical analysis	Marital status	Maternal race	Prenatal care 1st TRM	Insurance - job	Insurance - Medicaid
n	5663	5666	5554	5521	5518
Missing	3	0	112	145	148
M	1.59	2.77	1.20	1.32	1.69
SD	.492	1.348	.433	.466	.461
Skewness	-.373	4.174	2.077	.733	-.841
SE of skewness	.033	.033	.033	.033	.033
Kurtosis	-1.862	19.543	.153	-1.403	-1.294
SE of kurtosis	.065	.065	0.66	0.66	0.66

Maternal race was examined as a covariate within the study as it could impact the relationship between the dependent variable of preterm birth outcomes and the independent variables of marital status, insurance type, and timing of prenatal care. The population analyzed reflects the noted census changes from 2010 to 2020 among races within the United States. The most recent census data showed that the White American population has decreased by almost 9% since 2010 compared to 2020, whereas the Black American population alone and Black-combination population, which includes Black-White, Black-American Indian, and Black-Alaskan Native, grew by 88.7% since 2010 compared to 2020 (Jones et al., 2021). Table 4 illustrates the population distribution of the Phase 8 PRAMS dataset, highlighting that the largest racial populations are Black and White.

Table 4

Frequency of Maternal Race Distribution

Maternal race	*n*	% distribution
Asian	49	0.9
White	2504	44.2
Black	2911	51.4
Other race	154	2.7

The dependent variable was analyzed to understand the potential relationship among the variables. Table 5 shows the baseline descriptive analysis of the frequency of the dependent variable, less than 37 weeks gestation is deemed a preterm birth, and the frequency of the population shows that a combined 39.8% of all deliveries were less than 37 weeks, while 60.1% of deliveries were full term. Additionally, six cases were missing from the analysis; however, they accounted for less than 1% of the population; therefore, the potential impact was negligible.

Table 5

Frequency of Gestation Weeks at Delivery

Gestational weeks	*n*	%
Preterm	2255	39.8
Full term	3405	60.1

Results of Study

The relationship between the dependent variable of preterm births, as defined within the context of the study as any gestational week less than or equal to 37 weeks, and the independent variables, insurance types, as defined as insurance from a job (commercial) and Medicaid, the timing of prenatal care, as defined as prenatal care

received within the first trimester, and marital status among various races within the state of Mississippi was analyzed. The timing of prenatal care, defined as prenatal care received within the first trimester, and marital status among different races within Mississippi were analyzed.

RQ1: What is the association between preterm births and insurance type (Medicaid versus private/commercial insurance) among various races in Mississippi?

$H_0$1: There is no statically significant association between preterm births and insurance type (Medicaid versus private/commercial insurance) among various races in Mississippi.

H_a1: There is a statistically significant association between preterm births and insurance type (Medicaid versus private/commercial insurance) among various races in Mississippi.

The chi-square test was performed as it is used to investigate the relationship between two categorical variables that have two or more categories. Table 6 is the crosstabulation of preterm births and insurance type (commercial) as stated in RQ1, and Table 7 is the chi-square output. A *p* value less than .05 was set as the significance of each association.

Table 6

*Crosstabulation Preterm Births * Insurance Type - Job*

Gestational weeks	Insurance by job - No	Insurance by job - Yes	Total
Preterm births			
n	1562	624	2186
%	41.6%	35.4%	39.6%
Full term births			
n	2190	1140	3330
%	58.4%	64.6%	60.4%
Total	3752	1764	5516

The crosstabulation shows that the gestational weeks that correlate to preterm births have a lower frequency of insurance paid by job compared to full-term deliveries. Expressly, 41.6% of deliveries associated with being preterm indicated that the source of insurance at the time of delivery was not paid by the job (commercial). In comparison, 58.4% of full-term births indicated that insurance at delivery was not paid by job (commercial). Further analysis, as indicated in Table 7, shows that the insurance type of job (commercial) is statistically highly significant as the ($p < .001$).

Table 7

Chi-Square Tests Insurance – Job

Chi-square tests	Value	*df*	Asymptotic significance (2-sided)
Pearson chi-square	19.635a	1	< .001
Likelihood ratio	19.785	1	< .001
Linear-by-linear association	19.631	1	< .001
No. of valid cases	5516		

Table 8 is the crosstabulation of preterm births and insurance type (Medicaid) as stated in RQ1, and Table 9 is the chi-square output. The crosstabulation indicated that preterm birth rates were higher among those respondents who indicated that Medicaid was the primary source of payment at the time of delivery at 42.3% compared to 33.4% of respondents who stated that there was another source of insurance or compensation for delivery. Conversely, full-term births were higher among those respondents who indicated that Medicaid was not the primary payment source at 66.6% compared to 33.4% of respondents with preterm birth. A *p* value less than .05 was set as the significance of each association.

Table 8

*Crosstabulation Preterm Births * Insurance Type – Medicaid*

Gestational weeks	Insurance Medicaid - No	Insurance Medicaid - Yes	Total
Preterm births			
n	564	1619	2183
%	33.4%	42.3%	39.6%
Full term			
n	1123	2207	3330
%	66.6%	57.7%	60.4%
Total - *N*	1687	3826	5513

Further analysis, as indicated in Table 9, shows that this insurance type is statistically highly significant ($p < .001$).

Table 9

Chi-Square Tests Insurance – Medicaid

Chi-square tests	Value	*df*	Asymptotic significance (2-sided)
Pearson chi-square	38.630a	1	< .001
Likelihood ratio	39.113	1	< .001
Linear-by-linear association	38.623	1	< .001
No. of valid cases	5513		

To understand the association that timing of care can have on preterm births. Table 10 is the Crosstabulation of preterm births and timing of prenatal care as stated in RQ2.

RQ2: What is the association between preterm births and prenatal care timing (trimester of initial prenatal care) among various races in Mississippi?

$H_0$2: There is no statistically significant association between preterm births and prenatal care timing among various races in Mississippi.

H_a2: There is a statistically significant association between preterm births and prenatal care timing among various races in Mississippi.

The crosstabulation shows that of all the gestational weeks, more than 60% of the respondents in the population indicated receiving prenatal care during the first trimester of pregnancy had a full-term delivery compared to only 40% among preterm births. The frequencies among prenatal care timing after the first trimester were the same, however preterm births were higher among the population with no prenatal care at 51.2% compared to full-term births with no prenatal care at 48.8%. A *p* value less than .05 was set as the significance of each association.

Table 10

*Crosstabulation Preterm Births * Timing of Prenatal Care*

Gestational weeks	PNC 1st TRM -Yes	PNC 1st TRM - No	No PNC	Total
Preterm births				
n	1796	364	42	2200
%	39.5%	39.5%	51.2%	39.7%
Full Term				
n	2754	554	40	3348
%	60.5%	60.5%	48.8%	60.3%
Total	4450	916	82	5548
	100%	100%	100%	100%

Note. PNC = prenatal care; TRM = trimester.

Table 11

Chi-Square Tests Timing of Prenatal Care – Care Received in 1st Trimester

Chi-square tests	Value	*df*	Asymptotic significance (2-sided)
Pearson chi-square	4.653a	2	.098
Likelihood ratio	4.546	2	.103
Linear-by-linear association	1.272	1	0.259
No. of valid cases	5548		

Further analysis, as indicated in Table 11, shows that receiving care during the 1st trimester was not statistically significant ($p < .098$).

To understand the association that timing of care can have on preterm births. Table 12 is the Crosstabulation of preterm births and marital status as in RQ3.

RQ3: What is the association between preterm births and marital status among races in Mississippi?

$H_0$3: There is no statistically significant association between preterm births and marital status among various races in Mississippi.

H_a3: There is a statistically significant association between preterm births and marital status among various Mississippi races.

Table 12

*Crosstabulation Preterm Births * Marital Status*

Clinical weeks gestation	Married	Other	Total
Preterm births	784	1470	2254
Full term	1529	1876	3405
Total	2313	3346	5659

The crosstabulation shows that of all the gestational weeks, more respondents indicated other as their marital status than married at the time of delivery. Subsequently, chi-square analysis, as in Table 13, shows that marital status is statistically highly significant to preterm birth rates ($p < .001$).

Table 13

Chi-Square Tests Marital Status

Chi-square tests	Value	*df*	Asymptotic significance (2-sided)
Pearson chi-square	57.496a	1	< .001
Likelihood ratio	57.929	1	< .001
Linear-by-linear association	57.486	1	< .001
No. of valid cases	5659		

The crosstabulation, as shown in Table 14, shows that all the gestational weeks among races were analyzed. Asian race accounted for less than 100 total births for the analyzed years, while other races accounted for less than 200. The races with significant deliveries during the studied years were White and Black. Specifically, 31.6% of White women had births that were preterm compared to 47.8% of Black women, and 68.4% of

White women had a full-term birth compared to 52.2% of Black women. Subsequently, chi-square analysis, as in Table 15, shows that race is statistically highly significant to preterm birth rates ($p < .001$).

Table 14

*Crosstabulation Preterm Births * Race*

Clinical weeks gestation	Asian		White		Black		Other	
	n	%	*n*	%	*n*	%	*n*	%
Preterm Birth	33	34	791	31.6	1390	47.8	41	26.6
Full Term	64	66	1710	68.4	1518	52.5	113	73.4
Total	97	100	2501	100	2908	100	154	100

Table 15

Chi-Square Tests Race

Chi-square tests	Value	*df*	Asymptotic significance (2-sided)
Pearson chi-square	159.834a	3	< .001
Likelihood ratio	161.169	3	< .001
Linear-by-linear association	84.553	1	< .001
No. of valid cases	5660		

Association Between Preterm Births and Sociodemographic Factors in Mississippi

Binary logistic regression was performed to ascertain the effects of marital status, insurance type, the timing of prenatal care, and race on the likelihood of preterm births. The predictor variable, race, in the logistic regression analysis contributed to the model ($p < .001$). In contrast, the predictor variables, marital status, insurance type, and prenatal care timing did not add significantly to the model. The logistic regression model 3.8%

(Naagelkerke R^2) of the variance in preterm births and classified an overall 57.7% of cases. The odds of having a preterm birth were 1.3 times greater among Black women overall.

Additionally, Medicaid, late entry prenatal care, and race were associated with an increase in the likelihood of preterm births, while being married and insurance by job (commercial) decreased the possibility, as shown in Table 16 the variance in preterm births and classified an overall 57.7% of cases. Additionally, Medicaid, late entry prenatal care, and race were associated with an increase in the likelihood of preterm births, while being married and insurance by job (commercial) decreased the possibility, as shown in Table 16.

Table 16

Binary Logistic Regression Variables in the Equation

Step 1 Variables [a]	B	*SE*	Wald	*df*	Sig.	*OR*	95% CI for *OR* *LL*	*UL*
Race								
Asian (ref)			157.844	3	< .001			
White non-Hispanic	.109	.219	.247	1	.619	1.115	.726	1.711
Black-non-Hispanic	-.574	.217	6.972	1	.008	.563	.368	.862
Other race non-Hispanic	.351	.281	1.560	1	.212	1.421	.819	2.467
Constant	.662	.214	9.553	1	.002	1.939		
Marital status								
Constant (No) ref	1.092	.035	133.523	1	< .001	1.276		
Marital status	.424	.056	57.223	1	< .001	1.528	1.369	1.706
Insurance								
Insurance paid—Job (commercial)	-.048	.077	.387	1	.534	.953	.820	1.108
Insurance paid—Medicaid	.348	.078	19.716	1	< .001	1.417	1.215	1.652
Constant (Yes) ref	.352	.078	29.993	1	< .001	1.420		
PNC timing								
PNC 1st trimester (Yes) ref			4.570	2	.102			
PNC 1st trimester (No)	-.002	.074	.001	1	.979	.998	.863	1.154
No PNC	-.476	.223	4.562	1	.033	.621	.401	.962
Constant	.427	.030	198.662	1	< .001	1.533		

Note. CI = confidence interval; *LL* = lower limit; *UL* = upper limit; PNC = prenatal care.

[a] Variable(s) entered on Step 1: Imputed Race/ethnicity value, marital status, insurance type, and PNC timing.

Summary

This study analyzed PRAMS Phase 8, 2016–2020 data to examine preterm births, sociodemographic factors such as insurance type and marital status, and the timing of prenatal care among women of various races in Mississippi. There were 5666 total cases within the examined dataset. The statistical analyses included descriptive statistics, chi-square, and binary logistic regression to answer the research questions.

The study included 44.2% White women and 51.4% Black women. Preterm births were significantly higher in Black women (64.26%) than in White women (32.76%). Black women had a lower frequency of having insurance paid by job/commercial (34.1%) compared to White women (62.7%), whereas among women whose insurance was through Medicaid, preterm births were more prominent among Black women (62.9%) compared to White women (34.1%). The association of preterm births and marital status among races showed that Black women accounted for 22.9% of married cases compared to White women at 70.9%.

The null hypothesis was rejected, and the alternative hypothesis was accepted for Research question 1. The null hypothesis was not rejected for Research Question 2 as prenatal care timing was not statistically significant for preterm births. For Research Question 3, there were significant associations with marital status among Black women compared to White women with preterm birth; therefore, the null hypothesis was rejected, and the alternative hypothesis was accepted.

The results indicated that among the two predominant racial populations (Black and White) in Mississippi, there are significant racial disparities in the prevalence and association of preterm births and sociodemographic covariates such as insurance type and marital status. However, while both Black and White women experienced first-trimester prenatal care at a comparable rate, more Black women also started prenatal care later or did not receive care at all compared to White women in this study.

In Section 4, the study results will be discussed and interpreted further in association with the SEM theoretical framework, including potential recommended

actions for future research, applications to professional practice, and implications for social change.

Section 4: Application to Professional Practice and Implications for Social Change

Introduction

Preterm births are classified as births occurring at less than 37 weeks gestation, while early preterm births occur in cases of less than 32-week gestation (Barfield, 2018). Preterm births have made maternal health and prevention strategies an essential topic of public health interest locally, nationally, and internationally. The March of Dimes (2015) states that preterm birth rates in the United States are significantly higher than in other highly developed countries. Additionally, the American Public Health Association (2006) indicated in a brief that preterm births and associated short- and long-term health outcomes have been shown to disproportionately affect specific populations. This study analyzed the association between preterm birth outcomes, sociodemographic factors such as insurance type and marital status, and prenatal care timing among various races using Mississippi PRAMS Phase 8 (2016–2020) data.

The prevalence of preterm birth was statistically significant in Black women compared to White women among insurance type. Black women had a lower frequency of having insurance paid by an employer (34.1%) compared to White women (62.7%), whereas among women with insurance through Medicaid, Black women accounted for far more preterm births (62.9%) compared to White women at (34.1%). Thus, the null hypothesis was rejected, and the alternative hypothesis was accepted for Research Question 1. Although both Black and White women experienced first-trimester prenatal care at a comparable rate (48%), more Black women also started prenatal care later during pregnancy (62.1%) or did not receive care at all (63.4%) compared to White

women in this study. The null hypothesis was not rejected for Research Question 2 as prenatal care timing was not statistically significant for preterm births. There was also a statistically significant difference between Black women and White women with preterm birth in the marital status prevalence. Black women (22.9%) were lower in the frequency of married cases than White women (70.9%). For Research Question 3, there were significant associations with marital status among Black women compared to White women with preterm birth; therefore, the null hypothesis was rejected, and the alternative hypothesis was accepted. (63.4%) compared to White women in this study. The null hypothesis was not rejected for Research Question 2 as prenatal care timing was not statistically significant for preterm births. There was also a statistically significant difference between Black women and White women with preterm birth in the prevalence of marital status, where marital status among races showed that Black women (22.9%) were lower in the frequency of married cases compared to White women (70.9%). For Research Question 3, there were significant associations with marital status among Black women compared to White women with preterm birth; therefore, the null hypothesis was rejected, and the alternative hypothesis was accepted.

Interpretation of Findings

This current study starts to fill a research gap in racial disparities and preterm births through sociodemographic factors such as insurance type (Medicaid) and marital status (unmarried), which are significantly more prevalent in Black preterm birth. These findings indicate that continued focus on increasing quality outcomes for prenatal care received during the first trimester can lead to improved gains. There are still

improvements that can contribute to improving overall maternal health and reducing racial disparities in preterm birth when examining the timing of prenatal care in association with insurance type and marital status; however, the findings indicate that Medicaid seems to serve as a point of entryway for these interventions.

Preterm Birth, Insurance Types, and Racial Disparities

This study's findings support previous studies on the prevalence of preterm birth among Black women compared to White women. The Mississippi PRAMS Phase 8 data showed that 64.26% of births occurring were less than 37 weeks gestation among Black women compared to 32.78% with White women. The study by Matoba and Collins (2017) reported Black women were almost twice as likely to have a premature birth compared to White women. Moreover, this study's findings examined PRAMS data from 2016–2020, and more preterm births (42.3%) during this timeframe had Medicaid as the payor during delivery compared to insurance by job or commercial (35.4%). The impacts of insurance type align with the findings of Meltzer and Markus (2020) that indicated Medicaid had the highest preterm birth coverage percentage in 2011, 2014, and 2016. Additionally, while more preterm births have been associated with Medicaid, studies have found that expanding Medicaid was associated with increased coverage for maternal and childbirth in states with approved expansion, thus supporting vulnerable populations (Clapp et al., 2019).

Preterm Birth and Timing of Prenatal Care

Prenatal care is an essential pathway to help ensure both maternal and infant health throughout pregnancy. This study's findings showed that receiving prenatal care

during the first trimester was comparable among the two most prominent racial groups (Black and White) within the context of the study; however, the finding also showed that while similar, Black women were also shown to receive care more frequently after the first trimester and indicated receiving no care at all compared to White women. Additionally, the late entry of prenatal care was found more among Medicaid recipients than commercial recipients. This aligns with previous studies, which indicated that more Black women receiving late-entry prenatal care have Medicaid or an associated government payor compared to those with insurance paid by a job or commercial (Baer et al., 2019).

Preterm Births and Marital Status

This study seems to confirm the association between preterm births and marital status among various races. Previous studies, such as that of El-Sayed et al. (2012), reported an increased risk of preterm births among unmarried mothers throughout all maternal age groups. The study by Kim (2021) further expanded on the study. It indicated that unmarried women at a maternal age were associated with an increase in preterm birth rates over various races, which aligns with the findings of this study.

Findings Related to Theoretical Foundation

Using the SEM as the theoretical foundation of the study, I examined preterm births through a race/ethnicity lens (i.e., the individual level); the role of relationships such as marital status and behaviors associated with the timing of prenatal care and its influence (i.e., the interpersonal level), and the relationship between insurance demographics (the public policy level). The current study results indicated that maternal

race was associated with preterm births in Mississippi from 2016–2020. The results can be used to support the development of targeted interventions among vulnerable populations before, during, and after pregnancy to help support overall maternal health and long-term health outcomes by reducing high-risk activities. Moreover, attention and behavioral modification through education and support before and throughout pregnancy can help reduce racial disparities in preterm birth. Prior research, such as studies by Zamani-Hank et al. (2022) and Christian (2020), indicated that high frequency of preterm births in Black women was significantly associated with the individual level of SEM, such as health behaviors and related genetics as well as the interpersonal level such as family/environmental influences that can contribute to increased social stressors and psychological factors. Additionally, the study's results can also be used to support interventions and education to help vulnerable women who previously had a preterm birth to prevent additional preterm births in the future. For example, prioritizing knowledge of potential complications associated with preterm births through diverse communication methods can not only help minimize the normalizing of preterm births but increase behaviors leading to increased risks and provide consistent communication of accurate information between health care providers and women who are pregnant or attempting to get pregnant after previous preterm birth (Bryant et al., 2020).

Minimizing risky behaviors that can lead to preterm births can be extremely helpful in reducing the overall preterm rate among the populations most impacted. It is also prudent to examine how insurance payors can play a role in the frequency of preterm gestation. Continuous insurance coverage has been linked to optimal health outcomes by

way of improved access to preventative services, improved access to and compliance with prescription drugs, and fewer emergency room visits because of improvements in routine clinic visits (Shah & Friedman, 2022).

Limitations of the Study

There are several limitations to this study. The Mississippi PRAMS study population was selected from birth records between 2016 and 2020 that were sent to the PRAMS Phase 8 survey. While the survey contained multiple races, the findings are specific to the most prominent two racial demographics, Black and White women. Additionally, while the Mississippi PRAMS Phase 8 dataset was analyzed, the results were not limited to women who were state residents during the survey timeframe. Additionally, respondents who participated in the PRAMS survey could have answered untruthfully or answered questions based on what they perceived would allow them to be viewed in the most favorable light. Another limitation might be specific behaviors that could be deemed high risk in the PRAMS dataset were not analyzed.

Recommendations and Social Change Implications

There are several recommendations based on the study's findings on the association between preterm births and sociodemographic factors such as insurance type, marital status, and timing of prenatal care. First, the results from this study can guide future research on targeted awareness and risk factors for women who may have had a previous preterm birth. Specifically, pathways for providing information to the most vulnerable on risk factors, such as through mobile applications or group therapy, may prove advantageous. The study by Kim et al. (2019) found that the use of a smart device

such as a phone or tablet with access to improved education on risk factors led to an increased awareness of preterm birth, an increase in discussion of pregnancy, and an improvement to the provider-patient relationship through focal questions at clinic visits.

Since preterm births impact locally, statewide, and nationally, another potential recommendation would be to examine this study on a larger scale to determine if the results are similar among different localities or states with similar demographics. For instance, this study was conducted using Mississippi PRAMS Phase 8 survey data; analyzing PRAMS data from Louisiana, or other comparable states could help to identify racial disparities and targeted approaches. This can also be further expanded to assess long-term health outcomes for both mother and preterm infant by race and insurance payors to help promote policy and legislature.

The results of this study can be modified to improve overall health outcomes through social change and professional practice. Public health professionals can use these results to develop targeted interventions that are culturally relevant, needed, and understood. Furthermore, while targeted interventional approaches can be constructive, overall, women's health by providing a knowledge base that is inclusive to all can help to support improvements in timely care before, during, and after pregnancy. Additionally, group prenatal care may help reduce some of the risky behaviors some women will overlook when a foundational support system is limited or nonexistent. These results can also be used as a steppingstone to continue to expand upon the existing research by analyzing additional potential variables that may be associated with increases in preterm births.

Positive Social Change

Social change implications that were proposed included the identification of gaps in behaviors that could lead to limited utilization of services and the influence of those behaviors that could create barriers among and between socio-ecological levels, including women in Mississippi, families, health care professionals, and policy makers. Additionally, understanding mechanisms that influence the targeted population but also ways that public health professionals can use this knowledge and engage the targeted population, policymakers, and healthcare professionals may improve overall health outcomes. These positive social change implications align with the individual, interpersonal, and societal/policy levels.

Individual and Interpersonal Levels

This study's results can improve birth outcomes by reducing preterm births among vulnerable populations, including Black women, through creating, implementing, assessing, and modifying healthcare programs and services that reflect risk through awareness. Healthcare leaders and public health professionals can provide behavior modification that gives foundational support to program interventions. Because this positive social change impacts the individual and their related environments, such as family and friends, support and interventions should not be limited to women alone. Rather, encompassing the role and importance of a healthy support system will be crucial in igniting positive social change.

Public Policy Level

The results of this study can start a model shift in local, state, and national legislation. While there was a decrease in preterm birth rates following the implementation of the PREEMIE Act of 2006, there has now been a steady increase in some states. Positive changes via public policy begin when women and their families advocate for funding and services that may be limited in their area. Additionally, the results can be translated into ensuring healthy birth outcomes, such as reducing preterm births, improving maternal health, and reducing infant mortality rates through aggressive government-sponsored legislation. Positive social effects from these results would come from collaborative and comprehensive legislation that offers a bipartisan approach to ensure racial disparities are not overlooked. While policymakers are key stakeholders, public health professionals must serve as a voice and a vessel of education and support to legislators. Moreover, additional positive social changes can occur when a consistent flow of information is provided to and from community members in dire need of services. This method can serve as an avenue to offer and receive collaborative strategies locally and beyond.

Conclusion

In this study, I sought to determine the association between preterm births and sociodemographic factors such as insurance type (commercial/Medicaid), marital status, and prenatal care timing among various races in Mississippi. The study consisted of two major races, Black and White, with preterm births occurring more in Black women (64.2%) than in White women (32.7%). Additionally, the study found that more White

women indicated having insurance by job/commercial compared to Black women, while more Medicaid recipients reported having a preterm birth. Moreover, the study found that fewer Black women were married than White women, and more unmarried women were linked to preterm birth. Understanding the impacts of these factors is critical in future research on how racial disparities can and continue to influence risk factors impacting birth outcomes. Positive social change in the individual, interpersonal, and public policy levels can pull from this research to provide targeted, culturally appropriate interventions starting with collaborative dialogue and supportive legislature.

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