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Assessing The Influence Of Gender Equity In The US State Legislatures On Prenatal Healthcare Utilization

Prachi Joshi

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ASSESSING THE INFLUENCE OF GENDER EQUITY IN THE US STATE LEGISLATURES ON PRENATAL HEALTHCARE UTILIZATION

By

PRACHI JOSHI
(Under the direction of Professor Tilicia Mayo-Gamble)

ABSTRACT

Prenatal care is crucial for achieving public health and primary healthcare objectives. It is one of the goals of Healthy People 2030, which is the US federal initiative to improve the health and well-being of people nationwide. Unfortunately, despite the lofty goals, the United States has the highest maternal mortality rate among developed countries. In 2020, the maternal mortality rate in the US was 24 deaths per 100,000 live births, more than three times the rate in most high-income countries. What is concerning is that it is getting worse. Seven hundred women die of pregnancy-related complications. Among them, black and Native American women are 2 to 4 times more likely to die than white women. One of the reasons driving this maternal health crisis in the US is that not every woman has equitable access to maternity care. More than 5 million women live in maternal care deserts, counties with low access to maternal care in the US. Several other factors at individual, community, and systemic levels of the socio-ecological model affect maternal health. Personal factors like income, housing, and personal beliefs can affect a mother’s access to healthcare. At the community level, it is availability or accessibility to services, and on the systemic level, it is the number of policies aimed at maternal health. The study’s findings reveal that mothers with income greater than $90,000, government insurance, survivors of partner abuse, or have depression in states with high women’s representation in the state legislature are more likely to use prenatal care than mothers with the same conditions in states with low women’s representation in the state legislature. Therefore, under certain situations, the high representation of women in state legislature affects prenatal healthcare utilization, particularly the vulnerable population.

INDEX WORDS: Maternal health, Women’s representation, State legislature, Prenatal healthcare utilization, Prenatal healthcare services, Gender equity, Adverse maternal health outcomes.
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the Requirements for the Degree

DOCTOR OF PUBLIC HEALTH

STATESBORO, GEORGIA
ASSESSING THE INFLUENCE OF GENDER EQUITY IN THE US STATE LEGISLATURES ON PRENATAL HEALTHCARE UTILIZATION

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Electronic Version Approved:
May 2023
DEDICATION
This work is dedicated to my parents (Mr. VK Joshi and Mrs. Beena Joshi) and my sister.
ACKNOWLEDGMENTS

Words fall short of expressing my gratitude to my professor and committee chair, Dr. Tilicia Mayo-Gamble. Her invaluable feedback and patience made this work possible. She always showed more confidence in me than I had in myself, which was my biggest strength in completing my research work. Her belief in me has kept my spirits and motivation high. I am thankful to Dr. Bettye Apenteng for guiding me throughout my dissertation. Her insightful feedback and constant support during my most challenging times have made this research possible. I am also very grateful to Dr. Samuel Opoku. He was my supervisor for three years and has supported me professionally and academically. His valuable feedback, constant support, and encouragement helped me think critically throughout my research. Additionally, this endeavor would not have been possible without the generous support of Dr. Joseph Telfair. His experience, expertise, and knowledge have helped enrich the topics discussed in this research.

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I am grateful to my parents, sister, and Saanvi for showing their support and love throughout my research. Without the support of my family, this journey would not have been possible. I thank Dr. Prachi Mehta and Ms. Rima Pai for their data-related help, moral support, and feedback sessions.

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CHAPTER 1
INTRODUCTION

Purpose of the Study

In 2020, the United States (US) had the highest maternal mortality rates among high-income countries (Gunja, 2022). What is more concerning is that the maternal mortality rates in the US are still on the rise, as shown in Figure 1 (Hoyert, 2022). Seven hundred women die each year due to pregnancy-related complications. Of these seven hundred deaths, 31% occur during pregnancy, 36% during delivery and after, and 33% occur within a week to a year of delivery (CDC, 2019). Pregnancy is a period of extreme physical and emotional transformation for a mother. These changes are expected but become critical in pregnancy-related complications or mortality.

Figure 1

Country-Wise Maternal Mortality Trends from 2018 to 2020

The Centers for Disease Control (CDC) suggests that three out of five pregnancy-related deaths are preventable (CDC, 2019). Timely diagnosis, quality care, and recognizing early warning signs can save lives and prevent two-thirds of pregnancy-related deaths (CDC, 2020). According to the experts, early initiation of prenatal care and continuous monitoring of mothers' health throughout pregnancy can
significantly reduce the risk of pregnancy-related deaths and complications (CDC, 2019). Prenatal care is the care a mother seeks during pregnancy (NIH, 2017). A report by National Vital Statistics highlights that in 2016, 77.1% of mothers in the US initiated prenatal care services in their first trimester; 4.6% in their third trimester; 1.6% received no services at all; and 15% of mothers received inadequate prenatal care services (Osterman, 2018). Therefore, it was imperative to evaluate the factors that impact the use of prenatal care services among pregnant women in the United States.

**Figure 2**

*Initiation of Prenatal Care among Pregnant Women*

Several factors influence prenatal healthcare utilization, including individual, interpersonal, community, organizational, and policy. A study conducted in sub-Saharan Africa concludes that individual and community-level factors such as empowering women and improving access to care will likely increase healthcare service utilization among women during pregnancy (Tekelab, 2019). Policies are the core of the healthcare system and largely influence its geographic distribution, workforce distribution, financing of maternity services, and accessibility to maternal health services. Thus, policies play an essential role in influencing the utilization of healthcare services (National Academies of Sciences, Engineering, and Medicine, 2020). According to a study in Nigeria, the lack of availability and accessibility to care during pregnancy is the leading cause of maternal deaths in Nigeria, which has been ignored by the policymakers in the country (Okonofua, 2017). Therefore, the study highlights the
importance of including the voices of the target population to identify remediation in the policies on maternal health. Reportedly, the United States has performed poorly in preventing pregnancy-related deaths compared to other developed nations (MHTF, 2020). The US failed to meet initial national goals for reducing maternal mortality rates and did not meet the Healthy People 2020 goal of reducing maternal mortality by 10% between 2007 and 2020 (Healthy People, 2020). According to a report, among 11 developed nations, the United States has the highest maternal mortality rates and a relative undersupply of maternity care providers (Melillo, 2020; Kassebaum, 2016). However, maternal mortality is just the tip of the iceberg; the mass burden of maternal morbidities significantly impacts maternal health. To assess the hypothesis that women have a greater political will than men to improve maternal health was assessed through the influence of women's representation in the state legislature on factors contributing to the deteriorating maternal health in the US. In 2020, 29.3% of state legislators in the United States were women, 26.4% held state senate seats, and 30.3% held state house or assembly seats. Nevada, Colorado, and Oregon have the highest women representation in state legislature occupying 54%, 44%, and 42.2% seats, respectively. The maternal mortality rate in the three states was 15%, 21.9%, and 19.5%, respectively (Rankings, 2020). This study will explore in detail if these trends are causally related or if there is a significant association between women's representation in legislature and women's health outcomes.

Statement Of the Problem

As of 1st October 2019, the global representation of women in the parliament was approximately 25% (IPU, 2019). However, in 2019, the representation of women in the United States Congress was 23.6% (CAWP, 2019), which was below the global average.

Several studies have attempted to answer why women's representation in politics is vital to address the concerns regarding maternal health. A growing body of work suggests that women in policymaking play an instrumental role in goal setting and network building, leading to greater policy focus on reducing women's health issues (Asiedu et al., 2018; Bhalotra et al., 2014; Clayton et al., 2018; Lippman et al., 2019; Miller et al., 2008).
Low, inadequate, or lack of prenatal care are risk factors for poor maternal health outcomes (Institute of Medicine, 1985). Early prenatal care initiation among pregnant women in the United States can significantly reduce maternal mortality rates (CDC, 2019). The social determinants of health, including policies, are the critical drivers for encouraging the utilization of prenatal care services among women during pregnancy. The role of knowledge, power, and gender is crucial to policymaking. However, gender disparity in political representation remains a reality despite the widespread drive for equal representation of women in politics (Celis, 2018). In the United States (US), women account for 19% of Congress, 25% of state legislatures, 12% of governors, and 19% of mayors. Women of color constitute 6% of Congress, 5% of state legislatures, 4% of governors, and 6% of mayors (Rhode, 2017). The underrepresentation of women in politics has led to grave consequences on laws, policies, and guidelines on women's mental, physical, and social well-being and 'other' genders. Women's lack of political representation has ignored several aspects of their social, economic, and health rights, thereby impacting their overall utilization of healthcare services (Aroussi, 2015). Therefore, this study will help us identify the significance of including voices in policymaking to overcome the challenges posed by the social determinants of health and improve health outcomes. Factors for low prenatal care utilization have been considerably analyzed at an individual level (Boerleider et al., 2013; Lia-Hoagberg et al., 1990), interpersonal level (Jamieson, 2018), community level (Wong et al., 1987; Jones et al., 2017)), organizational level (Mattocks et al., 2019), and policy levels (Braveman, 2000). Though the first four levels were studied extensively, limited studies have explored the policy-level factors impacting prenatal care utilization. This study can be instrumental in filling up this gap in literature.

Objectives of the Study

The study aims to identify the role of women legislatures on prenatal healthcare service utilization among pregnant women. Specific objectives of the study are:

1. To assess the influence of women in legislature on factors impacting prenatal healthcare service utilization.
2. Identify the population Characteristics of the States with a higher percentage of women in state legislature compared to states with a lower percentage of women in the state legislature.

3. Assess the effect of population characteristics on prenatal care utilization.

4. Identify the barriers and facilitators to prenatal healthcare utilization.

These objectives align with the United Nations (UN) Sustainable Development Goals (SDGs) for 2030, which all UN members adopted in 2015. SDGs are the blueprint for peace and prosperity for people around the world. One of these goals focuses on achieving gender equality in all spheres of the public domain by 2030. The SDGs offer an opportunity to promote gender inclusivity and advance strategies to reduce gender disparity to address gender-specific health issues. Gender inequality severely impacts health outcomes and prenatal care for women and gender minorities (Gupta, 2019). Factors such as young maternal age, low education, financial dissatisfaction, unplanned pregnancy, depression, and domestic violence are associated with poor maternal health outcomes (Bai et al., 2018), whereas utilizing prenatal care services and good social support are responsible for positive maternal health outcomes (Kolu, 2014). According to World Health Organization (WHO), women live longer than men but are not necessarily healthy. One major contributor to women's ill health is a complication during childbirth that occurs mainly due to negligence in care, whereas skilled birth attendants with supportive obstetric emergency care services are instrumental in reducing childbirth health risks among women (Koblinsky, 2012). The two common pregnancy complications include hypertensive disorders and postpartum hemorrhage. There has been an increase in cases of two pregnancy complications in the US. In 2014, the rate of hypertensive deliveries was 900, and the rate of postpartum hemorrhage was 39 (CDC, 2019); despite the increase in the rates of childbirth complications, efforts to improve the conditions of prenatal care are limited, particularly in the medically underserved areas. Since 2010 hundreds of medically underserved hospitals have closed, and 20% are at risk of closing. Less than half of the medically underserved hospitals have practicing obstetricians and gynecologists (Lewis, 2019). Studies indicate a close association between women in politics and government spending on maternal and infant mortality (Edwin, 2018).
Research Questions

Poor policies on historically marginalized populations, including women, are often the result of poor representation of the population in the contemporary democratic policymaking process (Weldon, 2002). In 2019, female representation in Congress was only 23.7% compared to the global average of 25% (Represent Women, 2021). A recent study in Brazil revealed that an increase in the political representation of females is positively associated with improved prenatal care services such as skilled attendance at birth, improved nutrition status, and timely vaccinations (Hessel et al., 2020). Therefore, given the underrepresentation of females in the US Congress and considering the positive impact of female representation on prenatal care, this study is guided by two research questions, each followed by a sub-question:

1. What is the difference in using prenatal care services during pregnancy among US women living in states with high female legislative representation vs. pregnant women living in states with low female legislative representation?
   a. What is the association between the use of prenatal care services during pregnancy and the external environment (female legislative representation)?

2. What are the population characteristics (predisposing, enabling, and need factors) associated with using prenatal care services among US women during pregnancy?
   a. What is the difference between population characteristics (predisposing, enabling, and need factors) among pregnant women living in states with high female legislative representation vs. pregnant women living in states with low female legislative representation?

The first research question measures the association of female representation in the state legislature with the use of prenatal care services. The external environment is the construct that determines the association between females in legislature and the use of prenatal care. The number of female representatives in the state legislature for each state in the US was used as a variable to determine the external environment. States with representation greater than equal to 25% were considered high-
representation states, and less than 25% were considered low-representation states. The rationale for using 25% as a base is that the global average of female representation in the parliaments is 25% (IPU, 2019). The second research question measures the difference in the population characteristics of women using prenatal care services in states with high female representation compared to states with low female representation. This question measures which population characteristics are dominant in prenatal care services. The constructs used to measure the population characteristics include predisposing, enabling, and need factors. Variables such as age, race, and education measured predisposing factors. Income, insurance coverage, and family support measured enabling factors. The severity of underlying morbidity measured need factors. Responses from Pregnancy Risk Assessment Monitoring System (PRAMS) Phase 8 Core questionnaire were collected to measure each variable. PRAMS is a surveillance project of the CDC. It collects data on maternal experiences and attitudes before, during, and after pregnancy. PRAMS has two questionnaires: The core questionnaire and the Standard questionnaire. The core questionnaire is compulsory for every state, but the standard questionnaire is optional. Therefore, for this study, responses from the core questionnaire were considered.

PRAMS database provided the overall health status of women during pregnancy. This study was an observational retrospective cohort study. It was a quantitative study that used data from the secondary source, the PRAMS database. The geographic location of the study included all states in the United States that participated in the PRAMS survey from 2016 to 2019. The comparison was between states with high women representation and those with low representation in state legislatures. This study considered responses only from the PRAMS phase 8 core questionnaire. States were divided into two groups for analysis and interpretation based on women's representation in the state legislature. The States with greater than equal to 25% of women representation in the state legislature were Group 1, and states with less than 25% of women representation in the state legislature were Group 2. For descriptive statistics, frequencies and percentages measured population characteristics in each group. For inferential statistics, logistic regression measured the factors influencing prenatal care utilization. Logistic regression helps determine the association between the predictor and the outcome variable. In this study, the use of
prenatal care services is the outcome variable, women's representation in the state legislature is the predictor variable, and population characteristics are the moderating variables. The predictor variable was selected based on a recent global study, which revealed that with the increase in women's political participation, maternal mortality rates declined by 9% to 12%. There was also a 6% to 12% increase in prenatal care utilization and an 8% to 10% increase in skilled birth attendance rates (Bhalotra et al., 2020).

The inclusion criteria for this study were only to include States that participated in the PRAMS survey. The study included responses from mothers who have recently given live birth. PRAMS defines 'recent live birth' as delivery within one year of the data collection, which spans from 2016 to 2019. The study included only those mothers who participated in the PRAMS survey. The study measured the outcome based on PRAMS variables. The study included both telephonic and mail responses from the PRAMS database.

The four exclusion criteria in this study were the variables not included in the PRAMS survey. The study excluded mothers who did not participate in the PRAMS survey. This study also excluded the states that did not participate in the survey. Lastly, the study excluded the perceptions, attitudes, and experiences of fathers or partners of mothers who participated in the survey.

Figure 3

Study Design
Table 1
Operationalization of Variables

<table>
<thead>
<tr>
<th>Construct</th>
<th>Variables</th>
<th>Questions</th>
<th>Response Type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predictor Variable</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External Environment</td>
<td>Female representation in state legislature</td>
<td>States with female representation &lt;25% vs. &gt;=25%</td>
<td>Percentage</td>
</tr>
<tr>
<td><strong>Population Characteristics</strong></td>
<td>(PRAMS Core questionnaire, phase 8, 2016-2019)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Predisposing</td>
<td>Age, Race, Education</td>
<td>Age</td>
<td>Categorical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Race</td>
<td>Categorical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Education</td>
<td>Categorical</td>
</tr>
<tr>
<td>Enabling</td>
<td>Income, insurance coverage, Family support</td>
<td>Question 9 (Type of Insurance before pregnancy)</td>
<td>Categorical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Question 50 (Total household income)</td>
<td>Categorical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Question 28 (physical abuse before pregnancy)</td>
<td>Categorical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Question 29 (physical abuse during pregnancy)</td>
<td>Categorical</td>
</tr>
<tr>
<td>Need</td>
<td>Severity of underlying morbidity</td>
<td>Question 4 (Prior health condition)</td>
<td>Categorical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Question 18 (gestational morbidity)</td>
<td>Categorical</td>
</tr>
<tr>
<td><strong>Outcome Variable</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Service Use</td>
<td>Use of prenatal care</td>
<td>Question 10.1 (During your recent pregnancy did you used prenatal care)</td>
<td>Categorical</td>
</tr>
</tbody>
</table>
Factors impacting the use of prenatal care services have been studied from a myriad of perspectives, using socioecological and Anderson health utilization models (Tesfaye et al., 2018; Heaman et al., 2015; Beeckman et al., 2012; Hogan et al., 2012), but limited studies have identified the gender disparity in state legislatures as one of the critical factors in promoting the use of prenatal care services. A recent study shows a significant effect of female political representation on policy choices (Baskara, 2018). Therefore, this study is pertinent in filling the literature gap on the influence of gender equity in state legislatures on prenatal care utilization.

Limitations of the Study

The researcher should know some important considerations when using secondary data in social science research. Familiarity with the data is one of the limitations of using secondary data. Since the researcher collects the data, the researcher must become familiar with the data set, including how it was collected and stratified and what weights to use for analysis. Therefore, the primary data collection method helps mitigate the misinterpretation of the data due to a lack of familiarity with the data. Therefore, this study established familiarity with the data by following the codebook, identifying the weighing variables in the dataset, and understanding the population characteristics through descriptive statistics.

PRAMS questionnaire includes questions on mothers' past experiences with their families and partners. Therefore, there is a high probability of recall bias among interviewees.

Another critical limitation of the study was that the purpose of data collection was different from the objectives of this study. Therefore, the variables included in this study were those in the PRAMS Survey. Hence, there could be information bias.

Delimitation

Given the study's novelty, little literature is available studying the same variables as mentioned. In the future, this study can directly assess the influence of women in legislature on the other variables. The study's scope is also limited to two groups with the highest and lowest percentage of female legislators, which leaves a broad scope for the middle representation group.
Assumptions

The study highlights the significance of equality in gender representation in legislature on the health outcomes of the marginalized population, which are the women in this case. Though the broad framework of the study determines the impact and role of women legislators on the use of prenatal health care services among women during pregnancy, the study is not void of assumptions. The study assumes that all the women legislators have strong feminist ideologies and advocates for improving women's condition during pregnancy. Furthermore, the study assumes that party affiliation, ideologies, and personal beliefs do not play any role in motivating and influencing women legislators in drafting policies on maternal health. However, the study considers these strong assumptions to distort the study's results. Therefore, the data was adjusted for these confounding factors to mitigate the effect of these assumptions.

Definition of Terms

Prenatal Health Care: Prenatal care is the health care women can access while pregnant, including early and regular prenatal care (Womenshealth, 2019).

Political Representation: It refers to presenting the opinions, voices, and perspectives of the citizens in the process of making public policies (Pitkin H., 1967).

Maternal Mortality: Maternal mortality refers to deaths due to complications during pregnancy or childbirth (UNICEF, 2019).

Maternal Morbidity: "Maternal Morbidity is an overarching term that refers to any physical or mental illness or disability directly related to pregnancy and childbirth. These are not necessarily life-threatening but can have a significant impact on the quality of life" (Koblinsky, 2012)

Healthcare Service Utilization: The term refers to seeking healthcare services by an individual to prevent and cure morbidities and health problems to promote and maintain health and well-being (Carrasquillo, 2013).
Skilled Birth Attendance: The process of birthing a child with the help of a midwife, physician, obstetrician, nurse, or other health care professional who provides essential and emergency care services to the mother and baby during childbirth (Jhpiego, 2015).

Descriptive Statistics: A descriptive statistic is a summary that quantitatively describes or summarizes features from a collection of information. Standard measures used in descriptive statistics include measures of central tendencies like mean, median, and mode and measures of variance like standard deviation.

Inferential Statistics: Inferential statistics use a random sample of data taken from a population to describe and make inferences about the population.

Summary

Measuring the impact of women's representation in positions of power on women's health outcomes is a response to the existing gap in the literature. As discussed in this chapter, health experts have identified the importance of gender equality in policymaking. This study is an extension in support of that argument. The study supports the argument by exploring the impact of women's role in policymaking on health outcomes.
CHAPTER 2
LITERATURE REVIEW

This chapter contains four sections. The first section defines prenatal care and factors affecting prenatal Care Utilization; The second section explains the role of women legislators and their influence in impacting women's health policies. The third section assesses the influence of women's representation on maternal health outcomes at a global level. Finally, the fourth section explains the theoretical and analytical framework to measure prenatal health care utilization. Constructs from the Anderson healthcare utilization model will be adapted to analyze the variables.

Prenatal Healthcare Utilization

A healthy pregnancy is a foundation to promote healthy birth, and getting early and regular prenatal care improves the chances of a healthy pregnancy and fewer complications (NIH, 2017). Therefore, prenatal care is a type of preventive healthcare that includes regular check-ups and monitoring of high blood pressure and diabetes among high-risk patients. Several social determinants of prenatal healthcare utilization include racial disparity, unemployment, and poverty (Blakeney, 2019). Much work has documented racial disparities during prenatal healthcare utilization, which are widely persistent in the US (Howell, 2018). Previous research has found that racial disparity in prenatal healthcare utilization is primarily the result of social determinants of health, including social circumstances, access to medical care, and behavioral patterns (Bryant, 2010). It is evident from the literature that unemployment harms maternal health outcomes, including entry to prenatal care and birth weight (Fisher, 1985; Catalano, 2011; Neumayer, 2004). The role of social circumstances in prenatal health care utilization is vital. There is growing evidence of literature suggesting that poverty and stress are associated with adverse maternal health outcomes such as preterm birth (Michael C Lu, 2004; Calvin J Hobel, 2008). Black and American Indian/Alaska Native women are most susceptible to pregnancy-related stressors (Michael C Lu, 2004). Various studies have extensively explored the biological basis of stressors, and the role of corticotrophin-releasing hormone (CRH) as a potential mediator is evident in the literature. Though some studies suggest that high CRH leads to preterm deliveries, however, the findings are not consistent (Erickson, 2001;
Fadalti, 2000; Theresa L Osypuk, 2008; Lynn Rosenberg, 2002; Kramer, 2006; WP Frisbie, 1997; Stotland, 2006; Simon, 2006; Tenkku, 2009). Therefore, given the social, economic, and psychological factors impacting women's health during pregnancy, it is critical to have women-centric policies and services on prenatal health care. In a recent study, Ireland adopted a women-centric approach in policies and services for maternity care. The results revealed that mid-wife-led models significantly improved women's choices during pregnancy (Hunter et al., 2017).

Low prenatal health care utilization and poor quality of care are the key contributors to maternal mortality, and three-quarters of deaths are during labor, birth, and twenty-four hours postpartum (WHO, 2016). Studies indicate that managing these complications is possible with person-centered maternity care, including skilled attendance and health facilities for birthing (Khan et al., 2006; Say et al., 2014). Literature suggests that person-centered care significantly reduces maternal mortality and pregnancy-related complications through women-centric policies (Graham et al., 2013; Montagu et al., 2017; UNICEF, 2017).

In conclusion, prenatal care utilization is a significant factor in reducing. However, several factors impact the use of prenatal health care services among pregnant women. The following section discusses these factors in detail.

**Socioecological approach to prenatal health care utilization**

Other observational studies highlight that female legislators are more likely to pass bills in Congress dealing with issues on women (Thomas, 1991; Schwindt-Bayer, 2006). Therefore, adequate representation of women in legislature may result in an effective prenatal care utilization policy. Considering other factors, the socioecological approach has been used extensively in many quantitative studies to identify factors associated with the use of prenatal care services in the United States (Feijen-de Jong et al., 2011; Phillippi, 2009; Blackwell, 2002; Daniels et al., 2006; Reitmanova & Gustafson, 2007; Shaffer, 2002). Using a socioecological approach, a detailed evaluation of the factors impacting the use of prenatal care among pregnant women in the United States are as follows:
Individual factors: Some factors that can impact the use of prenatal care services among pregnant women may include race, age, education, income, attitudes, and personal beliefs. Current literature highlights the existence of racial disparity in prenatal care service utilization. A study conducted in the 1990s concluded that African American women are less likely to get good prenatal care than White women (Misra & Guyer, 1998). The racial and ethnic disparity in the use of prenatal health care services is the result of historic inequities, which are associated with health outcomes. African American, Hispanic, and Native American women are at risk for late prenatal care service, but African American women are significantly at higher risk for maternal deaths (Gadson et al., 2017). These disparities are rooted in health behavior, physical and social environment, and access to quality healthcare services (Bryant et al., 2010). At the individual level, age is an essential factor determining prenatal care utilization among pregnant women. According to a study, younger women are more likely to enter late or no prenatal care utilization compared to older women. The study concluded that age under 14 is highly associated with late or no prenatal care utilization, whereas ages between 15-19 are associated with increased complication risk and adverse health outcomes. (Blakeney et al., 2019). Education and income are essential factors in determining the use of prenatal care services. The World Health Organization (WHO) recommends at least four prenatal care visits throughout pregnancy. A study conducted in Zambia revealed that the high education level of mothers is associated with at least four prenatal care visits compared to mothers with low or no education (Muyunda et al., 2016). Income plays a critical role in access to and quality of care. Evidence suggests that women with low income have difficulty not only in accessing care but also in finding physicians who are willing to care for them (Aved et al., 1993). Many studies have associated poverty with an increased risk of complications during pregnancy (Parker, 1996; Kiernan, 1997; Larson, 2007). Attitudes and personal beliefs of women can extensively influence their use of prenatal care services. Women's attitudes and fear of childbirth may influence their prenatal care and birth outcomes (Haines et al., 2012).

Interpersonal Factors: Family and partner support are critical for pregnant women during the prenatal phase. Family is a basic social unit, and it significantly influences the choices women make
during pregnancy, including the use of health services (Morrissey, 2008). Father's involvement during pregnancy positively impacts a child's development (Martin et al., 2007). Involvement of partners during the prenatal phase not only supports the mothers psychologically but also helps improve their access to care and prenatal health service use by sharing the financial cost. Women who are not able to work or are not covered can obtain insurance through their spouse's insurance benefits plans (Pamuk et al., 1987).

Community Factors: Prenatal period is critical, and women's need for access to health services increases during this period. Therefore, a lack of resources within the community can delay access to prenatal care, decreases the rate of prenatal visits, and increases the risk of complications among women (NIH, n.d.).

Organizational Factors: Barriers to prenatal care are both individual and structural. The structural dimensions include care setting, wait time, lack of insurance, and lack of provider support (Phillippi, 2009). Women's experience during prenatal visits is essential to seeking prenatal care. Many studies have recorded women's experiences with the providers during prenatal care visits (Fiscella, 1995; Carroll et al., 2001; Novick, 2004). Studies show that after the first visit, physicians do not spend quality time with women during their prenatal visits, and women are referred to other childbirth classes, which are on different sites or not covered by insurance, and therefore, women tend to drop from the prenatal care program (Rising, 1998; Gagnon, 2000). According to a study, long waits, rushed visits, and women's perception of prenatal care as mechanistic and harsh act as a deterrent to seeking prenatal Care (Novick, 2009).

Policy Factors: Programs and policies are the best way to address structural barriers to care (Osterman & Martin, 2018). It is vital to include the representation of the target population within the policymaking process. In 1993, Schneider and Ingram established the basic concepts of social construction and policy design theory. The theory connects the social construction of the target population with policy design (Pierce et al., 2014). The theory helps understand why public policies fail to meet the objective of serving the public (Schneider & Ingram, 1993). Schneider and Ingram further argue that target populations are ignored in formulating public policies. In other words, the representation of the
target population in policy design will result in effective public policy. Extending this notion to prenatal care policies, a huge gender gap exists in legislature in the United States. In 2019, only 23.7% of the Congress was composed of women in the United States, compared to the global average of 24.5% (IPU, 2019). Therefore, the underrepresentation of women in legislature may have a moderating effect on prenatal health outcomes.

Women's Representation in Politics

Women's low participation rates in politics are a problem in gender stratification (Pamela Paxton, 2003). However, women's health-related policies need more female voices. Studies suggest that women's involvement in public life and politics has steadily declined across many countries (Sylvia Bawa, 2013).

There has been growing interest among researchers in understanding the role of women's representation in population health. A study by Macmillan et al. focuses on women's status and its implications for population health by focusing on their position in political systems. Caldwell observed that the 1928 Donoughmore Commission in Ceylon (Now Sri Lanka) responded to "the near stagnation in maternal mortality decline" by advocating for women's representation in politics and placing health services high on the political agenda at each election (Caldwell, 1986). Although the extension of this advocacy was the first wave of improvement in women's political status. There have been continuous improvements in women's political representation through efforts to increase the share of legislators who are women (Kathleen M. Fallon, 2012; Lane Kenworthy, 1999; Paxton, 1997). However, much debate has been on women's association in politics and its impact on population health, particularly women.

However, according to some studies, the result has been positive (Homan, 2017; Amm Quamruzzaman, 2016; Liam Swiss, 2012), whereas others have been more equivocal (Sonia Bhalotra, 2014; Ulrike Boehmer, 1996; Lena Wängnerud, 2011).

The notion behind promoting women's representation in politics is a link between descriptive and substantive representation. Descriptive representation focuses on the compositional similarity between representatives and those represented and the degree to which political bodies reflect the diversity within the concerned population regarding demographic characteristics (Pitkin H. F., 1967). Substantive
representation focuses on what policymakers do—that is, the extent to which politicians represent the interests of their constituents (Wängnerud, 2009). The two types of representation are linked to the degree that legislators may be more likely or better able to represent interests that arise from shared or similar experiences (Mansbridge, 1999). Concerning the gender of politicians, an argument emerges that the political presence of women can be salient in breaking gender differences and would be instrumental in improving the experiences of other women in different spheres of their lives (Phillips, 1995).

*Impact of women in legislature globally: Socioecological approach*

Socioecological frameworks at different levels can measure the impact of women's political representation, including individual, interpersonal, community, organizational, and policy.

**Individual:** Women's representation in politics impacts maternal mortality and morbidities. The rise in women's representation in the parliament in developing countries led to a nine to Twelve percent decline in maternal mortality rates (Bhalotra, 2020). The study suggests that a rise in women's representation in low-income countries increases the percentage of girls' education, which is associated with lower maternal mortality rates (Sonia R. Bhalotra, 2020). Evidence also suggests that the inclusion of women in parliament increased the development assistance for maternal health from international donors (Dieleman, 2016).

**Interpersonal:** Increasing women's political representation in some countries, including Rwanda, Spain, Sweden, and Pakistan, provides significant visibility to women's rights, particularly violence against women within families (Theo-Ben, 2012). Intimate partner violence (IPV) against women has been associated with patriarchal prerogatives and is accepted as a norm in many cultures (Heise, 1998). IPV during pregnancy is a severe public health concern. Some adverse health outcomes of IPV on maternal health include insufficient or inconsistent prenatal care, poor nutrition, inadequate weight gain, substance use, and increased prevalence of depression (Alhusen, 2015).

**Community:** Several studies indicate a positive association between a rise in women's political representation and improved maternal health outcomes in communities. A study in Vietnam indicates a
strong association between women empowerment and a higher rate of antenatal care utilization, which improved maternal and child health within communities (Myriam de Loenzien, 2021).

Organization: There is no substantive literature on the impact of women in legislature on the accessibility and availability of healthcare. However, one study indicates that women's empowerment increases access to healthcare among women facing domestic violence (Mahapatro, 2016). There has been a consensus among non-governmental organizations and feminist health researchers that there is a difference in the treatment of men and women by healthcare providers. Equal representation of women in places of power can improve gender-sensitive healthcare (Gijsbers, 1996).

Policies: According to an estimate made in the study, with every increase of 5 to 6 percentage points in the share of legislative seats by women, there is a 12% decline in the maternal mortality ratio and formulation of more gender-sensitive laws (Bhalotra, 2020).

*Schneider and Ingram's theory of social construction*

The pivotal theory of social construction of the target population helps in understanding why public policies fail to meet the objective of serving the public (Schneider, 1993). Schneider and Ingram further argue that target populations have often been overlooked in the formulation of public policies. In 1993, Schneider and Ingram articulated the theory of social construction. The theory connects the social construction of the target population with policy design (Pierce et al., 2014). In other words, the representation of the target population in policy design will result in effective public policy.
Schneider and Ingram divided the population into four categories based on power and social construction. Social construction is the people created by politics, religion, culture, history, and socialization. The theory suggests that the population that is a part of the positively advantaged group holds a more privileged position in policy design, and the population that is a part of the negative deviant group holds the weakest position in policy design. Lack of representation in policymaking weakens a population’s position in the policy design. Therefore, extending this notion to prenatal care policies, a considerable gender gap exists in legislature in the United States. Therefore, the underrepresentation of women in legislature may have a moderating effect on prenatal health outcomes.

**Social epidemiology**

The field of social epidemiology recognizes the importance and role of political contexts in social determinants of health (Hessel, 2020). Existing literature suggests that female politicians and spending preferences related to issues in health promotion are closely associated (Bratton, 2002). A study concluded that including women in politics results in a 1% increase in state spending on population health (Bolzendahl, 2007). Epidemiological research also confirms the importance of government spending on population health (Beckfield, 2016). Future improvement in population health will be achieved by
promoting health equity, and reducing gender parity in politics will significantly strengthen health equity (Pauly, 2013).

Several epidemiological studies suggest that gender inequities in health outcomes are the direct result of the existing inequalities between men and women in some critical areas of social determinants of health, such as limited access to employment opportunities, gendered pay gaps, and segregation (Prus, 2011; Dasha Cherepanov, 2010; Kakoli Roy, 2008). Though rarely, many, many epidemiological types of research focus on the importance of microsocial determinants of health, such as political power, state protection policies, the welfare state, labor market policies, and the interplay of power relations within the societal structures (O'Campo, 2012; Putnam, 2008; CSDH, 2008; O'Campo, 1998). These power relations generate social inequalities in health that are gaining much attention from researchers, including the policies that impact them (MMWR, 2011). Growing evidence in social epidemiology and feminist discourse suggests that political structural power is not void of gender inequalities (O'Campo, 2012; Einspahr, 2010) and has a considerable gender inclusivity gap in the United States and worldwide. Globally, only 25% of women are in the position of making or influencing laws or policies as of 2020 (UN Women, 2020). In the United States, only 23.6% of women are in Congress as of 2020, which is lower than the global average (CAWP, 2020). Therefore, this study will focus on the adverse maternal and child health outcomes that result from the lack of gender inequality in the political system in the United States.

The measure of prenatal care utilization

Considering that prenatal care is essential to prevent pregnancy complications such as blood pressure, underlying morbidities like gestational diabetes, and fetus-related complications, prenatal care utilization rates are low in the US (NIH, 2017). There are several determinants for low prenatal care utilization rates. Researchers have extensively used the socioecological approach and Anderson health utilization models to identify the mediating and moderating factors associated with prenatal care utilization (Tesfaye et al., 2018; Heaman et al., 2015; Beeckman et al., 2012; Hogan et al., 2012;
Blakeney et al., 2019; Johnson et al., 2007; Roozbeh et al., 2016). This study uses the adapted Anderson health utilization model to analyze the results.

**Figure 5**

*The Conceptual model Using Andersen Healthcare Utilization Model*

Given the constructs and variables applied to measure the research questions, this study will be conducted under the guiding framework of Andersen’s healthcare utilization model to determine the association between the predictor and the outcome variable. Ronald M. Anderson initially developed the model in the 1960s and, since then, has gone through four phases of transformation. The framework used for this study is the model developed in the fourth phase. The model assumes that an individual’s access to and use of health services is a function of three characteristics: predisposing, enabling, and need factors. The Andersen healthcare utilization model has been previously used globally in many developed and disparate settings to assess the factors impacting the use of healthcare services among pregnant women. A study conducted in the Kersa district of Ethiopia identified that environmental factors and enabling factors impede access to antenatal care among women (Tesfaye et al., 2018). Another study in Nepal explored socio-demographic factors impacting the use of antenatal care services among women (Neupane et al., 2020). A study was conducted in Netherlands and Belgium using predisposing and enabling constructs of the Anderson health utilization model to determine the factors stimulating the use
of antenatal care. The study concluded that predisposing and pregnancy-related factors are most important in influencing the content and service delivery timings for antenatal care (Vanden Broeck et al., 2016). According to a systematic review, the factors impacting prenatal care utilization rates in high-income countries using the Andersen healthcare utilization model. The study concluded that population characteristics, particularly predisposing and enabling factors, play an essential role in encouraging the use of prenatal care services (Feijen-de Jong et al., 2011). However, one of the most debatable limitations of this model is that it views healthcare utilization as dichotomous (present or not present) and not as a function of several moderating and mediating factors (Harris et al., 2009). This study applied the Andersen healthcare model to determine the influence of external environment and population characteristics on the use of prenatal care services. Figure 1 illustrates the study variables under each model construct.

**Summary**

The chapter summarizes the existing literature focusing on the dimensions of quality of life and the impact of women’s representation in the legislature on the quality of life of pregnant women. The following chapters will focus on the methodology to measure the impact of women’s representation in politics on prenatal healthcare utilization among pregnant women. The following three chapters will focus on methodology, results, and discussion.
CHAPTER 3

METHODS

Phase I of the study focuses on collecting data on the utilization of healthcare services during pregnancy; Phase II focuses on capturing mothers' experiences during pregnancy in states with higher female representation in legislature compared to states with lower female representation in legislature. This chapter describes the quantitative study design used in this study. This section will include the following topics: Purpose of the study, study design, justification, study population and sample, recruitment, eligibility criteria, instrumentation, data collection procedure, and data analyses.

Purpose of the Study

This study will follow an observational retrospective cohort design that aims to explore the impact of female representation in legislature on prenatal health care utilization of women during pregnancy. Prenatal healthcare utilization during pregnancy is significantly associated with positive health outcomes among pregnant women (Jie Li, 2012). Therefore, this study aims to explore the impact of women's representation in legislature on prenatal health utilization among pregnant women. Lack of willingness among women to participate in politics and racial discrimination can also be the reason for the need for more women's representation in politics. Therefore, the discourse can be expanded to the intersectionality of race and gender. Though the scope of our study is limited to understanding the impact of women's representation on prenatal healthcare utilization, future research can also focus on the existing intersectionality of gender and race. The target population includes women who have participated in the PRAMS survey. The rationale for selecting PRAMS survey data is that it covers 81% of all childbirths in the US (CDC, 2019). Studies show that the PRAMS survey is reliable and valid, with a sensitivity of 82% (Ahluwalia, 2013). State policies are an essential factor that impacts maternal health outcomes. Policies are critical for The Patient Protection and Affordable Care Act coverages, planned parenthood funding, contraception access, and various health services (Hawkins, 2020). All these factors are imperative in
determining women's choices during pregnancy. Therefore, the study also aims to look closely into the factors that impact women's choices to use prenatal health care services.

The study followed an observational retrospective cohort design. A quantitative analysis of the PRAMS data was conducted. Data was collected from Phase 8 of the PRAMS core questionnaire for the years 2016-2019 for all the participating states, providing a broad perspective on the population characteristics in states with higher representation of women in legislature than states with a lower representation of women in legislature.

**Measures**

The Independent variable in this study is women's representation in legislature, and the dependent variable includes prenatal health care service utilization. Other interacting variables include age, race, education, Income, insurance, family support, and morbidities. The variables were measured based on the PRAMS phase eight core questionnaire survey results. PRAMS is the only surveillance system providing data about pregnancy and the first few months of post-pregnancy. It is an ongoing, state-based population surveillance system designed to identify groups of women and infants with a high risk of adverse health outcomes.

**Figure 6**

*Quantitative analysis steps*

<table>
<thead>
<tr>
<th>Data:</th>
<th>Organizing Data:</th>
<th>Descriptive Stats:</th>
<th>Inferential Stats:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleanup</td>
<td>Group 1: high female representation</td>
<td>Mean</td>
<td>Logistic Regression</td>
</tr>
<tr>
<td></td>
<td>Group 2: low female representation</td>
<td>Frequency</td>
<td></td>
</tr>
</tbody>
</table>

**Study Design**

Investigating the research question of interest included: 1) collecting the data from PRAMS; 2) Cleanup the data; 3) Divide the data into two groups; the first group includes states with high
representation, and the second group includes states with low representation; 4) For the descriptive
statistics frequency and mean will be used for the categorical variables; 5) for the inferential statistics,
logistics regression will be used to identify the association between the independent variable (Women in
legislature) and dependent variable (prenatal health care service utilization); Figure 1 represents a visual
diagram for the study design.

Why Quantitative Study Design?

This study is a quantitative study, and secondary data was analyzed. The secondary data was
collected from the Pregnancy Risk Assessment Monitoring System (PRAMS) and State annual reports.
The PRAMS data will be used to assess the population characteristics of pregnant women in the States
with high female representation and states with low female representation.

Much of the research in the past has used quantitative study design to assess the use of prenatal
healthcare services among pregnant women (Mazúchová, 2017; (Mulubrhan F. Mogos, 2013);
Shishehgar, 2014; Lagadec, 2018). Some experts view quantitative data as more objective and accurate
because it is collected through a standardized method based on scientific rules and laws (Pole, 2007).
Traditionally, the quantitative method is considered more scientific and rigorous, considering randomized
control trials and systematic reviews as the gold standard (Sackett, 2001). Considering that quantitative
research includes a systematic methods approach to investigate social phenomena using statistical or
numerical data (Watson, 2014). Therefore, the phenomenon under research is easily measurable in the
quantitative research design, apart from being economical and less time-consuming.
The impact of women's representation in politics, the predictor variable, was measured by prenatal health care service utilization, the outcome variable. The variables were analyzed based on the model depicted in Fig. 2. The data was adjusted for interacting variables such as income and age. Prenatal healthcare utilization was measured by question 10, part 1 of the PRAMS phase eight core questionnaire, which asks if the mother has used prenatal care services. The response determined if the utilization of prenatal care services was more in states with higher women representation than in states with lower women representation. Several other interacting variables determine the utilization of prenatal care services, which was analyzed separately using logistic analysis. The logistic analysis also assessed the strength of the association between interacting variables and outcome variables. Therefore, the study's primary focus was to determine the impact of women's representation on prenatal healthcare service utilization. The analytical model was based on Anderson's health utilization model. As discussed in the previous sections, pregnancy is a critical phase for women, and several factors influence their pregnancy.
Therefore, it is crucial to determine how women's political representation impact pregnancy-related factors at the policy level.

Several studies have used Anderson’s health utilization model to understand women's service choices during pregnancy. A study used the Anderson health utilization model to understand the antenatal care service utilization among pregnant women in Ethiopia (Gezahegn, 2018). The study identified key strategies that motivated pregnant women to use antenatal services, including husband's support, pregnancy complications, and income status. These were the variables that we would be using in our study to assess the population characteristics.

A study was conducted using Anderson's health utilization model to identify enabling and predisposing factors impacting the use of prenatal health care among black and white communities (LaVeist et al., 1995). The study results show that black women are more likely to receive less prenatal care than white women. Though race is a variable in this study, it is a critical determinant of prenatal health use.

Another study was conducted to identify the factors impacting the use of antenatal health care services using logistic regression. The findings revealed that income, family support, and pre-existing chronic conditions were the key factors impacting antenatal healthcare services (You, 2019).

**Study population and sample**

The quantitative data was collected from the PRAMS database. The data for women in legislature was collected from the Center for American Women and Politics (CAWP). The average representation of women was considered from 2016 to 2019. The PRAMS data was collected from the CDC and divided into high and low-female representation groups. The highest female representation state is Colorado at 41.25%, and the lowest is Wyoming at 12.78%. The population for the study was the women of reproductive age who had agreed to participate in the PRAMS survey.

**Sampling and recruitment**

PRAMS, the Pregnancy Risk Assessment Monitoring System, is a surveillance project of the Centers for Disease Control and Prevention (CDC) and state health departments. Developed in 1987,
PRAMS collects state-specific, population-based data on maternal attitudes and experiences before, during, and shortly after pregnancy. Researchers use PRAMS data to investigate emerging issues in the field of reproductive health and by state and local governments to plan and review programs and policies aimed at reducing health problems among mothers and babies (CDC, 2020). PRAMS survey responses were collected from all the participant states in the United States.

**Inclusion and exclusion criteria**

Secondary data was collected from the PRAMS database for the study. Following are the inclusion criteria followed for collecting the data:

- States that participated in the PRAMS survey were included in the study.
- Only responses from women who agreed to participate in the survey was included.
- Only Phase 8 of the PRAMS survey was included in the study from the years 2016-2019.
- Survey responses from only the core PRAMS questionnaire were included.
- The study only included state health reports from 2016 to 2019.

The exclusion criteria for the study are as follows:

- Non-participating states in phase 8 of the PRAMS survey were excluded from the study.
- Non-participating women's responses will not be registered for the data analysis.
- All the phases before phase 8 of the PRAMS survey was excluded.
- Standard questionnaires and state-specific questions were excluded from the study.
- State health reports before 2016 were excluded from the study.

**Data analysis**

Data on state-wise female representation in politics was collected from CAWP. The data was acquired from the PRAMS database. A codebook was created based on the variables used in the analysis.

Female representation in the legislature is a continuous independent variable. Two groups were created. Group 1 included states with high women's representation, and Group 2 included states with low female representation. The categorical variables were analyzed through the odds ratio to compare the two groups.

SAS 9.4 software was used to analyze the data.
Data accessibility

For this study, data was obtained from a secondary source, PRAMS. PRAMS is a surveillance project of the CDC. Therefore, CDC was approached to access the data. The PRAMS data is collected frequently by CDC, and they hold rights to permission to access the data. The following steps were taken to seek permission from CDC:

- The data access application form was submitted with the details of all the variables the study measured.
- All the contributors to the study signed the application. In this study, the contributors were the committee members.
- A single-page abstract was submitted along with the application form. The abstract included the background of the study, objective, and the methods that were applied to analyze the study.
- The researcher and the contributors signed a confidentiality agreement form for this study. Signing the confidentiality agreement with CDC was to seek permission to use PRAMS data.
- On the 1st of April 2021, CDC reviewed and approved the data access application, which was then sent to the board for approval. After the board granted permission, it took four weeks to get the data. The whole process took six to eight weeks.

Biases and confounders

Considering that this study was based on a secondary data source, this study may have several biases. Some of these biases are enumerated as under:

- Selection Bias: Secondary data source has considerable potential for selection bias because the data collected at the primary level may have been collected with a different objective. Therefore, there is a high probability that there may be a bias in the sample selection.
- Time-lag Bias: There is a significant time gap between the present study and the timeframe in which the data was collected. Therefore, this can impact the accuracy of the results.
• Measurement Bias: *One* of the most significant drawbacks of using a secondary data source is measurement bias. Since a different person collected the information, the study variable's information may need to be more accurate and correctly measured the outcome variable.

• Reporting Bias: It refers to adding only selected results in the data, which covers only a fraction of relevant evidence. This bias is common in secondary data sources and may impact the outcome.

Apart from the biases, this study also has two major confounding variables: 1) the Political affiliation of women legislators, and 2) the personal attitudes and beliefs of female legislators. However, gender parity in the legislature is important and has shown a positive association with health outcomes, particularly for women's health.

*Ethical consideration*

Concerns regarding the use of secondary data mostly revolve around potential harm to individual participants and issues concerning consent. Some of the ethical issues that were considered in this study are as follows:

• Confidentiality Agreement: Signing the confidentiality agreement with CDC was an important step toward data security. The purpose of signing the confidentiality agreement is to ensure the privacy of the de-identified secondary data, which is a propriety of the CDC, by making sure that the data is only accessible to the researcher and co-signatories.

• Institutional Review Board (IRB) Approval: Georgia Southern University's IRB board approved the study. IRB approvals avoid unethical practices during the research, including social or personal harm to the participants.

• Data Storage and Protection: All the data is stored electronically in the password-protected system. The accessibility of the data is limited to the researcher and the contributors who have signed the confidentiality agreement. If data accessibility permission needs to be granted to a new person, CDC will be informed about it.
- **Timeframe and sharing rights:** The data will be destroyed or deleted after five years of publishing the study. The results will be shared with the CDC upon request. The published work will be available in the public domain.

**Summary**

This section focused on identifying the observable data. Considering the data was acquired from secondary sources, the data is bound to have biases and missing information. The next chapter focuses on interpreting the results and will address further discussion and the potential impact of results in the following Chapters.
CHAPTER 4

RESULTS

This chapter presents the results obtained from the analysis of the PRAMS data. The study was aimed to explore: 1) the influence of women’s representation in the legislature on the use of prenatal healthcare utilization; and 2) what are the Population characteristics associated with the use of prenatal care. For exploring the research questions of this study, data was divided into two groups: The first group included states with less than 25% of women’s representation in the legislature, and the second group included states with more than 25% of women’s representation in the legislature. The purpose of dividing the states into two groups is to explore the difference in the population characteristics, including predisposing, enabling, and need factors between the two groups and assess the impact of women’s representation in state legislature on prenatal healthcare utilization.

Descriptive Statistics

The initial descriptive statistics provide the general population characteristics between the two groups. For data analysis, constructs of the Andersen Healthcare Utilization Model were used. The following table summarizes the weighted frequencies and percentages for all the variables within the Andersen Healthcare Utilization Model constructs, including predisposing, enabling, and need factors.

The following table describes the demographic characteristics of the population. In Group 1, the highest percentage of maternal age falls between 30-34 years (18.52%); in Group 2, the highest percentage is between 25-29 years (12.25%). Both groups have higher percentages of respondents who identified as white, which is 41.55% for Group 1 and 28.02% for Group 2. In both groups, mothers had more than 15 years of education, 23.93% in group 1 and 13.62% in group 2. Therefore, in Group 1, a higher percentage of women had pregnancies above 30 years of age, and in Group 2 higher percentage of women had pregnancies above 25 years of age. In both groups, the frequency of respondents identifying as white was the highest. However, the percentage of white respondents was almost half in group 2. In both groups, the highest frequency of respondents having more than 15 years of education. However, the difference in the frequency percentages of the education levels between the two groups is almost 10%.
For the enabling factors, 58.40% of women have income less than equal to $90,000 in group 1 compared to 40.44% in group 2. In both groups, higher percentages of women have private insurance followed by government insurance. In group 1, 33.49% of women have private insurance, and 24.71% have government insurance. In group 2, 21.46% of women have private insurance, followed by 17.05% government insurance. There is not much difference between the two groups for partner abuse before and during pregnancy. In Group 1, 0.88% of women survived abuse before pregnancy compared to 0.77% in Group 2. In Group 1, 0.73% of mothers survived abuse during pregnancy compared to 0.71% in Group 2. Therefore, per the descriptive statistic, more mothers in Group 1 have an income higher than $90,000. Though in both the groups, a higher percentage of mothers reported having private insurance followed by government insurance, almost 12% more women in Group 1 opted for private insurance compared to Group 2, and almost 7% more women in Group 1 opted for government insurance compared to Group 2.

Regarding need factors, 04.14% of mothers in group 1 have gestational diabetes compared to 2.59% in group 2. 05.39% of mothers suffered from gestational hypertension in group 1 compared to 04.04% in group 2. In group 1, 03.03% of mothers had pre-existing hypertension, and 7.84% had pre-existing depression. In group 2, 02.26% of mothers had pre-existing hypertension, and 06.45% had pre-existing depression. Therefore, higher percentages of gestational and pre-existing health conditions were reported in Group 1 compared to Group 2.

Table 2

Descriptive Statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency (Percent)</th>
<th>Weighted Frequencies (Weighted percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Group 1</td>
</tr>
<tr>
<td>Age&lt;=17 years</td>
<td>1854 (1.24%)</td>
<td>43173 (00.56%)</td>
</tr>
<tr>
<td>Age 18-19</td>
<td>5265 (3.52%)</td>
<td>123457 (01.62%)</td>
</tr>
<tr>
<td>Age 20-24</td>
<td>27540 (18.41%)</td>
<td>759247 (10.00%)</td>
</tr>
<tr>
<td>Age 25-29</td>
<td>43817 (29.28%)</td>
<td>1292308 (17.03%)</td>
</tr>
<tr>
<td>Race</td>
<td>30 - 34</td>
<td>35 - 39</td>
</tr>
<tr>
<td>-----------</td>
<td>------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Asian</td>
<td>43904 (29.34%)</td>
<td>27243 (18.21%)</td>
</tr>
<tr>
<td>White</td>
<td>9947 (6.87%)</td>
<td>269124 (03.59%)</td>
</tr>
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Variables
Independent Variable

The study focuses on studying the influence of women’s representation in legislature on prenatal health care utilization. Therefore, the independent variable in this study is the percentage of women’s representation in state legislature in the United States. Of 50 states, 43 participated in the PRAMS phase 8 core questionnaire survey. The non-participating states include Nevada, Arizona, Maine, Idaho, California, Texas, and South Carolina. The data for women’s representation in state legislature was collected for only 43 states from 2016 to 2019 (table 4.6). The percentage of women in state legislature was collected separately for each year from 2016 to 2019, and the average of four years was considered for the analysis. States with greater than or equal to 25% of women representation in the state legislature were grouped as a high representation group, and states with less than 25% of women representation were grouped as a low representation group. Of 43 states, 23 have high women representation in the state legislature, and 20 have low women representation. Colorado has the highest women’s representation in state legislature, with 41.25% of women in state legislatures. Wyoming has the lowest women’s representation, with 12.78% of women in state legislatures. The impact of policies on prenatal healthcare utilization has been discussed in the previous chapter.
Table 3

State-Wise Percentage of Women in State Legislature

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<td>19.20%</td>
<td>24.00%</td>
<td>19.70%</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>North Dakota</td>
<td>ND</td>
<td>19</td>
<td>8</td>
<td>27</td>
<td>141</td>
<td>19.10%</td>
<td>18.40%</td>
<td>18.40%</td>
<td>21.30%</td>
<td>19.30%</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Kentucky</td>
<td>KY</td>
<td>18</td>
<td>4</td>
<td>22</td>
<td>138</td>
<td>15.90%</td>
<td>16.70%</td>
<td>16.70%</td>
<td>22.50%</td>
<td>17.95%</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Tennessee</td>
<td>TN</td>
<td>16</td>
<td>6</td>
<td>22</td>
<td>132</td>
<td>16.70%</td>
<td>15.90%</td>
<td>15.90%</td>
<td>15.90%</td>
<td>16.10%</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>OK</td>
<td>15</td>
<td>6</td>
<td>21</td>
<td>149</td>
<td>14.10%</td>
<td>13.40%</td>
<td>14.10%</td>
<td>21.50%</td>
<td>15.78%</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Louisiana</td>
<td>LA</td>
<td>17</td>
<td>5</td>
<td>22</td>
<td>144</td>
<td>15.30%</td>
<td>15.30%</td>
<td>14.60%</td>
<td>16.00%</td>
<td>15.30%</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Alabama</td>
<td>AL</td>
<td>16</td>
<td>4</td>
<td>20</td>
<td>140</td>
<td>14.30%</td>
<td>15.00%</td>
<td>15.00%</td>
<td>15.70%</td>
<td>15.00%</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>West Virginia</td>
<td>WV</td>
<td>18</td>
<td>2</td>
<td>20</td>
<td>134</td>
<td>14.90%</td>
<td>13.40%</td>
<td>14.90%</td>
<td>14.20%</td>
<td>14.35%</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Mississippi</td>
<td>MS</td>
<td>14</td>
<td>9</td>
<td>23</td>
<td>174</td>
<td>13.20%</td>
<td>14.90%</td>
<td>14.90%</td>
<td>13.80%</td>
<td>14.20%</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Wyoming</td>
<td>WY</td>
<td>11</td>
<td>1</td>
<td>12</td>
<td>90</td>
<td>13.30%</td>
<td>11.10%</td>
<td>11.10%</td>
<td>15.60%</td>
<td>12.78%</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
Moderating Variables

Women’s representation in state legislature is the independent variable in the study. However, several other factors affect prenatal healthcare utilization. The analytical framework of the study follows Andersen healthcare utilization model. Therefore, the variables under each construct of the population characteristics: Predisposing, enabling, and need factors, were analyzed to observe the interaction effect of each variable on the dependent when interacting with the independent variable. The effects are discussed extensively in the following section.

Dependent Variable

In this study, prenatal healthcare utilization is the dependent variable. As discussed, prenatal healthcare utilization also depends on other factors, including predisposing, enabling, and need factors. Therefore, it was imperative to analyze each factor and its interaction effect on prenatal healthcare utilization.

Predisposing factors: Predisposing factors such as age, race, and education of mothers were considered in this study. Predisposing factors determine an individual’s propensity to consume health services. Studies indicate that advanced maternal age has adverse health outcomes for the mother, fetus, or neonate (Mihret-ab Mehari, 2020). Evidence suggests that race impacts health disparities, including obstetrical and prenatal care (Allison S. Bryant, 2010). A study conducted in Congo found that the mother’s education level is significantly associated with healthcare utilization (Hanyu Wang, Maternal education level and maternal healthcare utilization in the Democratic Republic of the Congo: an analysis of the multiple indicator cluster surveys 2017/18, 2021). Considering the adverse effects of age, education, and race, all three predisposing factors were considered for the study. To assess the effect of age, race, and education on prenatal healthcare utilization direct effect and interaction effect of each variable were observed. The purpose of direct effect was to quantify the influence on the dependent variable not mediated by other variables in the model. Observing the interaction effect was to understand the role of the interaction of more than one independent variable in an estimated model on the dependent variable, prenatal healthcare utilization.
### Table 4

*Direct Effect of Predisposing Factors on Prenatal Healthcare Utilization*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Categories</th>
<th>Odds Ratio</th>
<th>95% Confidence Limits</th>
<th>P-Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Ref. Category &lt;=17 years)</td>
<td>18 – 19</td>
<td>1.60</td>
<td>(0.00267 - 0.9377)</td>
<td>0.0487</td>
</tr>
<tr>
<td></td>
<td>20 - 24</td>
<td>1.75</td>
<td>(0.1793, 0.9447)</td>
<td>0.0040</td>
</tr>
<tr>
<td></td>
<td>25 - 29</td>
<td>1.83</td>
<td>(0.2207, 0.9918)</td>
<td>0.0021</td>
</tr>
<tr>
<td></td>
<td>30 - 34</td>
<td>1.89</td>
<td>(0.2318, 1.0430)</td>
<td>0.0021</td>
</tr>
<tr>
<td></td>
<td>35 - 39</td>
<td>1.45</td>
<td>(-0.0506, 0.8059)</td>
<td>0.0839</td>
</tr>
<tr>
<td>Race (Ref. category white)</td>
<td>Asian</td>
<td>0.20</td>
<td>(-1.9822, -1.2307)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td></td>
<td>Black</td>
<td>0.55</td>
<td>(-0.7918, -0.3700)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td></td>
<td>Native American</td>
<td>0.51</td>
<td>(-0.9896, -0.3435)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td></td>
<td>Mixed /others</td>
<td>1.32</td>
<td>(-0.0952, 0.6569)</td>
<td>0.143</td>
</tr>
<tr>
<td>Education (Ref. category 9-11 years)</td>
<td>12 years</td>
<td>1.52</td>
<td>(0.1728, 0.6652)</td>
<td>0.0009</td>
</tr>
<tr>
<td></td>
<td>13-15 years</td>
<td>3.05</td>
<td>(0.8328, 1.4027)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td></td>
<td>&gt; 15 years</td>
<td>6.17</td>
<td>(1.4593, 2.1829)</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

### Table 5

*Interaction Effect of Predisposing Factors and Women’s Representation in the State Legislature on Prenatal Healthcare Utilization*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Categories</th>
<th>Odds Ratio</th>
<th>Confidence Limits (95%)</th>
<th>P-Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Ref. Category &lt;=17 years)</td>
<td>18 – 19</td>
<td>0.521</td>
<td>(-0.6543, 0.3888)</td>
<td>0.6179</td>
</tr>
<tr>
<td></td>
<td>20 - 24</td>
<td>0.678</td>
<td>(-0.3317, 0.4126)</td>
<td>0.8314</td>
</tr>
<tr>
<td></td>
<td>25 - 29</td>
<td>0.701</td>
<td>(-0.3391, 0.3982)</td>
<td>0.8752</td>
</tr>
<tr>
<td></td>
<td>30 - 34</td>
<td>0.822</td>
<td>(-0.2430, 0.5626)</td>
<td>0.4368</td>
</tr>
<tr>
<td></td>
<td>35 - 39</td>
<td>0.662</td>
<td>(-0.231, 0.63533)</td>
<td>0.3609</td>
</tr>
<tr>
<td>Race (Ref. category white)</td>
<td>Asian</td>
<td>0.882</td>
<td>(-0.5538, 0.3024)</td>
<td>0.5650</td>
</tr>
<tr>
<td></td>
<td>Black</td>
<td>1.189</td>
<td>(-0.1210, 0.4673)</td>
<td>0.2485</td>
</tr>
<tr>
<td></td>
<td>Native American</td>
<td>1.112</td>
<td>(-0.3390, 0.5520)</td>
<td>0.6394</td>
</tr>
<tr>
<td></td>
<td>Mixed /others</td>
<td>0.725</td>
<td>(-0.3390, 0.5520)</td>
<td>0.6394</td>
</tr>
<tr>
<td>Education (Ref. category 9-11 years)</td>
<td>12 years</td>
<td>1.143</td>
<td>(-0.1997, 0.4661)</td>
<td>0.4329</td>
</tr>
<tr>
<td></td>
<td>13-15 years</td>
<td>0.963</td>
<td>(-0.4131, 0.3377)</td>
<td>0.8439</td>
</tr>
<tr>
<td></td>
<td>&gt; 15 years</td>
<td>0.829</td>
<td>(-0.6363, 0.2606)</td>
<td>0.4117</td>
</tr>
</tbody>
</table>

---

1 In Table 5, the interaction effects were assessed with the main effect in the same model.
The above tables summarize the direct and interaction effect of predisposing variables. Table 4 summarizes the direct effect of age, race, and education on prenatal healthcare utilization. Age, race, and education are significantly associated with prenatal healthcare utilization. It was observed that as the age increases, the probability of utilizing prenatal healthcare increases; however, above 35 years, the probability of prenatal healthcare utilization slightly declines. The odds of using prenatal healthcare among mothers aged 18 to 19 years is 60%. Mothers aged 20 to 24 are 75% more likely to use prenatal healthcare. The odds of using prenatal healthcare among mothers aged 25 to 29 and 30 to 34 years are 83% and 89%, respectively. However, mothers between 35 to 39 years are only 45% more likely to use prenatal healthcare. For race there is a significant association between race and prenatal healthcare utilization. The odds of using prenatal healthcare is low among minority communities. Mothers identifying as Asian are 80% less likely to use prenatal healthcare. Mothers identifying as Black are 45% less likely to use prenatal healthcare. Similarly, mothers from the Native American community are 49% less likely to use prenatal healthcare. Therefore, we can conclude that more efforts at the policy and practice levels are required to narrow the disproportionate utilization rates among the minority population.

Education is significantly associated with prenatal healthcare utilization. Mothers with 12 years of education are 52% more likely to use prenatal healthcare. Mothers with 13 to 15 years of education are approximately three times more likely to use prenatal healthcare. Similarly, mothers with more than 15 years of education are six times more likely to use prenatal healthcare. Therefore, it can be concluded that as the level of education rises, the chances of women using prenatal care. The significant impact of age, race, and education on prenatal healthcare utilization has been established in several works of literature (Mehari et al., 2020; Alexander, 2002; Wang et al., 2021); however, the uniqueness of these findings is twofold: 1) To understand the implications of these findings in community health programs, which are discussed in detail in the next chapter. 2) This study also aims to view age, race, and education from the lens of political representation, which has yet to be studied.

Table 5 summarizes the interaction effect of age, race, and education with the independent variable, women’s representation in the state legislature. It was observed that women’s representation in
the state legislature and its interaction with the predisposing factors is not significantly associated with prenatal healthcare utilization.

**Enabling Factors:** One of the central concepts of Andersen healthcare utilization model is enabling factors. Enabling factors are resources that facilitate access to healthcare services, which include individual factors, family, and providers’ support. This study assessed individual factors based on household income, insurance, and partner support during pregnancy. Evidence shows that socioeconomic status, including poverty and lack of financial aid, have an adverse effect on maternity outcomes (Savitz et al., 2004; Kim et al., 2018). Family and provider support helps reduce adverse maternity outcomes (Renbarger et al., 2021; Peahl et al., 2020). Therefore, in this study, all the above discussed variables were assessed to identify their impact on the outcome variable, prenatal healthcare utilization. The following table summarizes the findings.

**Table 6**

*Direct Effect of Enabling Factors on Prenatal Healthcare Utilization*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Categories</th>
<th>Odds Ratio</th>
<th>95% Confidence Limit</th>
<th>P-Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income (Ref &gt;90,000)</td>
<td>&lt;=90,000</td>
<td>4.205</td>
<td>(-0.4308, 3.4043)</td>
<td>0.0525</td>
</tr>
<tr>
<td>Insurance (Ref Self-Pay)</td>
<td>Government</td>
<td>2.033</td>
<td>(0.3915, 1.0216)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>5.237</td>
<td>(1.3079, 2.0056)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Partner Abuse during pregnancy (Ref group No)</td>
<td>Yes</td>
<td>0.32</td>
<td>(0.5068, 1.2246)</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>
Table 7

Interaction Effect of Enabling Factors and Women’s Representation in State Legislature on Prenatal Healthcare Utilization

<table>
<thead>
<tr>
<th>Variables</th>
<th>Categories</th>
<th>Odds Ratio</th>
<th>95% Confidence Limit</th>
<th>P-Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income (Ref &gt;90,000)</td>
<td>&lt;=90,000</td>
<td>2.555</td>
<td>(0.1781, 1.6984)</td>
<td>0.0156</td>
</tr>
<tr>
<td>Insurance (Ref Self-Pay)</td>
<td>Government</td>
<td>1.61</td>
<td>(1.6984, 0.6320)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>0.93</td>
<td>(-0.5285, 0.3873)</td>
<td>0.7626</td>
</tr>
<tr>
<td>Partner Abuse during pregnancy</td>
<td>yes</td>
<td>2.96</td>
<td>(-1.7469, -0.3851)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>(Ref group No)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For this study, enabling factors that were considered for this study include individual factors and family support factors. Income and insurance were the variables considered for the individual factors, and partner abuse during pregnancy was considered for the family support.

Table 6 summarizes the direct effect of enabling factors on prenatal healthcare utilization. The income variable was significantly associated with prenatal care utilization. During the process of this study, many categories in the income variable overlapped. Considering that it is an important enabling factor, the study did not ignore it. However, to remove the effects of the overlapping, a binary category was created. The odds ratio of 4.2 indicates that mothers in the income bracket above $90,000 are four times more likely to use prenatal healthcare utilization. Insurance had a significant association with prenatal healthcare utilization, and government insurance also shows moderating effect on prenatal healthcare utilization. The odds ratio of 2.033 for government insurance indicates that mothers with government insurance are twice more likely to use prenatal healthcare than women who opted for self-pay. Partner abuse was significantly associated with prenatal healthcare utilization. The odds ratio of 0.32 indicates that mothers abused during pregnancy are 68% less likely to use prenatal healthcare.

2 In Table 7, the interaction effects were assessed with the main effect in the same model.
Similarly, the odds ratio of 5.23 for private insurance indicates that the odds of mothers having private insurance are five times more likely to use prenatal healthcare. These findings have public health policy and practice implications, discussed in the next chapter. The enabling factors were also observed from the political lens, which has not been studied before.

Table 7 summarizes the interaction effect between independent variables, including income, insurance, partner abuse, and women's representation in the state legislature on prenatal healthcare utilization. Income and women's representation in the state legislature significantly affects prenatal healthcare utilization. The odds ratio of 2.555 indicates that women with household income equal to $90,000 in high women's representation in the state legislature are twice more likely to use prenatal healthcare compared to women with income higher than equal to $90,000 in low women's representation states. For insurance, mothers opting for private insurance and women's representation in state legislature do not significantly affect prenatal healthcare utilization. However, government insurance and women's representation in the state legislature significantly affect prenatal healthcare utilization. The odds ratio of 1.61 indicates that mothers with government insurance in high women's representation in the state legislature are 61% more likely to use prenatal healthcare than mothers with government insurance in low women's representation in the state legislature. Partner abuse and women's representation in the state legislature significantly affect prenatal healthcare utilization. The odds ratio of 2.96 indicates that mothers who are abused during pregnancy by their partners in states with high women's representation in the legislature are twice more like to seek prenatal healthcare compared to mothers who are abused during pregnancy by their partners in states with low women's representation in the legislature. The next chapter discusses in detail the implications of these findings on maternal health policies and will also explore why enabling factors and women's representation in the state legislature have significant interaction effects on prenatal healthcare utilization.

**Need factors:** One of the three main concepts of Andersen Healthcare Utilization model is the Need factor. The need factor refers to the potential needs of health services, which may include self-perceived health, chronic conditions, and restricted activities. This study included two broad indicators of
need factors: gestational morbidities and prior health conditions. Within the gestation morbidities, the conditions assessed include hypertension and diabetes. Cardiovascular diseases are among the leading causes of maternal mortality in the US (CDC, 2022). Therefore, hypertension was included in the study. CDC’s recent report highlights that every year 2% to 10% of pregnancies in the United States are affected by gestational diabetes, and 50% of women develop type 2 diabetes (CDC, 2021). Considering the burden of gestational diabetes on the healthcare system, it was included in the study. Pre-existing conditions among women can lead to several pregnancy complications. However, if women receive the proper care before getting pregnant, the impact can be reduced significantly. Therefore, the second key indicator of need factors includes prior health conditions. Therefore, the health conditions assessed in this study are hypertension and depression. As discussed above, cardiovascular diseases are the common cause of maternal mortality in the US. Mental disorder is the most common condition among women in their reproductive age. 10% to 16% of women their reproductive age suffers from mental disorders (Summer, 2020). Therefore, the study assesses the association of depression with prenatal healthcare utilization.

Table 8

Direct Effect of Need Factors on Prenatal Healthcare Utilization

<table>
<thead>
<tr>
<th>Variables</th>
<th>Categories</th>
<th>Odds Ratio</th>
<th>95% Confidence Limit</th>
<th>P-Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational Diabetes (Ref. group No)</td>
<td>Yes</td>
<td>1.65</td>
<td>(3.9131, 4.3335)</td>
<td>0.0276</td>
</tr>
<tr>
<td>Gestational hypertension (Ref. group No)</td>
<td>Yes</td>
<td>1.12</td>
<td>(0.0558, 0.9543)</td>
<td>0.0200</td>
</tr>
<tr>
<td>Pre-Existing Hypertension (Ref group No)</td>
<td>Yes</td>
<td>1.53</td>
<td>(-0.1648, 0.4010)</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>
Gestational morbidities and pre-existing morbidities were included in this study. Under gestational morbidities, diabetes, and hypertension were considered among pregnant women. Table 8 summarizes the direct effect of gestational and pre-existing morbidities on prenatal healthcare utilization among pregnant women. Gestational diabetes was significantly associated with prenatal healthcare utilization. The odds ratio for gestational diabetes is 1.65, which indicates that the odds of women with gestational diabetes are 65% more likely to use prenatal healthcare. Gestational

---

3 In Table 9, the interaction effects were assessed with the main effect in the same model.
hypertension was significantly associated with prenatal healthcare utilization. The odds ratio of 1.12 indicates that mothers with hypertension are 12% more likely to use prenatal healthcare than women who do not have hypertension during pregnancy. Pre-existing hypertension and depression were considered to assess the effect of pre-existing morbidities among mothers on prenatal healthcare utilization. Pre-existing morbidities were significantly associated with prenatal healthcare utilization. The odds ratio of 1.53 for pre-existing hypertension indicates that mothers with pre-existing hypertension are 53% more likely to use prenatal healthcare. Similarly, the odds ratio of 1.25 for pre-existing depression indicates that mothers with pre-existing depression are 25% more likely to use prenatal healthcare.

Table 9 summarizes the interaction effect of women's representation in the state legislature, gestational morbidities, and pre-existing morbidities on prenatal healthcare utilization. Women's representation in the state legislature and gestational morbidities, including gestational diabetes and hypertension, does not significantly affect prenatal healthcare utilization. Similarly, there was no interaction effect between women's representation in the state legislature and pre-existing hypertension on prenatal healthcare utilization. However, there was a significant association between women's representation in the state legislature and pre-existing depression on prenatal healthcare utilization. The odds ratio of 1.55 indicates that mothers who have pre-existing depression are 55% more likely to use prenatal healthcare in states with high women's representation compared to mothers who have pre-existing depression in states with low women's representation. The next chapter explores the reasons for the high prenatal care utilization among mothers with pre-existing depression.

Final Model; Summary of the main effect and interaction effect

A multivariate analysis was conducted to understand the combined effect of predisposing, enabling, and need factors for the variables in all three constructs of Andersen healthcare utilization model. In the same model, the effect of the interaction was also observed to see the combined effect of independent variables on the dependent variable.
Table 10

*Full Model Showing the Direct Effect of Predisposing, Enabling, and Need Factors on Prenatal Healthcare Utilization*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Odds Ratio</th>
<th>Class Interval</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predisposing Factors</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 - 19</td>
<td>1.533</td>
<td>(0.964, 2.437)</td>
<td>0.3041</td>
</tr>
<tr>
<td>20 - 24</td>
<td>2.098</td>
<td>(1.385, 3.178)</td>
<td>0.0985</td>
</tr>
<tr>
<td>25 - 29</td>
<td>2.098</td>
<td>(1.388, 3.171)</td>
<td>0.1068</td>
</tr>
<tr>
<td>30 - 34</td>
<td>2.336</td>
<td>(1.531, 3.565)</td>
<td>0.0842</td>
</tr>
<tr>
<td>35 - 39</td>
<td>1.939</td>
<td>(1.259, 2.988)</td>
<td>0.3923</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Years</td>
<td>1.497</td>
<td>(1.239, 1.809)</td>
<td>0.0425</td>
</tr>
<tr>
<td>13 - 15 Years</td>
<td>2.615</td>
<td>(2.115, 3.234)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>&gt;=15 Years</td>
<td>4.216</td>
<td>(3.270, 5.435)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>0.154</td>
<td>(0.127, 0.187)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Black</td>
<td>0.605</td>
<td>(0.508, 0.720)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Native American</td>
<td>0.554</td>
<td>(0.428, 0.716)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Mixed/Other</td>
<td>1.079</td>
<td>(0.838, 1.391)</td>
<td>0.2657</td>
</tr>
<tr>
<td><strong>Enabling Factors</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;90,000</td>
<td>2.134</td>
<td>(1.054, 4.324)</td>
<td>0.2526</td>
</tr>
<tr>
<td><strong>Insurance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government Insurance</td>
<td>3.466</td>
<td>(2.686, 4.473)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Private Insurance</td>
<td>4.385</td>
<td>(3.348, 5.742)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td><strong>Abuse by partner during pregnancy</strong></td>
<td>2.287</td>
<td>(0.790, 2.204)</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>
### Need Factors

<table>
<thead>
<tr>
<th></th>
<th>Odds Ratio</th>
<th>CI</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational Diabetes</td>
<td>1.352</td>
<td>(1.020, 1.792)</td>
<td>0.0276</td>
</tr>
<tr>
<td>Gestational Hypertension</td>
<td>1.105</td>
<td>(0.885, 1.379)</td>
<td>0.4791</td>
</tr>
<tr>
<td>Pre-existing hypertension</td>
<td>1.531</td>
<td>(1.201, 1.952)</td>
<td>0.0397</td>
</tr>
<tr>
<td>Pre-existing Depression</td>
<td>1.090</td>
<td>(0.908, 1.307)</td>
<td>0.0586</td>
</tr>
</tbody>
</table>

Table 11

*Full Model Showing the Interaction Effect Between Women’s Representation in The State Legislature and Predisposing, Enableing, and Need Factors on Prenatal Healthcare Utilization*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Odds Ratio</th>
<th>CI</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predisposing Factors</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 - 19</td>
<td>1.133</td>
<td>(-0.6751, 0.9257)</td>
<td>0.7590</td>
</tr>
<tr>
<td>20 - 24</td>
<td>1.591</td>
<td>(-0.2127, 1.1408)</td>
<td>0.1790</td>
</tr>
<tr>
<td>25 - 29</td>
<td>1.599</td>
<td>(-0.2011, 1.1394)</td>
<td>0.1701</td>
</tr>
<tr>
<td>30 - 34</td>
<td>1.768</td>
<td>(-0.1239, 1.2637)</td>
<td>0.1074</td>
</tr>
<tr>
<td>35 - 39</td>
<td>1.981</td>
<td>(-0.0347, 1.4014)</td>
<td>0.0621</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Years</td>
<td>1.233</td>
<td>(-0.1707, 0.5890)</td>
<td>0.2805</td>
</tr>
<tr>
<td>13 - 15 Years</td>
<td>0.953</td>
<td>(-0.4767, 0.3803)</td>
<td>0.8256</td>
</tr>
<tr>
<td>&gt;=15 Years</td>
<td>1.031</td>
<td>(-0.5009, 0.5620)</td>
<td>0.9104</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>0.900</td>
<td>(-0.5830, 0.3713)</td>
<td>0.6637</td>
</tr>
<tr>
<td>Black</td>
<td>1.271</td>
<td>(-0.1093, 0.5894)</td>
<td>0.1781</td>
</tr>
<tr>
<td>Native American</td>
<td>1.192</td>
<td>(-0.3307, 0.6812)</td>
<td>0.4973</td>
</tr>
<tr>
<td>Mixed/Other</td>
<td>0.771</td>
<td>(-0.7856, 0.2660)</td>
<td>0.3328</td>
</tr>
<tr>
<td><strong>Enabling Factors</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;90,000</td>
<td>0.642</td>
<td>(-2.5582, 1.6725)</td>
<td>0.6816</td>
</tr>
</tbody>
</table>

\[4\] In Table 11, the interaction effects were assessed with the main effect in the same model.
### Table 12

*Table on the Effect of Women’s Representation in the State Legislature on Prenatal Healthcare Utilization*

<table>
<thead>
<tr>
<th>Table 12</th>
<th>Estimate</th>
<th>Lower bound</th>
<th>Upper bound</th>
<th>StdError</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Insurance</td>
<td>1.125</td>
<td>(-0.3532, 0.5889)</td>
<td>0.6239</td>
<td></td>
</tr>
<tr>
<td>Private Insurance</td>
<td>0.952</td>
<td>(-0.5629, 0.4652)</td>
<td>0.8523</td>
<td></td>
</tr>
<tr>
<td>Abuse by partner during pregnancy</td>
<td>0.535</td>
<td>(-1.1970, -0.0535)</td>
<td>0.0321</td>
<td></td>
</tr>
<tr>
<td>Need Factors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gestational Diabetes</td>
<td>0.628</td>
<td>(-1.1145, 0.1841)</td>
<td>0.0321</td>
<td></td>
</tr>
<tr>
<td>Gestational Hypertension</td>
<td>0.960</td>
<td>(-0.4893, 0.4078)</td>
<td>0.8587</td>
<td></td>
</tr>
<tr>
<td>Pre-existing hypertension</td>
<td>0.916</td>
<td>(-0.5750, 0.3991)</td>
<td>0.7234</td>
<td></td>
</tr>
<tr>
<td>Pre-existing Depression</td>
<td>1.327</td>
<td>(-0.0771, 0.6431)</td>
<td>0.1235</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group</th>
<th>Estimate</th>
<th>Lower bound</th>
<th>Upper bound</th>
<th>StdError</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Representation Group</td>
<td>1.087</td>
<td>(0.947, 1.247)</td>
<td>0.2596</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcome Variable</th>
<th>Frequency</th>
<th>Percentage</th>
<th>StdError</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attended PNC:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>144269</td>
<td>97.19%</td>
<td>9035</td>
</tr>
<tr>
<td>No</td>
<td>4594</td>
<td>2.89%</td>
<td>5319</td>
</tr>
</tbody>
</table>
Looking at the odds ratio in the above table, we can conclude that in predisposing factors, education and race show significant association with prenatal care utilization. However, they do not show moderating effect. The reference category for education is mothers with education between 9 to 11 years, and the reference category for race includes white mothers. The odds ratio for mothers with 12 years of education is 1.497, indicating that the odds of using prenatal healthcare is 49% higher among women with 12 years of education. The odds ratio of mothers with education between 13 to 15 years is 2.61, which indicates that the odds of using prenatal care is twice among mothers with an education level of 13 to 15 years. Therefore, as the education levels increased, the utilization rates improved among women. There was no moderating effect observed between representation and education. Race shows a significant direct association with prenatal healthcare utilization but does not significantly affect prenatal healthcare utilization when interacting with women’s representation in the state legislature. The reference category for race is White mothers. The odds ratio of 0.15 among Asian mothers indicates that the odds of using prenatal care are 85% less among Asian mothers. The odds ratio of 0.60 among Black mothers indicates that the odds of using prenatal care among Black mothers are 40% less. Similarly, the odds ratio of 0.55 indicates that the odds of using prenatal care among Native American mothers are 45% less. These results indicate the racial disparity in healthcare, and with the intersectionality of gender and race, the gap further widens. The racial disparity and its intersectionality with gender are discussed extensively in the next chapter.

For the enabling factors, insurance and partner support shows a significant association with prenatal healthcare utilization. When these variables interacted with women’s representation, partner abuse showed moderating effect on prenatal healthcare utilization. The odds ratio for government insurance is 3.46, and for private insurance is 4.38. Therefore, we can
conclude that mothers with government insurance are three times more likely to use prenatal care, and mothers with private insurance are four times more likely to use prenatal care. The utilization rates were higher among mothers with private insurance than government insurance, which could be attributed to higher income or education. The effect of insurance on prenatal healthcare utilization is discussed in detail in the next chapter. For partner abuse during pregnancy, it was observed that the odds ratio for women who were not abused during pregnancy was 2.28, which indicates that women who are not abused are twice more likely to use prenatal care compared to women who are abused. In other words, abuse is a barrier to prenatal healthcare utilization. However, we see a reverse trend in the high women representation states. The odds ratio for women who were not abused during pregnancy in high-representation states is 0.53, which indicates that women who are not abused are 47% less likely to use prenatal care. In other words, women abused in high women representation states are 47% more likely to use prenatal healthcare.

In the need factors, gestational diabetes, pre-existing hypertension, and pre-existing depression show significant association with prenatal healthcare utilization. However, only gestational diabetes shows moderating effect. For gestational morbidities, the odds ratio for diabetes is 1.35, which indicates that women with diabetes are 35% more likely to use prenatal care. The odds ratio for pre-existing morbidities is 1.53 for hypertension and 1.09 for depression, which indicates that women with hypertension are 53% more likely to use prenatal care, and women with depression are 09% more likely to use prenatal care. However, the odds ratio for women who are depressed in high women representation states is 1.32, which indicates that the association is positive, and the likelihood of using prenatal healthcare increases from 09% to 32% in high women representation states.
Overall, no association was observed between women’s representation and prenatal healthcare utilization.

Conclusion

From the above results, we can conclude that age, race, education, income, insurance, partner abuse, and gestational and pre-existing health conditions like diabetes, hypertension, and depression were the critical facilitators for prenatal healthcare utilization when these variables interacted with women’s representation in state legislatures, income, insurance, partner abuse, and pre-existing depression showed significant association with prenatal healthcare utilization in states with women representation greater than equal to 25% compared to states with women’s representation less than 25% in state legislatures. Therefore, we can conclude that women’s representation when interacting with certain environmental factors is significantly associated with prenatal healthcare. The results also indicate that high women’s representation benefitted the vulnerable population, including the survivors of partner abuse and mothers with depression. Women’s representation also had a significant interaction effect on insurance, particularly government insurance, providing additional benefits to low-income households and the population. Thus, in a nutshell, high women’s representation in state legislature is particularly beneficial for vulnerable populations under certain situations.
CHAPTER 5
DISCUSSION

Introduction

Access to healthcare should be the fundamental right of every human. However, myopic policies, prejudices, and a long history of racial oppression and discrimination have led to extreme disparities within the healthcare system. When these disparities meet the intersectionality of gender, age, education, race, socioeconomic status, or all these factors combined, healthcare access is more dismal. This theory-grounded study aims to identify the factors impacting prenatal healthcare utilization among women in the United States and assess the impact of women's representation in legislature on prenatal healthcare utilization. This study is an attempt not just to understand the influence of gender equality in the legislature but also to assess the effect of intersectionality on prenatal healthcare utilization. This chapter includes a summary, interpretation of results, interpretation in the context of public health, public health implications, community health implications, consideration for future research, strengths and limitations, and conclusions. Furthermore, this chapter also discusses the pressing questions on prenatal healthcare utilization that emerges from the data analysis.

Health disparity directly results from historical and current unequal and inequitable distribution of economic, social, environmental, and political resources. These disparities are rooted in racism, insurance coverage, provider biases, socioeconomic status, and morbidities that emanate from discrimination and oppression. One of the critical areas of public health that disparities have significantly impacted is maternal health. Given the broader concern to address the issues and gaps in maternal health, the fundamental question is whether the lack of robust policies is the reason that has failed to reduce the burden of adverse maternal health outcomes. Literature provides sufficient evidence-based research that establishes the role of women's participation in politics on maternal health outcomes. Evidence shows that the quotas in parliament in low-income countries resulted in a 9% to 12% decline in maternal mortality and a 6% to 12% increase in prenatal care utilization (Bhalotra, 2019). A longitudinal study assessed the influence of women in parliament and its impact on population health in 155 countries. Four population
health indicators were included in the multivariate longitudinal model, and the results indicate that 30% or higher representation of women in parliament positively impacts population health (Macmillan, 2018). Our finding coheres with the existing evidence that improving women's participation in politics influences policy choices that align to reduce adverse maternal health outcomes.

The Policy Landscape

CDC data indicates that 700 women die annually in the United States during pregnancy or delivery-related complications (CDC, 2019). The complications can either occur due to gestational morbidities or pre-existing health conditions. Sustainable Development Goals (SDG 3.1) 2030 target is to reduce the maternal mortality ratio (MMR) to less than 70 per 100,000 live births, and no country should have an MMR of more than 140 per 100,000 live births. The present estimates are 211 per 100,000 live births (WHO, 2021). Adequate care during and before pregnancy will be instrumental in achieving the SDG 2030 target. Adequate care refers to the quality-of-care women must receive before, during, and post-pregnancy. WHO defines the quality of care as safe, effective, timely, efficient, equitable, people-centered, and community-centered (WHO, 2018). A high-value policy structure is required to deliver quality care and advance comprehensive approaches to maternal health (Commonwealth Fund, 2020). As discussed above, policies are often influenced by the choices and preferences of policymakers. Therefore, an accurate representation of women within the organizational structures of policymaking is imperative in formulating robust policy structures to reduce adverse maternal health outcomes.

The following map highlights the policy actions taken by states participating in the PRAMS survey to improve maternal health outcomes between 2016 to 2019. The green states represent that the states have taken 16 to 20 policy actions to improve maternal health. The yellow states represent that the states have taken 10 to 15 policy actions to improve maternal health. Lastly, the red states are the states that have yet to take less than ten policy actions to improve maternal health. The highlighted policies are divided into coverage and benefits, care delivery, and data and oversight.
From the above map, we can conclude that out of 23 high women's representation states, 12 states have taken 16 to 20 policy actions to improve maternal health outcomes, eight states have taken 10 to 15 policy actions to improve maternal health outcomes, and three states have taken less than ten policy actions to improve maternal health. Whereas, out of 20 low women's representation states, only three states have taken 16 to 20 policy actions to improve maternal health outcomes, 15 have taken 10 to 15 policy actions to improve maternal health, and two have taken less than ten policy actions. Therefore, high women's representation states have taken more policy actions and initiatives to improve maternal health.
health than low women's representation states. Thus, from the map, we can draw enough evidence that a higher representation of women in state legislatures can translate into more policy actions to improve maternal health outcomes.

*The rationale for using the Andersen Healthcare Utilization Model*

The Andersen Healthcare Utilization Model was used to analyze the association between the independent and outcome variables. Several studies have used the Andersen healthcare utilization model, an extension of the Andersen behavioral model, to establish an association between environmental factors and maternal health outcomes (Habtamu Tolera, 2020; K A Phillips, 1998; Umar, 2017; P.K. Singh, 2012). A systematic review study identified the need for primary data analysis using the Andersen healthcare model in the existing healthcare utilization research. Operationalization of the model revealed a considerable variation in categories used by researchers using secondary data. The study recommends national primary data survey studies to enrich the Andersen healthcare utilization model (Babitsch, 2012). This study is an attempt to narrow that gap. The predictive variables used in this study were analyzed under predisposing, enabling, and need factors.

**Predisposing factors**

As discussed before, the disparity in healthcare is the direct outcome of generations of oppression and racial discrimination. A recently published report by Kaiser Family Foundation (KFF), Pregnancy-related deaths are three times higher among black women and two times higher among American Indians and Alaskan Natives, compared to the rate for white women (41.4 and 26.2 Vs. 13.7 per 100,000 births) (Hill, 2022). This study's three variables under predisposing factors were age, race, and education. Taylor argued that health disparities and lack of representation have further deteriorated maternal health among women (Taylor, 2020). Therefore, the impact of all three variables on prenatal healthcare utilization was also studied from the lens of women's representation in the state legislature.

Studies have shown that women who adhere to prenatal care have better pregnancy outcomes than those who do not. Age is vital in facilitating prenatal care services (Dowswell, 2021, B Simkhada, 2008). The results of this study indicate that there is a significant association between age and prenatal healthcare
utilization. A study on antenatal care supports these results. The study's results also indicated that the use of antenatal care services was lowest among adolescent mothers (Sagalova, 2021). Similarly, our study also indicates that as the age of mothers increases, the likelihood of using prenatal healthcare also increases. However, when age interacted with women's representation, it was found that there was no significant interaction effect on parental healthcare utilization. Thus, it was concluded that age directly affects prenatal healthcare utilization. However, women's representation in state legislature and age do not interact with prenatal healthcare utilization. Though the finding that age is a significant factor in prenatal healthcare utilization is not unique to this study, it adds to the existing literature. It champions the importance of considering age-specific maternal care policies. The reports indicate that the maternal mortality rate among women under 25 years is 20.4 deaths per 100,000 live births, the maternal mortality rate for women between the age group 25 to 39 years is 31.3 per 100,000 live births, and the maternal mortality rate for mothers aged 40 or over is 138.5 per 100,000 live births, which is approximately six times more than women under 25 years (CDC, 2023). Nearly all jurisdictions have maternal mortality review committees (MMRCs) that looks into pregnancy-related deaths and provide recommendations. It is imperative to include age-specific pregnancy care in the MMRCs recommendation report, which is usually ignored.

In 2021, the maternal mortality rate among non-Hispanic Black women was 69.9 deaths per 100,000 live births, 2.6 times higher than non-Hispanic White women. The maternal mortality rates among all the minority racial groups from 2020 to 2021 were significant (CDC, 2023). The findings of this study indicate that race and prenatal healthcare have a significant association. The results reveal that mothers from racial minority groups like Black and Native Americans are less likely to use prenatal healthcare than white mothers. When the variable race interacted with women's representation in the state legislature, it did not significantly affect prenatal healthcare utilization. Though many studies suggest that race has a significant association with prenatal healthcare utilization (Alexander et al., 2002; Green, 2018; Fiscella et al., 2002), therefore, the findings of this study are unique in a way that adds to the existing literature in advocating the inclusion of race, specifically minority communities, within maternal health
policy. Despite the existing research highlighting the importance of race in formulating maternal health policies, it was observed that MMRCs in 43 US states and four territories, only 11 states and two territories consider racial disparities in their reports (Guttmacher Institute, 2023). Therefore, the lack of inclusion of racial disparity in maternal health reports, which translates into policies, calls for more evidence-based research to highlight the significance of racial inclusion in improving health outcomes for mothers from minority communities. The finding of this study is an attempt to create a stronger evidence-based foundation for robust maternal health policies, particularly for mothers from minority communities.

One of the studies recommended that education level should be a critical consideration when designing public health interventions (Wang, 2021). The findings of our study indicate that the education levels of mothers have a significant direct effect on prenatal healthcare utilization. As the education level of mothers increases, the likelihood of prenatal healthcare utilization also increases. However, education and women’s representation in the state legislature did not significantly affect prenatal healthcare utilization. The existing literature proves that a mother’s education significantly improves maternal health outcomes (Mensch et al., 2019; Weitzman, 2017). However, there is a need to improve the translation of research into policies. To improve the translation of research into policy, proactive strategies are needed to bridge the gaps between research and policy and effectively improve policy adoption and implementation (Porter et al., 2018). The finding of this study is an attempt in that direction.

**Enabling Factors**

Income and insurance are significantly associated with receiving adequate maternal care (Sagalova, 2021). A recently published report stated that 60% of uninsured adults in the United States identified high coverage costs as the main reason for not getting insurance (Tolbert, 2022). Therefore, there is a strong correlation between the two critical enabling factors: income and insurance. The categories for income in the PRAMS database overlapped. Therefore, for the purpose of this study, the income was divided into two categories: 1) less than $90,000, and 2) greater than $90,000. Similarly, insurance was also divided into 1) government insurance, 2) private insurance, and 3) self-pay. It was
found that the direct effect of income was significant on prenatal healthcare utilization, which means that the higher the income, the higher the likelihood of mothers using prenatal care. Income and women's representation in state legislature shows a significant interaction effect on prenatal healthcare utilization, which means that the likelihood of using prenatal care among mothers from high-income households is greater in states with high women representation in the state legislature than in states with low women's representation. Similarly, it was found that insurance too has a significant direct effect on prenatal healthcare utilization, meaning that mothers with government or private insurance are more likely to seek prenatal care than mothers who opt for self-pay. It was also observed that government insurance and women's representation in the state legislature have a significant interaction effect on prenatal healthcare utilization, which means that mothers with government insurance in states with high women's representation in the state legislature are more likely to seek prenatal care compared to mothers with government insurance in states with low women's representation in the state legislature. A study conducted between 2014 to 2020 shows that Medicaid expansion states under ACA experienced a significant reduction in the uninsured population, particularly among low-income and vulnerable populations, higher healthcare utilization, and reduced uncompensated care costs (Guth, 2020). Commonwealth Funds summarized the policy action initiative of each state in the US to improve maternal health outcomes (The Commonwealth Fund, 2020). Comparing the top three high-women representation states (Colorado, Washington, and Illinois) with low-women representation states (West Virginia, Mississippi, and Wyoming) on the parameters of cost and coverage, it was found that high-women representation states offer Medicaid coverage for Free Standing Birth Centers, offers home-visiting services as a covered benefit, and Provides midwifery services as a covered benefit. Whereas the low women's representation states do not offer Medicaid coverage for Free Standing Birth Centers, do not offer home-visiting services as a covered benefit, and do not provide doula services as a covered benefit (The Commonwealth Fund, 2020).

The other enabling factor affecting prenatal healthcare utilization is family support. A study was conducted on identifying the factors affecting the use of antenatal care services among pregnant women.
The findings show that more than other factors, the partner or husband was most influential in deciding the utilization of antenatal care services (Upadhyay, 2014). Therefore, for this study, partner abuse during pregnancy was considered. It was found that partner abuse during pregnancy has a significant direct effect on prenatal healthcare utilization. However, the odds ratio of 0.32 indicates that mothers abused during pregnancy are 68% less likely to use prenatal care services. When partner abuse was studied from the lens of women's representation in the state legislature, it was found that there is a significant interaction effect on prenatal healthcare utilization. The odds ratio of 2.96 indicates that the likelihood of using prenatal care services among mothers abused during pregnancy is twice in states with high women's representation in state legislature compared to states with low women's representation in the state legislature. In alignment with the findings of our study, the top three states in the US with the highest percentage of intimate partner violence (IPV) are Oklahoma, Kentucky, and South Dakota, with IPV percentages at 49.1%, 45.3%, and 45.3%, respectively. The states with the lowest IPV percentages are Connecticut, Virginia, and New York, with 29.9%, 31.3%, and 31.7%, respectively (World Population Review, 2023). It is imperative to note that Oklahoma, Kentucky, and South Dakota have low women's representation in the state legislature, and Connecticut, Virginia, and New York have high representation. A study was conducted in India to explore the influence of women leaders on IPV. It was found that districts with women leaders experienced improvements in village-level public health infrastructure and reproductive health services. It was also found that women residing in districts with women leaders were more aware of recognizing violent acts by spouses as intimate partner violence (S Anukriti et al., 2022).

Need Factors

Gestational morbidities and pre-existing health conditions are critical indicators in facilitating prenatal healthcare utilization. The gestational and pre-existing morbidities were measured on two parameters each. For gestational morbidity, 1) gestational diabetes and 2) gestational hypertension were considered, and for pre-existing morbidities, 1) pre-existing hypertension and 2) pre-existing depression were considered for this study. It was observed that gestational and pre-existing morbidities directly affect prenatal healthcare utilization, which means mothers with either gestational or pre-existing morbidities
are more likely to seek prenatal care than mothers with none of these conditions. When gestational and pre-existing morbidities were studied with women's representation in the state legislature, it was found that pre-existing depression has a significant interaction effect on prenatal healthcare utilization, which means mothers with pre-existing depression in states with high women's representation are more likely to use prenatal care compared to mothers with pre-existing depression in low women's representation states. Morbidities directly affect prenatal healthcare utilization; therefore, an early detection model of gestational and pre-existing morbidities must be implemented at policy and practice levels. Therefore, robust policies addressing the issues of accessibility and availability of services and raising awareness among women will be a crucial strategy in improving maternal health outcomes.

**Public Health Implications**

Maternal mortality is highest in the US among developed countries. In 2020, the maternal mortality rate in the US was 24 deaths per 100,000 live births, three times that of most developed countries (Gunja, 2022). Maternal mortality poses a substantial economic burden on public health in the US. From 2018 to 2020, the economic burden of maternal mortality in terms of years of potential life lost (YPLL) and the value of a statistical life (VSL) increased from a YPLL of 32,824 and VSL of US $7.9 billion to a YPLL of 43,131 and VSL of US $10.4 billion (White, 2022). The strategies recommended to combat the issue of maternal mortality are 1) multidisciplinary care for women with pre-existing morbidities during preconception, pregnancy, and postpartum; 2) addressing structural discrimination along with social determinants of health; 3) implementing and building capacities for hospital-wide safety bundles; 4) raising patient awareness on early warning signs; and 5) regionalizing maternal care for women at risk of having pregnancy-related complications (Collier, 2019). Maternal mortality is just the tip of the iceberg. Severe pre-existing morbidities, gestational morbidities, and racial and other socioeconomic risk factors are an enormous threat to maternal health.

The importance of prenatal care is ignored in broad public health conversations. CDC claims that two-thirds of maternal deaths in the first year of childbirth are preventable by providing women with adequate and quality prenatal care (Shah, 2020). The findings of this study indicate that pre-existing
morbidities and provider support are essential drivers in facilitating prenatal healthcare utilization. This study identified that need factors and enabling factors influence more than predisposing factors in facilitating prenatal healthcare utilization. Therefore, it is crucial to incorporate the elements of need and enabling factors in the recommended care guidelines for pregnant women to meet the adequate quality of care benchmark. The adequacy of Prenatal Care Utilization (APNCU) Index and the Kessner Index is the most commonly used indices to measure the quality of prenatal care. These indices' limitation is that they do not capture whether the patient received guideline-recommended care during pregnancy. This study provides strong evidence and support to incorporate elements of need factors and enabling factors in the existing care guidelines to improve the quality of maternal care and measure the quality of care from the lens of guidelines-recommended care. Therefore, to address the maternal health crises and narrow the disparities in maternal health outcomes and quality of maternal care, a robust policy structure is essential to implement strategies addressing adverse maternal health outcomes.

Some of public health’s biggest success stories were only possible with policy changes. The four key policy changes that strengthen effective policy change are 1) Evidence-based policies, 2) Health equity, 3) Design actionable policies, and 4) Use proactive research for policy translation strategies (Porter et al., 2018). Evidence shows that political representation is significantly associated with policy responsiveness (Burgoon et al., 2022). Therefore, while formulating the policies on maternal health, women's representation in policymaking is imperative in drafting responsive maternal health policies. Therefore, the challenge that public health has to address is to advocate for Women's representation in policymaking and promote the right people in places for the right policies by undertaking the issue of unequal political representation. To reduce the gender gaps in politics and advocate for equitable representation of women in policymaking, the following evidence-based recommendations: 1) investing in women's human capital, 2) Empowering women from diverse socioeconomic backgrounds, and creating an environment to motivate them to take leadership positions. 3) safeguarding women's rights and addressing workplace biases, 4) International Monetary Fund's four-pillar strategy for mainstreaming gender into IMF's core activities. The four pillars include gender-disaggregated data collection, robust
governance framework, strengthening and collaborating with external partners, and efficient use of gender allocation (International Monetary Fund, 2022).

Internal advocacy models, which aim to build organizational and political support for policy changes, could be instrumental in advocating for women's representation in policymaking. Advancing committees on maternal mortality could drive change for championing gender equality in policymaking. However, these committees are mostly reporting bodies than advocacy bodies, which poses a challenge within public health in bringing gender-specific perspectives to maternal health. Therefore, to address this challenge, health committees should also transform into advocacy groups for gender equality. The training of the committees should be based on a human rights-based approach. This approach will empower the committee members and allow them to commence social and advocacy activities. Integrating health committees into the broader health system could effectively involve committees at the community level. Another critical approach to encourage health committees to undertake advocacy action is to motivate the committees to work closely in partnership with civil society networks.

Community Health Implications

Higher spending on maternal health may not necessarily translate to better maternal health outcomes. As discussed earlier in this chapter, women of color, particularly black women, women from low-income households, and indigenous women, are at more risk for adverse maternal health outcomes. The findings of this study indicate that provider-centric enabling factors have a significant impact on prenatal healthcare utilization. Therefore, there is a need for community-based participatory research that targets maternal health issues within communities and provides cultural sensitivity training to the providers or incorporates the diverse group of healthcare providers for better maternal health outcomes.

Research shows that community-based approaches have successfully addressed adverse maternal health outcomes at the community level. One such policy option is an expansion of reimbursement for community-based doulas and midwives (Zephyrin, 2021). Incentivization of providers will support the need for sensitive and effective care providers within communities. However, the challenge for public health practice is implementing these strategies in communities with low-resource settings. Some of the
strategies that can be implemented to improve public health response in low-resource settings are: 1) Using an integrated approach, 2) mobile facilities that will help in addressing the needs of larger populations with fewer resources, and 3) Making public health response context-specific.

The maternity health strategies are primarily designed to address three vital and relevant issues highlighted in the Three Delays model: 1) delay in the decision to seek care, 2) delay in reaching care, and 3) delay in receiving adequate care. The integrated approach includes intervention designed to address the demands at the community level using available resources within the community with low resources. The community-level efforts can be designed around the 'demand and supply sides.' Demand-side intervention includes improving knowledge and empowering mothers and their families to make maternal and reproductive health decisions. The supply-side interventions include access to training and skilled staff and providing high-quality care with the necessary supplies.

Rural communities in the US struggle with access to healthcare which is one of the enormous public health challenges that needs attention. A mobile health unit can be instrumental in addressing this challenge. This strategy will help reduce the waiting time among patients, provide faster access to healthcare services, and increase the coverage of underserved areas.

Another key strategy to improve health services in low-resource settings is to tailor the services to the specific requirement of the community and work closely with the community gatekeepers who understand the environment and enable the health system to be flexible and responsive to the changing needs of the community.

Strengths and Limitations of the Study

PRAMS data is used to test the hypothesis for this study, which is a reliable and valid data source. While the analysis process did not include the intervention and program effects, the state-level analysis could provide insights into potential policy and practice implications. Secondary data is subject to minor change compared to primary data, which helped maintain design and hypothesis testing stability. PRAMS data is categorical; therefore, logistic regression was the natural choice for statistical analysis. Logistic regression not only measures the predictor appropriately but also provides information about the direction
of the association. A linear cause and effect relationship was not established in this study because there was no cause and effect. However, the study establishes significant interaction effect for certain variables.

One of the key limitations of using secondary data is the need for more control in the data collection process, which could lead to several biases, including information and selection biases. An unequal distribution of response rates in different states poses a challenge in modeling. The categorical variable limits the statistical analysis of the study and cannot have a standardized interval scale. The data were divided into two groups based on the percentage of representation, and the data for response percentage was unbalanced, which may affect the model.

There were some limitations observed in the PRAMS variables and coding. The PRAMS data is fed into the system by coders, and there are chances of human error in feeding the data. There were some gaps identified in the PRAMS data. Latinos/Hispanics were not a separate group even though they are the disproportionately affected population. There were overlapping categories in income and race. The binary categories were coded as 1 and 2, but the response recorded for each needed to be more consistent.

**Future Considerations**

For future studies following the same research design, the problem of unbalanced data can be addressed using the allocation ratio for the two groups. To test our hypothesis, we can use Propensity Score matching techniques to obtain an appropriate match between the two groups to avoid selection bias. Following the same methodology as in this study, the categorical data can be represented using proportions and percentages. Further analysis can be done using multivariate logistic regression procedures to obtain the association between the study variables at a significance level of 0.05. All the analyses can be performed using SAS.

Another study that can emerge from this study is to observe the effect of second and third pregnancy on prenatal healthcare utilization using the same conceptual and analytical model. This study can further explore the association between second or third pregnancy and its effect on using prenatal healthcare services. This study did not consider this factor because it was out of scope.
The third research that this study could inform is using the same methodology, but the states could be divided into low, medium, and high representation, where low could be 15% to 24%, mid could be 25% to 35%, and high could be above 35%. This methodology was not followed in this study because not all states in the US participated in the PRAMS survey. Therefore, after following this model on participating states, only three states fell in the high and low categories, which was not an actual representative sample size.

**Final Remarks**

Nothing can be more tragic than seeing mothers dying from preventable health conditions while giving birth. The issue becomes more dismal when these deaths are disproportionate and often result from circumstances beyond control, such as race, income, and education. The policy landscape indicates that state and federal governments in the US have taken measures to reduce health disparities, but what is lacking is the gender equity framework in formulating these policies, which is a significant barrier to translating these efforts into results. Therefore, the representation of women in designing, formulating, and implementing policies for improving maternal health outcomes can be a significant move in achieving the overarching goal of healthy mothers.
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APPENDIX A

PROGRAM CODES

libname Thesis 'C:\Users\prach\Desktop\Thesis';
run;
OPTIONS NOFMTERR;
Proc logistics data=thesis.Group;
Class pol HTH_PCOS HTH_THYR HTH_ANX BPG_DEPRS8 BPG_HBP8 BPG_DIAB8 MM_HBP;
Model PP8_NOPNC = pol HTH_PCOS HTH_THYR HTH_ANX BPG_DEPRS8 BPG_HBP8 BPG_DIAB8 MM_HBP;
run;
Proc logistics data=thesis.Group_polt;
Class pol HTH_PCOS HTH_THYR HTH_ANX BPG_DEPRS8 BPG_HBP8 BPG_DIAB8 MM_HBP BFINF_SPC_RAW BFINF_NUR_RAW BFINF_DR_RAW PAB6HUS BFINF_FAM_RAW PAY INCOME8 MAT_ED MAT_RACE MAT_AGE_NAPHSIS;
Model PP8_NOPNC = pol HTH_PCOS HTH_THYR HTH_ANX BPG_DEPRS8 BPG_HBP8 BPG_DIAB8 MM_HBP BFINF_SPC_RAW BFINF_NUR_RAW BFINF_DR_RAW PAB6HUS BFINF_FAM_RAW PAY INCOME8 MAT_ED MAT_RACE MAT_AGE_NAPHSIS;
run;
Data Thesis.Income;
Set thesis.group;
if group = 1 then do;
  if State in ('CO', 'VT', 'WA', 'IL', 'OR', 'MD', 'RI', 'NJ', 'NH', 'HI', 'CT', 'NY', 'MA', 'WI') then do; pol = 1;
pol_name = "Women Majority Democratic States"; end;
else if state in ('AK', 'MN', 'NM', 'MT', 'KS', 'GA', 'FL', 'NE', 'WI') then do; pol = 2;
pol_name = "Women Majority Republican States"; end;
End;
if group = 2 then do;
  if state in ('DE') then do; pol = 3;
pol_name = "Women minority Democratic States"; end;
else if state in ('NC', 'IA', 'OH', 'MO', 'VA', 'IN', 'SD', 'PA', 'AR', 'UT', 'ND', 'KY', 'TN', 'OK', 'LA', 'AL', 'NV', 'MS', 'WY') then do; pol = 4;
pol_name = "Women minority Republican States"; end;
End;
run;
Proc logistics data=thesis.group descending;
Class MAT_AGE_NAPHSIS MAT_RACE MAT_ED INCOME8 PAY BFINF_FAM_RAW PAB6HUS BFINF_DR_RAW BFINF_NUR_RAW BFINF_FAM_RAW MM_HBP BPG_DIAB8 BPG_HBP8 BPG_DEPRS8 HTH_ANX HTH_THYR HTH_PCOS PP8_NOPNC PNC_VST_NAPHSIS;
Model PP8_NOPNC = MAT_AGE_NAPHSIS MAT_RACE MAT_ED INCOME8 PAY BFINF_FAM_RAW PAB6HUS BFINF_DR_RAW BFINF_NUR_RAW BFINF_FAM_RAW MM_HBP BPG_DIAB8 BPG_HBP8 BPG_DEPRS8 HTH_ANX HTH_THYR HTH_PCOS PP8_NOPNC PNC_VST_NAPHSIS;
/ selection=backward
s1stay = 0.05
details
lackfit;
run;
data thesis.Group1_Copy;
set thesis.group;
if group = 1;
run;
data thesis.Group2_Copy;
set thesis.group;
if group = 2;
run;

proc logistic data=thesis.Group1_Copy descending;
class MAT_AGE NAPHSIS MAT_RACE MAT_ED INCOME PAY BFINF_FAM_RAW PAB6HUS
 BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW MM_HBP BPG_DIA88 BPG_HBP8 BPG_DEPRS8
 HTH_ANX HTH_THYR HTH_PCOS PP8_NOPNC PNC_VST_NAPHSIS;
model Pre_Vist = MAT_AGE NAPHSIS MAT_RACE MAT_ED INCOME PAY BFINF_FAM_RAW
 PAB6HUS BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW MM_HBP BPG_DIA88 BPG_HBP8
 BPG_DEPRS8 HTH_ANX HTH_THYR HTH_PCOS PP8_NOPNC PNC_VST_NAPHSIS
 / selection=backward slstay = 0.05
 details lackfit;
run;

proc logistic data=thesis.Group2_Copy descending;
class MAT_AGE NAPHSIS MAT_RACE MAT_ED INCOME PAY BFINF_FAM_RAW PAB6HUS
 BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW MM_HBP BPG_DIA88 BPG_HBP8 BPG_DEPRS8
 HTH_ANX HTH_THYR HTH_PCOS PP8_NOPNC PNC_VST_NAPHSIS;
model Pre_Vist = MAT_AGE NAPHSIS MAT_RACE MAT_ED INCOME PAY BFINF_FAM_RAW
 PAB6HUS BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW MM_HBP BPG_DIA88 BPG_HBP8
 BPG_DEPRS8 HTH_ANX HTH_THYR HTH_PCOS PP8_NOPNC PNC_VST_NAPHSIS
 / selection=backward slstay = 0.05
 details lackfit;
run;

proc logistic data=thesis.Group_polt;
class pol HTH_PCOS HTH_THYR HTH_ANX BPG_DEPRS8 BPG_HBP8 BPG_DIA88 MM_HBP;
model PP8_NOPNC = pol HTH_PCOS HTH_THYR HTH_ANX BPG_DEPRS8 BPG_HBP8 BPG_DIA88
 MM_HBP;
run;

proc logistic data=thesis.Group_polt;
class group HTH_PCOS HTH_THYR HTH_ANX BPG_DEPRS8 BPG_HBP8 BPG_DIA88;
model Pre_Vist = group HTH_PCOS HTH_THYR HTH_ANX BPG_DEPRS8 BPG_HBP8
 BPG_DIA88;
run;

proc logistic;
proc freq data=Thesis.income
orderformatted;
tables income*group / chisq;
run;
proc logistic;
proc freq data=Thesis.Income
orderformatted;
tables PAY*group / chisq;
run;
data thesis.group_polt;
set thesis.group;
else if state in ("NC", "IA", "OH", "MO", "VA", "DE", "IN", "SD", "PA", "AR", "UT", "ND", "KY", "TN", "OK", "LA", "AL", "WV", "MS", "WY") then group =2;
if group in (1,2);
run;
data thesis.race;
set thesis.group_polt;
if MAT_RACE in ('5', '6', '7', '1') then do; Race = 1;
Race_Name = "Asian"; end;
if MAT_RACE in ('2') then do; Race = 2;
Race_Name = "White"; end;
if MAT_RACE in ('3') then do; Race = 3;
Race_Name = "Black"; end;
if MAT_RACE in ('9', '11') then do; Race = 5;
Race_Name = "Other/Mixed"; end;
else if MAT_RACE in (8', '10', '4') then do; Race = 4;
Race_Name = "Native American"; end;
run;
Data Thesis.group_polt;
Set Thesis.group;
if group = 1 then do;
if State in ("CO", "VT", "WA", "IL", "OR", "MD", "RI", "NJ", "NM", "NH", "HI", "CT", "NY", "MA", "WI") then do; pol = 1;
pol_name = "Women Majority Democratic States"; end;
else if state in ("AK", "MN", "NM", "MT", "KS", "GA", "FL", "NE", "WI") then do; pol = 2;
pol_name = "Women Majority Republican States"; end;
End;
if group = 2 then do;
if state in ('DE') then do; pol = 3;
pol_name = "Women minority Democratic States"; end;
else if state in ("NC", "IA", "OH", "MO", "VA", "IN", "SD", "PA", "AR", "UT", "ND", "KY", "TN", "OK", "LA", "AL", "WV", "MS", "WY") then do; pol = 4;
pol_name = "Women minority Republican States"; end;
End;
run;
Proc logistics data = Group_polt;
class

proc logistic data= thesis.race;
class Race;
model PP8_NOPNC = Race;
run;
proc logistic data= thesis.race;
class Race group;
model PP8_NOPNC = Race*group;
run;
ods rtf file='ThesisOutput.Rtf';
proc logistic data= thesis.group_polt;
class MAT_AGE_NAPHSIS pol MAT_ED MAT_RACE;
model PP8_NOPNC = pol*MAT_AGE_NAPHSIS pol*MAT_RACE pol*MAT_ED;
run;
proc freq data=Thesis.group_polt;
tables SUDAAN Nest Variable;
run;
```plaintext
proc freq data=Thesis.group;
tables PAB6HUS BFINF_FAM_RAW PAB_FAM PAD6HUS PAD_FAM;
tables group*PAB6HUS group*BFINF_FAM_RAW group*PAB_FAM group*PAD6HUS group*PAD_FAM/
      nopercent nocol chisq;
run;
proc logistics data = Thesis.group;
class PAB6HUS BFINF_FAM_RAW PAB_FAM PAD6HUS PAD_FAM group;
model PP8_NOPNC = group*PAB6HUS group*BFINF_FAM_RAW group*PAB_FAM group*PAD6HUS group*PAD_FAM;
run;
proc freq data=Thesis.group;
tables BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW BFINF_BDR_RAW;
tables group*BFINF_DR_RAW group*BFINF_NUR_RAW group*BFINF_SPC_RAW group*BFINF_BDR_RAW/
      nopercent nocol chisq;
run;
proc logistics data = Thesis.group;
class BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW BFINF_BDR_RAW;
model PP8_NOPNC = BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW BFINF_BDR_RAW;
run;
proc freq data=Thesis.group;
tables MM_DIAB MM_FEVER MM_HBP BPG_DIAB8 BPG_HBP8 BPG_DEPRS8 HTH_ASMA HTH_THR HTH_PCOS HTH_ANX;
tables group*MM_DIAB group*MM_FEVER group*MM_HBP group*BPG_DIAB8 group*BPG_HBP8 group*BPG_DEPRS8 group*HTH_ASMA group*HTH_THR group*HTH_PCOS group*HTH_ANX/
      nopercent nocol chisq;
run;
proc logistics data = Thesis.group;
class MM_DIAB MM_FEVER MM_HBP BPG_DIAB8 BPG_HBP8 BPG_DEPRS8 HTH_ASMA HTH_THR HTH_PCOS HTH_ANX group;
model PP8_NOPNC = group*MM_DIAB group*MM_FEVER group*MM_HBP group*BPG_DIAB8 group*BPG_HBP8 group*BPG_DEPRS8 group*HTH_ASMA group*HTH_THR group*HTH_PCOS group*HTH_ANX;
run;
proc freq data=Thesis.group_polt;
tables PP8_NOPNC PNC_MTH PNC_VST_NAPHSIS;
tables pol*PP8_NOPNC pol*PNC_MTH pol*PNC_VST_NAPHSIS/
      nopercent nocol chisq;
run;
proc logistic data = Thesis.joshi_2016_2019;
```
model group = PNC_VST_NAPHSIS/ expb;
run;
Data thesis.income;
set thesis.group;
If INCOME8 in (1, 2, 3, 4, 101, 102, 103, 201, 202, 203) then do; INCOME = 1;
Income_Name = "0 to 30,000"; end;
If INCOME8 in (5, 6, 7, 8, 9, 104, 105, 106, 107, 204, 205, 206, 207) then do;
Income = 2;
Income_Name = "30,000 to 60,000"; end;
If INCOME8 in (10, 11, 12, 108, 109, 110, 208, 209, 210) then do; Income = 3;
Income_Name = "60,001 to 90,000"; end;
If INCOME8 in (15, 16, 17, 18, 19, 20, 21, 111, 211) then do; Income = 4;
Income_Name = "90,001 to 120,000"; end;
If INCOME8 in (22, 112, 212) then do; Income = 5;
Income_Name = "More than 120,001"; end;
run;
Proc logistics data=thesis.income;
class Group Income;
Model PP8_NOPNC = Group*Income/expb CI;
run;
Proc logistics data=thesis.income;
class Group Income (ref = '2')/ param = ref;
Model PP8_NOPNC = Group*Income/expb CI;
run;
Proc logistics data=thesis.group;
class Group PAY;
Model PP8_NOPNC = Group*PAY/expb CI;
run;
Proc logistics data=thesis.group;
class Group PAY (ref = '2')/ param = ref;
Model PP8_NOPNC = Group*PAY/expb CI;
run;
Data Thesis.Age;
set thesis.group;
If MAT_AGE_NAPHSIS in (1) then do; age = 1;
Age_Name = "Less than 17"; end;
If MAT_AGE_NAPHSIS in (2) then do; age = 2;
Age_Name = "18-19"; end;
if MAT_AGE_NAPHSIS in (3) then do; age = 3;
Age_Name = "20-24"; end;
if MAT_AGE_NAPHSIS in (4) then do; age = 4;
Age_Name = "25-29"; end;
if MAT_AGE_NAPHSIS in (5) then do; age = 5;
Age_Name = "30-34"; end;
if MAT_AGE_NAPHSIS in (6, 7) then do; age = 6;
Age_Name = "35-39"; end;
run;
Proc logistics data=thesis.Age;
class Group Age (ref = '2')/ param = ref;
Model PP8_NOPNC = Group*Age/expb CI;
run;
Data Thesis.Age2_copy;
set thesis.Group2_copy;
If MAT_AGE_NAPHSIS in (1) then do; age = 1;
Age_Name = "Less than 17"; end;
If MAT_AGE_NAPHSIS in (2) then do; age = 2;
Age_Name = "18-19"; end;
if MAT_AGE_NAPHSIS in (3) then do; age = 3;
Age_Name = "20-24"; end;
if MAT_AGE_NAPHSIS in (4) then do; age = 4;
Age_Name = "25-29"; end;
if MAT_AGE_NAPHSIS in (5) then do; age = 5;
Age_Name = "30-34"; end;
if MAT_AGE_NAPHSIS in (6, 7) then do; age = 6;
Age_Name = "35-39"; end;
run;

data thesis.race1;
set thesis.Group1_copy;
if MAT_RACE in ('5', '6', '7', '1') then do; Race = 1;
Race_Name = "Asian"; end;
if MAT_RACE in ('2') then do; Race = 2;
Race_Name = "White"; end;
if MAT_RACE in ('3') then do; Race = 3;
Race_Name = "Black"; end;
if MAT_RACE in ('9', '11') then do; Race = 5;
Race_Name = "Other/Mixed"; end;
else if MAT_RACE in ('8', '10', '4') then do; Race = 4;
Race_Name = "Native American"; end;
run;
data thesis.race;
set thesis.Group;
if MAT_RACE in ('5', '6', '7', '1') then do; Race = 1;
Race_Name = "Asian"; end;
if MAT_RACE in ('2') then do; Race = 2;
Race_Name = "White"; end;
if MAT_RACE in ('3') then do; Race = 3;
Race_Name = "Black"; end;
if MAT_RACE in ('9', '11') then do; Race = 5;
Race_Name = "Other/Mixed"; end;
else if MAT_RACE in ('8', '10', '4') then do; Race = 4;
Race_Name = "Native American"; end;
run;
Proc logistics data=thesis.group;
class Group PNC_VST_NAPHSIS;
Model PP8_NOPNC = Group*PNC_VST_NAPHSIS/expb CI;
run;
Proc logistics data=thesis.Group;
class Group PNC_VST_NAPHSIS (ref = '2')/ param = ref;
Model PP8_NOPNC = Group*PNC_VST_NAPHSIS/expb CI;
run;
Proc logistics data=thesis.Race;
class Group race;
Model PP8_NOPNC = Group*Race/expb CI;
run;
Proc logistics data=thesis.Age;
class Group Age (ref = '2')/ param = ref;
Model PP8_NOPNC = Group*Age/expb CI;
run;
data thesis.ED;
set thesis.Group;
if MAT_ED in ('2') then do; Education = 1;
ED_Name = "9-11 years"; end;
if MAT_ED in ('3') then do; Education = 2;
Ed_Name = "12 years"; end;
if MAT_ED in ('4') then do; Education = 3;
Ed_Name = "13-15 years"; end;
if MAT_ED in ('5') then do; Education = 4;
Ed_Name = "greater than 15 years"; end;
run;
class Group Education (ref = '2')/ param = ref;
Model PP8_NOPNC = Group*Education/expb CI;
run;
class Group Education;
Model PP8_NOPNC = Group*Education/expb CI;
run;
data thesis.ED2;
set thesis.Group2_copy;
if MAT_ED in ('2') then do; Education = 1;
Ed_Name = "9-11 years"; end;
if MAT_ED in ('3') then do; Education = 2;
Ed_Name = "12 years"; end;
if MAT_ED in ('4') then do; Education = 3;
Ed_Name = "13-15 years"; end;
if MAT_ED in ('5') then do; Education = 4;
Ed_Name = "greater than 15 years"; end;
run;
Data thesis.income1;
set thesis.Group1_copy;
If INCOME8 in (1, 2, 3, 4, 101, 102, 103, 201, 202, 203) then do; INCOME = 1;
Income_Name = "0 to 30,000"; end;
If INCOME8 in (5, 6, 7, 8, 9, 104, 105, 106, 107, 204, 205, 206, 207) then do;
Income = 2;
Income_Name = "30,001 to 60,000"; end;
If INCOME8 in (10, 11, 12, 108, 109, 110, 208, 209, 210) then do; Income = 3;
Income_Name = "60,001 to 90,000"; end;
If INCOME8 in (15, 16, 17, 18, 19, 20, 21, 111, 211) then do; Income = 4;
Income_Name = "90,001 to 120,000"; end;
If INCOME8 in (22, 112, 212) then do; Income = 5;
Income_Name = "More than 120,001"; end;
run;
Data thesis.income2;
set thesis.Group2_copy;
If INCOME8 in (1, 2, 3, 4, 101, 102, 103, 201, 202, 203) then do; INCOME = 1;
Income_Name = "0 to 30,000"; end;
If INCOME8 in (5, 6, 7, 8, 9, 104, 105, 106, 107, 204, 205, 206, 207) then do;
Income = 2;
Income_Name = "30,001 to 60,000"; end;
If INCOME8 in (10, 11, 12, 108, 109, 110, 208, 209, 210) then do; Income = 3;
Income_Name = "60,001 to 90,000"; end;
If INCOME8 in (15, 16, 17, 18, 19, 20, 21, 111, 211) then do; Income = 4;
Income_Name = "90,001 to 120,000"; end;
If INCOME8 in (22, 112, 212) then do; Income = 5;
Income_Name = "More than 120,001"; end;
run;
proc freq data=Thesis.Age1_copy;
tables age;
run;
proc freq data=Thesis.Age2_copy;
tables age;
run;
proc freq data=Thesis.Race1;
tables Race;
run;
proc freq data=Thesis.Race2;
tables Race;
run;
proc freq data=Thesis.Ed1;
tables Education;
run;
proc freq data=Thesis.Ed2;
tables Education;
run;
proc freq data=Thesis.Income1;
tables income;
run;
proc freq data=Thesis.Income2;
tables income;
run;
proc freq data=Thesis.Group1_copy;
tables Pay;
run;
proc freq data=Thesis.Group2_copy;
tables Pay;
run;
proc freq data=Thesis.Group1_copy;
tables BFINF_FAM_RAW;
run;
proc freq data=Thesis.Group2_copy;
tables BFINF_FAM_RAW;
run;
proc freq data=Thesis.Group1_copy;
tables PAB6HUS;
run;
proc freq data=Thesis.Group2_copy;
tables PAB6HUS;
run;
proc freq data=Thesis.Group1_copy;
tables MM_FEVER;
run;
proc freq data=Thesis.Group2_copy;
tables MM_FEVER;
run;
proc freq data=Thesis.Group1_copy;
tables MM_HBP;
run;
proc freq data=Thesis.Group2_copy;
tables MM_HBP;
run;
proc freq data=Thesis.Group1_copy;
tables BPG_DIAB8;
run;
proc freq data=Thesis.Group2_copy;
tables BPG_DIAB8;
run;
proc freq data=Thesis.Group1_copy;
tables BPG_HBP8;
run;
proc freq data=Thesis.Group2_copy;
tables BPG_HBP8;
run;
proc freq data=Thesis.Group1_copy;
tables BPG_DEPRS8;
run;
proc freq data=Thesis.Group2_copy;
tables BPG_DEPRS8;
run;
proc freq data=Thesis.Group1_copy;
tables HTH_ASMA;
run;
proc freq data=Thesis.Group2_copy;
tables HTH_ASMA;
run;
proc freq data=Thesis.Group1_copy;
tables HTH_THYR;
run;
proc freq data=Thesis.Group2_copy;
tables HTH_THYR;
run;
proc freq data=Thesis.Group1_copy;
tables HTH_PCOS;
run;
proc freq data=Thesis.Group2_copy;
tables HTH_PCOS;
run;
proc freq data=Thesis.Group1_copy;
tables HTH_ANX;
run;
proc freq data=Thesis.Group2_copy;
tables HTH_ANX;
run;
proc logistic data=thesis.income;
  class BFINF_FAM_RAW PAD6HUS PAD_FAM;
  model PP8_NOPNC = BFINF_FAM_RAW PAD6HUS PAD_FAM;
  run;
proc freq data=Thesis.Group1_copy;
tables PAB_FAM;
run;
proc freq data=Thesis.Group2_copy;
tables PAB_FAM;
run;
proc freq data=Thesis.Group1_copy;
tables PAD6HUS;
run;
proc freq data=Thesis.Joshi_2016_2019;
tables HTH_PCOS;
run;
proc freq data=Thesis.Group2_copy;
tables PAD6HUS;
run;
proc freq data=Thesis.Group1_copy;
tables PAD_FAM;
run;
proc freq data=Thesis.Group2_copy;
tables PAD_FAM;
run;
proc freq data=Thesis.Group1_copy;
tables BFINF_DR_RAW;
run;
proc freq data=Thesis.Group2_copy;
tables BFINF_DR_RAW;
run;
proc freq data=Thesis.Group1_copy;
tables BFINF_NUR_RAW;
run;
proc freq data=Thesis.Group2_copy;
tables BFINF_NUR_RAW;
run;
proc freq data=Thesis.Group1_copy;
tables BFINF_SPC_RAW;
run;
proc freq data=Thesis.Group2_copy;
tables BFINF_SPC_RAW;
run;
proc freq data=Thesis.Group1_copy;
tables BFINF_BDR_RAW;
run;
proc freq data=Thesis.Group2_copy;
tables BFINF_BDR_RAW;
run;
proc freq data=Thesis.Group1_copy;
tables MM_DIAB;
run;
proc freq data=Thesis.Group2_copy;
tables MM_DIAB;
run;
proc logistic data= thesis.income;
  class BFINF_FAM_RAW group PAD6HUS PAD_FAM;
  model PP8_NOPNC = BFINF_FAM_RAW*group PAD6HUS*group PAD_FAM*group;
  run;
proc logistic data= thesis.income;
  class BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW BFINF_BDR_RAW;
  model PP8_NOPNC = BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW BFINF_BDR_RAW;
  run;
proc logistic data= thesis.income;
  class BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW BFINF_BDR_RAW group;
  model PP8_NOPNC = BFINF_DR_RAW*group BFINF_NUR_RAW*group BFINF_SPC_RAW*group BFINF_BDR_RAW*group;
  run;
proc logistic data= thesis.income;
  class BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW BFINF_BDR_RAW group;
model PP8_NOPNC = BFINF_DR_RAW*group BFINF_NUR_RAW*group
BFINF_SPC_RAW*group BFINF_BDR_RAW*group;
run;

proc logistic data= thesis.group_polt;
class MAT_AGE_NAPHSIS group MAT_RACE MAT_ED;
model PP8_NOPNC = group*MAT_RACE group*MAT_ED group*MAT_AGE_NAPHSIS;
run;
proc logistic data= thesis.group_polt;
class MAT_AGE_NAPHSIS pol MAT_ED MAT_RACE;
model PP8_NOPNC = pol MAT_AGE_NAPHSIS MAT_RACE MAT_ED;
run;
proc freq data=Thesis.joshi_2016_2019;
tables BABYDEAD;
tables group;
run;
Proc genmod data=Thesis.joshi_2016_2019;
class MAT_ED;
model group = MAT_ED;
lsmeans MAT_ED;
run;
Proc logistic data=Thesis.joshi_2016_2019;
class MAT_ED;
model group = MAT_ED/expb;
run;
proc freq data=Thesis.Group_polt;
tables group*MAT_Ed / RELRISK;
run;
proc freq data=Thesis.joshi_2016_2019;
tables STATE;
tables PRE_VIST;
run;
*** CODES FOR WORD FILE;
*Age;
proc freq data=Thesis.Group1_copy;
tables MAT_AGE_NAPHSIS;
tables group*MAT_AGE_NAPHSIS/nopercent nocol chisq;
run;
data thesis.age_G1;
set data thesis.Group1_Copy;

data Thesis.One;
set Thesis.joshi_2016_2019;
if 1 <= MAT_AGE_NAPHSIS < 4 then AgeCat=1; *Age less than 25;
else if MAT_AGE_NAPHSIS >= 4 then AgeCat=2; *Age greater than 25;
else AgeCat=999; *Missing/Unknown;
run;
Proc freq data=Thesis.One;
where AgeCat ne 999;
tables group*AgeCat/nopercent nocol chisq;
run;

*Education;
proc freq data=Thesis.joshi_2016_2019;
tables MAT_ED;
tables group*MAT_ED/nopercent nocol chisq;
run;
data Thesis.One1;
set Thesis.One;
if 1 <= MAT_ED < 4 then EdCat=1; *Age less than 25;
else if MAT_ED => 4 then EdCat=2; *Age greater than 25;
else if MAT_ED = " " then EdCat=999; *Missing/Unknown;
run;
proc freq data=Thesis.One1;
tables EdCat;
tables group*EdCat/nopercent nocol chisq;
run;

*Race;
Proc freq data=Thesis.joshi_2016_2019;
tables MAT_RACE;
tables group*MAT_RACE/nopercent nocol chisq;
run;

*Maternal Weight Gain;
proc univariate data=Thesis.joshi_2016_2019 normal;
var MOMLBS;
run;
Proc means data=Thesis.joshi_2016_2019 maxdec=3;
var MOMLBS;
run;
proc npar1way data=Thesis.joshi_2016_2019 wilcoxon; * Wilcoxon test;
var MOMLBS;
class group;
run;

*Maternal Height;
proc univariate data=Thesis.joshi_2016_2019 normal;
var MOM_FEET;
run;
Proc means data=Thesis.joshi_2016_2019 maxdec=3;
var MOM_FEET;
run;
proc npar1way data=Thesis.joshi_2016_2019 wilcoxon; * Wilcoxon test;
var MOM_FEET;
class group;
run;

*Method of Payment;
proc univariate data=Thesis.joshi_2016_2019 normal;
var PAY;
run;
Proc means data=Thesis.joshi_2016_2019 maxdec=3;
var PAY;
run;
proc npar1way data=Thesis.joshi_2016_2019 wilcoxon; * Wilcoxon test;
var PAY;
class group;
run;

*Household income;
proc freq data=Thesis.joshi_2016_2019;
tables INCOME8;
tables group*INCOME8/nopercent nocol chisq;
run;

*Dependents on the Income ;
proc univariate data=Thesis.joshi_2016_2019 normal;
var INC_NDEP;
run;
Proc means data=Thesis.joshi_2016_2019 maxdec=3;
var INC_NDEP; run;
proc npar1way data=Thesis.joshi_2016_2019 wilcoxon; * Wilcoxon test;
var INC_NDEP;
class group;
run;

***Logistic Regression;
*Number of healthcare visits before pregnancy;
proc freq data=Thesis.joshi_2016_2019 ;
tables PRE_VIST;
tables group*PRE_VIST / nopercent nocol chisq;
run;
proc logistic data=Thesis.joshi_2016_2019 ;
model group = PRE_VIST / expb;
run;

*Information from the doctor;
proc freq data=Thesis.joshi_2016_2019 ;
tables BFINF_DR_RAW;
tables group*BFINF_DR_RAW / nopercent nocol chisq;
run;
proc logistic data=Thesis.joshi_2016_2019 ;
model group = BFINF_DR_RAW / expb;
run;

*Information from the Nurse;
proc freq data=Thesis.joshi_2016_2019 ;
tables BFINF_NUR_RAW;
tables group*BFINF_NUR_RAW / nopercent nocol chisq;
run;
proc logistic data=Thesis.joshi_2016_2019 ;
model group = BFINF_NUR_RAW / expb;
run;

*Information from breastfeeding/lactation specialist;
proc freq data=Thesis.joshi_2016_2019 ;
tables BFINF_SPC_RAW;
tables group*BFINF_SPC_RAW / nopercent nocol chisq;
run;
proc logistic data=Thesis.joshi_2016_2019 ;
model group = BFINF_SPC_RAW / expb;
run;
*Providers testing mother’s knowledge of baby care;

```sql
proc freq data=Thesis.joshi_2016_2019;
tables BFINF_BDR_RAW;
tables group*BFINF_BDR_RAW / nopercent nocol chisq;
run;
proc logistic data=Thesis.joshi_2016_2019;
model group = BFINF_BDR_RAW / expb;
run;
```

*Information received from family and friends;

```sql
proc freq data=Thesis.joshi_2016_2019;
tables BFINF_FAM_RAW;
tables group*BFINF_FAM_RAW / nopercent nocol chisq;
run;
proc logistic data=Thesis.joshi_2016_2019;
model group = BFINF_FAM_RAW / expb;
run;
```

*Abuse 12 months before pregnancy by husband / Partner.;

```sql
proc freq data=Thesis.joshi_2016_2019;
tables PAB6HUS;
tables group*PAB6HUS / nopercent nocol chisq;
run;
proc logistic data=Thesis.joshi_2016_2019;
model group = PAB6HUS/ expb;
run;
```

*Abuse 12 months before pregnancy by another family member;

```sql
proc freq data=Thesis.joshi_2016_2019;
tables PAB_FAM;
tables group*PAB_FAM / nopercent nocol chisq;
run;
proc logistic data=Thesis.joshi_2016_2019;
model group = PAB_FAM / expb;
run;
```

*Abuse during pregnancy by husband;

```sql
proc freq data=Thesis.joshi_2016_2019;
tables PAD6HUS;
tables group*PAD6HUS / nopercent nocol chisq;
run;
proc logistic data=Thesis.joshi_2016_2019;
model group = PAD6HUS / expb;
run;
```

*Abuse during pregnancy by another family member;

```sql
proc freq data=Thesis.joshi_2016_2019;
tables PAB_FAM;
tables group*PAB_FAM / nopercent nocol chisq;
run;
proc logistic data=Thesis.joshi_2016_2019;
model group = PAB_FAM / expb;
run;
```

*Gestational Morbidities;
*Diabetes;

```sql
proc freq data=Thesis.joshi_2016_2019;
```
**Tables**

```
tables MM_DIAB;
tables group*MM_DIAB/ nopercent nocol chisq;
run;
```

**PROC LOGISTIC**

```
proc logistic data=Thesis.joshi_2016_2019 ;
model group = MM_DIAB / expb;
run;
```

*Fever*

```
proc freq data=Thesis.joshi_2016_2019 ;
tables MM_FEVER;
tables group*MM_FEVER/ nopercent nocol chisq;
run;
```

**PROC LOGISTIC**

```
proc logistic data=Thesis.joshi_2016_2019 ;
model group = MM_FEVER / expb;
run;
```

**Hypertension**

```
proc freq data=Thesis.joshi_2016_2019 ;
tables MM_HBP;
tables group*MM_HBP/ nopercent nocol chisq;
run;
```

**PROC LOGISTIC**

```
proc logistic data=Thesis.joshi_2016_2019 ;
model group = MM_HBP / expb;
run;
```

*Prior Health Condition*

*Diabetes*

```
proc freq data=Thesis.joshi_2016_2019 ;
tables BPG_DIAB8;
tables group*BPG_DIAB8/ nopercent nocol chisq;
run;
```

**PROC LOGISTIC**

```
proc logistic data=Thesis.joshi_2016_2019 ;
model group = BPG_DIAB8 / expb;
run;
```

**Hypertension**

```
proc freq data=Thesis.joshi_2016_2019 ;
tables BPG_HBP8;
tables group*BPG_HBP8/ nopercent nocol chisq;
run;
```

**PROC LOGISTIC**

```
proc logistic data=Thesis.joshi_2016_2019 ;
model group = BPG_HBP8 / expb;
run;
```

*Depression*

```
proc freq data=Thesis.joshi_2016_2019 ;
tables BPG_DEPRS8;
tables group*BPG_DEPRS8/ nopercent nocol chisq;
run;
```

**PROC LOGISTIC**

```
proc logistic data=Thesis.joshi_2016_2019 ;
model group = BPG_DEPRS8 / expb;
run;
```

*Asthma*

```
proc freq data=Thesis.joshi_2016_2019 ;
tables HTH_ASM;A
```
run;
proc logistic data=Thesis.joshi_2016_2019;
model group = HTH_ASMA/ expb;
run;

*Thyroid;
proc freq data=Thesis.joshi_2016_2019;
tables HTH_THYR;
tables group*HTH_THYR/ nopercent nocol chisq;
run;
proc logistic data=Thesis.joshi_2016_2019;
model group = HTH_THYR/ expb;
run;
proc freq data = thesis.Group;
tables group*BFINF_DR_RAW /relrisk;
run;
proc freq data = thesis.Group;
tables group*BFINF_NUR_RAW /relrisk;
run;
proc freq data = thesis.Group;
tables group*BFINF_SPC_RAW /relrisk;
run;
proc freq data = thesis.Group;
tables group*BFINF_BDR_RAW /relrisk;
run;
proc freq data = thesis.Group;
tables group*BFINF_FAM_RAW /relrisk;
run;
proc freq data = thesis.Group;
tables group*PAB6HUS /relrisk;
run;
proc freq data = thesis.Group;
tables group*PAD6HUS /relrisk;
run;
proc freq data = thesis.Group;
tables group*PAD_FAM /relrisk;
run;
proc freq data = thesis.Group;
tables group*MM_HBP /relrisk;
run;
proc freq data = thesis.Group;
tables group*MM_DIAB /relrisk;
run;
proc freq data = thesis.Group;
tables group*MM_Fever /relrisk;
run;
proc freq data = thesis.Group;
tables group*BPG_HBP8 /relrisk;
run;
proc freq data = thesis.Group;
tables group*BPG_DEPRS8 /relrisk;
run;
proc freq data = thesis.Group;
tables group*HTH_ANX /relrisk;
run;
proc freq data = thesis.Group;
tables group*HTH_ASMA /relrisk;
run;
proc freq data = thesis.Group;
tables group*HTH_THYR / relrisk;
run;
proc freq data = thesis.Group;
tables group*HTH_PCOS/ relrisk;
run;
proc freq data = thesis.Group_Polt;
tables group*PNC_VST_NAPHSIS/ relrisk;
run;
proc genmod data = thesis.Group_polt descending;
class group MAT_ED;
model PP8_NOPNC = group*MAT_ED/ dist = binomial link = log;
run;
* PCOS;
proc freq data=Thesis.joshi_2016_2019;
tables HTH_PCOS;
tables group*HTH_PCOS / nopercent nocol chisq;
run;
proc logistic data=Thesis.joshi_2016_2019;
model group = HTH_PCOS/ expb;
run;

* Anxiety;
proc freq data=Thesis.joshi_2016_2019;
tables HTH_ANX;
tables group*HTH_ANX / nopercent nocol chisq;
run;
proc logistic data=Thesis.joshi_2016_2019;
model group = HTH_ANX/ expb;
run;

* Attended PNC;
proc freq data=Thesis.joshi_2016_2019;
tables PP8_NOPNC;
tables group*PP8_NOPNC/ nopercent nocol chisq;
run;
proc logistic data=Thesis.joshi_2016_2019;
model group = PP8_NOPNC/ expb;
run;

* First PNC Visit;
proc freq data=Thesis.joshi_2016_2019;
tables PNC_MTH;
tables group*PNC_MTH/ nopercent nocol chisq;
run;
proc logistic data=Thesis.joshi_2016_2019;
model group = PNC_MTH/ expb;
run;

* Number of Prenatal Care Visits grouped;
proc freq data=Thesis.joshi_2016_2019;
tables PNC_VST_NAPHSIS;
tables group*PNC_VST_NAPHSIS/ nopercent nocol chisq;
run;
proc logistic data=Thesis.joshi_2016_2019;
model group = PNC_VST_NAPHSIS/ expb;
run;
ods rtf close;

****Multivariate analysis;
proc logistic data=Thesis.joshi_2016_2019;
class MAT_AGE_NAPHSIS MAT_ED MAT_RACE MOLMLBS PAY INCOME8 INC_NDEP PRE_VIST
BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW BFINF_BDR_RAW
    _BFINF_FAM_RAW PAB6HUS PAB_FAM PAD6HUS PAD_FAM MM_DIAB
MM_FEVER MM_HBP BPG_DIAB8 BPG_HBP8 BPG_DEPRS8 HTH ASMA HTH_THYR
    _HHT_PCOS HHT_ANX PIB_NOPNC PNC_MTH PNC_VST_NAPHSIS;
model group = MAT_AGE_NAPHSIS MAT_ED MAT_RACE MOLMLBS MOM_FEET PAY INCOME8
INC_NDEP PRE_VIST BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW BFINF_BDR_RAW
    _BFINF_FAM_RAW PAB6HUS PAB_FAM PAD6HUS PAD_FAM MM_DIAB
MM_FEVER MM_HBP BPG_DIAB8 BPG_HBP8 BPG_DEPRS8 HTH ASMA HTH_THYR
    _HHT_PCOS HHT_ANX PIB_NOPNC PNC_MTH PNC_VST_NAPHSIS/
selection=stepwise details lackfit;
Run;

**GLM;*
considered group as independent variable here and checking if other factors
are related to the group (woman's representation) being the independent
factor;
* for example, if maternal age is affected/associated by the women's
representation state or not?;
proc GLM data=Thesis.joshi_2016_2019;
class MAT_AGE_NAPHSIS MAT_ED MAT_RACE /
    param=glm;
model PP8_NOPNC = MAT_AGE_NAPHSIS MAT_ED MAT_RACE/
    link = glogit rsquare;
run;

***********1/25*********** Roshni and Kavita meeting ;

**********1)*
proc logistic data = thesis.group_polt;
class MAT_AGE_NAPHSIS MAT_ED MAT_RACE / param=glm;
model PP8_NOPNC = MAT_AGE_NAPHSIS MAT_ED MAT_RACE/ link = glogit rsquare;
run;

****2)*
proc logistic data = thesis.group_polt;
class MAT_AGE_NAPHSIS MAT_ED MAT_RACE PAY INCOME8 BFINF_DR_RAW BFINF_NUR_RAW
    BFINF_SPC_RAW PAB6HUS PAB_FAM PAD6HUS PAD_FAM/ param=glm;
model PP8_NOPNC = MAT_AGE_NAPHSIS MAT_ED MAT_RACE PAY INCOME8 BFINF_DR_RAW
    BFINF_NUR_RAW BFINF_SPC_RAW PAB6HUS PAB_FAM PAD6HUS PAD_FAM / link = glogit;
run;

****3)*
proc logistic data = thesis.group_polt;
class MAT_AGE_NAPHSIS MAT_ED MAT_RACE PAY INCOME8 BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW PAB6HUS PAB_FAM PAD6HUS PAD_FAM MM_DIAB MM_FEVER MM_HBP BPG_DIAB8 BPG_HBP8 BPG_DEPRS8 HTH_ASMA HTH_THYR HTH_PCOS HTH_ANX / param=glm;
model PP8_NOPNC = MAT_AGE_NAPHSIS MAT_ED MAT_RACE PAY INCOME8 BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW PAB6HUS PAB_FAM PAD6HUS PAD_FAM MM_DIAB MM_FEVER MM_HBP BPG_DIAB8 BPG_HBP8 BPG_DEPRS8 HTH_ASMA HTH_THYR HTH_PCOS HTH_ANX / link = glogit;
run;
proc logistic data = thesis.group_polt;
class PAY INCOME8 BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW PAB6HUS PAB_FAM PAD6HUS PAD_FAM;
model PP8_NOPNC = PAY INCOME8 BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW PAB6HUS PAB_FAM PAD6HUS PAD_FAM;
run;

proc logistic data = thesis.group_polt;
class MAT_AGE_NAPHSIS MAT_ED MAT_RACE PAY INCOME8 BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW PAB6HUS PAB_FAM PAD6HUS PAD_FAM MM_DIAB MM_FEVER MM_HBP BPG_DIAB8 BPG_HBP8 BPG_DEPRS8 HTH_ASMA HTH_THYR HTH_PCOS HTH_ANX Pol /
link = glogit;
run;

proc surveylogistic data = thesis.group_polt nomcar;
strata sud_nest;
weight wtanal;
class / param=glm;
model group = / link = glogit;
run;

proc surveylogistic data = thesis.group_polt nomcar;
strata sud_nest;
weight wtanal;
class MAT_AGE_NAPHSIS MAT_ED MAT_RACE group;
model PP8_NOPNC = MAT_AGE_NAPHSIS MAT_ED MAT_RACE / rsquare;
run;

proc surveylogistic data = thesis.group_polt nomcar;
strata sud_nest;
weight wtanal;
class MAT_AGE_NAPHSIS MAT_ED MAT_RACE PAY INCOME8 BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW BFINF_FAM_RAW PAD6HUS PAD_FAM;
model PP8_NOPNC = MAT_AGE_NAPHSIS MAT_ED MAT_RACE PAY INCOME8 BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW BFINF_FAM_RAW PAD6HUS PAD_FAM / rsquare;
run;

proc surveylogistic data = thesis.group_polt nomcar;
strata sud_nest;
weight wtanal;
class MAT_AGE_NAPHSIS MAT_ED MAT_RACE PAY_INCOME8 BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW BFINF_FAM_RAW PAD6HUS PAD_FAM MM_DIAB MM_FEVER MM_HBP BPG_DIAB8 BPG_HBP8 BPG_DEPRS8 HTH_ASMA HTH_THYR HTH_PCOS HTH_ANX;
model PP8_NOPNC = MAT_AGE_NAPHSIS MAT_ED MAT_RACE PAY_INCOME8 BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW BFINF_FAM_RAW PAD6HUS PAD_FAM MM_DIAB MM_FEVER MM_HBP BPG_DIAB8 BPG_HBP8 BPG_DEPRS8 HTH_ASMA HTH_THYR HTH_PCOS HTH_ANX / rsquare;
run;

proc surveylogistic data = thesis.group_polt nomcar;
strata sud_nest;
weight wtanal;
class MAT_AGE_NAPHSIS MAT_ED MAT_RACE PAY_INCOME8 BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW BFINF_FAM_RAW PAD6HUS PAD_FAM MM_DIAB MM_FEVER MM_HBP BPG_DIAB8 BPG_HBP8 BPG_DEPRS8 HTH_ASMA HTH_THYR HTH_PCOS HTH_ANX pol PNC_VST_NAPHSIS;
model PP8_NOPNC = MAT_AGE_NAPHSIS MAT_ED MAT_RACE PAY_INCOME8 BFINF_DR_RAW BFINF_NUR_RAW BFINF_SPC_RAW BFINF_FAM_RAW PAD6HUS PAD_FAM MM_DIAB MM_FEVER MM_HBP BPG_DIAB8 BPG_HBP8 BPG_DEPRS8 HTH_ASMA HTH_THYR HTH_PCOS HTH_ANX pol PNC_VST_NAPHSIS / rsquare;
run;