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Preconception Health and Preterm Birth Differences Among U.S.-Born and Foreign-Born Black Women

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2019

Abstract

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Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Foreign-born Black women giving birth in the United States have superior preterm birth outcomes compared to their U.S-born Black peers. Many studies have focused on tobacco use and medical risk factors, but few have focused solely on preconception health. The purpose of this study was to examine preconception health and preterm birth differences among U.S.-born and foreign-born Black women. Three theoretical frameworks guided this study: the life course theory, healthy migrant theory/immigrant paradox, and weathering theory. Primary research questions assessed (a) if there were an association between chronic preconception risk factors, prepregnancy obesity, diabetes, and hypertension, in U.S.-born and foreign-born Black women, (b) if U.S.-born Black women had a higher risk of having a preterm infant compared to foreign-born Black women, and (c) if weathering existed in U.S.-born and foreign-born Black women. A quantitative design using the 2017 Natality Public Use File was employed that included non-Hispanic Black women ages 15 to 44 years. Chi-square test and binary logistic regression were used for the data analysis. Key findings revealed (a) a statistically significant association between preterm birth and chronic preconception health risk factors in both groups of women, (b) U.S.-born women were roughly 1.4 times more likely to have a preterm infant than foreign-born women, and (c) both groups experienced weathering. This study might positively impact social change by offering an alternative perspective to the reproductive health advantage of foreign-born Black women. This perspective can aid in advancing policy and systems change strategies to address the root causes of racial and ethnic disparities in birth outcomes, advance health equity, and improve maternal health.

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Dedication

For Coby and Chaz: You are my inspiration and greatest blessing. To have monoamniotic twins who were preterm, at 30 weeks and 6 days, and at a time I was writing a study to improve the birth outcomes of preterm infants, was very discouraging. But you both inspired me to continue my path, and I thank God every day for bringing you both into my life and for your health.

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"I can do all things through Christ which strengthens me" - Philippians 4:13

First and foremost, I give honor and glory to God.

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Section 1: Foundation of the Study and Literature Review

Introduction

Historically, non-Hispanic Black infants (hereafter "Black infants") have suffered from adverse birth outcomes, such as infant mortality, low birth weight, and preterm birth at disproportionate rates, as compared to their United States White counterparts (Elder, Goddeeris, & Haider, 2016). The U.S. infant mortality rate in 2016 was 5.87 per 1,000 live births, which was a 294 fewer infant deaths from 2015; however, for Black infants, the death rate 11.76, which is an alarming 2.45 times greater than their White counterparts (Xu, Murphy, Kochanek, Bastian, & Arias, 2018). Researchers have shown that the infant mortality gap continues to exist, even when adjusting for access to prenatal care, marital status, and education (Elder et al., 2016; Loggin & Anadrade, 2014. Loggins and Anadrade (2014) projected that the Black-White disparity would continue to persist, with Black infants not making the Healthy People 2020 mark of 6.0 deaths per 1,000.

In the United States in 2017, 13.93% of Black infants were preterm, compared to 9.05% of their White peers (Martin, Hamilton, Osterman, Driscoll, & Mathews, 2018). Preterm birth, defined as the birth of an infant prior to 37 weeks of gestation (Martin et al., 2018), is a direct predictor of infant mortality. Moreover, preterm birth rates dropped between the years of 2007 and 2014 but had 3 straight years of an increase from 9.57 in 2014 to 9.9 in 2017 (Martin et al., 2018). However, disparities have continued to exist for Black infants (Martin et al., 2018). Although racial and ethnic differences in preterm birth have been studied for years, there are still gaps that are not well understood.

Research dating as far back as the late 1970s by Valanis and Rush (1979) addressed a reproductive advantage in foreign-born women by comparing differences in birth outcomes of U.S.-born and foreign-born women. Furthermore, research related to this reproductive advantage in foreign-born racial and ethnic women became more prominent in the 1990s (Cabral, Fried, Levenson, & Amaro, 1990; David & Collins, 1997; Singh & Yu, 1996; Wasse, Hold, Daling, 1994;). What the research has shown is that the birth outcomes of foreign-born Blacks are superior to their U.S.-born peers in infant mortality, low-birth weight, and preterm rates (Almeida, Mulready-Ward, Bettegowda, & Ahluwalia, 2014; Collins, Soskolne, Rankin, & Bennett, 2013; Dominquez, 2011). Moreover, foreign-born non-Hispanic Black women (hereafter "foreign-born Black women") giving birth in the United States have infant birth outcomes that are similar to those of U.S. born White women (Collins et al., 2013; Dominquez, 2011). Equally important, multiple studies have shown that even though U.S. born non-Hispanic Black women (hereafter "U.S. born Black women") had higher rates of engaging in prenatal care, foreign-born racial and ethnic minorities experienced superior birth outcomes of their infants (David & Collins, 1997; Deal, Bennett, Rankin, & Collins, 2014; El-Sayed & Gala, 2012; Singh & Yu, 1996). Few, if any, studies have addressed the comparison of preconception health behaviors between U.S.-born and foreign-born women.

The purpose of the study was to examine differences in chronic disease preconception health risk factors in preterm birth in U.S.-born and foreign-born Black women who give birth in the United States. I explored the weathering theory by

measuring and comparing age-specific patterns in preterm birth in U.S.-born and foreign-born Black women preterm birth in foreign-born Black women.

Over the decades, many studies have addressed health factors during pregnancy, which has, over time, resulted in interventions and programs for women once pregnant or after birth. Some of these programs include the Maternal, Infant, and Early Childhood Home Visiting Program and Healthy Start (Health Resources and Service Administration [HRSA], 2017; . However, the health of a woman's body prior to pregnancy directly affects birth outcomes. Understanding health across the life span and right before pregnancy is vital. Addressing these issues is essential to improving health equity, women's health, and the positive birth outcomes of Black infants.

The potential social change implications of this study included an application of new knowledge in public health by contributing to existing research seeking to understand of the protective factors that foreign-born Black women exhibit when immigrating to the United States. Results from the study may offer an alternative perspective to the reproductive health advantage of foreign-born Black women by expanding beyond individual medical and behavioral risk factors during pregnancy by assessing the influence key preconception health indicators on birth outcomes. Data from this study may address research gaps and shine light on the impact of understanding health across the life span and right before pregnancy to reduce preterm birth in Black infants born in the United States.

Problem Statement

In the United States, there has been an ongoing, persistent disparity in infant mortality, low birth weight, and preterm birth in Black infants (Almeida et al., 2014; Collins et al., 2013; Dominquez, 2011). For years, foreign-born Black women have experienced a reproductive advantage as well as superior infant birth outcomes as compared to their U.S-born Black peers (Almeida et al., 2014; Collins et al., 2013; Dominquez, 2011). To demonstrate, when giving birth in the United States, foreign-born Black women have similar birth outcomes to U.S.-born White women (Collins et al., 2013; Dominquez, 2011).

Many researchers have linked this phenomenon to the healthy migrant theory or immigrant paradox, which states that foreign-born individuals who migrate to the United States have more positive health outcomes than U.S.-born individuals with the same racial and ethnic background (Almeida et al., 2014; Culhane & Goldenberg, 2011). Additionally, it also supports the weathering theory, which states that there are psychosocial factors in racial/ethnic minority groups living in the United States that contribute to their health diminishing overtime (Collins et al., 2012, Culhane & Goldenberg, 2011; Dominquez, 2011).

Previous researchers examining differences in birth outcomes in racial and ethnic diverse groups have explored stress over the lifetime and psychosocial factors, including racism, mental health, neighborhood density and redlining, and perceived health status and their effects on adverse birth outcomes in U.S.-born Black women compared to other racial/ethnic groups (Dominquez, 2011; Elo & Culhane, 2010; Jackson, Rowley, &

Owens, 2012; Mendez, Hogan, & Culhane, 2014; Nuru-Jeter et al., 2017). Moreover, Doamekpor and Dinwiddie (2015) examined the relationship between nativity and allostatic load, which is the physiological wear and tear the body experiences because of the effects of chronic stress over time (McEwen & Stellar, 1993), among U.S.- and foreign-born women. The relationship between social ties and social support among immigrants and U.S.-born racial and ethnic diverse groups have also been linked to positive birth outcomes (Almeida et al., 2013).

The majority of studies comparing U.S.-born and foreign-born women have primarily focused on tobacco use, medical risk factors (Green, 2012, Elo, Vang, & Culhane, 2014; Xaverious, Salas, & Tenkku, 2010), and prenatal care differences (David & Collins, 1997; Deal et al., 2014; El-Sayed & Gala, 2012; Green, 2012; Singh & Yu, 1996). Elo et al. (2014) conducted a comparison of U.S.-born and foreign-born women giving birth to preterm and small for gestational age infants. Using sociodemographic, health, behavioral, and medical risk factors presented on the revised United States birth certificate from 27 states, Elo et al. (2014) found similar findings to previous studies that the reproductive advantage was evident. Foreign-born Black women had lower rates or preterm birth than their U.S.-born Black peers (Elo et al., 2014). While many root causes have been studied to explore the reproductive advantage in foreign-born Black women, few studies have addressed preconception health.

In this study, I examined differences in chronic preconception health risk factors in preterm birth in U.S.-born and foreign-born Black women. I also explored the weathering theory in U.S.-born and foreign-born Black women. Additionally, this study

was unique because it was the first known study using the 2017 Natality Public Use File to examine if there is a relationship between chronic preconception health risk factors and preterm birth and to explore the reproductive health advantage in foreign-born Black women by comparing the differences in U.S.-born and foreign-born Black women.

Purpose of Study

The purpose of this study was to determine if there is an association between chronic preconception health risk factors in U.S.-born and foreign-born Black women and to conduct a comparison between the two groups. I explored the weathering theory by measuring and comparing age-specific patterns in preterm birth in U.S.-born and foreign-born Black women preterm birth in foreign-born Black women.

To improve prepregnancy health of U.S.-born Black women, an understanding of the root cause of this reproductive health advantage in foreign-born Black women is critical. Moreover, to improve infant birth outcomes of Black infants born to U.S.-born Black women, there is a need to address the contributing factors through interventions prior to pregnancy. Therefore, I explored chronic preconception health risk factors in an attempt to understand health behaviors prior to pregnancy. The dependent variable in this study was preterm birth, and the independent variables in the study were prepregnancy obesity, prepregnancy diabetes, and pregnancy hypertension. The covariates included nativity, age, education, and marital status.

Research Questions and Hypotheses

Research Question 1: Is there an association between chronic disease preconception health risk factors (prepregnancy obesity, diabetes, and hypertension) and preterm birth in U.S.-born Black women?

$H_0$1: There is no association between prepregnancy obesity and preterm birth in U.S.-born Black women.

H_a1: There is an association between prepregnancy obesity and preterm birth in U.S.-born Black women.

$H_0$2: There is no association between prepregnancy diabetes and preterm birth in U.S.-born Black women.

H_a2: There is an association between prepregnancy diabetes and preterm birth in U.S.-born Black women.

$H_0$3: There is no association between prepregnancy hypertension and preterm birth in U.S.-born Black women.

H_a3: There is an association between prepregnancy hypertension and preterm birth in U.S.-born Black women.

Research Question 2: Is there an association between chronic disease preconception health risk factors and preterm birth (prepregnancy obesity, diabetes, and hypertension) in foreign-born Black women?

$H_0$1: There is no association between prepregnancy obesity and preterm birth in foreign-born Black women.

H_a1: There is an association between prepregnancy obesity and preterm birth in foreign-born Black women.

$H_0$2: There is no association between prepregnancy diabetes and preterm birth in foreign-born Black women.

H_a2: There is an association between prepregnancy diabetes and preterm birth in foreign-born Black women.

$H_0$3: There is no association between prepregnancy hypertension and preterm birth in foreign-born Black women.

H_a3: There is an association between prepregnancy hypertension and preterm birth in foreign-born Black women.

Research Question 3*:* Are U.S.-born Black women at a higher risk for having a preterm infant compared to foreign-born Black women, controlling for chronic disease preconception health risk factors (prepregnancy obesity, diabetes, and hypertension), nativity, age, education, and marital status?

$H_0$1: U.S-born Black women are not at a higher risk for having a preterm infant compared to foreign-born Black women.

H_a2: U.S-born Black women are at a higher risk for having a preterm infant compared to foreign-born Black women.

Research Questions 4: Is there an age-specific weathering pattern exhibited in U.S-born Black women who give birth to preterm infants, controlling for chronic disease preconception health risk factors (prepregnancy obesity, diabetes, and hypertension), age, education, and marital status?

H_01: There no age-specific weathering pattern exhibited in U.S-born Black women.

H_a2: There is an age-specific weathering pattern exhibited in U.S-born Black women.

Research Questions 5: Is there an age-specific weathering pattern exhibited in foreign-born Black women who give birth to preterm infants, controlling for chronic disease preconception health risk factors (prepregnancy obesity, diabetes, and hypertension), age, education, and marital status?

H_01: There no age-specific weathering pattern exhibited in foreign-born Black women.

H_a2: There is an age-specific weathering pattern exhibited in foreign-born Black women.

Theoretical Foundation of Study

In this study, three theories, life course theory, healthy migrant theory/immigrant paradox (immigrant paradox), and weathering theory were used to examine the research questions.

The life course theory examines behavioral, social, ecological, and environmental factors that affect health outcomes over an individual's lifespan (Baltes & Staudinger 1999; Elder, 1998, Halfton & Hochstein, 2002; Lu & Halfon, 2003). The life course theory recognizes that exposure to negative events can have an effect on health later in life (Halfton, Larson, Lu, Tullis, & Russ, 2014; Kramer, Dunlap, Hogue, 2014). The interaction between biological and environmental factors at an early age can contribute to

long-range outcomes (Baltes & Staudinger, 1999; Elder, 1998, Halfton & Hochstein, 2002). Hogan, Rowley, Bennett, and Taylor (2012) also rebirthed a hypothesis by epidemiologist David Barker. Barker was one of the first individuals to use the term epigenetics and suggested that experiences of a woman prenatally can result in chronic diseases in the child over their lifetime (Hogan et al., 2012).

The immigrant paradox has been studied over time, with the research being evident that there are differences in health the outcomes of individuals who migrate to the United States than those born in the United States (Almeida et al., 2014; Culhane & Goldenberg, 2011; Miller, Robinson, & Cibula, 2016). Furthermore, as time progresses, second-generation immigrants suffer from the weathering theory as similar to their nonimmigrant counterparts (Almeida et al., 2014; Culhane & Goldenberg, 2011; Geronimus, 1992). The weathering theory states that there are psychosocial factors in racial and ethnic minority groups living in the United States that contribute to their health diminishing overtime (Collins et al., 2012, Culhane & Goldenberg; Dominquez, 2011; Geronimus, 1992).

The first and second research question tested the association between chronic disease preconception health risk factors and preterm birth (prepregnancy obesity, diabetes, and hypertension) in U.S.-born and foreign-born Black women. The third question addressed if U.S.-born Black women were at a higher risk for having a preterm infant compared to foreign-born Black women, controlling for chronic disease preconception health risk factors (prepregnancy obesity, diabetes, and hypertension), nativity, age, education, and marital status. The fourth and fifth research questions

addressed age-specific weathering pattern exhibited in U.S-born and foreign-born Black women who give birth to preterm infants, controlling for chronic disease preconception health risk factors (prepregnancy obesity, diabetes, and hypertension), age, education, and marital status. The dependent variable in this study was preterm birth, and the independent variables in the study were prepregnancy obesity, prepregnancy diabetes, and prepregnancy pregnancy hypertension. The covariates included nativity, age, education, and marital status.

When there are persistent social, economic, and environmental inequities across generations, it can limit health outcomes and have an impact on disease outcome Halfton, et al., 2014; Kramer et al., 2014; Nuru-Jeter et al., 2017). Henceforth, it can be hypothesized that while nativity can be a protective factor (immigrant paradox) to the adverse events that U.S.-born Black women experience, over time, immigrants and their second-generation family member's health may deteriorate over time (weathering theory) after years of living in the United States. The individual would experience events (life course theory) that would reshape or eliminate their protective factors. Table 1 illustrates the connectivity of the life course theory, immigrant paradox, and weathering theory.

Lu and Halfon (2003) recommended applying the life course theory to racial and ethnic disparities, particularly in maternal and child health to examine the root cause of disparities. In addition, while discussing the impact of the life course theory on maternal and child health, Halfon et al. (2014) highlighted the importance of preconception health and suggested that the use of the life course theory in preconception has been underappreciated.

The life course theory, immigrant paradox, and weathering theory can be used to understand how environment and events across the life span (both positive and negative) can play a role in health outcomes over the lifetime. The three theories interconnect and provide in-depth context to the aims of the research.

Nature of the Study

A quantitative cross-sectional design was used for this study. Pearson's chi-square test and binary logistic regression was performed using IBM SPSS Statistics Version 24 for the data analysis of this study. The study design chosen was consistent with Deal et al. (2014) and Miller et al. (2016), whom both explored differences in U.S.-born and foreign-born related to adverse birth outcomes.

The dependent variable in this study was preterm birth, and the independent variables in the study were prepregnancy obesity, prepregnancy diabetes, and prepregnancy hypertension. The covariates included nativity, age, education, and marital status.

The secondary data set used for the study was the 2017 Natality Public Use File, which was obtained from the National Center for Health Statistics (NCHS) at the Centers for Disease Control and Prevention (CDC) (Centers for Disease Control and Prevention [CDC)]; 2018). The 2017 Natality Public Use file consists of birth certificate data from all 50 states, the District of Columbia, and New York City (CDC, 2018). The registration of birth certificate data is required by 50 states, the District of Columbia, and New York City (CDC, 2018).

Literature Search Strategy

A systematic literature search of both historical and recent literature was conducted for this study. The search involved that of subjects including psychology and public health. The period of search for historical articles were between the years of 1970 to 2010 and for recent articles, the years of 2011 to 2017. Databases used in the search included EBSCO, CINAHL, ProQuest, Medline, PsycINFO, PubMed, and Science Direct. I also searched using Google Scholar, Research Gate, and one open access journal BMC Pregnancy and Childbirth.

Keyword searches for historical articles from 1970 to 2010 included *preterm birth, prematurity, infant mortality, low birth weight, disparities, weathering, weathering theory, U.S.-born, United States born, foreign-born, foreign-born Black, life course, life course theory, life span, weathering, healthy migrant theory, stress*, and *maternal stress*. Keyword searches for recent articles between 2011 and 2017 included *preconception, preconception health, preterm, preterm birth, prematurity, preterm delivery, prenatal, prenatal care, infant mortality, low birth weight, birth outcomes, pregnancy outcomes, disparities, gestational age, body mass index, folic acid, multivitamin, weathering, weathering theory, U.S.-born, United States born, foreign-born, foreign-born Black, life course, life course theory, life span, weathering, healthy migrant theory, stress*, and *maternal stress*.

Literature Review Based on Key Variables/Key Concepts

Preterm Birth

The leading cause of mortality and morbidity in infants and childhood disability in the United States is preterm birth (Behrman & Stith, 2007; HRSA, 2014; Romero, Day, & Fisher, 2008). Moreover, preterm infants can have higher rates of developmental disabilities and neurological problems (Frey & Klebanoff, 2016). The economic burden of preterm birth is daunting. To my knowledge, the last known cost of preterm birth was $26.2 billion in the United States (Behrman & Stith-Butler, 2007).

Race is a highly predictive risk factor for preterm birth, with additional categorized risk, including social characteristics (teen and advanced maternal age and socioeconomic status), health behaviors (tobacco, alcohol, drug use, and either a low or high body mass index [BMI]), and medical and pregnancy characteristics (mental health, medical and pregnancy history, fertility treatments; CDC, 2016c). Moreover, pregnancy at a young or advanced age, under the age of 18 and over 35 years of age, are also risk factors for preterm birth (Behrman & Stith-Butler, 2007; Coley, 2015; Kenny, 2015; Khalil, 2015; Schoen, 2015).

Additional risk factors for preterm birth include social characteristics, such as low socioeconomic status. Elder et al. (2016) suggested that socioeconomic status may play a role in the infant mortality gaps. Elder et al. abstracted data from U.S. Vital Statistics and U.S. Census data to examine racial and ethnic disparities in infant mortality rates using the variables prenatal care, previous pregnancy loss, gender of the infant, live birth order, maternal marital status, education, and age. Racial categories included White, Black,

Native American, Asian, and Hispanic. Elder et al. concluded that increased risk of infant mortality was strongly related to poverty and income.

There is a strong body of literature moving away from linking disparities in infant mortality and preterm birth to low socioeconomic status and shifting to study those of middle- or higher-class statuses (Dominquez, 2011). As a result, researchers have shown that college-educated U.S.-born Black women have worse birth outcomes than U.S.-born White women who are high school drop outs (Dominquez, 2011). Preterm birth affects U.S.-born Black women of all income levels, with current researchers still attempting to understand preterm birth in women with low socioeconomic status but placing a significant focus on causes and factors beyond socioeconomic status.

Similarly, the effects of psychosocial factors across the life span, including stress from discrimination and racism, have been linked to preterm birth. Historically, experiences of U.S.-born Black women include various types of discrimination and racism, including institutionalized, gendered, and residential (Dominquez, 2011; Kramer & Houge, 2009; Nuru-Jeter et al., 2017, Orr, Reiter, James, & Orr, 2012; Strutz et al., 2014).

Preconception Health

Addressing overall health status is essential prior and during pregnancy. Preconception health, which refers to an individual's body prior to pregnancy, is connected to their reproductive health status (CDC, 2015). In the United States, 45% of pregnancies are unintended (Finer & Zolna, 2016), which can lead to late initiation into prenatal care. Preconception counseling can provide education and increase a woman's

knowledge of social and behavioral health prior to pregnancy and can reduce the likelihood of an adverse pregnancy (CDC, 2016b). It is recommended that women create a reproductive life plan that encompasses their plans for pregnancy and overall health across their life course (Callegari, Aiken, Dehlendorf, Cason, & Borreo, 2017; CDC, 2016b; Nypayer, Abour, & Niederegger, 2016). Moreover, reproductive life planning should be inclusive of knowing the family medical history, engaging in regular check-ups with a doctor, pregnancy planning and prevention efforts, nutrition and physical activity, folic acid/multivitamin intake, chronic disease management, continued uptake of vaccines, managing mental health, abstaining from tobacco and drugs, and lastly, not drinking alcohol when trying to become pregnant (Callegari, Aiken, Dehlendorf, Cason, & Borreo 2017; CDC, 2016; Nypayer et al., 2016).

Preconception risk factors, such as substance use during pregnancy, can lead to serious birth defects, preterm birth, and low birth weight (Forray, 2016; Passey, 2014). Engaging in such behaviors can also cause physical, cognitive, and behavioral health effects on the fetus (Forray, 2016). In addition, folic acid consumption is recommended at 8 to 12 weeks before conception to prevent neural tube defects, which affects about 3,000 infants annually (Balough, 2014; CDC, 2016a). The lack of folic acid consumption as early as 28 days postconception can cause neural tube defects in infants (CDC, 2016a; Balough, 2014). According to the CDC (2016a), roughly 40% of women of childbearing consume the recommended amount of 400 micrograms of folic acid a day, compared to the 81% of women of childbearing age who are aware of the benefits. Hispanic women

have the lowest rate of consumption of folic acid, followed by Black women and lastly, White women (CDC, 2016a).

Masho, Bassyouni, and Cha (2016) conducted a study on folic acid adherence, and they revealed that women who were obese and overweight were less likely to consume folic acid. Moreover, being overweight and underweight can have negative effects on birth outcomes and can cause preterm birth (Shaw et al., 2014). BMI in pregnancy is an indicator of the level of individual body fatness. Weight-to-height (weight in kilograms/height in meters) is calculated to determine specific weight categories (CDC, 2015a). BMI categories are as follows: below 18.5 underweight, 18.5 to 24.9 normal/healthy weight, 25.0 to 29.9 overweight, and 30.0 and above obese (CDC, 2015a). In 2014, 50% of women in the United States were either obese or overweight prior to becoming pregnancy (NCHS, 2015). Of these women, they were more likely to be American Indian/Alaska Native, Black or Hispanic (NCHS, 2015). Regarding being underweight, prior to pregnancy was lowest among Hispanic and Asian (NCHS, 2015).

Foreign-Born Reproductive Health Advantage

Historical studies. The earliest study I could find was in the 1970s (see Valanis & Rush, 1979), which compared the birth outcomes of U.S.-born and foreign-born infants, reporting a reproductive advantage in foreign-born racial and ethnic women. Over the last 25 years, research on the study of the health of infants born to foreign-born mothers, specifically racial and ethnic minorities, has become prominent (Cabral, 1990; David & Collins, 1997; Singh & Yu, 1996; Wasse et al., 1994). Researchers have identified that foreign-born Black women have experienced a reproductive advantage as

well as superior infant birth outcomes as compared to their U.S-born Black peers (Almeida et al., 2014; Collins et al., 2013; Dominquez, 2011). Moreover, when giving birth in the United States, foreign-born Black women experience similar birth outcomes in their infants to U.S.-born White women (Collins et al., 2013; Dominquez, 2011).

In an early study, Cebral, Levenson, Amaro, & Zuckerman (1990) examined prepregnancy and prenatal health behaviors of U.S.-born and foreign-born Black women in Boston, in 1984. The study included 616 U.S.-born and 201 foreign-born Black women receiving prenatal care at Boston City Hospital prenatal clinics across the city (Cebral et al., 1990). The demographics of foreign-born women included Haiti (40%), Africa (25%), Caribbean countries outside of Haiti and Jamaica (21%), Jamaica (11%), and England (3%) (Cebral et al., 1990). Prepregnancy status was determined by the pregnancy weight-for-height, which is the current BMI, pregnancy weight gain, and trimester of first prenatal visit (Cebral et al., 1990). Other factors included were maternal age, marital status, maternal education, and household income (Cebral et al., 1990). Foreign-born Black women were older, married, and more educated than their U.S. peers. Comparatively, U.S.-born Black women they were more likely to smoke, use drugs, and drink alcohol during their pregnancy (Cebral et al., 1990). Infants born to foreign-born women had greater intrauterine growth, had larger head circumferences, and were less likely to be born with low birth weight (Cebral et al., 1990).

Just as in the Cebral et al. (1990) study, other historical studies that took place in the 1990s, considered individual-level factors such as age, education, and socioeconomic status. Singh and Yu (1996) determined that there were significant differences in adverse

birth outcomes of infants born to U.S.-born and foreign-born women of the major ethnic groups from 1985 to 1987. Using data abstracted from National Linked Birth and Infant Death data sets, the researchers analyzed differences in infant mortality, preterm birth, and low birth weight (Singh & Yu, 1996). They concluded that Chinese and Japanese foreign-born women had lower infant mortality rates, and U.S.-born Black, Cuban, and Puerto Ricans had the highest infant mortality rates (Singh & Yu, 1996). The lowest rates of low birth weight were in infants born to Chinese and Mexican foreign-born women and the highest to U.S.-born Black and Puerto Rican women (Singh & Yu, 1996). Moreover, foreign-born and U.S.-born Asians and Whites had the lowest rates of preterm birth, with U.S.-born Black and Mexicans having the largest nativity differences (Singh & Yu, 1996).

Wasse, Holt, and Daling (1994) compared the birth outcomes of infants born to Ethiopian-born Black, U.S.-born Black, and U.S.-born White women from 1980 to 1991 using birth certificates in Washington State. Despite being refugees, low-income, and lacking prenatal care, the Ethiopian-born women's risk of low birth weight was similar to U.S.-born White women (Wasse et al., 1994). Moreover, compared to U.S.-born Black and White women, Ethiopian-born women were primarily older, married, nonsmokers, and experiencing their first pregnancy (Wasse et al., 1994). Ironically, Ethiopian-born women were more likely to have diabetes (Wasse et al., 1994). Similarly, David and Collins (1997) studied vital records from 1980 and 1995 in the states of Illinois to explore birth weights of infants from foreign-born Black, U.S.-born Black, and U.S.-born White women. David and Collins determined a pattern, such as those in the Wasse et al. (1994)

study, that infants of U.S.-born Black women had higher risks of low birth weight. Furthermore, U.S.-born Black women were more likely to be low-income, younger, and less educated than both U.S.-born White and foreign-born Black women and had late to no prenatal care (David & Collins, 1997).

Healthy migrant theory/immigrant paradox and weathering theory. In an early study, Singh and Yu (1996) identified that being an immigrant to the United States had a beneficial effect and was considered a proxy for behavioral, cultural and psychosocial factors. Overall, the beneficial effect experienced by immigrants varied by race and ethnicity and the predictor of having a low birthweight infant nobility decreased as compared to their U.S.-born counterparts (Singh & Yu, 1996). More recently, Deal et al. (2014) examined data from 2003-2004 from the National Center for Health Statistics to explore weathering in foreign-born Black women. The study particularly compared age-specific low birth rates to factors, including marital status, parity, and prenatal care. Results concluded that infants born to foreign-born Black women had birth rates similar to U.S.-born white women with no evidence of weathering (Deal et al., 2014). The weathering pattern was determined by reviewing age and a rise in low birth weight rates throughout childbearing years and/or inadequate prenatal care (Deal et al., 2014). The researchers speculated that indirect, unmeasured factors such as lifelong minority status in the United States could explain weathering in the U.S.-born Black women in the study.

Similarly, Almeida, Mulready-Ward, Bettegowda, and Ahluwalia (2014) explored social ties and social support in U.S.-born and foreign-born women. The Immigrant Paradox was shown in preterm birth with social ties being a buffer to negative outcomes

such as socioeconomic status. On the other hand, foreign-born women had an increased risk for delivering an infant with low birth weight (Almeida et al., 2014). Overall, roughly 25% of foreign-born women in each racial/ethnic group immigrated to the United States prior to the age of 15, thus possibly experiencing weathering (Almeida et al., 2014).

Elder et al. (2016) abstracted data from U.S. Vital Statistics and U.S. Census data to examine racial and ethnic disparities in infant mortality rates. The following variables, prenatal care, previous pregnancy loss, gender of the infant, live birth order, and maternal marital status, education, and age were used. Racial categories included were white, Black, Native American, Asian, and Hispanic. In short, Elder et al. (2016) suggested that the immigrant paradox was linked to maternal marital status and education and that socioeconomic status may play a prominent role in the infant mortality gaps. It is important to point out that nativity was only examined in Hispanic women.

Discrimination/racism. The research of Singh & Yu (1996) noted that an explanation for differences in U.S.-born and foreign-born Black infant outcomes could result from life circumstances of their mothers, in particular, discrimination. Regarding the years of the data from the study (1985-1987), foreign-born Black women would have had less exposure to long-term socioeconomic structural discrimination (Singh & Yu, 1996).

In the same manner, Dominquez, Strong, Krieger, Gillman, and Rich-Edwards (2009) explored differences in perceived racism in U.S.-born and foreign-born Black pregnant women. As similar to the Singh and Yu (1996) study, self-reports of exposure to

racism were higher among U.S.-born Black women than that of foreign-born Black women and crossed a longer duration of their lifetime (Dominquez et al., 2009). Moreover, foreign-born Black women from the Caribbean who had migrated to the U.S. prior to the age of 18 had similar rates of self-reported racism as U.S.-born Black women and higher rates than African-born Black women (Dominquez et al., 2009). Furthermore, African-born women had significantly lower rates of self-reported racism than U.S.-born Black women (Dominquez et al., 2009). Differences between foreign-born Caribbean and African women cannot entirely be explained through this study, however waves of Caribbean's have been migrating to the U.S. prior to the Civil Rights Act (Dominquez et al., 2009; Freeman, 2002), which in turn could explain their similar self-reported rates of racism to U.S.-born Black women (Dominquez et al., 2009).

Social ties and social support. Social ties and social support have been both a facilitator and barrier to foreign-born Black women when living in the U.S. (Wasse et al., 1994; Almeida et al., 2014; Miller et al., 2016). While positive, social ties and social support can be buffers to negative health outcomes (Wasse et al., 1994; Almeida et al., 2014; Miller et al., 2016), social ties and social support can also place stress on a woman if she has people dependent on her for social support (Almeida et al., 2014). Wasse et al. (1994), noted that Ethiopian-born women had more psychological and emotional support than U.S. born-white and Black women. Psychological and emotional support served as buffers to smoking, alcohol, and drug use (Wasse et al., 1994).

Almeida et al. (2014) explored the relationship between birth outcomes and social ties and social support of infants born to U.S. born and foreign-born mothers in New

York City, New York. Data were obtained from the New York City Pregnancy Risk Assessment Monitoring System during the years of 2004-2007 and linked birth certificates (Almeida et al., 2014). Racial and ethnic groups within this study included Black, white, Hispanic, and Asian/Pacific Islander (Almeida e al., 2014). For this particular study, social ties were determined using the question "During your most recent pregnancy, who would have helped you if a problem had come up?" Because there were options for multiple options, the researchers grouped the variables into categories from 0-4, using ordinal variables. Concerning social support, the question asked respondents about their availability of support during their pregnancy. In the same format as previous questions, researchers categorized responses as high, medium, and low perceived social support (Almeida et al., 2014). Preterm birth was lower in foreign-born Whites, and preterm birth was higher in Blacks than in any other ethnicities (Almeida et al., 2014). Preterm birth was higher in women with four or more social ties, and women with either low or high social support were more likely to have an infant with low birth weight (Almeida et al.,, 2014). Results showed that social ties and social support were both buffers to low socioeconomic status for Hispanics (Almeida et al., 2014). The authors hypothesized that the lower social support was a protective factor to stress and/or demands if the woman was providing the social support (Almeida et al., 2014).

In another study, Miller, Robinson, and Cibula (2016) examined the Immigrant Paradox using birth records in Syracuse, New York of infants born to U.S.-born and foreign-born women of all racial/ethnic backgrounds. Overall results indicated that foreign-born women had a decreased risk of preterm birth than that of U.S.-born mothers

(Miller et al., 2016). Research has shown that refugees from sub-Saharan Africa and Asia are known to have higher rates of preterm birth, however contrary to previous research, in this study, foreign-born women had lower rates of preterm birth (Miller et al., 2016). The researchers contributed the lack of preterm birth to social ties within the Syracuse community (Miller et al., 2016). Syracuse is a refugee resettlement city and provides resources and support for immigrants and refugees that many if living in other cities, may not have the same access to support (Miller et al., 2016).

Preconception health behaviors. There has been little research comparing the relationship between preterm birth to preconception health behaviors and the differences that exist among U.S.-born and foreign-born women. Chao, Wakeel, Nazinyan, & Sun (2016) examined preconception health behaviors among U.S.-born and foreign-born women of all racial and ethnic groups to explore differences in Asian/Pacific Islanders and Hispanics. Chao et al. found an association between adverse health status prior to pregnancy and being born in the United States. Health issues including being overweight and obese, asthmatic, having increased risk of tobacco use before pregnancy, and decreased risk of contraception use (Chao et al., 2016).

Moreover, Elo and Culhane (2010) examined differences in health status and behaviors of pregnant U.S.-born Black and foreign-born Black women from Africa and Caribbean countries. While Elo and Culhane included survey question focused on preconception health behaviors, it must be noted that prenatal behaviors where also observed. The health behaviors studied included two physical health indicators (self-reporting from a scale of poor to excellent and BMI), two mental health indicators (self-

reporting from a scale of poor to excellent and the Epidemiologic Studies Depression Scale), and two health behaviors indicators (self-reports marijuana and alcohol use prior to pregnancy, and smoking during pregnancy) (Elo & Culhane, 2010). Individual-level characteristics included two indicators for socioeconomic status (education and ability to pay monthly bills), two variables for social support (material support and stressful life situations), and lastly nativity, length of stay in U.S., maternal age, and marital status. Overall, health behaviors of foreign-born women included less tobacco use, marijuana use, and alcohol abuse. Regarding physical health, foreign-born women were less obese and had more positive self-reports of physical and mental health (Elo & Culhane, 2010). Furthermore, they were often married or cohabitating and had higher education, which in turn lowered their risk of depressive symptoms (Elo & Culhane, 2010).

Xavriuos, Sales, & Tenkku (2012) explored preconception differences by nativity, conducting a secondary analysis of National Health and Nutrition Examination Survey (NHANES) from the years of 1996 to 2006. Results demonstrated that foreign-born women (Black, White, Hispanic, and those selecting the "other race" category) had a reproductive advantage over their United States counterparts. While non-pregnant U.S.-born women had higher rates of physical activity and contraceptive use, their higher rates of alcohol intake, binge drinking, and use of illicit drugs have a greater impact on adverse birth outcomes (Xavriuso et al., 2012). Moreover, pregnant foreign-born women were less educated, had income less than $35,000 annually, lower food security, and more likely be improvised and have no health insurance (Xavriuso et al., 2012). Although U.S.-

born women have a socioeconomic advantage, it does not significantly reduce the gap between them and their foreign-born peers (Xavriuso et al., 2012).

Definitions

Allostatic load: The physiological wear and tear the body experiences because of the effects of chronic stress over time (McEwen & Stellar, 1993.)

Foreign-born: Someone who is not a U.S. citizen at birth and born in a country outside of the United States (United States Census Bureau, 2016).

Gestational age: A description of how far along a woman's pregnancy is in weeks, measuring from the first day of the woman's last menstrual cycle to the current date (United States National Library of Medicine, 2017).

Infant mortality: The death of an infant prior to their first birthday (CDC, 2017).

Infant mortality rate: A comparison of the number of deaths of infants prior to their first birthday per 1,000 live births (Central Intelligence Agency, 2017).

Low birth weight: Infants weighing less than 5.8 pounds (March of Dimes, 2017).

Life span: An individual's duration of life from birth to death (Merriam-Webster Dictionary, 2017).

Nativity: Describes if an individual was born U.S.-born or if they are foreign-born (United States Census Bureau, 2016).

Preconception health: The health of an individual's body prior to pregnancy (CDC, 2015).

Preconception health care: Medical care received from a health professional focusing prior to pregnancy to increase the chance of having a healthy baby (CDC, 2015).

Pregnancy wantedness: Whether or not an individual wanted their pregnancy.

Preterm birth: The birth of an infant prior to 37 weeks of gestation (Martin, Hamilton, Osterman, Driscoll, & Mathews, 2017).

Reproductive advantage: The superior birth outcomes of infants born to foreign-born women (Dominquez, 2011; Almeida, Mulready-Ward, Bettegowda, & Ahluwalia, 2014; Collins, Soskolne, Rankin, & Bennett, 2013).

Second generation: An individual with at least one foreign-born parent (United States Census Bureau, 2016).

Small for gestational age: Infants weighing less than 2,500 grams (United States National Library of Medicine, 2017).

U.S.-born: An individual born in the United States (United States Census Bureau, 2016).

Assumptions

It is assumed that the data collection by mothers, birthing facilities, and state agencies is accurate and reporting is conducted by the quality assurance standards required by the National Vital Statistics System. It is also assumed that general population is not aware of (1) the reproductive health advantage in foreign-born Black women, (2) the importance of preconception health, (3) the concept of weathering.

Scope and Delimitations

As mentioned in the research problem, the reproductive health advantage in foreign-born women has been explored examining stress over the lifetime and psychosocial factors including racism, mental health, neighborhood density and redlining,

and perceived health status and their effects on adverse birth outcomes in U.S.-born Black women compared to other racial/ethnic groups (Dominquez, 2011; Kramer & Houge, 2009; Nuru-Jeter et al., 2017, Orr, Reiter, James, & Orr, 2012; Strutz et al., 2014). Moreover, many studies have compared U.S.-born and foreign-born women have primarily focused on tobacco use, medical risk factors (Green, 2012; Elo et al., 2014, Xaverious, Salas, and Tenkku, 2010), and prenatal care differences (David & Collins, 1997; Deal, Bennett, Rankin, & Collins, 2014; Green, 2012; El-Sayed & Gala, 2012; Singh & Yu, 1996). The specific focus on chronic preconception health risk factors is due to the lack of knowledge around chronic preconception health factors and the difference in U.S.-born and foreign-born Black women, as it relates to preterm birth.

Three theoretical frameworks guided this study and have been used in previous research related to research problem. The three theories are the life course theory, healthy migrant theory/immigrant paradox, and weathering theory.

As for inclusion and exclusion criteria, inclusion of the study included Black women between the ages of 15-44 years, with no previous preterm birth, and had a live birth of a singleton infant in 2016. In the same manner, exclusion criteria of the study were women who gave birth to multiples, had not given birth within the previous 18 months of their most recent pregnancy, and no previous preterm births

The 2017 Natality Data file is not generalizable to the entire population. The data is population-level and includes a complete count of live births in the United States. for the year 2017. Due to the secondary data set chosen, other delimitations included sample size and research questions.

Significance and Summary

This study explored preconception health factors leading up to the disparities that exist in U.S. birth outcomes among Black infants. With persistent social, economic, and environmental inequities across generations, specifically in the U.S.-born Black populations, the birth outcomes of Black infants have been impacted by infant mortality, low birth weight, and preterm birth (Elder, Goddeeris, & Haider, 2016; Martin et al, 2017). Understanding root causes of adverse health outcomes across the life span and prior to pregnancy may aid in combating racial and ethnic disparities in birth outcomes, improving health equity, and maternal health. As mentioned, the potential social change implications of this study may an application of new knowledge in public health by contributing to existing research seeking to understand of the protective factors that foreign-born Black women exhibit when immigrating to the United States. Results from the study may offered an alternative perspective to the reproductive health advantage of foreign-born Black women by expanding beyond individual medical and behavioral risk factors during pregnancy but assessing the influence of the social determinants of health and key preconception health indicators on birth outcomes. Data from this study may address research gaps and shine light on the impact of understanding health across the life span and right before pregnancy to reduce preterm birth in Black infants born in the U.S.

In conclusion, through the literature review, it was found that little studies have focused on the comparison among U.S.-born and foreign-born Black women related to the effect of preconception health behaviors on preterm birth. Furthermore, through the review of the literature, research questions, and analysis of the data, the research goal is

the use the results of this study to tackle adverse birth outcomes in Black infants using effective public health interventions that will address social, ecological, and environmental factors.

Section 2: Research Design and Data Collection

Introduction

To address ongoing adverse outcomes in Black infant health directly following birth, prior researchers have studied differences in U.S.-born and foreign-born women, primarily focusing on tobacco use, medical risk factors (Elo et al., 2014; Green, 2012; Xaverious et al., 2010), and prenatal care differences (David & Collins, 1997; Deal et al., 2014; El-Sayed & Gala, 2012; Green, 2012; Singh & Yu, 1996). Following prior research, in this study, I focused on addressing gaps in the literature related to preconception health and preterm birth. The purpose of the study was to examine differences in chronic disease preconception health risk factors in preterm birth among U.S.-born and foreign-born Black women who give birth in the United States. I explored the weathering theory by measuring and comparing age-specific patterns in preterm birth in both U.S.-born and foreign-born Black women. In this section, I describe the research design and rationale, methodology, threats to validity, and ethical procedures used in this study.

Research Design and Rationale

The dependent variable in this study was preterm birth; the independent variables were prepregnancy obesity, prepregnancy hypertension, and prepregnancy diabetes. Covariates were nativity, age, education, and marital status. I employed a cross-sectional quantitative design because this type of design is nonexperimental and allowed me to study trends in the population by measuring differences, relationships, and association (see Babbie, 2016; Creswell 2007). Furthermore, the study design was convenient

because it was cost-effective and timely, and the secondary dataset was public and readily available (see Babbie, 2016). Lastly, the study design was consistent with previous research addressing adverse birth outcomes and comparing U.S.-born and foreign-born women (David & Collins, 1997; Deal et al., 2014; El-Sayed & Gala, 2012; Green, 2012;Singh & Yu, 1996; Xaverious et al., 2010).

Methodology

Population

The target population for the study was non-Hispanic Black women between the ages of 15 and 44 years, with no previous preterm birth and who had a live birth of a singleton infant in 2016, N = 495,370.

Sampling and Sampling Procedures

The secondary data set used for the study was the 2017 Natality Public Use File, which was obtained from the NCHS at the CDC (2018). The 2017 Natality Public Use file consists of birth certificate data from all 50 states, the District of Columbia, and New York City (CDC, 2017b). Registration of birth certificate data is required by 50 states, the District of Columbia, and New York City (CDC, 2017b).

The 2017 Natality Public Use File is free and open to the public to download and use for research purposes (CDC, 2015b). To gain access, I was able to download it directly from the NCHS website. Moreover, a data user agreement is provided by NCHS on the webpage (CDC, 2015b). There were no forms that needed to be signed. For this reason, I had to read and personally agree to use the data usage. The form is included in the Appendix A.

In 2017, 3,855,500 births were registered in the United States (Martin et al., 2018); after inclusion and exclusion criteria, N = 495,370. As for inclusion and exclusion criteria, inclusion of the study included Black women between the ages of 15 and 44 years, with no previous preterm birth and who had a live birth of a singleton infant in 2016. In the same manner, exclusion criteria of the study were women who gave birth to multiples, had not given birth within the previous 18 months of their most recent pregnancy, and had no previous preterm births. The literature has shown that women with these three major characteristics, short pregnancy intervals, preterm birth, and multiple births, are at a higher risk for preterm birth (Fuchs & Senat, 2016; Lengyel, Ehrlich, Iams, Muglia, & DeFranco, 2017). Women who were under the age of 15 years and over the age of 44 years were excluded because they were outside the optimal childbearing age.

A power analysis was not conducted due to the data being previously collected, and the sample size was already defined. I referenced previous literature using U.S. Natality Public Use files to define appropriate alpha (.05) and power levels (.80) to reduce Type I and Type II errors (see DeSisto, 2018; Orchard & Price, 2017).

Instrumentation and Operationalization of Constructs Operationalization

In 2017, over 99% of births were recorded and registered with vital statistics, and the 2017 Natality Public Use File represented 100% of the birth certificates registered (Martin et al., 2018).

The U.S. Standard Certificate of Live Birth (birth certificate), which can be seen in Appendix B, was updated to improve data content and quality (CDC, 2017b). Roughly

every 10 years, there is an update or modification to birth certificate data, and in 2014, due to poor data quality, a list of items was dropped (CDC, 2017b). Furthermore, over the years, there was variation among states using the 2003 revised birth certificate (CDC, 2017b). Starting in 2016, all 50 states, the District of Columbia, and New York City use the 2003 revised birth certificate (CDC, 2017b).

Birth certificate data are required to be registered with the National Vital Statistics System regardless of the facility in which the infant is born (CDC, 2017b). Prior to leaving the facility, the mother is required to complete a Mother's Worksheet for Child's Birth Certificate (mother's worksheet), which can be seen in Appendix C (CDC, 2017b).

The Mother's Worksheet requires the mother to complete self-reported data about her demographics as well as the father of the infant. In a like manner, there is also a Facility Worksheet for the Live Birth (facility worksheet) that is required to be completed by the facility were the infant is born (CDC, 2016d). The facility worksheet provides information regarding the medical history of the mother and infant (CDC, 2016e). The facility worksheet can be seen in Appendix D.

A data user agreement is provided by the CDC on the webpage (CDC, 2015b). There were no forms that needed to be signed. For this reason, I had to read and personally agree to use the data usage. In addition, there was no current, published information regarding the reliability and validity of birth certificate data.

Operationalization of Variables

The variables included in this study included the dependent and independent variables and demographic characteristics in the sample. Definitions of the variables are below.

Black referred to the race of the women in the sample. During the data analysis, participants who were of any other race excluded. The variable was recoded to 1 = Black and 2 = all other races.

Nativity referred to the origin of birth of the sample population. During the Pearson's chi-square analysis for U.S.-born Black women, foreign-born nativity was excluded. Moreover, during the Pearson's chi-square analysis for foreign-born Black women, U.S.-born nativity was excluded. Lastly, during the binary logistic regression for Research Question 3, nativity was included as a covariate. 0 = foreign-born and 1 = U.S.-born.

Gestation refers to infants who were preterm (> 37 weeks) or full term (< 37 weeks). 0 = full-term and 1 = preterm.

Prepregnancy obesity referred to women in the sample with a BMI over 30 prior to pregnancy. The original variable, BMI, was recoded by narrowing down responses to a dichotomous variable to only include options of participants who were obese or not obese. 0 = no and 1 = yes.

Prepregnancy diabetes referred women in the sample with diabetes prior to pregnancy. 0 = no and 1 = yes.

Prepregnancy hypertension referred women in the sample with hypertension prior to pregnancy referred. 0 = no and 1 = yes.

Singleton birth referred to women in the sample who had one baby in 2017. During the data analysis, women in the study with a plural birth or those who gave birth to an infant >18 months prior to the infant born in 2017 were excluded. 1 = singleton birth and 2 = plural birth.

Education referred to the educational level of the participants. Education was recoded and condensed. 1 = no H.S. diploma, 0 = H.S. diploma, 2 = college degree.

Age referred to the ages of the women in the sample. Age was recoded to exclude participants under the age of 15 and over the age of 44. 1 = 15 to 19, 2 = 20 to 24, 0 = 25 to 29, 3 = 30 to 34, 4 = 35 to 39, 5 = 40 to 44, 6 = all others.

Marital_status referred to if the women in the sample were married or unmarried. 0 = no and 1 = yes.

Previous_preterm referred to if the women in the sample had a previous preterm birth. During the data analysis, participants with previous preterm births were excluded. 0 = no and 1 = yes.

Table 1 shows the operationalized definition of the variables in this study.

Table 1

Operationalized Definition of Variables

Original variable	Recode variable	Scale	Original code	Recode
MBRACE	Black	Dichotomous	1= White 2= Black 3= American Indian or Alaskan Native 4= Asian or Pacific Islander	1= Black 2= All Other Races
MBSTATE_REC	Nativity	Dichotomous	1= Born in the U.S. (50 US States) 2= Born outside the U.S. (includes possessions) 3= Unknown or Not Stated	0= Foreign-Born 1= U.S.-Born
GESTREC3	Gestation	Dichotomous	1= Under 37 weeks 2= 37 weeks and over 3= Not stated	0= Full-term 1= Preterm
BMI_R	Prepregnancy obesity	Dichotomous	1= Underweight <18.5 2= Normal 18.5-24.9 3= Overweight 25.0-29.9 4= Obesity I 35.0-34.9 5= Obesity II 35.0-39.9 6= Extreme Obesity III ≥ 40.0 9= Unknown or not stated	0= No 1= Yes
RF_PDIAB	Prepregnancy diabetes	Dichotomous	Y= Yes N= No U= Unknown or not stated	0= No 1= Yes
RF_PHYPE	Prepregnancy hypertension	Dichotomous	Y= Yes N= No U= Unknown or not stated	0= No 1= Yes

(Table continues)

Original variable	Recode variable	Scale	Original code	Recode
ILLB_R11	Singleton birth	Dichotomous	00= Zero to 3 months (plural delivery 01= 4 to 11 months 02= 12 to 17 months 03= 18 to 23 months 04= 24 to 35 months 05= 36 to 47 months 06= 48 to 59 months 07= 60 to 71 months 08= 72 months and over 88= Not applicable (1st natality event) 99= Unknown or not stated	1= Singleton Birth 2= Plural Birth
MEDUC	Education	Ordinal	1= 8th grade or less 2 9th through 12th grade with no diploma 3= High school graduate or GED completed 4= Some college credit, but not a degree 5= Associate degree (AA,AS) 6= Bachelor's degree (BA, AB, BS) 7= Master's degree (MA, MS, MEng, MEd, MSW, MBA) 8= Doctorate (PhD, EdD) or Professional Degree (MD, DDS, DVM, LLB, JD) 9 Unknown	1= No H.S. Diploma 0= H.S. Diploma 2= College Degree

(Table continues)

Original variable	Recode variable	Scale	Original code	Recode
MAGER9	Age	Ordinal	1= Under 15 years 2= 15-19 years 3= 20-24 years 4= 25-29 years 5= 30-34 years 6= 35-39 years 7= 40-44 years 8= 45-49 years 9= 50-54 years	1= 15-19 2= 20-24 0= 25-29 3= 30-34 4= 35-39 5= 40-44 6= All Others
DMAR	Marital_status		1= Married 2= Unmarried	0= Married 1= Unmarried
PPTERM2	Previous_preterm		Y Yes N No U Unknown or not stated	0= No 1= Yes

Data Analysis Plan

IBM SPSS Statistics version 24 was used for the data analysis of this study. The dataset was downloaded in SAS and uploaded and cleaned in IBM SPSS Statistics version 24.

The 2017 Natality Public Use File was provided in a fixed format and coded in a Numeric/Alphabetic/Blank scheme (CDC, 2017b). The record length was 1,330 (CDC, 2017b). While the CDC has a system to automatically check for completeness, code validity, and unacceptable inconsistencies between data items (CDC, 2017b), the data had to be thoroughly reviewed and cleaned. The codebook in IBM SPSS was ran on each variable to determine any code inconsistencies. Furthermore, frequencies were run on the variables used in the study, to determine if there were any missing data or data errors. Next, variables that were not needed in the study were deleted from the dataset. Lastly,

marital status, any missing variables excluded by SPSS in the analysis, and for all other variables, I only used variables with completed birth records.

Research Questions are reiterated below.

Research Question 1: Is there an association between chronic disease preconception health risk factors (prepregnancy obesity, diabetes, and hypertension) and preterm birth in U.S.-born Black women?

$H_0$1: There is no association between prepregnancy obesity and preterm birth in U.S.-born Black women.

H_a1: There is an association between prepregnancy obesity and preterm birth in U.S.-born Black women.

$H_0$2: There is no association between prepregnancy diabetes and preterm birth in U.S.-born Black women.

H_a2: There is an association between prepregnancy diabetes and preterm birth in U.S.-born Black women.

$H_0$3: There is no association between prepregnancy hypertension and preterm birth in U.S.-born Black women.

H_a3: There is an association between prepregnancy hypertension and preterm birth in U.S.-born Black women.

Research Question 2: Is there an association between chronic disease preconception health risk factors and preterm birth (prepregnancy obesity, diabetes, and hypertension) in foreign-born Black women?

$H_0$1: There is no association between prepregnancy obesity and preterm birth in foreign-born Black women.

H_a1: There is an association between prepregnancy obesity and preterm birth in foreign-born Black women.

$H_0$2: There is no association between prepregnancy diabetes and preterm birth in foreign-born Black women.

H_a2: There is an association between prepregnancy diabetes and preterm birth in foreign-born Black women.

$H_0$3: There is no association between prepregnancy hypertension and preterm birth in foreign-born Black women.

H_a3: There is an association between prepregnancy hypertension and preterm birth in foreign-born Black women.

Research Question 3*:* Are U.S.-born Black women at a higher risk for having a preterm infant compared to foreign-born Black women, controlling for chronic disease preconception health risk factors (prepregnancy obesity, diabetes, and hypertension), nativity, age, education, and marital status?

$H_0$1: U.S-born Black women are not at a higher risk for having a preterm infant compared to foreign-born Black women.

H_a2: U.S-born Black women are at a higher risk for having a preterm infant compared to foreign-born Black women.

Research Questions 4: Is there an age-specific weathering pattern exhibited in U.S-born Black women who give birth to preterm infants, controlling for chronic disease

preconception health risk factors (prepregnancy obesity, diabetes, and hypertension), age, education, and marital status?

H_01: There no age-specific weathering pattern exhibited in U.S-born Black women.

H_a2: There is an age-specific weathering pattern exhibited in U.S-born Black women.

Research Questions 5: Is there an age-specific weathering pattern exhibited in foreign-born Black women who give birth to preterm infants, controlling for chronic disease preconception health risk factors (prepregnancy obesity, diabetes, and hypertension), age, education, and marital status?

H_01: There no age-specific weathering pattern exhibited in foreign-born Black women.

H_a2: There is an age-specific weathering pattern exhibited in foreign-born Black women.

Univariate, Pearson's chi-square (chi-square), and binary logistic regression was used in the data analysis. First, frequencies of the variables were conducted to obtain descriptive data of the study participants. Second, for research question one and two, chi-square test was run to test if an association existed between the dependent variable, preterm birth, and each independent variable (separately) prepregnancy obesity, prepregnancy diabetes, and prepregnancy hypertension. Following the chi-square test, binary logistic regression analysis was conducted. The covariates, age, education, and marital status were added to the statistical analysis during the binary logistic regression

test. It is important to realize that the covariates provided an opportunity to determine if age, education, or marital status were predictive factors that served as barrier or facilitator to preterm birth. In addition, adding the covariates were necessary to increase the accuracy of the results of the analysis.

Binary logistic regression was run for research question three. Again, the dependent variable was preterm birth, and each independent variable, prepregnancy obesity, prepregnancy diabetes, and prepregnancy hypertension, and covariates, age, education, and marital status were added to the statistical analysis. An additional covariate, nativity, was added to the binary logistic regression. The use of nativity as a covariate was the key to answering Research Question 3. Moreover, adding the covariate nativity provided an opportunity to determine if place of birth was a predictive factor that served as barrier or facilitator to preterm birth. Lastly, research questions four and five were answered using the first binary logistic analysis model that were also used for research questions one and two.

Results of the data analysis were calculated and interpreted by p-values, confidence intervals, odds ratios. Chi-square provided p-values, which are associated with 95% confidence intervals, meaning the chi-square statistics had to be less than or equal to .05 to be statistically significant. The binary logistic regression test was interpreted by assessing the p-value, odds ratio, and confidence intervals. Just as chi-square test, the p-values are associated with 95% confidence intervals, meaning the p-value had to be less than or equal to .05 to be statistically significant. The odds ratio,

which is a measure of association between exposure and outcome, was essential to interpreting if the probability of preterm birth could occur.

Threat to Validity

The study included several threats to validity with the primary being that the 2017 Natality Data file is not generalizable to the entire population. The data is population-level and includes a complete count of live births in the U.S. for the year 2017. Moreover, while only Black women were used in the study, foreign-born women, n= 97,799 were underrepresented as compared to U.S-born women, n= 397,571. To ensure the sample had enough foreign-born women to make accurately test the research question hypothesis, all foreign-born and U.S.-born women who met the criteria were included in the study.

A threat to internal validity is the self-reporting of data on the Mother's Worksheet. Items such as race, educational attainment, marital status, and age of father are self-reported by the mother. There can be inaccuracies, such as response bias or items purposely not answered by the mother's because of choice. Another concern is the amount of data missing from the entire data file for the variable marital status. In the 2017 Natality Data file, .04% of mother's did not respond to the question (CDC, 2018). Moreover, the imputation of marital status on birth certificate is of concern. If the marital status is unknown, but the father's age is known, the mother's marital status will automatically be considered married. This instance is an example of how the quality of the data can be challenged. Therefore, in analysis, any missing variables for marital

status, was excluded by IBM SPSS. For all other variables, after inclusion was met, there was no missing data.

Ethical Procedures

Approval from the Walden University Institutional Review Board (IRB) was required to conduct this study. A conditional IRB approval was granted on April 11, 2018. A Change in IRB Request form was submitted to the IRB because I was not able to obtain the original secondary data set and requested use of the 2017 Natality Public Use File. On November 11, 2018, I received full IRB approval. The IRB number for this study is 04-11-18-0060215.

There were no additional IRB approvals needed by the CDC, the 2017 Natality Public Use File is publicly available for researchers. There were also no forms needed to be signed for a data use agreement (CDC, 2015b). For this reason, I read and personally agreed to use the data usage according to their terms. In addition, I engaged in Human Research Protections training certification from the National Institute of Health.

Birth certificate registration is required in the U.S. and District of Columbia required to be registered regardless of the facility in which the infant is born (CDC, 2017b). The mother is required to complete the Mother's Worksheet and the facility in which the infant was born completed a Facility Worksheet for the Live Birth (CDC, 2017b). The information is submitted to the CDC via electronic files through the Vital Statistics Cooperative Program (CDC, 2017b). Moreover, starting in 2005, the CDC only provides individual-level vital event data at the national level (CDC, 2017b). There are

no geographic identifiers at the city, county, or state level. Exact dates are also excluded from the dataset (CDC, 2017b).

My personal computer was used for the data analysis. The computer was stored at my home and was password protected. All data was de-identified prior to receiving the data, therefore no identifiers were present. The data was also kept on a locked, password required Integral 2GB Crypto Drive - FIPS 140-2 encrypted flash drive. The encrypted flash drive was stored in a security lockbox when not used. To sum up, I was the only person with access to the computer, flash drive, and lockbox.

Summary

In conclusion, this section provided the research design and rationale, methodology, included sampling and sampling procedures, instrumentation and operationalization of constructs, and the data analysis plan. Moreover, the threats to validity and ethnical procedures. Section three provides a presentation of the results and finding from this study, including, the interpretation of the findings, limitations of the study, recommendations, and implications for professional practice and social change.

Section 3: Presentation of the Results and Findings

Introduction

The purpose of the study was to examine differences in chronic disease preconception health risk factors in preterm birth in U.S.-born and foreign-born Black women who give birth in the United States. In the study, I explored the weathering theory by measuring and comparing age-specific patterns in preterm birth in U.S.-born and foreign-born Black women preterm birth in foreign-born Black women. In this section, I present the data collection, results, and summary of findings of the study. The research questions and hypothesis for the study are presented below:

Research Question 1: Is there an association between chronic disease preconception health risk factors (prepregnancy obesity, diabetes, and hypertension) and preterm birth in U.S.-born Black women?

$H_0$1: There is no association between prepregnancy obesity and preterm birth in U.S.-born Black women.

H_a1: There is an association between prepregnancy obesity and preterm birth in U.S.-born Black women.

$H_0$2: There is no association between prepregnancy diabetes and preterm birth in U.S.-born Black women.

H_a2: There is an association between prepregnancy diabetes and preterm birth in U.S.-born Black women.

$H_0$3: There is no association between prepregnancy hypertension and preterm birth in U.S.-born Black women.

H_a3: There is an association between prepregnancy hypertension and preterm birth in U.S.-born Black women.

Research Question 2: Is there an association between chronic disease preconception health risk factors and preterm birth (prepregnancy obesity, diabetes, and hypertension) in foreign-born Black women?

$H_0 1$: There is no association between prepregnancy obesity and preterm birth in foreign-born Black women.

$H_a 1$: There is an association between prepregnancy obesity and preterm birth in foreign-born Black women.

$H_0 2$: There is no association between prepregnancy diabetes and preterm birth in foreign-born Black women.

$H_a 2$: There is an association between prepregnancy diabetes and preterm birth in foreign-born Black women.

$H_0 3$: There is no association between prepregnancy hypertension and preterm birth in foreign-born Black women.

$H_a 3$: There is an association between prepregnancy hypertension and preterm birth in foreign-born Black women.

Research Question 3*:* Are U.S.-born Black women at a higher risk for having a preterm infant compared to foreign-born Black women, controlling for chronic disease preconception health risk factors (prepregnancy obesity, diabetes, and hypertension), nativity, age, education, and marital status?

H_01: U.S-born Black women are not at a higher risk for having a preterm infant compared to foreign-born Black women.

H_a2: U.S-born Black women are at a higher risk for having a preterm infant compared to foreign-born Black women.

Research Questions 4: Is there an age-specific weathering pattern exhibited in U.S-born Black women who give birth to preterm infants, controlling for chronic disease preconception health risk factors (prepregnancy obesity, diabetes, and hypertension), age, education, and marital status?

H_01: There no age-specific weathering pattern exhibited in U.S-born Black women.

H_a2: There is an age-specific weathering pattern exhibited in U.S-born Black women.

Research Questions 5: Is there an age-specific weathering pattern exhibited in foreign-born Black women who give birth to preterm infants, controlling for chronic disease preconception health risk factors (prepregnancy obesity, diabetes, and hypertension), age, education, and marital status?

H_01: There no age-specific weathering pattern exhibited in foreign-born Black women.

H_a2: There is an age-specific weathering pattern exhibited in foreign-born Black women.

Data Collection of Secondary Data Set

The data set used for this study, the 2017 Natality Public Use File, was derived from the United States birth registration system. There was no formal recruitment process because birth data are legally required to be reported by all 50 states, District of Columbia., and New York City (CDC, 2017b). The NCHS engages in the Vital Statistics Cooperative Program, which receives electronic files of individual records from the states and cities (CDC, 2017b). The data represent 100% of births reported in 2016, with a response rate of over 99% of births registered (Martin et al., 2018). There were no discrepancies in the use of the data set to report, pertaining to the plan presented in Section2.

Study Results

Demographic Characteristics of the Sample

Overall sample. The sample consisted of population data of all women in the inclusion categories. Demographic characteristics included non-Hispanic Black women between the ages of 15 and 44 years who had a live birth of a single infant in 2016 (N = 495,370). Within the sample, n = 397,571 were U.S.-born and n = 97,799 were foreign-born.

The majority of the women in the study were aged 20 to 29 years; 28.8% of the women were aged 20 to 24 years and 4% were aged 25 to 29 years. Roughly 60% of women had a high school diploma, 15.3% did not have a high school diploma, and approximately 24% had a college degree. Of the women exhibiting chronic disease preconception health risk factors, 1.1% had prepregnancy diabetes, 3.1% had

prepregnancy hypertension, and 35.3% had prepregnancy obesity. Overall, 14.6% of women had a preterm infant. Frequencies are presented in Table 2.

Table 2

Frequencies of Total Sample

Maternal characteristics	Frequency *N* = 495,370	% of Sample *N* = 495,370	Frequency of those who had a preterm birth *N* = 72,122	% of those who had a preterm birth
Nativity				
U.S.-born	397,571	80.3	11,370	15.8
Foreign-born	97,799	19.7	60,752	84.2
Age				
15-19	43,729	8.8	7,087	9.8
20-24	142,680	28.8	20,134	27.9
25-29	145,600	29.4	20,000	27.7
30-34	100,602	20.3	14,247	19.8
35-39	51,235	10.3	8,413	11.7
40-44	11,524	2.3	2,241	3.1
Marital status				
Married	146,095	65.6 (69.0)	18,385	25.5 (26.4)
Unmarried	324,722	29.5 (31.0)	51,141	70.9 (73.6)
Missing	24,553	5.0	2,596	3.6
Education				
No H.S. diploma	75,568	15.3	12,393	17.2
H.S. diploma	299,862	60.5	44,799	62.1
College degree	119,940	24.2	14,930	20.7
Gestation				
Preterm	72,122	14.6	n/a	n/a
Full-term	423,248	85.4	n/a	n/a
Prepregnancy Obesity				
Yes	174,760	35.3	26,546	36.8
No	320,610	64.7	45,576	63.2
Prepregnancy Hypertension				
Yes	15,442	3.1	1,573	2.2
No	479,928	96.9	70,549	94.2
Prepregnancy Diabetes				
Yes	5,349	1.1	4,198	2.2
No	490,021	98.9	67,924	97.8

U.S.-born Black women. The study sample was 80.3% U.S.-born (*n* = 397,571), with 15.3% of women having a preterm infant. The majority of U.S.-born women was 20 to 29 years of age. Nearly 32% of U.S.-born Black women was 20 to 24 years of age, and another was 29.9% was 25 to 29 years of age. Moreover, education levels consisted of 64% having a high school diploma, 21.4% having a college degree, and 13.8% not having a high school diploma. Of the women exhibiting chronic disease preconception health risk factors, 1.1% had prepregnancy diabetes, 3.4%had prepregnancy hypertension, and 38.0% had prepregnancy obesity. Frequencies are presented in Table 3.

Table 3

Frequencies of U.S.-Born Black Women

Maternal Characteristics	Frequency *N* = 397,571	% of sample *N* = 397,571	Frequency of those who had a preterm birth *N* = 60,752	% of those who had a preterm birth
Age				
15-19	40,941	10.3	6,704	11.0
20-24	129,368	32.5	18,709	30.8
25-29	119,060	29.9	17,229	28.4
30-34	69,590	17.5	10,841	17.8
35-39	32,219	8.1	5,883	9.7
40-44	6,393	1.6	1,386	2.3
Marital status				
Married	87,529	22.0 (23.3)	11,847	19.5 (20.3)
Unmarried	288,827	72.6 (76.7)	46,572	76.7 (79.7)
Missing	21,215	5.3	2,333	3.8
Education				
No H.S. diploma	54,783	13.8	9,835	16.2
H.S. diploma	257,666	64.8	39,729	65.4
College degree	85,122	21.4	11,188	18.4
Gestation				
Preterm	60,752	15.3	n/a	n/a
Full-term	336,819	84.7	n/a	n/a
Prepregnancy obesity				
Yes	151,050	62.0	37,251	61.3
No	246,521	38.0	23,501	38.7
Prepregnancy hypertension				
Yes	13,649	3.4	57,017	93.9
No	383,922	96.6	3,735	6.1
Prepregnancy diabetes				
Yes	4,397	1.1	1,358	2.2
No	393,174	98.9	59,394	97.8

Foreign-born Black women. The study sample was 19.7% U.S.-born (*n* = 97,799) with 11.6% of women having a preterm infant. Nearly 31% of foreign-born Black women was 30-34 years of age and another were 27.1% was 25-29 years of age. Education levels consisted of 43.1% having a high school diploma, 35.6% had a college degree, and 21.3% did not have a high school diploma. Of the women exhibiting chronic disease preconception health risk factors, 1% had prepregnancy diabetes, 1.8% prepregnancy hypertension, and 24.2% prepregnancy obesity. Frequencies are presented in Table 4.

Table 4

Frequencies of Foreign-Born Black Women

Maternal Characteristics	Frequency *N* = 97,799	% of Sample	Frequency of those who had a Preterm Birth *N* = 11,370	% of those who had a Preterm Birth
Age				
15-19	2,788	2.9	383	3.4
20-24	13,312	13.6	1,425	12.5
25-29	26,540	27.1	2,771	24.4
30-34	31,012	31.7	3,406	30.0
35-39	19,016	19.4	2,530	22.3
40-44	5,131	5.2	855	7.5
Marital Status				
Married	58,566	59.9 (62)	6,538	57.5 (58.9)
Unmarried	35,895	36.7 (38)	4,569	40.2 (41.1)
Missing	3,338	3.4	263	2.3
Education				
No H.S. diploma	20,785	21.3	2,558	22.5
H.S. diploma	42,196	43.1	5,070	44.6
College Degree	34,818	35.6	3,742	32.9
Gestation				
Preterm	11,370	11.6	n/a	n/a
Full-term	86,429	88.4	n/a	n/a
Prepregnancy obesity				
Yes	23,710	24.2	3,045	26.8
No	74,089	75.8	8,325	73.2
Prepregnancy hypertension				
Yes	11,370	11.6	463	4.1
No	96,006	98.2	10,907	95.9
Prepregnancy diabetes				
Yes	952	1.0	215	4.1
No	96,847	99.0	11,155	95.9

Chi-Square Test and Binary Logistic Regression

Research Question 1: Is there an association between chronic disease preconception health risk factors (prepregnancy obesity, diabetes, and hypertension) and preterm birth in U.S.-born Black women?

Hypothesis 1 tested the association between prepregnancy obesity and preterm birth in U.S.-born Black women. Chi-square test was conducted and revealed a statistically significant association between prepregnancy obesity and preterm (χ^2 (1) = 14.504, p < .001). Therefore, rejecting the null hypothesis and accepting the alternative hypothesis that there is a statistically significant association between prepregnancy obesity and preterm birth in U.S.-born Black women. Moreover, results, which are shown in Table 5, indicate that U.S.-born Black women with prepregnancy obesity (*n* = 23501, 11.6%) are more likely to give birth to a preterm infant than U.S.-born Black women without prepregnancy obesity (*n* = 37251, 15.1%).

Table 5

Results of Chi-square Test, Gestation by Prepregnancy Obesity: U.S.-Born

	Prepregnancy obesity	
Gestation	No	Yes
Full term	209,270 (84.9%)	127,549 (84.4%)
Preterm	37,251 (15.1%)	23,501 (15.6%)

Note. $\chi^2(1) = 14.504$, $p < .001$. Numbers in parentheses indicate column percentages.

Hypothesis 2 tested the association between prepregnancy diabetes and preterm birth in U.S.-born Black women. Chi-square test was conducted, with the results seen on Table 6, showing that there is a statistically significant association between prepregnancy

diabetes and preterm birth ($\chi^2(1) = 836.229$, $p < .001$). The null hypothesis is rejected therefore the alternative hypothesis is accepted, that there is a statistically significant association between prepregnancy diabetes and preterm birth in U.S.-born Black women. Therefore, results of the chi-square test demonstrate that U.S.-born Black women with prepregnancy diabetes (n = 1,358, 30.9%) are more likely to give birth to a preterm infant than U.S.-born Black women without prepregnancy diabetes (n = 59,394, 15.1%). Results of the chi-square test are also shown in Table 6.

Table 6

Results of Chi-square Test, Gestation by Prepregnancy Diabetes: U.S.-Born

	Prepregnancy diabetes	
Gestation	No	Yes
Full term	333,780 (84.9%)	3,039 (69.1%)
Preterm	59,394 (15.1%)	1,358 (30.9%)

Note. $\chi^2(1) = 836.229$, $p < .001$. Numbers in parentheses indicate column percentages.

Hypothesis #3 tested the association between prepregnancy hypertension and preterm birth in U.S.-born Black women. Chi-square test was conducted and revealed a statistically significant association between prepregnancy hypertension and preterm $\chi^2(1) = 1594.246$, $p < .001$. The null hypothesis is rejected and the alternative hypothesis, there is a statistically significant association between prepregnancy hypertension and preterm birth in U.S.-born Black women, is accepted. The results of the chi-square test, shown in Table 7, demonstrate that U.S.-born Black women with prepregnancy hypertension (*n*

=3,735, 27.4%) are more likely to give birth to a preterm infant than U.S.-born Black women without prepregnancy diabetes (*n* =57,017, 14.9%).

Table 7

Results of Chi-square Test, Gestation by Prepregnancy Hypertension: U.S.-Born

	Prepregnancy diabetes	
Gestation	No	Yes
Full term	326,905 (85.1%)	9,914 (72.6%)
Preterm	57,017 (14.9%)	3,735 (27.4%)

Note. $\chi^2(1) = 1594.246$, $p < .001$. Numbers in parentheses indicate column percentages.

Binary logistic regression was performed to test the association between prepregnancy obesity and preterm birth in U.S.-born Black women, inclusive of the additional covariates age, education, and marital status. Overall the model contained the dependent variable, preterm birth, and covariates, prepregnancy obesity, prepregnancy diabetes, prepregnancy hypertension, age, marital status, and education, on preterm birth. The results concluded that overall, all predictor variables were statistically significant, χ^2 (11, N= 376,356) = 3198.270, $p < .001$.

The model explained between 8% (Cox and Snell R square) and 1.5% (Nagelkerke R squared) of the variance in preterm birth, and correctly classified 84.5% of cases. As shown in Table 8, the three strongest predictors of preterm birth are prepregnancy diabetes (*OR* = 2.03, $p < .001$), prepregnancy hypertension (*OR* = 1.91, $p < .001$, and being 40-44 years of age (*OR* = 1.71, $p < .001$). This indicates that U.S.-born Black women with prepregnancy diabetes roughly two times more likely to have a

preterm birth than their peer without prepregnancy diabetes. Lastly, U.S.-born Black women aged 15-19 years of age (*OR* = 1.0, *p* = .85) did not contribute to the model.

Table 8

Results of Logistic Regression Predicting the Likelihood of Preterm Birth: U.S.-Born Black Women

	B	S.E.	Wald	df	p	OR	95% C.I. for OR
Age_Reg			749.226	5	.00		
Age_Reg(1)	.003	.017	.036	1	.85	1.00	.970, 1,034
Age_Reg(2)	-.060	.012	25.751	1	.00	.941	.920, .964
Age_Reg(3)	.140	.014	100.613	1	.00	1.15	1.12, 1.18
Age_Reg(4)	.336	.018	361.314	1	.00	1.40	1.35, 1.45
Age_Reg(5)	.537	.033	258.933	1	.00	1.71	1.60. 1.83
Ed_Reg			524.395	2	.00		
Ed_Reg(1)	.163	.013	150.656	1	.00	1.18	1.15, 1.20
Ed_Reg(2)	-.227	.013	305.724	1	.00	.797	.777, .817
Obesity(1)	-.036	.010	14.134	1	.00	.965	.947, .983
Prepregnancy Diabetes(1)	.705	.035	416.900	1	.00	2.03	1.89, 2.17
Prepregnancy Hypertension(1)	.645	.021	959.265	1	.00	1.91	1.83, 1.99
Marital_Status(1)	.213	.012	300.349	1	.00	1.24	1.20, 1.27
Constant	-1.908	.014	18053.447	1	.00	.148	

Note. OR = odds ratio. CI = confidence interval. *N* = 376,356

Research Question 2: Is there an association between chronic preconception risk factors (prepregnancy obesity, diabetes, and hypertension) and preterm birth in foreign-born Black women?

Hypothesis 1 tested the association between prepregnancy obesity and preterm birth in foreign-born Black women. Chi-square test was conducted and revealed a

statistically significant association between prepregnancy obesity and preterm $\chi^2(1) = 45.102$, $p < .001$. Therefore, rejecting the null hypothesis and accepting the alternative hypothesis that there is a statistically significant association between prepregnancy obesity and preterm birth in foreign-born Black women. Moreover, results of the chi-square test indicate that foreign-born Black women with prepregnancy obesity (n = 3,045, 12.8%) are more likely to give birth to a preterm infant that foreign-born Black women without prepregnancy obesity (n = 8,325, 11%). Results are shown in Table 9.

Table 9

Results of Chi-square Test, Gestation by Prepregnancy Obesity: Foreign-Born

	Prepregnancy obesity	
Gestation	No	Yes
Full term	65,764 (88.8%)	20,665 (87.2%)
Preterm	8,325 (11.2%)	3,045 (12.8%)

Note. $\chi^2(1) = 45.102$, $p < .001$. Numbers in parentheses indicate column percentages.

Hypothesis 2 tested the association between prepregnancy diabetes and preterm birth in foreign-born Black women. Chi-square test was conducted and indicated that there is a statistically significant association between prepregnancy diabetes and preterm birth ($\chi^2(1) = 112.359$, $p < .001$). The null hypothesis is rejected therefore the alternative hypothesis is accepted, that there is a statistically significant association between prepregnancy diabetes and preterm birth in foreign-born Black women. Therefore, results of the chi-square test demonstrate that foreign-born Black women with prepregnancy diabetes (n = 215, 22.6%) are more likely to give birth to a preterm infant than foreign-

born Black women without prepregnancy diabetes (*n* = 11,155, 11.5%). Results are shown in Table 10.

Table 10

Results of Chi-square Test, Gestation by Prepregnancy Diabetes: U.S. Born

	Prepregnancy diabetes	
Gestation	No	Yes
Full term	85,692 (88.5%)	737 (77.4%)
Preterm	11,155 (11.5%)	215 (22.6%)

Note. $\chi^2(1) = 112.359$, $p < .001$. Numbers in parentheses indicate column percentages.

Hypothesis 3 tested the association between prepregnancy hypertension and preterm birth in foreign-born Black women. Chi-square test were conducted and revealed a statistically significant association between prepregnancy hypertension and preterm ($\chi^2(1) = 358.297$, $p < .001$). The null hypothesis is rejected and the alternative hypothesis, there is an association between prepregnancy hypertension and preterm birth in foreign-born Black women, is accepted. The results of the chi-square test demonstrate that foreign-born Black women with prepregnancy hypertension (*n* = 463, 25.8%) are more likely to give birth to a preterm infant than foreign-born Black women without prepregnancy diabetes (*n* = 10,907, 11.4%). Results are shown in Table 11.

Table 11

Results of Chi-square Test, Gestation by Prepregnancy Hypertension: U.S. Born

	Prepregnancy diabetes

Gestation	No	Yes
Full term	85099 (88.6%)	1330 (74.2%)
Preterm	10907 (11.4%)	463 (25.8%)

Note. $\chi^2(1) = 358.297$, $p < .001$. Numbers in parentheses indicate column percentages.

Binary logistic regression was performed to test the association between prepregnancy obesity and preterm birth in foreign-born Black women, inclusive of the additional covariates age, education, and marital status. Overall the model contained the dependent variable, preterm birth, and covariates, prepregnancy obesity, prepregnancy diabetes, prepregnancy hypertension, age, marital status, and education, on preterm birth. The results concluded that overall, all predictor variables were statistically significant, χ^2 (11, N= 94,461) = 620.101, $p < .001$.

The model explained between 7% (Cox and Snell R square) and 1.3% (Nagelkerke R squared) of the variance in preterm birth, and correctly classified 88.2% of cases. As shown in Table 12, the three strongest predictors of preterm birth are (*OR*= 2.34, $p < .001$), prepregnancy diabetes (*OR* = 1.81, $p < .001$), and being 40-44 years of age (*OR*= 1.62, $p < .001$). The results indicate that foreign-born Black women with prepregnancy hypertension are 2.34 times more likely to have a preterm birth than their foreign-born Black women without prepregnancy hypertension. Lastly, foreign-born Black women with no high school diploma (*OR* = .996, $p = .875$) and those 20-24 years of age (*OR* = .975, $p = .468$) did not contribute to the model.

Table 12

Results of Logistic Regression Predicting the Likelihood of Preterm Birth: Foreign-Born Black Women

	B	S.E.	Wald	df	p	OR	95% C.I. for OR
Age_Reg			200.336	5	.000		
Age_Reg(1)	.209	.061	11.894	1	.001	1.23	1.09, 1.39
Age_Reg(2)	-.026	.035	.526	1	.468	.975	.910, 1.04
Age_Reg(3)	.066	.028	5.796	1	.016	1.07	1.01, 1.13
Age_Reg(4)	.268	.030	79.816	1	.000	1.31	1.23, 1.39
Age_Reg(5)	.484	.044	121.348	1	.000	1.62	1.49, 1.77
Ed_Reg			29.746	2	.000		
Ed_Reg(1)	-.004	.026	.025	1	.875	.996	.946, 1.05
Ed_Reg(2)	-.125	.024	26.568	1	.000	.883	.842, .926
Obesity(1)	.076	.023	10.657	1	.001	1.08	1.03, 1.13
Prepregnancy Diabetes(1)	.595	.081	54.469	1	.000	1.81	1.55, 2.12
Prepregnancy Hypertension(1)	.850	.057	225.820	1	.000	2.34	2.1, 2.61
Marital_Status(1)	.151	.022	48.219	1	.000	1.16	1.11, 1.21
Constant	-2.189	.026	7260.218	1	.000	.112	

Note. OR = odds ratio. CI = confidence interval. *N*= 94,461

Research Question 3: Are U.S.-born Black women at a higher risk for having a preterm infant compared to foreign-born Black women, controlling for chronic preconception risk factors (prepregnancy obesity, diabetes, and hypertension), nativity, age, education, and marital status?

Binary logistic regression was performed to determine if U.S.-born Black women are at a higher risk for having a preterm infant as compared to foreign-born Black women. The model contained the dependent preterm birth and independent variables,

nativity, prepregnancy obesity, prepregnancy diabetes, prepregnancy hypertension, age, marital status, and education, on preterm birth. The results concluded that all predictor variables were statistically significant, χ^2 (12, N= 470,817) = 4590.804, $p < .001$. Moreover, U.S.-born Black women are roughly 1.4 times more likely to have a preterm infant than a foreign-born Black woman. Therefore, the null hypothesis is rejected.

The model explained between 1% (Cox and Snell R square) and 1.7% (Nagelkerke R squared) of the variance in preterm birth, and correctly classified 85.2% of cases. As shown on Table 13, the two strongest predictors of preterm birth are prepregnancy diabetes and prepregnancy hypertension. Overall, this indicates that women with prepregnancy diabetes (*OR* = 1.99) and prepregnancy hypertension (1.95), independently and regardless of their nativity status, are approximately two times more likely to have preterm birth than women without prepregnancy diabetes and prepregnancy hypertension. Furthermore, unmarried women were 1.2 times more likely to have preterm birth than married women. Pertaining to age, compared to the reference group (20-24 years of age), all other ages were at least one times more likely to have a preterm birth. Lastly, for education, women without a high school diploma had an odds ratio of 1.13.

Table 13

Results of Logistic Regression Predicting the Likelihood of Preterm Birth: Nativity Status

	B	S.E.	Wald	df	p	OR	95% C.I. for OR
Age_Reg			911.12	5	.00		
Age_Reg(1)	.03	.016	4.23	1	.04	1.03	1.00, 1.07
Age_Reg(2)	-.05	.011	23.01	1	.00	.95	.927, .969
Age_Reg(3)	.12	.012	96.13	1	.00	1.13	1.10, 1.16
Age_Reg(4)	.32	.015	440.42	1	.00	1.37	1.33, 1.41
Age_Reg(5)	.52	.026	397.36	1	.00	1.69	1.60, 1.77
Ed_Reg			493.50	2	.00		
Ed_Reg(1)	.12	.012	105.74	1	.00	1.13	1.10, 1.16
Ed_Reg(2)	-.197	.011	302.80	1	.00	.82	.803, .839
Obesity(1)	-.021	.009	5.41	1	.02	.98	.963, .997
Prepregnancy Diabetes(1)	.69	.032	469.07	1	.00	1.99	1.87, 2.11
Prepregnancy Hypertension(1)	.67	.020	1177.52	1	.00	1.96	1.88, 2.03
Marital_Status(1)	.20	.011	359.53	1	.00	1.22	1.2,1.25
Nativity(1)	.30	.012	619.71	1	.00	1.35	1.32, 1.38
Constant	-2.21	.015	22838.05	1	.00	.11	

Note. OR = odds ratio. *CI* = confidence interval. *N= 470,817*

Research Questions 4: Is there an age-specific weathering pattern exhibited in U.S-born Black women who give birth to preterm infants, controlling for controlling for chronic preconception risk factors (prepregnancy obesity, diabetes, and hypertension), age, education, and marital status.

Binary logistic regression was conducted to explore if there was is an age-specific weathering pattern exhibited in U.S.-born Black women. Odds ratio and confidence intervals are presented in Table 14. The odds ratio for U.S.-born Black women aged 15-19 years was 1.00 followed ages 20-24 years .941. However, the odds ratio's began to

escalate as age groups increased. The odds ratio for 30-34 years of age was 1.15, following an increase for ages 35-40 years of age (1.40), and finally, for ages 40-44 years, the odds ratio was 1.71. Results indicate is that as age increases for U.S-born Black women, controlling for prepregnancy obesity, prepregnancy diabetes, and prepregnancy hypertension, education, and marital status, their likelihood for preterm birth increases, therefore, exhibiting weathering. The null hypothesis is rejected, and the alternative hypothesis is accepted.

Table 14

Odds Ratio and Confidence Intervals for Weathering: U.S.-Born Black Women

Age Groups	OR	95% C.I.
15-19	1.00	.970, 1,034
20-24	.941	.920, .964
25-29	1	*
30-34	1.15	1.12, 1.18
35-40	1.40	1.35, 1.45
40-44	1.71	1.60. 1.83

Note. *25-29 Reference group

Research Questions 5**:** Is there an age-specific weathering pattern exhibited in foreign-born Black women who give birth to preterm infants, controlling for controlling for chronic preconception risk factors (prepregnancy obesity, diabetes, and hypertension), age, education, and marital status.

Binary logistic regression was conducted to explore if there was is an age-specific weathering pattern exhibited in foreign-born Black women who gave birth to preterm birth infants, controlling for prepregnancy diabetes. Odds ratio and confidence intervals are presented in Table 15. The odds ratio for foreign-born Black women aged 15-19 years was 1.23 followed ages 20-24 years at .975. However, odds ratio's began to escalate as age groups increased. The odds ratio for 30-34 years of age was 1.07, following an increase in odds ratio for ages 35-40 years of age (1.32), and finally, ages 40-44 years, had an odds ratio of 1.62. The results indicate is that as age increases for foreign-born Black women, controlling for prepregnancy obesity, prepregnancy diabetes, and prepregnancy hypertension, education, and marital status, their likelihood for preterm birth increases, therefore, exhibiting weathering. The null hypothesis is rejected, and the alternative hypothesis is accepted.

Table 15

Odds Ratio and Confidence Intervals for Weathering: Foreign-Born Black Women

Age Groups	OR	95% C.I.
15-19	1.23	1.09, 1.39
20-24	.975	.910, 1.04
25-29	1	*
30-34	1.07	1.01, 1.13
35-40	1.32	1.23, 1.39
40-44	1.62	1.49, 1.77

Note. *25-29 Reference group

Summary

The first two research questions sought to determine if that was an association between chronic preconception risk factors and preterm birth (prepregnancy obesity, diabetes, and hypertension) in U.S.-born and foreign-born Black women. Chi-square test was conducted and determined that both U.S.-born and foreign-born Black women had independent associations between prepregnancy obesity, prepregnancy diabetes, and prepregnancy hypertension and preterm birth. Furthermore, binary logistic regression was performed to determine if the association between preterm birth and prepregnancy obesity, diabetes, and hypertension would continue to be significant with the addition of the covariate age, education, marital status.

Notable comparisons include the highest predictors in the binary logistic regression models for both U.S.-born and foreign-born Black women. For U.S.-born Black women, prepregnancy diabetes ($OR = 2.03$, $p < .001$) was the greatest predictor for preterm birth and for U.S.-foreign-born Black women, it was hypertension ($OR = 2.34$, $p < .001$). Regarding age groups, 40-44 years of age for both U.S.-born and foreign-born Black women was the highest predicator for preterm birth. Differences included U.S.-born Black women, 15-19 years of age ($OR = 1$, $p = .85$), not contributing to the model, whereas for foreign-born Black women, age 20-24 years ($OR = .975$, $p = .468$), did not contribute to the model. Also, U.S.-born Black women of all educational levels contributed to the model, but foreign-born Black women, without a high school diploma ($OR = .996$, $p = .875$) did not contribute to model. Finally, while prepregnancy obesity was statistically significant in both binary logistic regression models for U.S.-born and

foreign-born Black women, there were significant differences in odds ratios. U.S.-born Black women had an odds ratio for prepregnancy obesity of (*OR*= .965. $p < .001$) and foreign-born Black women, (*OR* =1.08, $p < .001$).

For the third research question, binary logistic regression was performed to determine if U.S.-born Black women at a higher risk for having a preterm infant compared to foreign-born Black women, controlling for chronic preconception risk factors (prepregnancy obesity, diabetes, and hypertension), nativity, age, education, and marital status. Results indicated that the overall model was statistically significant, suggesting that U.S.-born Black women (*OR* = 1.35. $p > .001$) were 1.35 times more likely to have a preterm infant than foreign-born Black women. Lastly, the fourth and fifth research questions focused on addressing the probability of weathering in U.S.-born and foreign-born Black women. Results indicated that as age increased, the probability of having a preterm infant also increased, therefore rejecting the null hypothesis in both research questions.

In conclusion, section four will summarize the overall doctoral study, discuss the study results in further detail, and address implications to professional practice and social change.

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

Introduction

The purpose of the study was to explore chronic preconception health risk factors leading up to the disparities that exist in the U.S. birth outcomes among Black infants. Researchers have shown that birth outcomes of foreign-born Blacks are superior to their U.S.-born peers in infant mortality, low birth weight, and preterm rates (Almeida et al., 2014; Collins et al., 2013; Dominquez, 2011). Moreover, foreign-born Black women who give birth in the United States have infant birth outcomes similar to those of U.S.-born White women (Collins et al., 2013; Dominquez, 2011). In this study, I examined chronic preconception health risk factors in preterm birth in U.S.-born and foreign-born Black women and the differences that existed in the sample. Following studies addressing gaps in research by Collins et al. (2012) and Deal et al. (2014) who addressed weathering in U.S-born and foreign-born women, I also explored weathering in U.S.-born and foreign-born Black women.

Key findings in the study revealed a statistically significant association between preterm birth and prepregnancy obesity, diabetes, and hypertension in both U.S.-born and foreign-born women. Moreover, the addition of the covariates, age, education, and marital status revealed that all predictor variables were statistically significant. Furthermore, results showed that U.S.-born Black women are roughly 1.4 times more likely to have a preterm infant than a foreign-born Black woman. Lastly, results indicated that weathering existed in both U.S.-born and foreign-born Black women.

Interpretations of Findings

The findings of this study had some similarities to previous study results, suggesting that the foreign-born reproductive health advantage was linked to maternal marital status, education, and that socioeconomic status may play a prominent role in the gaps in birth outcomes (see Elo & Culhane 2010; Elder et al., 201; Wasse et al., 1994; Cebral et al., 1990). To illustrate, in the overall population data, 35.6% of foreign-born Black women had a college degree, compared to 21.4% of U.S.-born Black women. Moreover, 62% of foreign-born women in the study were married, compared 23.3% of U.S.-born Black woman. It must be noted that 10.3% of U.S.-born Black women were 15 to 19 years of age and did not contribute to the binary logistic regression model (*OR* = 1.0, *p* = .85). Moreover, foreign-born Black women with no high school diploma (*OR* = .996, *p* = .875). This is similar to the research that states, U.S.-born White women without a high-school diploma have more favorable birth outcomes that U.S.-born Black women (Dominquez, 2011). Furthermore, foreign-born Black women exhibit similar birth outcomes to U.S.-born White women (Collins et al., 2013; Dominquez, 2011). Lastly, foreign-born Black women ages 20 to 24 years (*OR* = .975, *p* =. 468) did not contribute to the model.

As mentioned in Sections 1 and 2, there has been little research comparing the relationship between preterm birth to preconception health behaviors and the differences that exist in U.S.-born and foreign-born women. Chao et al. (2016) found an association between adverse health status before pregnancy and being born in the United States in Asian/Pacific Islanders and Hispanics. Health issues included being overweight and

obese, being asthmatic, having an increased risk of tobacco use before pregnancy, and having a decreased risk of contraception use (Chao et al., 2016). Moreover, Elo and Culhane (2010) examined differences in health status and behaviors of pregnant U.S.-born and foreign-born Black women from Africa and Caribbean countries, prepregnancy and prenatally. Results showed that foreign-born women were less obese and had more positive self-reports of physical and mental health (Elo & Culhane, 2010). In this study, while prepregnancy obesity was statistically significant in both binary logistic regression models for U.S.-born and foreign-born Black women, there were significant differences in odds ratios. U.S.-born Black women (OR = .965, p < .001) and foreign-born Black (OR = 1.08, p < .001).

Equally important, U.S.-born and foreign-born Black women had identical percentages (1.1%) for prepregnancy diabetes, but drastically different percentages for hypertension. Foreign-born Black women in the sample had 11.6% of women with prepregnancy hypertension, compared to only 3.4% of U.S.-born Black women. Henceforth, prepregnancy diabetes (OR = 2.03, p < .001) was the greatest predictor for preterm birth in U.S.-born Black women and prepregnancy hypertension (OR = 2.34, p < .001) for foreign-born Black women.

Again, while researchers have shown that the birth outcomes of foreign-born Blacks are superior to their U.S.-born peers in infant mortality, low-birth weight, and preterm rates (Almeida et al., 2014; Collins et al., 2013; Dominquez, 2011), in this study, the foreign-born Black women with chronic diseases prior to pregnancy were still vulnerable pertaining to having a preterm infant. Contrary to the overall prepregnancy

health of foreign-born Black women, the reproductive health advantage related to having superior birth outcomes for their infants still rang true. To demonstrate, U.S.-born Black women ($OR = 1.35$, $p < .001$) are roughly 1.4 times more likely to have a preterm infant than a foreign-born Black woman.

As mentioned in Section 1, there were three theoretical frameworks in this study, the life course theory, immigrant paradox, and weathering theory. Previous researchers have sought to explore these three theories, applying them to U.S.-born and foreign-born women of all racial and ethnic backgrounds. Elder et al. (2016) examined racial and ethnic disparities in infant mortality rates using the variables prenatal care, previous pregnancy loss, gender of the infant, live birth order, maternal marital status, education, and age. Racial categories included were White, Black, Native American, Asian, and Hispanic. In short, Elder et al. suggested that the immigrant paradox (in Hispanic women) was linked to maternal marital status and education and that socioeconomic status may play a prominent role in the infant mortality gaps. Also, Deal et al. (2014) examined data from 2003-2004 Natality Files from the National Center for Health Statistics to explore weathering in foreign-born Black women. Deal et al. compared age-specific low birth rates to factors, including marital status, parity, and prenatal care. Deal et al. concluded that infants born to foreign-born Black women had birth rates similar to U.S.-born White women with no evidence of weathering shown. The weathering pattern was determined by reviewing age and a rise in low birth weight rates throughout childbearing years and inadequate prenatal care (Deal et al., 2014).

Foreign-born Black women in this study exhibited weathering similar to U.S.-born Black women. In both groups, as age increased, the likelihood to give birth to a preterm infant increased, therefore exhibiting weathering. A point not to be overlooked is that weathering was revealed while controlling for the covariates, prepregnancy obesity, prepregnancy diabetes, and prepregnancy hypertension, education, and marital status.

As mentioned in Section 1, it can be hypothesized that while nativity can be a protective factor (immigrant paradox) to the adverse events that U.S.-born Black women experience, over time, immigrants and their second-generation family member's health may deteriorate over time (weathering theory) after years of living in the United States. The individual would experience events (life course theory) that would reshape or eliminate their protective factors. Another explanatory thought is that the data were limited in that it was unknown when foreign-born Black women immigrated to the United States; therefore, an accurate assessment of weathering by the age of when the woman immigrated to when she gave birth to the infant was not measured.

It must also be noted that in recent trends, via journal articles, newspaper articles, and newscasts since the most recent presidential election of 2016, that there has been an uptick in deportation and discrimination against immigrants living in the United States and those attempting to migrate to the United States. There has been the criminalization and backlog of asylum seekers, detention centers for migrant children, attempts to build a wall at the border of Mexico and the United States, messages to invoke fear of immigrants, and the talk of executive orders to denounce and/or revote citizenship for infants born in the United States from immigrant women (Kaiser Family Foundation,

2018; Palmedo et al., 2016; Tempus, 2018). According to Palmedo et al. (2016), a potential outcome could be poor health in the immigrant population. Furthermore, there is the presidential proposed rule to change "public charge" policies (Kaiser Family Foundation, 2018). These changes could either deny a person entry into the United States or make changes to their green card if they were to likely become a public charge (Kaiser Family Foundation, 2018). The potential outcomes could decrease participation in public health programs and others that address the social determinants of health, therefore contributing to decreasing health and stability of immigrant families (Kaiser Family Foundation, 2018). To illustrate via current events, a recent article addressed how legal immigrants who access public health services are either not enrolling or cancelling their services, such as health insurance, because of fear of being selected for deported (Adams, 2018; Kennedy, 2018).

As mentioned in the literature review, there have been multiple studies with reports that exposure to racism was higher among U.S.-born Black women than that of foreign-born Black women (Dominquez et al., 2009; Singh & Yu 1996). There could possibly be a turn in self-reports of exposure to racism in foreign-born Black women. While most media attention has focused on immigrants and asylum seekers from Mexico and Central America, it is important to realize that negative stereotypes of immigrants are focused on immigrants of color, which include Black immigrants. All things considered, there could be potential impacts on recent births in from foreign-born Black women because of the heightened discrimination and potential policy changes. In brief, further

research on preterm birth focused on current stress levels of immigrants (post the 2016 election), and their exposure to racism may be warranted.

Limitations of the Study

Birth certificate data is required for all live birth in the United States, regardless of where the birth occurred, hospital, birthing center, or home, etc. (CDC, 2017b). Over 99% of all births in the United States were reported (CDC, 2017b). However, there can be births that are unreported. Moreover, the completeness of reporting is also a concern. For instance, self-reported information by the mother on the Mother's Worksheet (CDC 2016d). Items such as race, educational attainment, marital status, and age of father are self-reported by the mother (CDC, 2016d). There can also be inaccuracies, such as response bias or items purposely not answered by the mother because of choice. An example includes the reporting of marital status. In the 2017 Natality Data file, .04% of mother's did not respond to the question (CDC, 2017b). Furthermore, if the mother does not report the father's age or if it is unknown, the mother the mother is automatically considered unmarried (CDC, 2017b). Moreover, if the marital status is unknown, yet the father's age is known, the mother's marital status will automatically be considered married (CDC, 2017b).

Another limitation includes gaps in the quality control measures of the data. While NCHS has a system to automatically check for completeness, code validity, and unacceptable inconsistencies between data items, the quality control of individual hospitals and overall state data is not consistent (CDC, 2017b). NCHS provided a list of underreporting and/or inaccurate reporting from states on specific data points. Pertaining

to this study, one state, New Mexico, in which NCHS states that the data reported on "Risk Factors – Previous preterm birth" should be used with caution (CDC, 2017b).

The second major limitation is not having the exact age when a foreign-born Black woman immigrated to the United States. Having the exact age can provide a more detailed an accurate assessment of weathering.

Recommendations

The health of a woman's body before pregnancy directly affects the birth outcome of their child. Fully addressing the Life Course Theory and preconception health is necessary to improve preterm birth outcomes, by focusing on health across the life course and not just during prenatally. As mentioned in section one, many studies have focused on health factors during pregnancy, which has, over time, resulted in interventions and programs for women once pregnant or after birth (HRSA, 2017). Going beyond prenatal care and reproductive health, and improving health starting in young adolescence is vital. In the binary logistic regression performed to test the association between preterm birth and the covariates, prepregnancy obesity, prepregnancy diabetes, prepregnancy hypertension, age, education, and marital status, U.S.-born Black women aged 15-19 years of age (OR= 1, p = .85) did not contribute to the model. Moreover, in foreign-born Black women, women who were 30-34 years of age had the highest percentage of preterm births (30%), versus U.S.-born Black women who were 20-24 years of age (30.8%). This leads me to suggest that addressing the preconception health behaviors, and health promotion and disease prevention in early adolescence, may lead to healthier lifestyles in their 20’s-30’s, and lead to improved preterm birth outcomes in the future.

Equally important, as mentioned, there could be potential impacts on recent births in foreign-born Black women because of the heightened discrimination and potential policy changes related to the social determinants of health, therefore further research on preterm birth focused on current stress levels of immigrants (post the 2016 United States presidential election), and their exposure to racism may be warranted.

Implications for Professional Practice and Social Change

The initial hope was that this study would apply new knowledge to the field of public health by contributing to existing research seeking to understand the protective factors that foreign-born Black women exhibit when immigrating to the United States. As mentioned, foreign-born Black women in this study exhibited weathering similar to U.S.-born Black women. However, foreign-born women still had more favorable preterm birth outcomes. Binary logistic regression was performed to determine if U.S.-born Black women are at a higher risk for having a preterm infant as compared to foreign-born Black women, U.S.-born Black women were roughly 1.4 times more likely to have a preterm infant than a foreign-born Black woman.

The study offered an alternative perspective to the reproductive health advantage of foreign-born Black women by assessing the influences of chronic disease preconception health risk factors and their impact on Black women having a preterm birth. The results suggest that foreign-born Black women giving birth in the U.S. do have a protective factor improves the health outcomes of their infants, namely preterm birth, however even with the presence of chronic preconception risk factors they are still susceptible to having a preterm birth. As mentioned, in the previous protective factors

such as social ties and social support (Almeida, 2014; Miller et al., 2016), could be buffers to preterm birth. In this study, foreign-born Black women were more likely to be married (58.9%) than a U.S.-born Black woman (20.3%) and marriage can be considered social support.

This study will positively impact social change by offering an alternative perspective to the reproductive health advantage of foreign-born Black women. This perspective can aid in advancing policy and systems change strategies to address the root causes of racial and ethnic disparities in birth outcomes, advance health equity, and improve maternal health.

Conclusion

This study determined that prepregnancy obesity, prepregnancy diabetes, and prepregnancy hypertension, all independent were associated with preterm birth. Moreover, with the additions of the covariates, age, education, and marital status to a binary logistic model, the prepregnancy obesity, prepregnancy diabetes, and prepregnancy hypertension were still statistically significant. Moreover, in a comparison of U.S.-born and foreign-born women, results indicated that U.S.-born Black women were approximately 1.4 times more likely to have a preterm infant than foreign-born Black women. Lastly, the fourth and fifth research questions focused on addressing the probability of weathering in both U.S.-born and foreign-born Black women. The results suggested that weathering occurred, because as age increased, the probability of having a preterm infant also increased.

Data from this study addressed gaps in the literature pertaining to predictors in preterm birth in Black infants. Moving forward in the literature and well as in practice, addressing the social determinants of health and health across the life course, and not just prenatally is essential. A focus on healthy lifestyles, particularly reproductive life planning, chronic disease prevention and management, and obesity prevention initiatives focused in early adolescence versus waiting until young adults are in their twenties and early thirties can lead to healthier lifestyles as middle-aged adults.

Overall, understanding health across the life span and before pregnancy is critical to improving preterm birth rates in the U.S. Addressing these issues are paramount to improving the positive birth outcomes of Black infants.

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Appendix A: Data User Agreement

Centers for Disease Control and Prevention

Data User Agreement

Warning! Data Use Restrictions Read Carefully Before Using

The Public Health Service Act (Section 308 (d)) provides that the data collected by the National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC), may be used only for the purpose of health statistical reporting and analysis.

Any effort to determine the identity of any reported case is prohibited by this law.

NCHS does all it can to assure that the identity of data subjects cannot be disclosed. All direct identifiers, as well as any characteristics that might lead to identification, are omitted from the dataset. Any intentional identification or disclosure of a person or establishment violates the assurances of confidentiality given to the providers of the information. Therefore, users will:

1. Use the data in this dataset for statistical reporting and analysis only.
2. Make no use of the identity of any person or establishment discovered inadvertently and advise the Director, NCHS, of any such discovery.
3. Not link this dataset with individually identifiable data from other NCHS or non- NCHS datasets.

By using these data you signify your agreement to comply with the above-stated statutorily based requirements.

Related Sites

- Data Linkage (http://wwwdev.cdc.gov/nchs/data-linkage/index.htm)
- NCHS Data Visualization Gallery (http://www.cdc.gov/nchs/data-visualization/)
- Research Data Center (http://wwwdev.cdc.gov/rdc)

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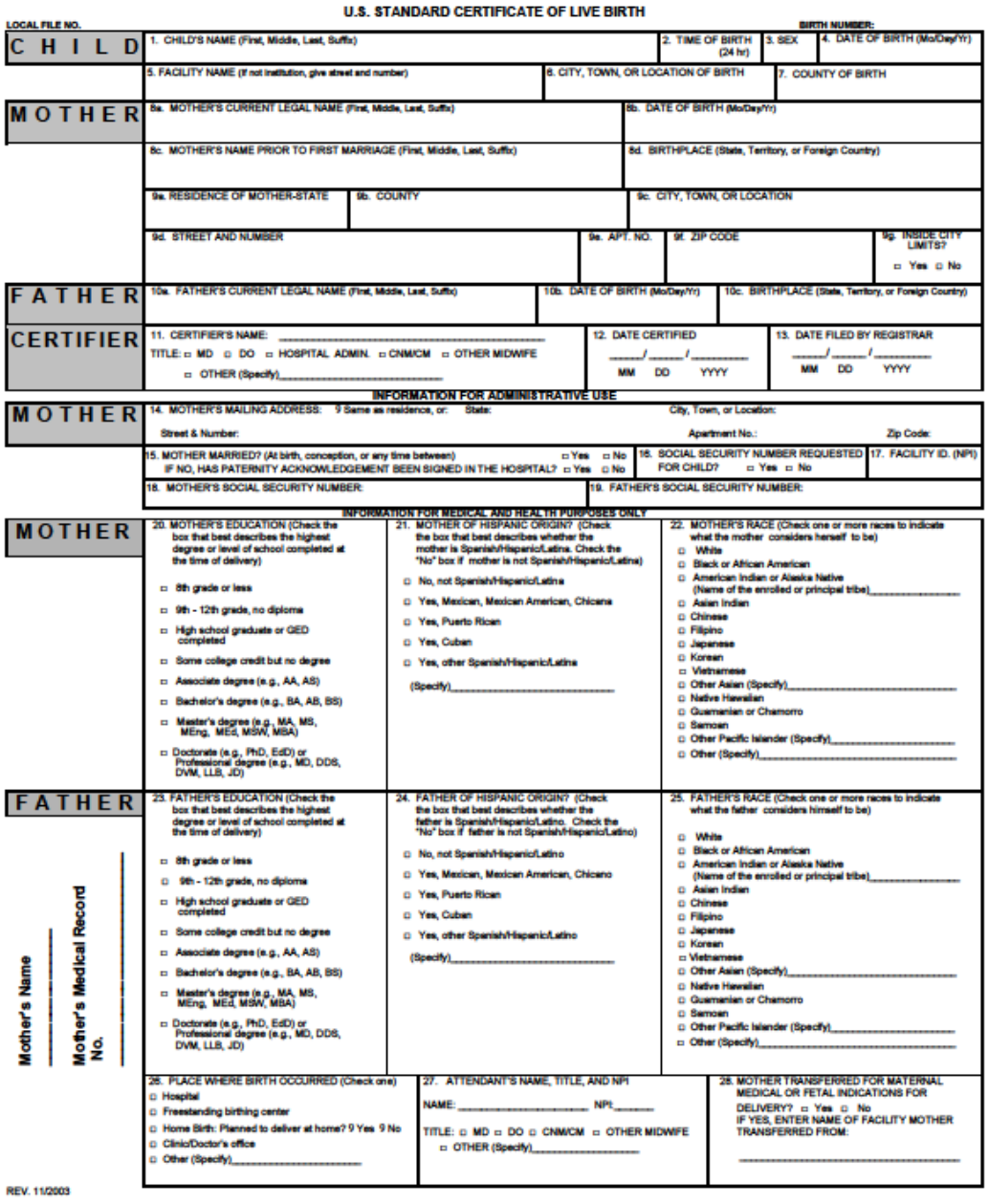
Appendix B: Standard Certificate of Live Birth



U.S. STANDARD CERTIFICATE OF LIVE BIRTH

LOCAL FILE NO. BIRTH NUMBER:

CHILD

1. CHILD'S NAME (First, Middle, Last, Suffix)
2. TIME OF BIRTH (24 hr)
3. SEX
4. DATE OF BIRTH (Mo/Day/Yr)
5. FACILITY NAME (If not institution, give street and number)
6. CITY, TOWN, OR LOCATION OF BIRTH
7. COUNTY OF BIRTH

MOTHER

8a. MOTHER'S CURRENT LEGAL NAME (First, Middle, Last, Suffix)
8b. DATE OF BIRTH (Mo/Day/Yr)
8c. MOTHER'S NAME PRIOR TO FIRST MARRIAGE (First, Middle, Last, Suffix)
8d. BIRTHPLACE (State, Territory, or Foreign Country)
9a. RESIDENCE OF MOTHER-STATE
9b. COUNTY
9c. CITY, TOWN, OR LOCATION
9d. STREET AND NUMBER
9e. APT. NO.
9f. ZIP CODE
9g. INSIDE CITY LIMITS? ☐ Yes ☐ No

FATHER

10a. FATHER'S CURRENT LEGAL NAME (First, Middle, Last, Suffix)
10b. DATE OF BIRTH (Mo/Day/Yr)
10c. BIRTHPLACE (State, Territory, or Foreign Country)

CERTIFIER

11. CERTIFIER'S NAME: _____
TITLE: ☐ MD ☐ DO ☐ HOSPITAL ADMIN. ☐ CNM/CM ☐ OTHER MIDWIFE
☐ OTHER (Specify)_____
12. DATE CERTIFIED _____/_____/_____ MM DD YYYY
13. DATE FILED BY REGISTRAR _____/_____/_____ MM DD YYYY

INFORMATION FOR ADMINISTRATIVE USE

MOTHER

14. MOTHER'S MAILING ADDRESS: 9 Same as residence, or: State: City, Town, or Location:
Street & Number: Apartment No.: Zip Code:
15. MOTHER MARRIED? (At birth, conception, or any time between) ☐ Yes ☐ No
IF NO, HAS PATERNITY ACKNOWLEDGEMENT BEEN SIGNED IN THE HOSPITAL? ☐ Yes ☐ No
16. SOCIAL SECURITY NUMBER REQUESTED FOR CHILD? ☐ Yes ☐ No
17. FACILITY ID. (NPI)
18. MOTHER'S SOCIAL SECURITY NUMBER:
19. FATHER'S SOCIAL SECURITY NUMBER:

INFORMATION FOR MEDICAL AND HEALTH PURPOSES ONLY

MOTHER

20. MOTHER'S EDUCATION (Check the box that best describes the highest degree or level of school completed at the time of delivery)
☐ 8th grade or less
☐ 9th - 12th grade, no diploma
☐ High school graduate or GED completed
☐ Some college credit but no degree
☐ Associate degree (e.g., AA, AS)
☐ Bachelor's degree (e.g., BA, AB, BS)
☐ Master's degree (e.g., MA, MS, MEng, MEd, MSW, MBA)
☐ Doctorate (e.g., PhD, EdD) or Professional degree (e.g., MD, DDS, DVM, LLB, JD)

21. MOTHER OF HISPANIC ORIGIN? (Check the box that best describes whether the mother is Spanish/Hispanic/Latina. Check the "No" box if mother is not Spanish/Hispanic/Latina)
☐ No, not Spanish/Hispanic/Latina
☐ Yes, Mexican, Mexican American, Chicana
☐ Yes, Puerto Rican
☐ Yes, Cuban
☐ Yes, other Spanish/Hispanic/Latina
(Specify)_____

22. MOTHER'S RACE (Check one or more races to indicate what the mother considers herself to be)
☐ White
☐ Black or African American
☐ American Indian or Alaska Native (Name of the enrolled or principal tribe)_____
☐ Asian Indian
☐ Chinese
☐ Filipino
☐ Japanese
☐ Korean
☐ Vietnamese
☐ Other Asian (Specify)_____
☐ Native Hawaiian
☐ Guamanian or Chamorro
☐ Samoan
☐ Other Pacific Islander (Specify)_____
☐ Other (Specify)_____

FATHER

23. FATHER'S EDUCATION (Check the box that best describes the highest degree or level of school completed at the time of delivery)
☐ 8th grade or less
☐ 9th - 12th grade, no diploma
☐ High school graduate or GED completed
☐ Some college credit but no degree
☐ Associate degree (e.g., AA, AS)
☐ Bachelor's degree (e.g., BA, AB, BS)
☐ Master's degree (e.g., MA, MS, MEng, MEd, MSW, MBA)
☐ Doctorate (e.g., PhD, EdD) or Professional degree (e.g., MD, DDS, DVM, LLB, JD)

24. FATHER OF HISPANIC ORIGIN? (Check the box that best describes whether the father is Spanish/Hispanic/Latino. Check the "No" box if father is not Spanish/Hispanic/Latino)
☐ No, not Spanish/Hispanic/Latino
☐ Yes, Mexican, Mexican American, Chicano
☐ Yes, Puerto Rican
☐ Yes, Cuban
☐ Yes, other Spanish/Hispanic/Latino
(Specify)_____

25. FATHER'S RACE (Check one or more races to indicate what the father considers himself to be)
☐ White
☐ Black or African American
☐ American Indian or Alaska Native (Name of the enrolled or principal tribe)_____
☐ Asian Indian
☐ Chinese
☐ Filipino
☐ Japanese
☐ Korean
☐ Vietnamese
☐ Other Asian (Specify)_____
☐ Native Hawaiian
☐ Guamanian or Chamorro
☐ Samoan
☐ Other Pacific Islander (Specify)_____
☐ Other (Specify)_____

Mother's Name _____ Mother's Medical Record No. _____

26. PLACE WHERE BIRTH OCCURRED (Check one)
☐ Hospital
☐ Freestanding birthing center
☐ Home Birth: Planned to deliver at home? 9 Yes 9 No
☐ Clinic/Doctor's office
☐ Other (Specify)_____

27. ATTENDANT'S NAME, TITLE, AND NPI
NAME: _____ NPI:_____
TITLE: ☐ MD ☐ DO ☐ CNM/CM ☐ OTHER MIDWIFE
☐ OTHER (Specify)_____

28. MOTHER TRANSFERRED FOR MATERNAL MEDICAL OR FETAL INDICATIONS FOR DELIVERY? ☐ Yes ☐ No
IF YES, ENTER NAME OF FACILITY MOTHER TRANSFERRED FROM:
_____

REV. 11/2003

Appendix C: Mother's Worksheet for Child's Birth Certificate

Mother's Medical Records # _____ Mother's name _____
FOR HOSPITAL USE ONLY

Final 12/16

Mother's Worksheet for Child's Birth Certificate

The information you provide below will be used to create your child's birth certificate. The birth certificate is a document that will be used for legal purposes to prove your child's age, citizenship and parentage. This document will be used by your child throughout his/her life. State laws provide protection against the unauthorized release of identifying information from the birth certificates to ensure the confidentiality of the parents and their child.

It is very important that you provide complete and accurate information to all of the questions. In addition to information used for legal purposes, other information from the birth certificate is used by health and medical researchers to study and improve the health of mothers and newborn infants. Items such as parent's education, race, and smoking will be used for studies but will not appear on copies of the birth certificate issued to you or your child.

All information on the mother should be for the woman who delivered the infant. In cases of surrogacy or gestational carrier, the information reported should be that for the surrogate or the gestational carrier, that is, the woman who delivered the infant.

PLEASE PRINT CLEARLY

1. What is your current legal name?

_____ _____ _____ _____
First Middle Last Suffix (Jr., III, etc.)

2. What will be your baby's legal name (as it should appear on the birth certificate)?

_____ _____ _____ _____
First Middle Last Suffix (Jr., III, etc.)

❑ Name not yet chosen

3. Where do you usually live--that is--where is your household/residence located?

Complete number and street: _____ Apartment Number: _____
(Do not enter rural route numbers)

City, Town, or Location: _____

County: _____ State: _____ Zip Code: _____
(or U.S. Territory, Canadian Province)

If not United States, *country*_____

4. Is this household inside city limits (inside the incorporated limits of the city, town, or location where you live)?

❑ Yes
❑ No
❑ Don't know

**Full worksheet can be uploaded at https://www.cdc.gov/nchs/data/dvs/moms-worksheet-2016.pdf*

Appendix D: Facility Worksheet for the Live Birth

Mother's medical record # _____
Mother's name_____

FINAL (12/16)

FACILITY WORKSHEET FOR THE LIVE BIRTH CERTIFICATE

For pregnancies resulting in the births of two or more live-born infants, this worksheet should be completed for the 1st live born infant in the delivery. For each subsequent live-born infant, complete the "Attachment for Multiple Births."

For any fetal loss in the pregnancy reportable under State reporting requirements, complete the "Facility Worksheet for the Fetal Death Report."

*For detailed definitions, instructions, information on sources, and common key words and abbreviations please see "**The Guide to Completing Facility Worksheets for the Certificate of Live Birth.**"*

All birth certificate information reported for the mother should be for the woman who delivered the infant. In cases of surrogacy or gestational carrier, the information reported should be that for the surrogate or the gestational carrier, that is, the woman who delivered the infant.

1. Facility name*: _____
(If not institution, give street and number)

2. Facility I.D. (National Provider Identifier): _____

3. City, Town or Location of birth: _____

4. County of birth: _____

5. Place where birth occurred:

- ❑ Hospital
- ❑ Freestanding birthing center
  (Freestanding birthing center is defined as one which has no direct physical connection with an operative delivery center.)
- ❑ Home birth
  Planned to deliver at home ⌟ Yes ⌟ No ⌟ Unknown
- ❑ Clinic/Doctor's Office
- ❑ Other (specify, e.g., taxi cab, train, plane, etc.) _____

*Facilities may wish to have pre-set responses (hard-copy and/or electronic) to questions 1-5 for births which occur at their institutions.

1 1/5/2017

**Full worksheet can be uploaded at https://www.cdc.gov/nchs/data/dvs/facility-worksheet-2016.pdf*